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(54) **GOLF COURSE BUNKER**

GOLFPLATZBUNKER

BUNKER DE PARCOURS DE GOLF

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## Description

### Background of the Invention

**[0001]** The present invention concerns a golf bunker and a method of constructing a golf bunker.

**[0002]** The maintenance of a golf course is crucial to the golfer and as such to the success of a golf course in general. The level of maintenance is directly related to many issues, but it is the quality of the playing surfaces and the appearance of the golf course that matter most to the average golfer. One of the most demanding areas in terms of the expense, time, effort and labour is the maintenance of golf course bunkers. Golf bunkers are critical to the strategy and appearance of most golf courses and this has been the case for hundreds of years. Despite this long time span, and the many efforts that have been made, no satisfactory solution has been developed that can substantially reduce the maintenance burden, whilst at the same time ensuring that bunker quality is retained.

**[0003]** Green keepers will bear witness to the challenging tasks of maintaining bunkers and the majority of them will pinpoint bunkers as their most time intensive and problematic areas.

**[0004]** Likewise those who finance a golf course will testify to the disproportionate expense involved in maintaining bunkers. This is necessary due to a combination of factors: heavy rain which washes elements of the face away, erosion of the face, subsidence, damage to the face caused by golf clubs as well as golf balls, damage caused by animals, and wear and tear caused by machinery in or around the bunker. There are many different types of bunkers, but the problems described above are common to all bunkers. Steep faced, or revetted face bunkers which are often critical components in the character of many golf courses (common on links land golf courses in the UK) are particularly susceptible to undermining and collapse.

**[0005]** Many courses spend large sums of money on renewing revetted faces on bunkers. Revetted face bunkers need rebuilding on average every 3 years. Slopes that face adverse prevailing weather conditions can often become unstable much sooner than that. In an attempt to stabilise bunker faces some Championship courses have installed custom designed water sprinkler systems to all their revetted bunkers. This is only possible via the large amounts of grant aid and sponsor money made available to support major professional tournaments. This sort of solution is impossible on financial grounds for the vast majority of golf courses. Furthermore, the large volume of irrigation water required raises the issue of sustainability and it is highly questionable whether this sort of practice should be permitted by agencies with environmental responsibility.

**[0006]** Maintenance of bunkers has received much attention and much prior art exists relating to the maintenance of bunker borders and prevention of sand migra-

tion or weed creep. However, very little of this prior art appears to have become widespread in the golfing world, and the problem of bunker face and edge maintenance remains an unsolved issue. Recent solutions have included seemingly dangerous and/or ineffective use of timber facings, formed in some cases simply by arranging vertically extending lengths of timber against the inner wall or face of the bunker. In some cases, old railway sleepers have been used to define a retaining wall.

**[0007]** It is believed that golf courses favour non-synthetic (or "natural") construction materials for facing bunkers so as to fit in and match the aesthetic look and feel of the rest of the golf-course.

**[0008]** The present invention seeks to mitigate the above-mentioned problems. Alternatively or additionally, the present invention seeks to provide an improved golf course bunker and/or an improved method of constructing a bunker.

**[0009]** EP 0753329 discloses a playground golf course, including a section designated as a bunker/"dummy pond", made using an artificial turf. The bunker/dummy pond section is made from differently coloured artificial turfs fixed together with an adhesive, thus providing a bunker/dummy pond section that is reversible so as to provide one of two different externally exposed surfaces.

### Summary of the Invention

**[0010]** The present invention provides a golf course bunker including an upwardly extending sloped surface defined at least partly by a plurality of layers of artificial grass, the plurality of layers being substantially horizontal and arranged in a staggered arrangement corresponding to the gradient of the said sloped surface. For example the plurality of layers of artificial grass may face an exterior surface of the bunker. The use of artificial grass in layers in embodiments of the present invention advantageously enables the provision of a durable and low maintenance facing for the bunker which also has an appearance that complements the look and feel of a typical golf course.

**[0011]** The use of artificial grass on a golf course is known, but it is believed that its use is limited to single layer applications. For example, the Alice Springs golf club, near Usk, Wales has bunkers which include a single layer of artificial grass that extends from a top surface of the bunker, over and partway down the sloping face of the bunker. GB 2398508 discloses a practice golf bunker in the form of a free standing and static sand tray. The tray is higher at one end and curved to form the bunker wall which is covered with a single non-horizontal layer of artificial turf.

