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

(11) **EP 3 608 474 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
30.11.2022 Bulletin 2022/48

(21) Application number: **19190202.2**

(22) Date of filing: **06.08.2019**

(51) International Patent Classification (IPC):
E01C 13/08 *(2006.01)* ***A63C 19/06*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E01C 13/08; A63C 19/065

(54) **ARTIFICIAL TURF**

KUNSTRASEN

GAZON ARTIFICIEL

(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

(30) Priority: **06.08.2018 FI 20185674**

(43) Date of publication of application:
12.02.2020 Bulletin 2020/07

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Description

TECHNICAL FIELD

[0001] The current disclosure relates to artificial turf, to a method of manufacture of artificial turf, and to a use thereof.

BACKGROUND

[0002] Field sports, such as football, are increasingly played on artificial turf surface. The artificial surface aims at reproducing the playing properties of natural grass, but simultaneously being more weather and wear resistant, as well as easy to maintain. Artificial turf systems generally contain a support layer, a large number of artificial grass fibers attached to the backing, and possibly an infill layer of granular material distributed on the backing between the grass fibers. The artificial grass fibers, which can be tufted or knitted to the backing or cowoven therewith, protrude substantially perpendicularly to the backing.

[0003] Line markings on an artificial turf field are oftentimes permanently produced. A single field may be used by various sports, and also the same sport may be played on alternative field sizes. For example, a full-size adult football field may additionally contain two junior fields that are positioned side-by-side crossways on the adult field. The field may thus contain more than one set of markings, in which case the different fields may be marked with different colors.

[0004] The clarity of line markings is important for the ability of the spectators to appropriately follow the game. In stadiums, the spectators view the field from various angles, depending on the height at which they are seated. This angle affects the visibility of the line markings. The viewing experience is different when the games are broadcasted through television and internet, which also affects the properties required from the line markings.

[0005] As an example, document AU-A-2014100372 discloses a mat of artificial grass including a plurality of tufts of fibres secured to a substrate.

SUMMARY

[0006] The artificial turf for a sports field according to the current disclosure comprises a support layer and tufts formed by a multi-filament ribbon penetrating the support layer and forming tufts. At least some tufts comprise filaments of a first color and filaments of a second color, the first and the second color being obviously different. The tufts comprising filaments of a first color and filaments of a second color are arranged to form a line of predetermined width, wherein the width of the line is 8 cm to 14 cm, for example 10 cm to 12 cm.

[0007] The method of manufacturing artificial turf according to the present disclosure comprises providing a support layer and at least one multi-filament ribbon for forming tufts, the at least one ribbon comprising filaments of a first color and filaments of a second color, the first and the second color being obviously different. The method further comprises tufting the at least one ribbon into to the support layer to obtain a tufted artificial turf. The ribbon comprising filaments of a first color and filaments of a second color is tufted to form a line of a pre-determined width, wherein the width of the line is 8 cm to 14 cm, for example 10 cm to 12 cm.

[0008] A sports field according to the present disclosure comprises line markings made of artificial turf according to any of claims 1 to 7.

[0009] Use of the artificial turf according to the current disclosure for making line markings on a sports field, for example in a football field, is also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying drawings, which are included to provide a further understanding of the current disclosure and constitute a part of this specification, illustrate embodiments of the disclosure and together with the description help to explain the principles of the current disclosure. In the drawings:

Fig. 1 is a schematic illustration of a portion of an embodiment of the artificial turf from the side,
Fig. 2 is a schematic illustration of a detail of Fig. 1, and
Fig. 3 is a schematic illustration of an embodiment of the artificial turf from below.
Fig. 4, panels A to D, is a schematic presentation of some exemplary embodiments of the artificial turf according to the present disclosure.
Fig. 5, panels A to C, is a photograph of an embodiment of the artificial turf according to the present disclosure.

DETAILED DESCRIPTION

[0011] In one aspect, artificial turf for a sports field is disclosed. The artificial turf comprises a support layer and tufts formed by a multi-filament ribbon penetrating the support layer and is characterized in that at least some tufts comprise filaments of a first color and filaments of a second color.

[0012] In another aspect, a method of manufacturing artificial turf is disclosed. The method comprises providing a support layer and at least one multi-filament ribbon for forming tufts, the at least one ribbon comprising filaments of a first color and filaments of a second color; and tufting the at least one ribbon into to the support layer to obtain a tufted artificial turf.

[0013] The artificial turf according to the current disclosure is meant for practicing sports. Many different sports, most notably football (both association football and American football) and rugby may be played on artificial turf surface. High quality requirements are posed on the surface, especially in professional-level games. The surface should be wearresistant and retain its original properties sufficiently over extended use. For example, the piles forming the "grass blades" should not be easily released, and the color of the field should remain relatively unaltered, despite being exposed to sunshine and other weather conditions. Certain demands are also made on the glare of the surface to avoid unpleasant reflections or inaccurate reproduction of the game in television or internet.

[0014] A tufted artificial turf is generally produced by providing a support layer, which may be, for example a mesh, a woven fabric or other net structure. Suitable materials for the support layer are known in the art. Then, a ribbon comprising multiple filaments is repeatedly stitched through the support layer to form a row of loops. The length of a stich in a tufted artificial turf typically varies between 0.5 and 3 centimeters. The selection of a suitable stich length may be selected by the skilled person for each application. The ribbon is typically made of synthetic material, such as plastics, for example polyethylene.

[0015] The multi-filament ribbons used for producing the artificial turf according to the present disclosure may contain a variable number of filaments. There may be, for example 6 to 12 filaments in the ribbon, for example 8 or 10 filaments. In one embodiment of the artificial turf, each ribbon contains six filaments, or eight filaments, or ten filaments. Accordingly, each tuft comprises twice the number of piles as the ribbon.

