



US 20090246418A1

(19) **United States**

(12) **Patent Application Publication**

Wise

(10) **Pub. No.: US 2009/0246418 A1**

(43) **Pub. Date: Oct. 1, 2009**

(54) **JOINT CONSTRUCTION FOR ARTIFICIAL TURF SUBSTRATE**

Publication Classification

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(51) **Int. Cl.**
A41G 1/00 (2006.01)
E02B 11/00 (2006.01)

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(52) **U.S. Cl. 428/17; 405/38**

(21) Appl. No.: **12/369,434**

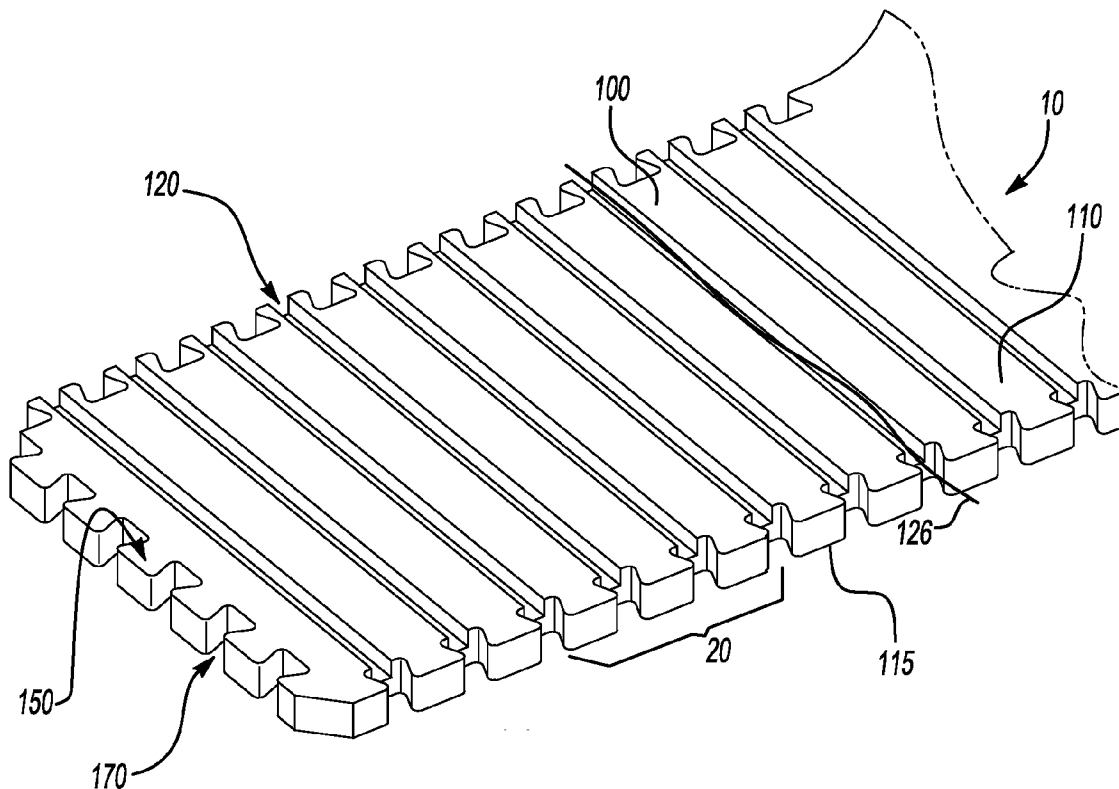
(57) **ABSTRACT**

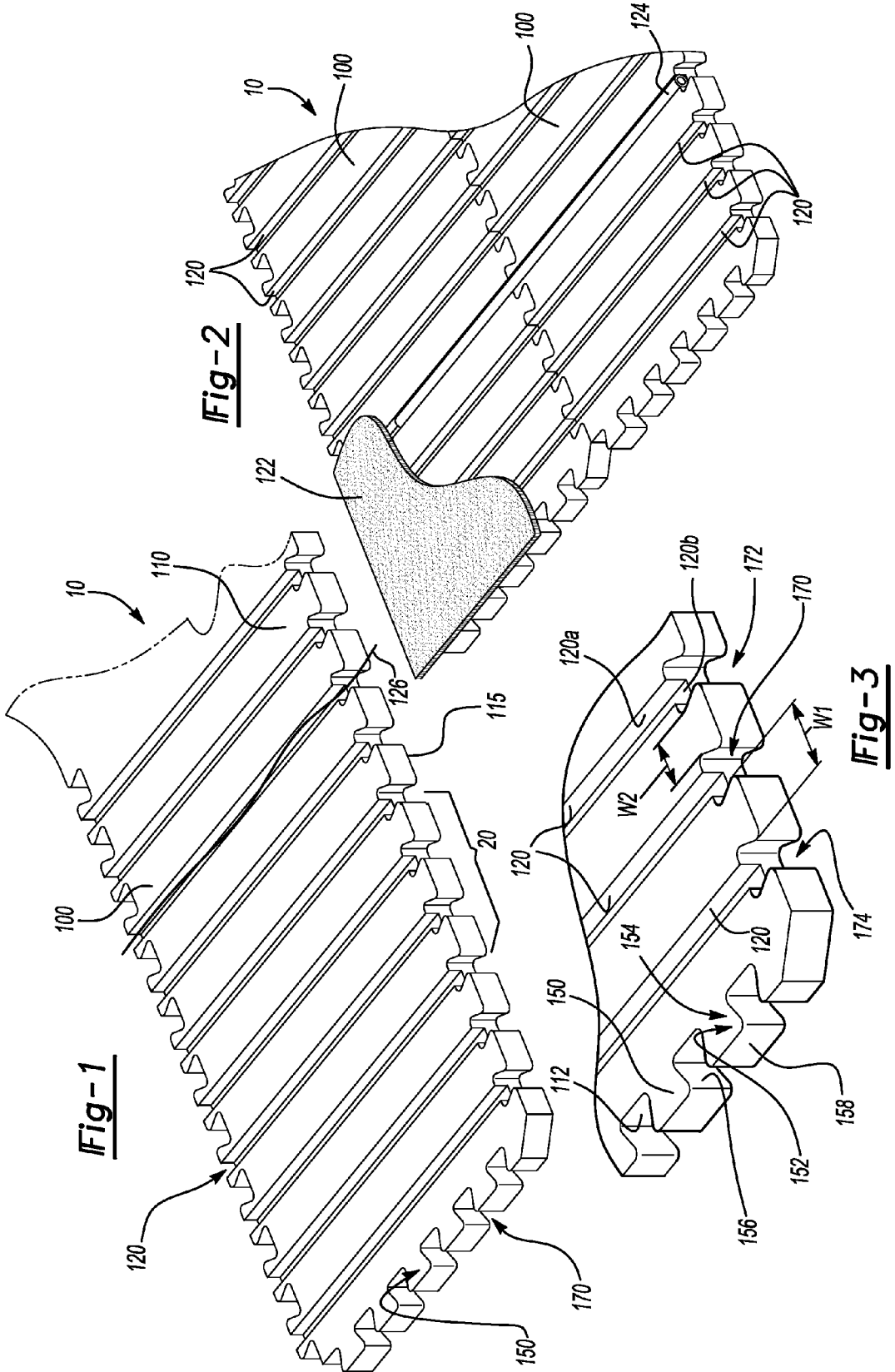
(22) Filed: **Feb. 11, 2009**

An interlocking substrate for artificial turf that includes a base pad having an interlocking tab-and-notch structure that is operable to lock one piece of the base pad to an adjacent piece of the base pad and including channels formed in the upper surface of the substrate to provide drainage and to carry heating and cooling tubes to regulate the temperature of the artificial turf.

Related U.S. Application Data

(60) Provisional application No. 61/028,014, filed on Feb. 12, 2008.





JOINT CONSTRUCTION FOR ARTIFICIAL TURF SUBSTRATE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of U.S. Provisional Patent Application Ser. No. 61/028,014, filed Feb. 12, 2008, which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention relates generally to a substrate for artificial turf. More specifically, the invention relates to a joint construction for a substrate for artificial turf and to a construction that provides for drainage and for heating the artificial turf.

BACKGROUND OF THE INVENTION

[0003] Synthetic turf, also known as artificial turf, is a grass-like surface manufactured from synthetic materials. Although items such as floor mats, rugs, and the like, can be produced from artificial turf, it is most often used in stadiums and fields where sports are played. Some of the advantages of using artificial turf are its extended lifetime compared to natural turf and its ability to provide a suitable playing surface in environments that are unsuitable for natural grass. One of the disadvantages of artificial turf can be the tendency for the turf to develop folds or ripples where the turf is not securely attached to or laid upon a substrate underneath. One cause for the development of such folds and ripples can be due to adjacent pieces of the underlying substrate separating from one another. As such, expensive and/or time-consuming methods and mechanisms are used to ensure that substrate pieces beneath the artificial grass remain flat and attached to one another. Therefore, an artificial turf substrate possessing an improved joint construction for attaching one piece of the substrate to another piece would be desirable.

[0004] Also such a substrate including means to provide for drainage of the artificial turf and for melting snow that may cover the artificial turf or for cooling the turf in hot weather would improve the playing conditions for those using the artificial turf and therefore would be desirable.