**[0012]** In the context of the present invention, a bunker may be in the form of a depression in the course, typically filled at least partially with sand or other granular material, and/or grass. The bunker need not be bounded on all sides by sloped surfaces that extend upwardly in a direction away from the bunker. It will be appreciated that the

plurality of layers of artificial grass define a facing of at least part of such a sloped surface. The present invention has particular advantage in relation to bunkers having at least one steeply sloped surface, but is not limited in application only to such steep bunkers. A surface may (optionally) be considered as "steep" if it has a gradient steeper than 1:3 over a distance of more than 500mm. A surface of the bunker may have an average gradient of steeper than 1:1 over a distance of more than 500mm.

**[0013]** The present invention has particular advantage in relation to bunkers having at least one revetted surface (i.e. a wall that forms or defines a revetment). The revetment may be faced at least partially by the plurality of layers of artificial grass. The revetted surface may have a gradient of steeper than 1:1 over a distance of more than 500mm. The revetted surface may be in the form of a retaining wall. The revetted surface preferably has an upper edge, from which a layer of turf, whether artificial or natural, extends away from the bunker. Thus, in this case, the bunker has an upper surface having a layer of turf that terminates at this edge, and does not roll over the edge and down into the bunker.

**[0014]** The layers of artificial grass may be separated by other layers of material. It is preferred however for the layers of artificial grass to be arranged one on top of the other, preferably in direct contact with each other. In accordance with the present invention, the plurality of layers of artificial grass are arranged in a substantially horizontal orientation. When constructing the bunker, having successive layers arranged substantially horizontally, may improve structural stability of the stack of layers. It will be understood that the layers need not be exactly horizontal. In accordance with the present invention, the layers of artificial grass are staggered. Thus, for example, one layer of grass may have an upper surface that is only partially covered by the layer on top, thus leaving part of the upper surface exposed. The layers may thus have a stepped appearance. The layers may have a varying stagger. The gradient of the wall/surface of the bunker defined by the layers may vary.

**[0015]** Each layer of artificial grass may be in the form of a piece of artificial turf. Each layer of artificial grass may comprise synthetic grass fibres on a backing material. The synthetic grass fibres may be made from or comprise polypropylene. The backing material may be a rubber or plastic material, such as for example latex. The backing material may support a granular material that fills at least some of the space between the synthetic grass fibres. Such a granular material, preferably sand, may increase the density of the layers. Providing such a granular material may assist in distributing load. It may for example reduce the amount by which layers of artificial grass in a vertically low (relatively high-load) region of the bunker are compressed compared to layers in a vertically high (relatively low-load) region of the bunker. The depth of the pile (the height of the grass fibres above the backing material) is preferably greater than 10mm. The depth of the pile is preferably less than 35mm and

may be less than 25mm. The depth of the pile may be greater than 15mm.

**[0016]** There may be many separate pieces of artificial grass turf in each layer. Each piece may have a width of between 100mm and 500mm. Each piece may have a length of between 100mm and 1000mm. Each piece is preferably arranged such that its length extends left-to-right (or right-to-left) across the exterior face of the bunker and such that its width extends into the bunker.

**[0017]** The layers of artificial grass advantageously define an exterior surface of the bunker. The interior of the bunker is preferably formed of different material. The different material may comprise soil. The different material is preferably formed mostly, and more preferably substantially entirely, from the same material as was present in the vicinity of the bunker before the bunker of the present invention was installed. Such material will typically be of substantially the same composition as that of the ground immediately surrounding the bunker.

**[0018]** The bunker may be considered as comprising an exterior facing and infill material, the infill material filling in the interior of the bunker. Such infill material may comprise soil for example. One of the layers of artificial grass may extend further into the interior of the bunker so as to key-in to the different material.

**[0019]** The layers of artificial grass may be tied together. For example, one or more elongate tie members may pass through each layer of a plurality of stacked layers of artificial grass. The or each elongate tie member may be substantially rigid, for example in the form of a screw, pin, post, bolt, or the like. The layers of artificial grass may be anchored together by means of an anchor member.