[0016] The ribbon is cut to open up each loop, resulting in a multiplicity of ribbon ends extending from the support layer and forming piles. Each filament in the ribbon forms a pile (i.e. "a grass blade") in the artificial turf. When a multi-filament ribbon is used, the cut loop forms one tuft, each having a number of free filament ends (piles) corresponding to the number of filaments contained in two ribbons. All the filaments in the tuft have a common penetration point in the support layer, i.e. the point at which the ribbon went through the support layer. All the piles in the artificial turf are thus of the same length. Although slight variation in length is inherent due to cutting accuracy, all the piles are exhibited as the surface of the artificial turf.

[0017] The side with the tufts forms the playing surface. In other words, the surface from which the piles extend is positioned upwards in the installed artificial turf field. Therefore, for the purposes of the current disclosure, the surface from which the ribbon ends (i.e piles) extend, is called the upper surface.

[0018] Finally, the support layer may be backed by a rubber- and/or plastic-based coating on the opposite side of the support layer from the tufts. This secures the piles in the support layer. Also the thickness and flexibility of the ready product may be adjusted through backing. The backed surface faces downwards in a ready artificial turf field. It is therefore called the lower surface in this disclosure.

[0019] The artificial turf may be produced as a carpet having a width of several meters (for example four meters), having numerous rows stitched of loops running next to each other in the direction of turf production. The distance between neighboring rows of stitches may be, for example 0.5 to 3 cm, for example 1, 1.5 cm or 2 cm. Thus, also the tufts run in rows having constant distance.

[0020] When in use, the artificial turf surface may be supplemented with infill material, such as rubber pieces and/or sand. The infill material affects the elasticity of the playing surface, and may also take part in keeping the piles upright. Artificial turf fields with and without the infill material are known.

[0021] In the current artificial turf, at least some tufts comprise filaments of a first color and filaments of a second color. This means that there are at least some tufts in the artificial turf that comprise filaments of two colors. This allows the formation of visually identifiable areas in the artificial turf if some tufts have only filaments of one color, whereas some tufts have filaments of two colors. One of the two colors in the tufts may be the same as the color of the tufts comprising only one color. In other words, there may be areas in which there are only tufts with filaments of a first color, whereas in some areas there are tufts with filaments of the first color and a second color.

[0022] As the line-marking colors are often bright colors, such as white, glare produced by an all-white surface may produce unwanted glare in bright light. Especially in situation in which an object followed in the game, such as the football, which often contains white areas itself, is close to the line, the visibility of details could be reduced.

[0023] Due to the manufacturing method, the visually identifiable areas may be formed as lines in the direction of stitching. According to the invention, the tufts comprising filaments of a first color and filaments of a second color are

arranged to form a line of predetermined width. According to the invention, the ribbon comprising filaments of a first color and filaments of a second color is tufted to form a line of a pre-determined width. There may be one line of a predetermined with, or there may be three or more lines of predetermined width in a carpet of artificial turf.

[0024] The width of the line depends of how many parallel rows of tufts contain a given color or a combination of two colors. The artificial turf may contain one or more lines containing ribbons having filaments of two colors. For example, in artificial turf produced as a 4-meter wide carpet, there may be one line in which the ribbons comprise filaments of a first color and filaments of a second color, while the rest of the carpet has only filaments of the first color. Alternatively, the carpet may contain two or three such lines.

[0025] The lines formed on the artificial turf may be used as permanent line markings of a sports field. By line markings is herein meant the visually identifiable markings that are required on the field for a given sport to be practiced. Examples of line markings are the goal lines, touchlines, center ring, the penalty box and center and penalty spots of a football field. Line markings may be straight or curved.

[0026] Especially, in association football, the goal line and the centerline may be made by using the lines on the artificial turf. Making the line markings on a field is very time-consuming. Thus, if even a part of them are integrated into the turf beforehand, significant monetary saving may be achieved. The width of the at least one line can be, for example 8 cm, 10 cm or 12 cm or 14 cm. According to the invention, the width of a line is 8 cm to 14 cm, for example 10 cm to 12 cm. Different sports, as well as different organizations may have different requirements for the line width. Due to the manufacturing method, the width of the line may be selected as basically any multiple of the distance between neighboring rows of stitches.

[0027] The first color may be, for example, green, white, blue or yellow. The second color may be, for example, green, white, blue or yellow. In one embodiment of the artificial turf, the first color is green and the second color is white, or yellow, or blue or red.

[0028] In one embodiment of the artificial turf, the first color is a field color, and the second color is a line-marking color. By a field color is meant the color of the playing field. The field color may be green. The field color may alternatively be blue. Also other colors, such as red, may be used as field color. In some embodiments, a logo, decorative pattern or other ornament not directly related to the sports being played on the field may be located in the vicinity of the playing area. In such situations, it may be desired to repeat the line-marking color also in the ornamental patterns. For such embodiments, the color of the ornament may function similarly to the field color. By a line-marking color is meant the color of the line markings. The line-marking color may be white. The line-marking color may alternatively be yellow or blue or red.

[0029] White, blue, yellow and red filaments, that are commonly used in line-marking, are more sensitive to UV radiation than green filaments. Therefore, they are commonly treated with larger amounts of UV protectants than green filaments. This may be necessary to achieve appropriate UV tolerance of color and/or structure of the filaments. Larger chemical use adds to the cost of the field. It may also increase the chemical load of the manufacturing process. When filaments of line-marking colors are mixed with green ones, the manufacturing cost of the artificial turf may be reduced. It is also possible that the UV tolerance is increased, as the fading of the line-marking color may be less clearly visible. Also the mixing of the white, blue, yellow and/or red filaments with darker ones may as such contribute to the improvement in UV tolerance.

