The invention relates to an embodiment for hybrid-turf bottom fibers that enables growth of roots and leaves of the natural grass between the synthetic turf yarns by applying an organic and/or inorganic filler between the synthetic turf yarns where the grass seeds can grow. In particular, the invention relates to an embodiment for hybrid-turf bottom fibers that allows the zones where the grass seeds will grow to be more porous and stronger attachment of the synthetic yarns, and that facilitate growth of the grass roots into farther depths.
HYBRID-TURF MAT

Technical field of the invention:

The invention relates to an embodiment for hybrid-turf bottom fibers that enables growth of roots and leaves of the natural grass between the synthetic turf yarns by applying an organic and/or inorganic filler between the synthetic turf yarns where the grass seeds can grow.

In particular, the invention relates to an embodiment for hybrid-turf bottom fibers that allows the zones where the grass seeds will grow to be more porous and stronger attachment of the synthetic yarns, and that facilitate growth of the grass roots into farther depths.

State of the art:

Today, the turf grounds are used at the football fields, rugby, American football, golf, baseball and various park and garden areas. New advancements are implemented in this field due to demanding and costly maintenance practices for such grounds. The most frequently applied advancement in this respect is the hybrid turfs.

The hybrid-turfs comprise of the combination of natural grass with the synthetic fibers, thus allowing the roots to intertwine with the artificial turf while the natural grass grows. There are different systems and methods for planting the hybrid-turf.

One of such systems is the ramming system (where the turf yarns are rammed on the existing natural grass ground) and another system is the "Woven" or "Tufted" system (where the grass seeds are planted into the carpet, allowing the growth
of natural grass within synthetic turf carpet). In time, it is observed that the hybrid-turfs bring along various problems.

In the tufted system, the grass seeds are spread within the carpets and then soil is laid thereon, thus allowing the grass seeds to germinate and take root downwards. The most significant problem here is the porous structure of the carpet backing. The structure of the carpet backing used in the state of the art prevents growth of the grass roots due to inadequacy of its pores.

Another problem experienced is that the system with scarce pores stick to the parts of the maintenance machine and cause disruption of the field surface during a maintenance operation so-called "Vert idrain". Or, in case the bottom fibers have wider pores, the pile adhesion forces of the synthetic turf yarns have lower values, thus leading to low adhesion forces for the synthetic yarns.

In conclusion, there is a necessity to make an improvement in the respective art due to aforementioned disadvantages and due to inadequacy of the existing solutions in this respect.

**Objective of the invention:**

The foremost objective of the invention is to allow growth of roots and leaves of the natural grass between synthetic turf yarns by applying an organic and/or inorganic filler between the synthetic turf yarns.

Another major objective of the invention is to provide protection against all probable impacts acting on the turf by supporting the natural grass with the synthetic turf yarns and the bottom fibers during use after the grass grows.

Another objective of the invention is to ensure more strong adhesion of the synthetic yarns and to allow growth of the
grass roots to farther depths due to extremely tight zones woven with the bottom fibers but allowing the zones where the grass seeds will grow to be more porous.

Yet another objective of the invention is to create an environment where the roots of the natural grass will grow into farther depths by establishing a more porous structure at the sites other than the sections to be in contact with the synthetic turf yarns by means of more porous bottom fibers manufactured in compliance with the weaving width.

Another objective of the invention is to prevent disruption of the field surface due to sticking to the parts of the maintenance machine during the maintenance operation by means of an alternate porous structure.

The structural and characteristic features and all advantages of the invention shall be comprehended more clearly by virtue of the figures provided hereunder and the detailed description provided with reference to such figures, and therefore assessment should be made taking said figures and detailed description into account.

**Description of the Figures:**

**FIGURE—1;** is the drawing that illustrates the perspective view of the hybrid-turf bottom fibers with alternate pores of the invention.

**FIGURE—2;** is the drawing that illustrates the top view of the hybrid-turf bottom fibers with alternate pores of the invention.