**[0020]** The present invention also provides a method of constructing a golf course bunker. The golf course bunker so constructed may be in accordance with the golf course bunker as described or claimed herein. The method comprises the steps of (a) forming an excavation having an exterior surface; (b) cutting layers of artificial grass; and (c) laying the artificial grass in a plurality of horizontal layers in a staggered arrangement to create the required shape, height and gradient to face the exterior surface of the excavation, whereby the bunker so constructed has an upwardly extending sloped surface with a gradient corresponding to said staggered arrangement.

**[0021]** The method may include a step of cutting layers of artificial grass before laying them, for example to cut the layers to size. The excavation is preferably formed *in situ* at the golf course for which the bunker is being constructed. The step of cutting the layers of artificial grass is preferably by means of mechanised machinery (i.e. more than a simple knife that would be used by hand). The mechanised machinery may be manually operable. The mechanised machinery will typically need to be located at a site other than the golf-course. The step of cutting the layers of artificial grass before laying them is preferably conducted at a site remote from the excavation, and preferably not on the golf course. Using mech-

anised machinery has been found to give a better finish and to be more reliable.

**[0022]** The method may include a step of cutting at least one layer of artificial grass to form an incision. The incision may provide sufficient flexibility to allow the layer of artificial grass to be manipulated to suit the contours of the exterior surface of the excavation, whilst maintaining the appearance of the front facing surface of the bunker. Preferably, the incision is hidden from view in the final completed bunker. The incision may be formed in the rear surface of the layer of artificial grass. The incision may allow the layer of artificial grass to be more readily stretched along its rear surface. The incision may facilitate removal of a portion, for example a wedge-shaped portion, of the layer of artificial grass to be removed this allowing the layer to be more readily compressed along its rear surface.

**[0023]** The layers of artificial grass are preferably impregnated with sand before being laid. The layers of artificial grass may be at least partially impregnated with sand before the step of cutting the layers of artificial grass. Mechanised cutting is preferable here, as more sand is retained than when cutting manually.

**[0024]** The step of laying the artificial grass in horizontal layers may include adding regulating material in between successive layers. There may be a step of laying a first layer, and then adding regulating material directly on top of the first layer to create an even and level surface on which to lay a second layer. There may then be a step of laying a second layer on top of the regulating material on the first layer. The regulating material may comprise granular material. The regulating material may comprise sand. The regulating material may comprise soil.

**[0025]** The method may include a step of adding natural turf to the bunker. The method may include a step of adding topsoil to the bunker. The method may include a step of adding seed to the bunker. Topsoil is preferably added on the uppermost surface of the bunker. Preferably, the topsoil has a depth of greater 30mm, and may be greater than 40mm. A natural turf layer is preferably laid on the topsoil. In the case where the artificial grass layers hold sand, it is desirable to have some moisture retained within the layers to aid retention of the sand within the layers. Adding natural soil and turf on the top of the bunker can aid such moisture retention.

**[0026]** The layers of artificial grass are preferably formed from pieces of artificial grass turf that have been previously used as artificial grass for a different application. Using such "second hand" (or "used") artificial grass has the advantage of reducing cost, but also has the advantage of providing a viable second/further use of artificial grass turf that has been used in a conventional application (such as on a football pitch for example). Artificial grass surfaces, as used in such conventional applications, typically have a useable lifetime of several years, but will need nevertheless to be replaced from time to time. When replaced, it is common practice simply to dispose of used artificial grass as refuse in land-fill sites.

The present invention provides a means of re-using / re-cycling used artificial grass. It will be appreciated that the quality of the artificial grass required for the present invention is lower than that required for, for example, a football pitch and that therefore the present invention provides an advantageous means of extending the useful life of such artificial grass.

**[0027]** It will of course be appreciated that features described in relation to one aspect of the present invention may be incorporated into other aspects of the present invention. For example, the method of the invention may incorporate any of the features described with reference to the bunker /structure of the invention and *vice versa*.

#### 15 Description of the Drawings

**[0028]** Embodiments of the present invention will now be described by way of example only with reference to the accompanying schematic drawings of which:

Figure 1 shows a sectional view of a golf bunker according to a first embodiment of the invention; Figure 2 is an enlarged sectional view showing region "A" of Figure 1 in greater detail; and Figure 3 is a plan view of a portion of a layer of artificial grass of the bunker of the first embodiment; Figure 4 shows a sectional view of a golf bunker according to a second embodiment of the invention; Figure 5 is an enlarged sectional view showing region "B" of Figure 4 in greater detail; and Figures 6 is a schematic illustration of a bunker of a third embodiment of the invention.