[0030] A color in the meaning of the current disclosure should be understood as a general color containing various shades. In other words, a color contains a range of wavelengths interpreted by a viewer as being green, white, yellow or blue, for example. Especially green color may include shades such as "pine green", "field green" or "olive green".

[0031] In one embodiment of the artificial turf, the first color comprises two shades of the color. In the art of artificial turf, a field color may be created by mixing two shades of the desired color (typically green) to achieve a natural-looking result. Even three shades of a given color may be included in a field color. Since it is the meaning of lines to be readily discernible from the surrounding field, the skilled person uses colors that are obviously different as the field color and line-marking color. Therefore, the mixture of different shades of a color can be considered being one color.

[0032] An artificial turf carpet can be positioned so that a side line of the field is formed entirely of a line in the carpet. If two such carpets are appropriately positioned, both the side lines of a field may be marked through the lines in the artificial turf carpet.

[0033] It is possible to produce artificial turf in which all the ribbons comprise filaments of a first color and filaments of a second color. Also in this case, the first color may be a field color, and the second color may be a line-marking color. In one embodiment of the artificial turf, all the ribbons comprise filaments of the first color and of the second color to form a line marking on a sports field.

[0034] The field color, such as green, matches the color of a separately produced carpet that is used for the majority of the playing field. A carpet composed of only tufts having filaments of two colors can be cut to strips of desired width. The desired width may be, for example, 5 to 15 cm, such as 7, 10 or 12 cm. The strips are preferably cut in the direction of the stiches. The strips may be used as line markings. This is effected by removing parts corresponding to the line markings from an otherwise ready-installed artificial turf field, and inserting the strips containing the two colors in the

freed space as line markings. With this system, all line markings of a sports field can be produced. When curved lines are produced, typically line marking strips are used and they are bent appropriately to produce the desired line curvature. Alternatively, curved pieces of a carpet can be cut for fitting into the desired position.

[0035] In another aspect, line marking strip is disclosed. The line-marking strip is characterized in that it comprises the artificial turf according to the present disclosure. In addition to the artificial turf structure described above, the line-marking strip may comprise additional components meant to adhere the strip to the surface of the field. Alternatively, the strip may be attached to the field may be attached by a layer of adhesive on-site.

[0036] It is also possible to produce an artificial turf carpet in which only a portion of the tufts comprises filaments of a first color and filaments of a second color, but the single-colored and two-colored tufts are not separated spatially. For example, every other parallel row of stiches could have a single color, and every other row two colors. This could be especially suitable if the rows of stiches are close to each other. Such an artificial turf could be used as the previous embodiment, in which all the tufts contain two colors. Thus, the first color may be a field color and the second color may be a line-marking color. Strips of the artificial turf may be cut out and used as the line markings.

[0037] In the artificial turf according to the current disclosure, the ratio of the filaments of a first color to the filaments of the second color is typically constant, since all the line markings on a field should have similar intensity and/or contrast to surrounding areas. However, it may be possible to produce artificial turf having two color combinations.

[0038] As the line markings have a small area compared to the rest of the sports field, the consumption of the two-color artificial turf is correspondingly smaller than the consumption of the field-colored turf. Thus, in some applications, it may be beneficial to produce two or more color combinations simultaneously. For example, a part of the carpet being produced may have tufts having green and white filaments, a part having green and blue filaments, and a part having green and yellow filaments. Alternatively, there may be different combinations of green and white in one carpet. In such cases, the shade of the green and/or white may vary, or the ratio of white and green filaments may vary.

[0039] As the tufts are produced by stitching, the different color combinations are produced as segments along the length of the produced carpet.

[0040] The visual effect of the area in which the tufts comprise filaments of two colors depends on the ratio of the filaments of a first color to the filaments of the second color. For example, is the second color is white, the area containing the ribbons with white filaments appears the brighter and whiter the larger the proportion of white filaments to the filaments of the first color is. Also the contrast between the area of the artificial turf in which the tufts comprise filaments of two colors to the area comprising only filaments of one color may increase the larger the proportion of the filaments of differing color is in the two-colored tufts. For example, when a field color and a line-marking color are used, the contrast to between the playing field and the line markings is increased when the proportion of the filaments of the line-marking color is increased.

[0041] In one embodiment of the artificial turf, two of the filaments are of the second color, or four of the filaments are of the second color, or six of the filaments are of the second color, or eight of the filaments are of the second color, with the proviso that the ribbon comprises at least one filament of the first color. If a field color and a line-marking color are used, this means that two of the filaments may of the line-marking color, or four of the filaments may be of the line-marking color, or six of the filaments may be of the line-marking color, or eight of the filaments may be of the line-marking color, as long as the ribbon comprises at least one filament of the field color.

[0042] In most embodiments, at least 50 % of the filaments are of the line-marking color. In one embodiment of the artificial turf, 50% to 85% of the filaments in a ribbon are of the second color. For example, six of twelve filaments, or six of ten filaments may be of the line-marking color. Alternatively, eight of ten filaments, or eight of twelve filaments may be of the line-marking color. The rest of the filaments may be of the field color. In an embodiment, the ribbon comprises ten filaments, four of which are of the field color, and six of which are of the line-marking color.

[0043] However, in some embodiments, a smaller proportion of the filaments may be of the second color. This may be the case, for example, when the second color is a line-marking color, and the lines to be produced are secondary lines on the sports field.