SUMMARY OF THE INVENTION

[0005] Disclosed is an interlocking substrate for artificial turf that includes a base pad having an interlocking tab-and-notch structure that is operable to interlock one piece of the base pad to an adjacent piece of the base pad. The interlocking tab-and-notch structure has at least one tab extending from the base pad and at least one notch adjacent to the at least one tab. The interlocking tab has an outer portion and an inner portion, the inner portion proximate to the base pad and the outer portion extending from the inner portion. The outer portion has a width dimension that is greater than a width dimension of the inner portion.

[0006] In an embodiment of the present invention, the interlocking tab-and-notch structure has a plurality of interlocking tabs extending from the base pad, the plurality of interlocking tabs being spaced apart from each other and defining a plurality of interlocking notches, a single interlocking notch defined between two adjacent interlocking tabs. The interlocking tabs each have an outer portion and an inner portion, with the inner portion proximate to the base pad and the outer portion extending from the inner portion. The outer portion

has a width dimension that is greater than a width dimension of the inner portion. The interlocking notch defined between two of the interlocking tabs has an inner portion and an outer portion also, however, the inner portion has a width dimension that is greater than a width dimension of the outer portion.

[0007] The substrate further includes an upper surface upon which the artificial turf lays that is provided with spaced and open channels extending there across to provide the means for drainage and to accommodate tubes or the like to permit the circulation of a heated fluid to melt snow and/or ice from the surface of the turf or the circulation of cooling fluid in a hot environment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of an embodiment of the present invention;

[0009] FIG. 2 is a perspective view of an embodiment of the present invention wherein two adjacent base pads are attached to each other; and

[0010] FIG. 3 is a perspective view of an embodiment of the present invention showing a closer view of an interlocking tab-and-notch structure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] The present invention discloses an interlocking substrate for artificial turf that provides for interlocking attachment of adjacent pieces of the substrate. As such, the present invention has utility as a base material for artificial turf. In addition, the present invention has utility for improving the method in which a substrate for artificial turf is laid down in order for artificial grass to be placed upon. The substrate includes means to provide drainage from the artificial turf and for heating and/or cooling the turf.

[0012] The interlocking substrate of the present invention is preferably an elastomeric foam material having an interlocking tab-and-notch structure around the perimeter of the substrate. The interlocking tab-and-notch structure can include a plurality of tabs that are spaced apart from each other, the tabs defining an interlocking notch between adjacent tabs. The placement and spacing of the tabs along the perimeter of the piece of the interlocking substrate of the present invention provides for adjacent pieces of the substrate to be attached together in a generally quick, easy and efficient manner.

[0013] Channels are provided in the upper surface of the substrate beneath the artificial turf to promote drainage and to accommodate tubes for the circulation of heated or cooled fluids.

[0014] Referring now to FIGS. 1-3, an embodiment of the present invention is illustrated generally at reference numeral 10. The interlocking substrate 10 includes a base pad 100, the base pad 100 having a top surface 110 and a bottom surface 115. Extending from the top surface 110 in a direction towards the bottom surface 115 is a plurality of spaced channels 120. Each of the channels 120 is substantially U-shaped in cross section and as best seen in FIG. 3 includes a sidewall 120a that extends in a direction from the top surface 110 towards the bottom surface 115. The sidewall 120a extends to a bottom surface 120b of the channel 120, the bottom surface 120b being spaced apart from the lower surface 115 of the base pad 100.

[0015] As can best be seen in FIG. 1 artificial turf 122 lays atop the substrate 10 and is adhered thereto by an adhesive (not shown) or the like. The turf 122 can conform to the configuration of the surface 110 of each of the base pads 100 as shown in the drawings or it could be in the form of sheets laid on top of and glued to the base pads 100 during installation without regard to the configuration of the surface 110.

[0016] Located along the perimeter of the base pad 100 is an interlocking tab-and-notch structure 20 (FIG. 1). The interlocking tab-and-notch structure 20 includes an interlocking tab 150 with an interlocking notch 170 adjacent thereto. As best seen in FIG. 3 the interlocking tab 150 extends from a sidewall 112 of the base pad 100 in a generally outward direction. In addition, the interlocking tab 150 can have a tab sidewall 156 that extends from the sidewall 112 to an outer tab surface 158. In some instances, the interlocking tab 150 has an outer portion 152 and an inner portion 154. The inner portion 154 is proximate to the base pad 100 with the outer portion 152 extending from the inner portion 154. The tab sidewall 156 extends from the sidewall 112 at an angle, or a series of angles, such that the inner locking tab 150 has a shape that fits within the interlocking notch 170. Given that the interlocking notch 170 is adjacent to the interlocking tab 150, the outline of the notch 170 mirrors the shape of the tab 150. In this manner, the interlocking structure 20 that has interlocking notches 170 that fit securely around interlocking tabs 150, and/or vice-versa, is provided. An example of how two adjacent pieces of the base pad 100 interlock together is best illustrated in FIG. 2.