#### 35 Detailed Description

**[0029]** A first embodiment of the invention is shown in Figure 1, which illustrates in cross-section a bunker 10 on a golf course, the bunker 10 comprising a plurality of layers 11 of artificial grass. The use of artificial grass, placed in horizontal layers at a varying stagger creates a durable, low maintenance, bunker, in particular the slopes and edges of the bunker 10. In this embodiment, it is the use of artificial grass in horizontal layers 11 in forming the bunker face that makes it unique and different to any previous attempts at using artificial grass in the golfing environment.

**[0030]** Figure 2 shows a close-up / enlarged view of region "A" of Figure 1. It will be seen from Figure 2 that the at least some of the layers 11 of artificial grass are staggered, thereby defining steps 12 between at least some adjacent layers 11.

**[0031]** Each layer 11 of artificial grass comprises a latex backing material 13 and a polypropylene pile material 14 attached to the backing material. The depth of the pile 14 is 20mm. The artificial grass is sand filled. The interior of the bunker is formed from infill material 5 in the form of soil. Some of the layers 11 of artificial grass are tied together by means of anchor pins 6.

**[0032]** The materials required, the mode of construction and the ongoing maintenance are described as follows, all in relation to the first embodiment.

**[0033]** Artificial grass is provided. Artificial grass generally consists of synthetic grass fibres (nylon or polypropylene), a backing material (a range of products including polyurethane, canvas or latex) and an infill (typically sand). New artificial grass can be purchased from a wide range of suppliers, however the first embodiment of the present invention is best suited to the use of second hand ('used') artificial grass. Used artificial grass is also widely available as it has a finite lifespan in its primary use as a football pitch, tennis court, hockey pitch etc. At present a high proportion of used artificial grass ends up in landfill sites. This secondary use for the artificial grass would provide a new market for the material and significantly reduce waste.

**[0034]** The construction of the bunker of the first embodiment is undertaken in three principal stages. Firstly the bunker faces and edges are excavated to the client's required dimensions. Secondly the artificial grass is cut by a sharp knife to suit the dimensions of the excavation. When it is processed, care must be taken to retain the majority of the sand within the pile structure of the artificial grass.

**[0035]** In the case where the piece 4 of artificial grass is to be used to face a sharply curving portion of the bunker (i.e. curving in the horizontal plane to an extent that can not be accommodated by the inherent flexibility of the pieces of artificial grass being used), one or more small incisions are made on the back facing surface of each strip 4 of artificial grass as shown in Figure 3. The incisions 2 provide a degree of flexibility which allows the artificial grass to be manipulated to suit the required contours of the bunker face 3, whilst maintaining the appearance of the front facing surface 3 which is seen by the golfer. Figure 3 shows two incisions 2, but it would, as an alternative, be possible to use just one incision at the centre point of the back facing surface.

**[0036]** Finally, the artificial grass is laid by hand in horizontal layers to create the required shape, height and gradient. Each layer is laid and then levelled and made solid by means of adding and tamping down extra soil/sand on top of the layer as required. A modest amount of natural turf, topsoil and seed is then used to marry the artificial structure into the natural contours, for example at a region 15 at the top of the bunker as shown in Figure 1. Under most ground conditions the self weight of the artificial turf (which is pre impregnated with sand) is sufficient to provide adequate slope stability. Sand may also be added (or already provided) to form the base 16 of the bunker. Each layer 11 is formed of many strips 4 laid end-to-end. Typical (plan-view) dimensions of a strip are a width of between about 200mm and about 300mm and a length of about 500mm.

**[0037]** Where bunker faces are proposed to be more than 1200mm high, there may be a need for additional support / techniques of providing structural strength

and/or integrity. Such additional support / techniques are described below with reference to the bunker of the second embodiment shown in Figures 4 and 5.

**[0038]** Ongoing maintenance may also be required. However, the maintenance of the artificial grass faces is minimal compared with traditional solutions that are formed from growing grass sod. The artificial faces are not reliant on good natural growing conditions or regular watering to keep their integrity and are much more durable to everyday wear and tear. Maintenance will be limited to occasional brushing to remove excess sand build up.

**[0039]** Aesthetics are very important, and the horizontal layering is critical in delivering the desired appearance. A very natural and pleasing appearance can be achieved by means of embodiments of the present invention.