[0044] Possible combinations of the number of field-color filaments and line-marking color filaments in a multi-filament ribbon are indicated in table 1. The cross indicates a possible combinations of field-color filaments and line-marking color filaments in the artificial turf according to the present disclosure.

number of line color	number of field color filaments										
	1	2	3	4	5	6	7	8	9	10	11
1					×	×	×	×	×	×	×
2				×	×	×	×	×	×	×	
3			×	×	×	×	×	×	×		
4		×	×	×	×	×	×	×			
5	×	×	×	×	×	×	×	×			
6	×	×	×	×	×	×					
7	×	×	×	×	×						
8	×	×	×	×							
9	×	×	×								
10	×	×									
11	×										

Table 1: Combinations of field color filaments and line color filaments in a ribbon.

[0045] In another aspect, a sports field is disclosed. The sports field is characterized in that it comprises line markings made of artificial turf according to the current disclosure. The line markings may be formed during the manufacture of the artificial turf, when lines are stitched in the artificial turf. Alternatively or in addition, line markings may be made during or after the installation of the artificial turf by replacing some of the field-colored turf with the turf according to the present disclosure.

[0046] By a sports field is herein meant the surface on which sports is practiced and the additional structures necessary for its functionality, such as the foundation and possible drainage systems.

[0047] In one embodiment of the sports field, the sports field is a football field.

[0048] In yet another aspect, use of the artificial turf according to the current disclosure for making line markings on a sports field, for example in a football field is disclosed.

[0049] The embodiments described hereinbefore may be used in any combination with each other. Several of the embodiments may be combined together to form a further embodiment. Artificial turf, a method of manufacturing artificial turf, as well as the use of the artificial turf, to which the disclosure is related, may comprise at least one of the embodiments described hereinbefore.

[0050] Reference will now be made in detail to the embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings.

[0051] Some embodiments are disclosed below in such a detail that a person skilled in the art is able to utilize the object of the disclosure. Not all features of the embodiments are discussed in detail, as many of them will be obvious for the person skilled in the art based on this specification.

[0052] Item numbers will be maintained in the following exemplary embodiments in the case of repeating components. The thickness of the ribbon and filaments, the length of the tufts or the thickness of the support layer or other features in the figures are not drawn to scale for clarity.

[0053] Figure 1 is a schematic illustration of a portion of the artificial turf from the side. A portion of a row of stitches is shown. The artificial turf comprises a support layer 1. A multi-filament ribbon 2 is stitched in the support layer. The ribbon 2 comprises filaments of first color (dashed line) and filaments of second color (solid line). All the filaments extend from the support layer substantially the same distance. In other words, all the piles in the artificial turf have the same length. The ribbon penetrates the support layer 1 at several penetration points 3. On the upper side, the ribbon forms tufts 4. One of the tufts 4 is boxed with a dashed line for visualization. The length of the filament ends forming the tufts is approximately constant.

[0054] The material of the ribbon affects how the tufts extend from the support layer, and this has not been indicated in the drawing.

[0055] Figure 2 is a detail of the embodiment of artificial turf of figure 1. In Figure 2, the multi-filament ribbon 2 running from the upper surface to the lower surface of the artificial turf, and back again is shown. The ribbon comprises two filaments of the first color and four filaments of the second color. The first color may be a field color, such as green, and the second color may be a line-marking color, such as white.

[0056] Figure 3 is a schematic presentation of an embodiment according to the current disclosure from the direction of the lower surface. Four rows of stitches running parallel to each other are shown. The multi-filament ribbon 2 penetrates the support layer 1 (grey background) at penetration points 3 and forms tufts on the upper surface of the artificial turf (not visible in this viewing direction). On the lower surface, backing known in the art may be provided.

[0057] Figure 4, panels A to D, displays the organization of areas containing variable ribbon colors schematically. Individual rows of stitches are not visible, but the vertical hatching depicts the various colors and color combinations. In fig. 4, the artificial turf is produced as a carpet 5. The direction in which the carpet 5 extends from a tufting machine 6 is depicted with a vertical arrow. The wavy end of the carpet 5 indicates that the end of the carpet is not drawn in the figure.

[0058] In the embodiment of panel A, the whole area of the carpet comprises ribbons containing filaments of first color and filaments of second color. The color of the carpet is thus uniform. The carpet may be cut into strips of suitable length and used to form line markings on a sports field. Thus, the overall color of the artificial turf may be line-marking color, although the tufts comprise filaments of field color as well.

[0059] In the embodiment of panel B, the carpet 5 of artificial turf comprises one line containing filaments of first color and filaments of second color (dashed lines). The rest of the carpet comprises filaments of first color only (solid line). The first color may be field color, for example green, while the second color may be a line-marking color, such as white. Any other line-marking color, such as blue, red or yellow, may be produced similarly. The line width depends on the purpose for which the artificial turf is being produced. The width of the line may be selected according to the rules of the sport in question. For example the line width may be 10 cm. The position of the line may be selected so that the line may function as a marking line of a sports field. For example, the line may be at the very side of the carpet being produced, or, as depicted in panel 4B, at a distance from the side of the carpet. The line may be produced in the middle of the carpet.

[0060] In the embodiment of panel C, two different color combinations are produced. The dashed hatching indicates a first combination of filaments of a first color and filaments of a second color. The solid hatching indicates a second combination of filaments of a first color and filaments of the second color. The first and second combination may differ from each other through the selection of colors. The first and second combination may differ from each other alternatively through the ratio of first and second colors.

[0061] For example the dashed area may have a combination of six filaments of line-marking color to four filaments of field color. The line-marking color may be white, and the field color may be green. The solid area in panel C may have the same colors as the dashed area in a combination of eight filaments of a line-marking color to two filaments of a field color. Alternatively, the solid area in panel C could have the same ratio of line-marking color to field color (six and four), but the line-marking color may be yellow.