[0017] Still referring to FIG. 3 in some instances, the outer portion 152 of the interlocking tab 150 has a width dimension w_1 that is greater than a width dimension w_2 of the inner portion 154. Such a tab provides an interlocking notch 170 having an outer portion 172 with a width dimension that is less than a width dimension of an inner portion 174. Thus, once the interlocking tab 150 is placed within the interlocking notch 170, the wider outer portion 152 of the tab 150 within the wider inner portion 174 of the notch 170, prevents the notch 150 from being removed when pulled upon in a coplanar direction with respect to the base pad 100. In this manner, a plurality of base pads 100 can be easily interlocked to each other by inserting the interlocking tabs 150 within the interlocking notches 170 from a generally vertical direction. In addition, it is appreciated that once the base pads 100 have been laid upon a bed structure and artificial turf 122 has been placed thereupon, the pads 100 are securely attached to one another.

[0018] To install the artificial turf 122 base pads 120 are preferably provided in rolls and are rolled into place one base pad at a time and with adjacent rolls locked together using the tabs 150 and the notches 170 of adjacent base pads 120.

[0019] As best be seen in FIG. 2 the channels 120 of adjacent base pads 100 are in alignment to provide a path for drainage for the artificial turf 122. In addition tubes 124 can be placed within the channels 120 to provide for heating and/or cooling of the artificial turf 122 by circulating fluid through the tubes 124. As shown in FIG. 1 a radiant heating wire 126 can be included within the base pad 100 to provide heating to the artificial turf 122.

[0020] Although FIGS. 1-3 illustrate a particular shape for the interlocking tab 150 and interlocking notch 170, other shapes and types of interlocking tabs and notches are within the scope of the present invention. In fact, within the scope of the present invention are interlocking tabs and interlocking

notches of various sizes and shapes, so long as the combination provides for an interlocking attachment of one base pad 100 to an adjacent base pad 100. In addition, different sizes and shapes of interlocking tabs 150 and interlocking notches 170 can be included as part of one base pad 100, so long as matching interlocking tabs and notches are present on an adjacent base pad 100.

[0021] In this manner, an interlocking substrate for artificial turf that affords for the interlocking attachment of adjacent pieces of substrate is provided. In addition, the foregoing drawings, discussion and description are illustrative of specific embodiments of the present invention, but they are not meant to be limitations upon the practice thereof. Numerous modifications and variations of the invention will be readily apparent to those of skill in the art in view of the teachings present herein. It is the following claims, including all equivalents, which define the scope of the invention.

1. A substrate for artificial turf, said substrate comprising:
 - a base pad having an interlocking tab-and-notch structure operable to interlock said base pad to an adjacent base pad;
 - said interlocking tab-and-notch structure having at least one tab extending from said base pad and at least one notch adjacent to said at least one tab;
 - said interlocking tab having an outer portion and an inner portion, said inner portion proximate said base pad and said outer portion extending from said inner portion;
 - said outer portion having a width dimension greater than a width dimension of said inner portion.
2. The substrate of claim 1, wherein said interlocking tab-and-notch structure has two interlocking tabs spaced apart from each other that define an interlocking notch therebetween, said interlocking notch having an inner portion and an outer portion, said interlocking notch inner portion having a width dimension greater than a width dimension of said outer portion.
3. The substrate of claim 2, wherein an interlocking tab of an adjacent base pad fits within said interlocking notch of said base pad.
4. The substrate of claim 1, wherein said base pad includes an upper surface and at least one channel formed in and extending across said upper surface of said base pad to provide drainage for the artificial turf.
5. The substrate of claim 4, wherein said channel is a generally U-shaped in cross-section.
6. The substrate of claim 4, wherein said base pad has a plurality of said channels.
7. The substrate of claim 1, wherein said base pad includes an upper surface and at least one channel formed in and extending across said upper surface of said base pad, a tube disposed in said channel to provide for circulation of a heating or cooling fluid.
8. The substrate of claim 1, wherein said base pad is made from elastomeric foam material.
9. A substrate for artificial turf, said substrate comprising:
 - a base pad having a structure operable to interlock said base pad to an adjacent base pad;
 - said base pad having a channel extending across an upper surface of said base pad in alignment with a channel formed on said adjacent base pad to provide a path for drainage.

10. The substrate of claim **9**, including a tube carried in at least one of said channels.

11. The substrate as defined in claim **9** and including a radiant heating wire carried in at least one of said channels

12. The substrate of claim **9**, wherein said base pad is made from elastomeric foam material.

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