**[0040]** Figures 4 and 5 show sectional views of a revetted wall of a bunker 110 which has been faced by means of a second embodiment of the invention. Natural sand 3 provided in the base 116 of the bunker and turf is provided on the top 115 of the revetted wall. The principal differences between this second embodiment and the first embodiment will now be described. The slope of the wall of the bunker defined by the artificial grass layers 111 is steeper. Consequently, a larger and more secure tie-member 106 is used. In this case, the tie member 106 is an anchor member with a screw-thread. The staggering is less pronounced in view of the steepness of the wall. Every 5<sup>th</sup> or 6<sup>th</sup> layer 121 is bigger in the direction/dimension that extends into interior 105 of the bunker, which facilitates a key-in between the wall and the excavation, thus providing better stability. Lastly the pieces of sand-filled artificial turf are cut to size with an angle-grinder with a suitable cutting disc attached.

**[0041]** Figure 6 shows a bunker 210 according to a third embodiment, illustrating in highly schematic form the type of 3-dimensional shape of bunker made possible by means of the present invention. Thus the bunker 210 includes a base 216 that is substantially horizontal and filled with sand, which is surrounded by a steeply sloping retaining wall defined by multiple staggered layers 211 of artificial turf. The bunker is formed as a depression in the surrounding land and thus the top region 215 of the bunker is relatively flat, and is level with the surrounding land. In this embodiment, the top region 215 is in the form of natural turf which terminates at the edge between the flat level land at the top region 215 and the steeply sloping retaining wall. In the finished bunker, the multiple layers 211 that form the side wall of the bunker are readily visible when close to the bunker, but are defined by materials such that from a distance the look and appearance of the bunker marries in well to its surroundings.

**[0042]** Whilst the present invention has been described and illustrated with reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not specifically illustrated herein. By way of

example only, certain possible variations will now be described.

**[0043]** While the method and invention of a synthetic bunker face has been described with certain degrees of particularity, the structure of each bunker face may change or be modified. The constant feature is artificial grass laid as (preferably horizontal) layers, and this is a unique solution to the problem of economically maintaining aesthetically pleasing bunker faces and edges.

**[0044]** All the dimensions of the bunkers shown in the Figures can be amended on site to suit particular local ground conditions and client requirements.

**[0045]** A retaining wall as described above could be used as a landscaping tool in other contexts, not on golf courses.

### Claims

1. A golf course bunker (10) including an upwardly extending sloped surface defined at least partly by a plurality of layers (11) of artificial grass, **characterised in that** the plurality of layers (11) are substantially horizontal and arranged in a staggered arrangement corresponding to the gradient of said sloped surface.
2. A golf course bunker (10) according to claim 1, wherein each layer (11) of artificial grass comprises synthetic grass fibres (14) on a backing material (13).
3. A golf course bunker (10) according to claim 2, wherein the backing material (13) supports a granular material that fills at least some of the space between the synthetic grass fibres.
4. A golf course bunker (10) according to any preceding claim, wherein said plurality of layers (11) of artificial grass define an exterior surface of the bunker and the interior of the bunker is formed of different material.
5. A golf course bunker (10) according to claim 4, wherein the interior of the bunker comprises infill material (5).
6. A golf course bunker (10) according to any preceding claim, wherein said plurality of layers (11) of artificial grass are tied together.
7. A golf course bunker (10) according to any preceding claim, wherein an anchor member (6) passes through said plurality of layers of artificial grass.
8. A method of constructing a golf course bunker (10) at a golf course, wherein the method comprises the following steps:

- forming an excavation having an exterior surface;
- cutting layers of artificial grass;
- laying the artificial grass in a plurality of horizontal layers (11) in a staggered arrangement to create the required shape, height and gradient to face the exterior surface of the excavation, whereby the bunker (10) so constructed has an upwardly extending sloped surface with a gradient corresponding to said staggered arrangement.