[0062] The embodiment of panel D is similar to that of panel C, except three color combinations are produced simultaneously. The color combinations and the ratio of filaments of a first color to filaments of a second color may be independently selected in each of the three segments. For example, the tightly dashed area on the left in panel D may be a combination of six filaments of a line-marking color to four filaments of field color, while the segment with solid dash may have a combination of eight filaments of a line-marking color to two filaments of field color. The right-most segment in panel D with the loose hatching may comprise either of the previous ratios of a line-marking color and a field color, but the line-marking color may be different than in the other two segments.

[0063] Alternatively, each of the segments could have the same ratio of a line-marking color to a field color, for example six to six, eight to four or ten to two, but in each segment, a different line-marking color (for example white, yellow and blue) could be used.

[0064] Figure 5, panels A to C, depicts an embodiment of the artificial turf according to the current disclosure. The support layer 1, as well as filaments of first color 21 and filaments of second color 22 are depicted in the figure. In the embodiment of figure 5, each ribbon contains four filaments of the first color (the filed color, green) and six filaments of the second color (the line-marking color, white).

[0065] In panel A, an overview of a patch of the artificial turf according to the current disclosure is depicted. A line comprising filaments of the first color an filaments of the second color is visible on the foreground of panel A. At the background, an area of filaments of only the first color, i.e. the field color, is visible. The piles of the tufts are of the same length throughout.

[0066] Panel B is a close-up photo of the artificial turf of panel A from one side. The line comprising filaments of both colors is depicted. A tuft 4 emerging from one penetration point is indicated with an arrow.

[0067] In panel C, the artificial turf is shown from above, displaying the clear contrast between the field-colored area (top part of the panel), and the line containing line-marking color (bottom part of the panel).

[0068] It is obvious to a person skilled in the art that with the advancement of technology, the basic idea of the invention may be implemented in various ways. The invention and its embodiments are thus not limited to the examples described

above; instead they may vary within the scope of the claims.

Claims

1. Artificial turf for a sports field comprising a support layer (1) and tufts (4) formed by a multi-filament ribbon (2) penetrating the support layer (1), wherein at least some tufts (4) comprise filaments of a first color (21) and filaments of a second color (22), wherein the first color (21) is a field color, and the second color (22) is a line-marking color, the first and the second color being obviously different; **characterized in that** the tufts (4) comprising filaments of a first color (21) and filaments of a second color (22) are arranged to form a line of predetermined width, wherein the width of the line is 8 cm to 14 cm, preferably 10 cm to 12 cm.

2. Artificial turf according to claim 1, wherein each tuft (4) contains six filaments, or eight filaments, or ten filaments.

3. Artificial turf according to any of the preceding claims, wherein two of the filaments are of the second color (22), or wherein four of the filaments are of the second color (22), or wherein six of the filaments are of the second color (22), or wherein eight of the filaments are of the second color (22), with the proviso that the tuft comprises at least one filament of the first color (21).

4. Artificial turf according any of the preceding claims, wherein 50% to 85% of the filaments in a tuft (4) are of the second color (22).

5. Artificial turf according any of the preceding claims, wherein the first color (21) is green and the second color (22) is white, or yellow, or blue or red.

6. Artificial turf according any of the preceding claims, wherein the first color (21) comprises two shades of the color.

7. Artificial turf according to any of the preceding claims, wherein all the tufts (4) comprise filaments of the first color (21) and of the second color (22) to form a line marking on a sports field.

8. Method of manufacturing artificial turf, the method comprising

   - providing a support layer (1) and at least one multi-filament ribbon (2), the at least one ribbon (2) comprising filaments of a first color (21) and filaments of a second color (22); wherein the first color (21) is a field color and the second color (22) is a line-marking color, the first and the second color being obviously different; and
   tufting the at least one ribbon (2) into to the support layer (1) to obtain a tufted artificial turf;
   characterized in that the ribbon (2) comprising filaments of a first color (21) and filaments of a second color (22) is tufted to form a line of a pre-determined width, wherein the width of the line is 8 cm to 14 cm, preferably 10 cm to 12 cm.

9. Line-marking strip, **characterized in that** the line marking strip comprises the artificial turf according to any of claims 1 to 7.

10. A sports field, **characterized in that** it comprises line markings made of artificial turf according to any of claims 1 to 7.

11. The sports field according to claim 10, wherein 50% to 85% of the filaments in a tuft (4) are of the second color (22).

12. The sports field according to claim 10 or 11, wherein the first color (21) comprises two shades of the color.

13. The sports field according to any of claims 10 to 12, wherein the sports field is a football field.

14. Use of the artificial turf according to any of claims 1 to 7 for making line markings on a sports field, for example on a football field.

Patentansprüche

1. Kunstrasen für ein Sportfeld, umfassend eine Stützschicht (1) und Büschel (4), welche durch ein Multifilamentband

(2) gebildet werden, das die Stützschicht (1) durchdringt, wobei mindestens manche Büschel (4) Filamente einer ersten Farbe (21) und Filamente einer zweiten Farbe (22) umfassen, wobei die erste Farbe (21) eine Feldfarbe ist, und die zweite Farbe (22) eine Linienmarkierungsfarbe ist, wobei die erste. und die zweite Farbe offensichtlich unterschiedlich sind;
dadurch gekennzeichnet, dass die Büschel (4), welche Filamente einer ersten Farbe (21) und Filamente einer zweiten Farbe (22) umfassen, angeordnet sind, um eine Linie von vorgegebener Breite zu bilden, wobei die Breite der Linie 8 cm bis 14 cm beträgt, vorzugsweise 10 cm bis 12 cm.

2. Kunstrasen nach Anspruch 1, wobei jedes Büschel (4) sechs Filamente, oder acht Filamente, oder zehn Filamente enthält.