**Reference numbers:**

100. Hybrid-turf Bottom fibers
Description of the Invention:

An environment where the roots of the natural grass will grow into farther depths is created by establishing a more porous structure at the sites other than the sections to be in contact with the synthetic turf fiber (130) yarns by means of more porous hybrid-turf bottom fibers (100) manufactured in compliance with the weaving width. The fact that the zones woven with the hybrid-turf bottom fibers (100) are very tightly weaved and that the zones where the grass seeds will grow have more porous structure not only ensures stronger adhesion to the synthetic turf fibers (130) but also enables growth of grass roots into farther depths. The hybrid-turf bottom (100) of the invention comprises the elements of the natural grass pore (110) that allows growth of natural grass between the synthetic turf fibers (130) by applying an organic and/or inorganic filler between the synthetic turf fibers (130) where the grass seeds can grow; a synthetic turf weaving zone (120) woven tighter than the natural grass pore (110); and the synthetic turf fiber (130) woven with the "Tufting method".

The hybrid-turf bottom fibers (100) are made of monofilament and/or Fibril, polyethylene and/or polypropylene yarns, that is woven as porous at the sites other than the sites corresponding to the ends of the needle intervals of the tufting machinery when compared to the other sites and/or woven by employing the tufting method using the polyethylene.
and/or polypropylene synthetic turf yarns on the occasionally supported bottom fibers and then manufactured by coating of the product partially or completely with latex or polyurethane or similar adhesive in order to securely fix the product to the synthetic turf fibers (130).

The roots of the natural grass plant grow either downwards and/or laterally from the natural grass pores (110) by virtue of the more porous structure at the natural grass pore (110) zones outside the sections where the synthetic turf fibers (130) of the hybrid-turf bottom fibers (100) of the invention are woven. In this manner, a porous structure that would allow growth, and ensure supporting, of the roots of the natural grass plant is created. On the other hand, the synthetic turf fibers (130) woven on said hybrid-turf bottom fibers (100) by employing the tufting method allows attachment of the leaves of the natural grass plant to such yarns for its lifespan and remain protected.
CLAIMS

1. The invention is hybrid-turf bottom fibers (100), characterized in that, it comprises

   • **natural grass pore** (110) that allows growth of the roots and leaves of the natural grass between the synthetic turf fibers (130) and growth of the roots of the natural grass to farther depths by applying an organic and/or inorganic filler between the synthetic turf fibers (130) where the grass seeds can grow,

   • a **synthetic turf weaving zone** (120) woven tighter than the natural grass pore (110), which enables strong adhesion of the synthetic turf fibers (130) to each other, and

   • a **synthetic turf fiber** (130) woven with Tufting method, which allows attachment of the natural grass leaves to the synthetic yarns for its lifespan and remain protected, and coated with adhesive and then dried in order to immobilize the yarns.

2. The invention is hybrid-turf bottom fibers (100) according to claim 1, characterized in that; the coating used for drying said synthetic turf fibers (130) is made of latex.

3. The invention is hybrid-turf bottom fibers (100) according to claim 1, characterized in that; the coating used for drying said synthetic turf fibers (130) is made of polyurethane.

4. The invention is hybrid-turf bottom fibers (100) according to claim 1, characterized in that; said hybrid-turf bottom fibers (100) are made of monofilament, fibril, polyethylene, polypropylene yarns.
The invention is hybrid-turf bottom fibers (100) according to claim 1, characterized in that; the synthetic turf fibers (130) are made of polyethylene and polypropylene yarns.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. E91C13/08

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

EOIC

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier application or patent published on or after the international filing date
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  - "O" document referring to an oral disclosure, use, exhibition or other means
  - "P" document published prior to the international filing date but later than the priority date claimed
  - "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  - "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  - "Y" document of particular relevance, the claimed invention cannot be considered as involving an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  - "*" document member of the same patent family

Date of the actual completion of the international search:
14 March 2018

Date of mailing of the international search report:
22/03/2018

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Flores Hokkanen, P
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