9. A method according to claim 8, wherein the method further includes a step of cutting at least one layer of artificial grass to form an incision (2) which provides sufficient flexibility to allow the layer of artificial grass to be manipulated to suit the contours of the exterior surface of the excavation, whilst maintaining the appearance of the front facing surface of the bunker.
10. A method according to claim 8 or claim 9, wherein the layers (11) of artificial grass are impregnated with sand before being laid.
11. A method according to any of claims 8 to 10, wherein the step of laying the artificial grass in horizontal layers (11) includes laying a first layer, adding regulating material directly on top of the first layer to create an even and level surface on which to lay a second layer, and then laying a second layer on top of the regulating material on the first layer.
12. A method according to any of claims 8 to 11, wherein the method further includes a step of adding natural turf, topsoil and seed to marry the artificial structure into the natural contours of the surrounding golf course.
13. A method according to any of claims 8 to 12, wherein each layer (11) of artificial grass has been previously used as artificial grass for a different application.
14. A golf course comprising a bunker (10) according to any of claims 1 to 7 or a bunker as constructed by the method of any of claims 8 to 13.

### Patentansprüche

1. Golfplatzbunker (10), der eine sich nach oben erstreckende schräge Fläche aufweist, die zumindest teilweise von einer Vielzahl von Schichten (11) aus künstlichem Gras gebildet ist, **dadurch gekennzeichnet, dass** die Vielzahl von Schichten (11) im wesentlichen horizontal verlaufen und in einer versetzten Anordnung angeordnet sind, die dem Gradienten der

- schrägen Fläche entspricht.
2. Golfplatzbunker (10) nach Anspruch 1, wobei jede Schicht (11) aus künstlichem Gras synthetische Grasfasern (14) auf einem Trägermaterial (13) aufweist. 5
  3. Golfplatzbunker (10) nach Anspruch 2, wobei das Trägermaterial (13) ein granulartförmiges Material trägt, welches zumindest einige der Zwischenräume zwischen den synthetischen Grasfasern füllt. 10
  4. Golfplatzbunker (10) nach einem der vorhergehenden Ansprüche, wobei die Vielzahl von Schichten (11) aus künstlichem Gras eine äußere Fläche des Bunkers bilden und wobei das Innere des Bunkers aus einem anderen Material gebildet ist. 15
  5. Golfplatzbunker (10) nach Anspruch 4, wobei das Innere des Bunkers ein Füllmaterial (5) aufweist. 20
  6. Golfplatzbunker (10) nach einem der vorhergehenden Ansprüche, wobei die Vielzahl von Schichten (11) aus künstlichem Gras miteinander verbunden sind. 25
  7. Golfplatzbunker (10) nach einem der vorhergehenden Ansprüche, wobei ein Verankerungsteil (6) durch die Vielzahl von Schichten aus künstlichem Gras hindurchgeht. 30
  8. Verfahren zum Bauen eines Golfplatzbunkers (10) auf einem Golfplatz, wobei das Verfahren die folgenden Schritte aufweist: 35
    - Herstellen einer Ausschachtung mit einer äußeren Fläche; 40
    - Schneiden von Schichten aus künstlichem Gras;
    - Auslegen des künstlichen Grases in einer Vielzahl von horizontalen Schichten (11) in einer versetzten Anordnung, um die erforderliche Gestalt, die erforderliche Höhe und den erforderlichen Gradienten zu erzeugen, welche der äußeren Fläche der Ausschachtung gegenüberliegen, wobei der derart gebaute Bunker (10) eine nach oben verlaufende schräge Fläche mit einem Gradienten besitzt, welcher der versetzten Anordnung entspricht. 45
  9. Verfahren nach Anspruch 8, wobei das Verfahren ferner einen Schritt aufweist, bei dem zumindest eine Schicht aus künstlichem Gras eingeschnitten wird, um einem Einschnitt (2) zu bilden, der eine ausreichende Flexibilität bietet, 50
    - um es zu ermöglichen, dass die Schicht aus künstlichem Gras derart gehandhabt werden kann, dass sie an die Konturen der äußeren Fläche der Ausschachtung anpassen lässt, während das Aussehen der vorderen Fläche des Bunkers beibehalten wird.
  10. Verfahren nach Anspruch 8 oder 9, wobei die Schichten (11) aus künstlichem Gras mit Sand imprägniert werden, bevor sie ausgelegt werden. 55
  11. Verfahren nach einem der Ansprüche 8 bis 10, wobei der Schritt des Auslegens des künstlichen Grases in horizontalen Schichten (11) folgendes umfasst: Auslegen einer ersten Schicht, Hinzufügen von Ausgleichsmaterial direkt auf der Oberseite der ersten Schicht, um eine gleichmäßige und ebene Fläche zu bilden, auf der eine zweite Schicht auszuliegen ist; und anschließendes Verlegen einer zweiten Schicht auf der Oberseite des Ausgleichsmaterials auf der ersten Schicht.
  12. Verfahren nach einem der Ansprüche 8 bis 11, wobei das Verfahren ferner einen Schritt aufweist, bei dem natürlicher Rasen, Mutterboden und Saatgut hinzugefügt werden, um die künstliche Struktur in die natürlichen Konturen des umgebenden Golfplatzes einzubetten.
  13. Verfahren nach einem der Ansprüche 8 bis 12, wobei jede Schicht (11) aus künstlichem Gras vorher als künstliches Gras für einen anderen Anwendungszweck verwendet worden ist.
  14. Golfplatz, der einen Bunker (10) nach einem der Ansprüche 1 bis 7 oder einen Bunker aufweist, der mit dem Verfahren gemäß einem der Ansprüche 8 bis 13 hergestellt worden ist.