3. Kunstrasen nach einem der vorangehenden Ansprüche, wobei zwei der Filamente von der zweiten Farbe (22) sind, oder wobei vier der Filamente von der zweiten Farbe (22) sind, oder wobei sechs der Filamente von der zweiten Farbe (22) sind, oder wobei acht der Filamente von der zweiten Farbe (22) sind, unter der Voraussetzung dass das Büschel mindestens ein Filament der ersten Farbe (21) umfasst.

4. Kunstrasen nach einem der vorangehenden Ansprüche, wobei 50% bis 85% der Filamente in einem Büschel (4) von der zweiten Farbe (22) sind.

5. Kunstrasen nach einem der vorangehenden Ansprüche, wobei die erste Farbe (21) grün ist und die zweite Farbe (22) weiß ist, oder gelb, oder blau, oder rot.

6. Kunstrasen nach einem der vorangehenden Ansprüche, wobei die erste Farbe (21) zwei Schattierungen der Farbe umfasst.

7. Kunstrasen nach einem der vorangehenden Ansprüche, wobei alle der Büschel (4) Filamente der erste Farbe (21) und der zweiten Farbe (22) umfassen um eine Linienmarkierung auf einem Sportfeld zu bilden.

8. Verfahren der Herstellung eines Kunstrasen, das Verfahren umfassend

- Bereitstellen einer Stützschicht (1) und mindestens eines Multifilamentbandes (2), wobei das mindestens eine Band (2) Filamente einer ersten Farbe (21) und Filamente einer zweiten Farbe (22) umfasst; wobei die erste Farbe (21) eine Feldfarbe und die zweite Farbe (22) eine Linienmarkierungsfarbe ist, wobei die erste und zweite Farbe offensichtlich verschieden sind; und
Tuften des mindestens einen Bandes (2) in die Stützschicht (1) um einen getufteten Kunstrasen zu erhalten;
dadurch gekennzeichnet, dass das Band (2), welches Filamente einer ersten Farbe (21) und Filamente einer zweiten Farbe (22) umfasst, getuftet ist um eine Linie mit einer vorbestimmten Breite zu bilden, wobei die Breite der Linie 8 cm bis 14 cm, vorzugsweise 10 cm bis 12 cm, beträgt.

9. Linienmarkierungsstreifen, **dadurch gekennzeichnet, dass** der Linienmarkierungsstreifen den Kunstrasen nach einem der Ansprüche 1 bis 7 umfasst.

10. Ein Sportfeld, **dadurch gekennzeichnet, dass** es Linienmarkierungen umfasst, die aus Kunstrasen gemacht sind, nach einem der Ansprüche 1 bis 7.

11. Das Sportfeld nach Anspruch 10, wobei 50% bis 85% der Filamente in einem Büschel (4) von der zweiten Farbe (22) sind.

12. Das Sportfeld nach Anspruch 10 oder 11, wobei die erste Farbe (21) zwei Schattierungen der Farbe umfasst.

13. Das Sportfeld nach einem der Ansprüche 10 bis 12, wobei das Sportfeld ein Fußballfeld ist.

14. Verwendung des Kunstrasen nach einem der Ansprüche 1 bis 7 um Linienmarkierungen auf einem Sportfeld, zum Beispiel auf einem Fußballfeld, zu machen.

Revendications

1. Gazon synthétique pour un terrain de sports, comprenant une couche de support (1) et des touffes (4) formées par un ruban à filaments multiples (2) qui pénètre dans la couche de support (1), dans lequel au moins certaines touffes (4) comprennent des filaments d'une première couleur (21) et des filaments d'une seconde couleur (22), dans lequel la première couleur (21) est une couleur de terrain, et la seconde couleur (22) est une couleur de ligne de marquage, les première et seconde couleurs étant évidemment différentes ;
caractérisé en ce que les touffes (4) comprenant des filaments d'une première couleur (21) et des filaments d'une seconde couleur (22) sont agencées pour former une ligne d'une largeur prédéterminée, dans lequel la largeur de la ligne est comprise entre 8 cm et 14 cm, de préférence entre 10 cm et 12 cm.

2. Gazon synthétique selon la revendication 1, dans lequel chaque touffe (4) contient six filaments, ou huit filaments, ou dix filaments.

3. Gazon synthétique selon l'une quelconque des revendications précédentes, dans lequel deux des filaments sont de la seconde couleur (22), ou dans lequel quatre des filaments sont de la seconde couleur (22), ou dans lequel six des filaments sont de la seconde couleur (22), ou dans lequel huit des filaments sont de la seconde couleur (22), sous réserve que la touffe comprenne au moins un filament de la première couleur (21).

4. Gazon synthétique selon l'une quelconque des revendications précédentes, dans lequel entre 50 % et 85 % des filaments dans une touffe (4) sont de la seconde couleur (22).

5. Gazon synthétique selon l'une quelconque des revendications précédentes, dans lequel la première couleur (21) est le vert, et la seconde couleur (22) est le blanc, ou le jaune, ou le bleu ou le rouge.

6. Gazon synthétique selon l'une quelconque des revendications précédentes, dans lequel la première couleur (21) comprend deux nuances de la couleur.

7. Gazon synthétique selon l'une quelconque des revendications précédentes, dans lequel toutes les touffes (4) comprennent des filaments de la première couleur (21) et de la seconde couleur (22) pour former une ligne de marquage sur un terrain de sports.

8. Procédé de fabrication d'un gazon synthétique, le procédé comprenant les étapes suivantes

   - fournir une couche de support (1) et au moins un ruban à filaments multiples (2), l'un au moins des rubans (2) comprenant des filaments d'une première couleur (21) et des filaments d'une seconde couleur (22) ; dans lequel la première couleur (21) est une couleur de terrain et la seconde couleur (22) est une couleur de ligne de marquage, les première et seconde couleurs étant évidemment différentes ; et
   - touffeter l'un au moins des rubans (2) dans la couche de support (1) afin d'obtenir un gazon synthétique touffeté ;

   caractérisé en ce que le ruban (2) comprenant des filaments d'une première couleur (21) et des filaments d'une seconde couleur (22) est touffeté pour former une ligne d'une largeur prédéterminée, dans lequel la largeur de la ligne est comprise entre 8 cm et 14 cm, de préférence entre 10 cm et 12 cm.

9. Bande de ligne de marquage, **caractérisée en ce que** la bande de ligne de marquage comprend le gazon synthétique selon l'une quelconque des revendications 1 à 7.

10. Terrain de sports, **caractérisé en ce qu'**il comprend des lignes de marquage réalisées dans le gazon synthétique selon l'une quelconque des revendications 1 à 7.

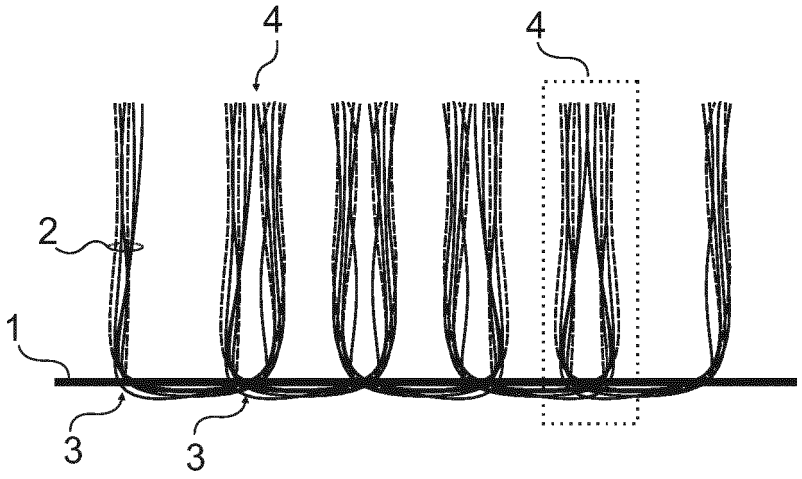
11. Terrain de sports selon la revendication 10, dans lequel entre 50 % et 85 % des filaments dans une touffe (4) sont de la seconde couleur (22).

12. Terrain de sports selon la revendication 10 ou 11, dans lequel la première couleur (21) comprend deux nuances de la couleur.

13. Terrain de sports selon l'une quelconque des revendications 10 à 12, dans lequel le terrain de sports est un terrain de football.

14. Utilisation du gazon synthétique selon l'une quelconque des revendications 1 à 7, afin de réaliser des lignes de marquage sur un terrain de sports, par exemple sur un terrain de football.

Fig. 1



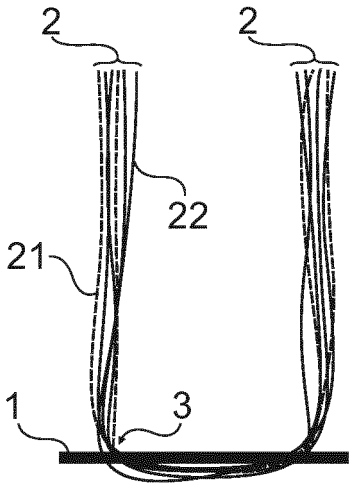


Fig. 2

Fig. 3

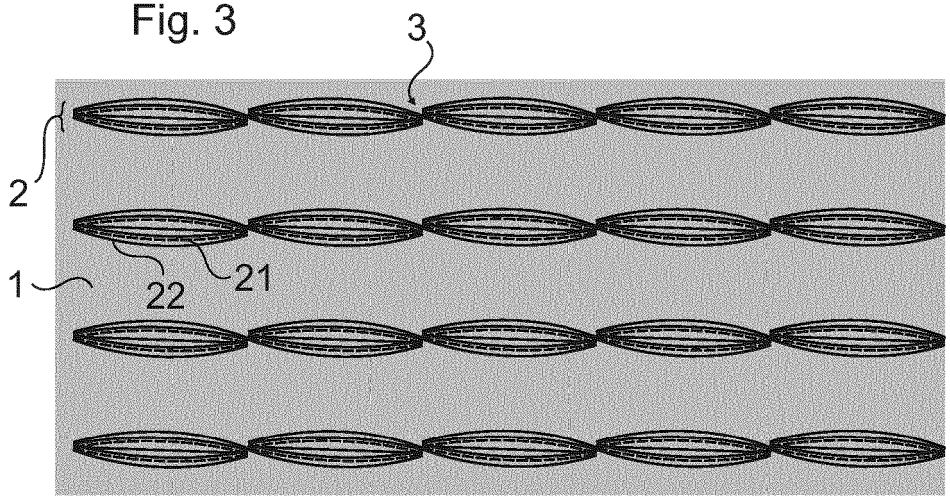


Fig. 4

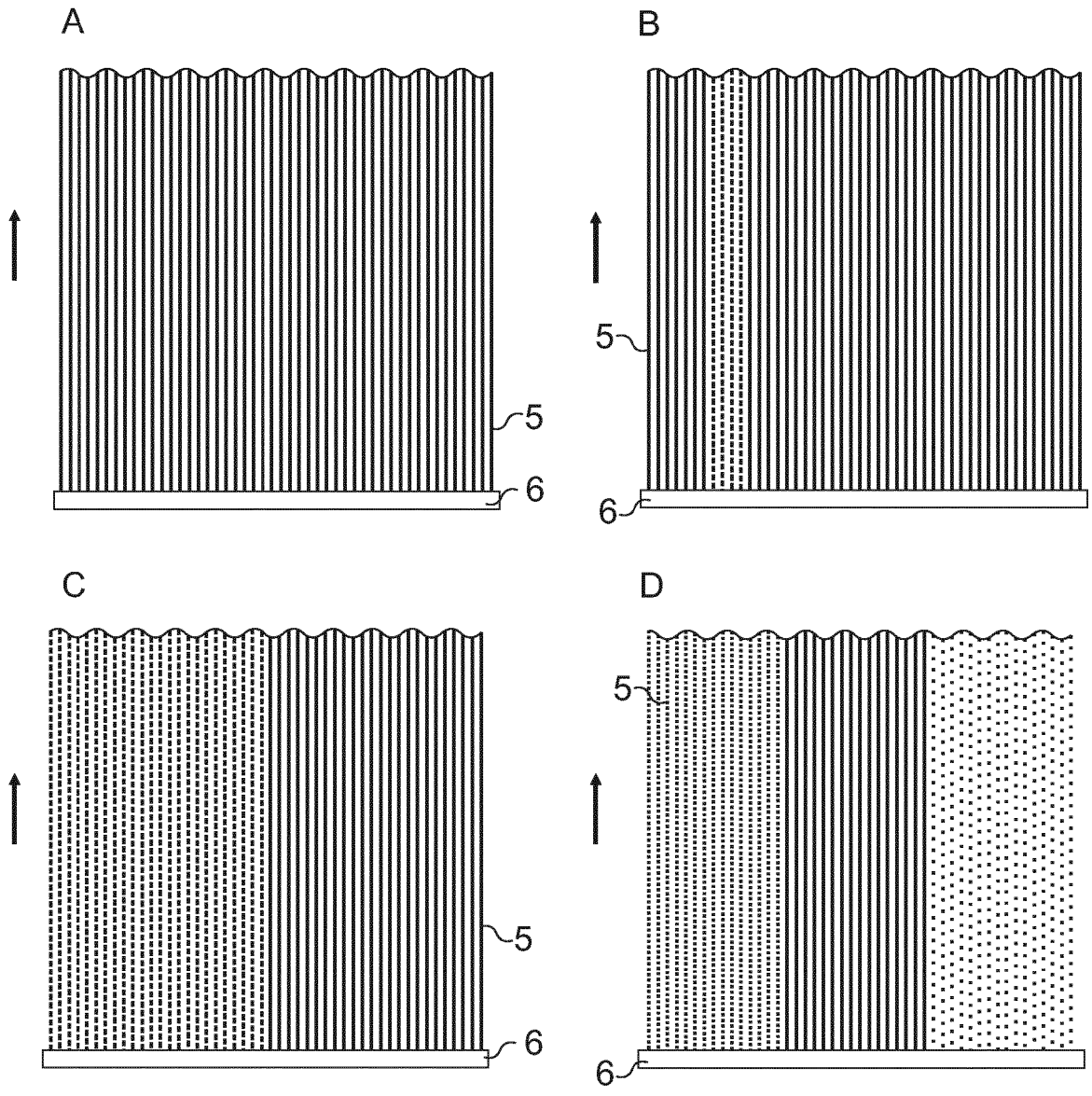
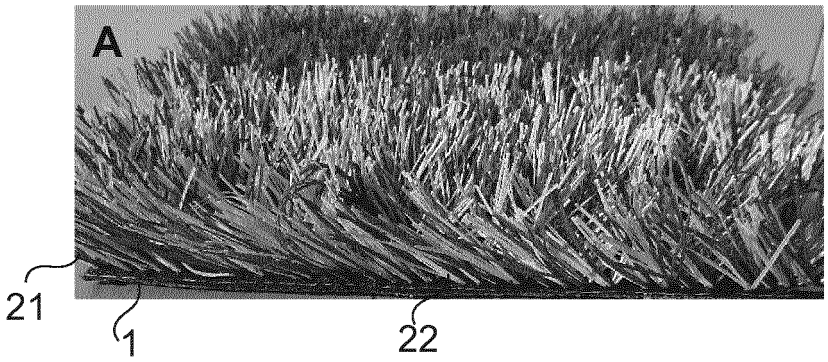
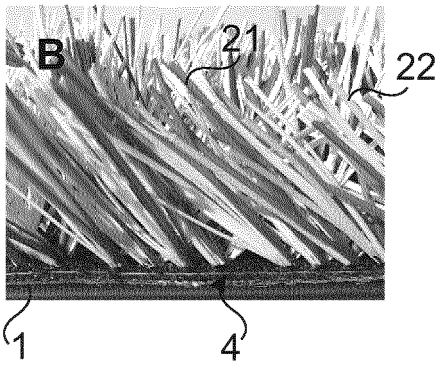
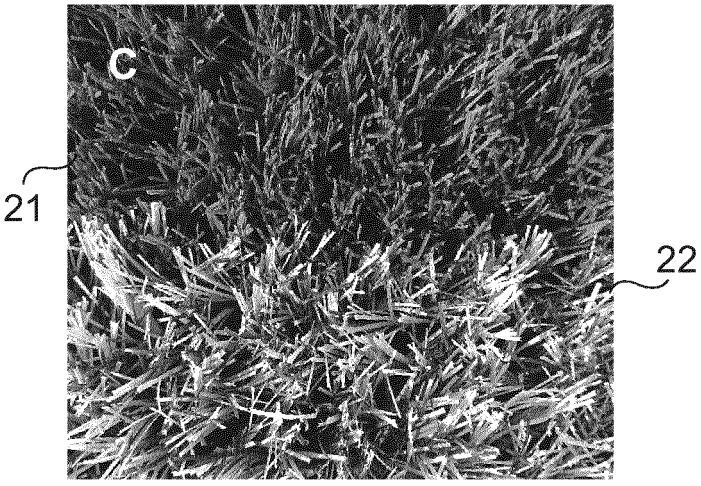


Fig. 5







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