## Revendications

1. Bunker de parcours de golf (10) comprenant une surface inclinée s'étendant vers le haut définie au moins en partie par une pluralité de couches (11) de gazon artificiel, **caractérisé en ce que** la pluralité de couches (11) est sensiblement horizontale et agencée en un agencement en quinconce correspondant à la pente de ladite surface inclinée.
2. Bunker de parcours de golf (10) selon la revendication 1, dans lequel chaque couche (11) de gazon artificiel comprend des fibres de gazon synthétique (14) sur un matériau de soutien (13).
3. Bunker de parcours de golf (10) selon la revendication 2, dans lequel le matériau de soutien (13) sup-

- porte un matériau granulaire qui remplit au moins une partie de l'espace entre les fibres de gazon synthétique.
4. Bunker de parcours de golf (10) selon l'une quelconque des revendications précédentes, dans lequel ladite pluralité de couches (11) de gazon artificiel définit une surface extérieure du bunker et l'intérieur du bunker est formé d'un matériau différent. 5
5. Bunker de parcours de golf (10) selon la revendication 4, dans lequel l'intérieur du bunker comprend un matériau de remplissage (5). 10
6. Bunker de parcours de golf (10) selon l'une quelconque des revendications précédentes, dans lequel ladite pluralité de couches (11) de gazon artificiel sont liées ensemble. 15
7. Bunker de parcours de golf (10) selon l'une quelconque des revendications précédentes, dans lequel un organe d'ancrage (6) passe à travers ladite pluralité de couches de gazon artificiel. 20
8. Procédé de construction d'un bunker de parcours de golf (10) sur un parcours de golf, dans lequel le procédé comprend les étapes suivantes : 25
- la formation d'une excavation ayant une surface extérieure ; 30
  - la découpe de couches de gazon artificiel ;
  - la pose du gazon artificiel en une pluralité de couches horizontales (11) dans un agencement en quinconce afin de créer la forme, la hauteur et la pente souhaitées pour faire face à la surface extérieure de l'excavation, moyennant quoi le bunker (10) ainsi construit a une surface inclinée s'étendant vers le haut avec une pente correspondant audit agencement en quinconce. 35
9. Procédé selon la revendication 8, dans lequel le procédé comprend en outre une étape de découpe d'au moins une couche de gazon artificiel afin de former une incision (2) qui fournit une flexibilité suffisante pour permettre la manipulation de la couche de gazon artificiel pour qu'elle s'adapte aux contours de la surface extérieure de l'excavation, tout en maintenant l'apparence de la surface de face avant du bunker. 40
10. Procédé selon la revendication 8 ou la revendication 9, dans lequel les couches (11) de gazon artificiel sont imprégnées de sable avant d'être posées. 45
11. Procédé selon l'une quelconque des revendications 8 à 10, dans lequel l'étape de pose du gazon artificiel en couches horizontales (11) comprend la pose d'une première couche, l'ajout d'un matériau de régulation directement par-dessus la première couche afin de créer une surface régulière et de niveau sur laquelle on peut poser une seconde couche, puis la pose d'une seconde couche par-dessus le matériau de régulation sur la première couche. 50
12. Procédé selon l'une quelconque des revendications 8 à 11, dans lequel le procédé comprend en outre une étape d'ajout de pelouse naturelle, de terre végétale et de semence pour marier la structure artificielle avec les contours naturels du parcours de golf environnant. 55
13. Procédé selon l'une quelconque des revendications 8 à 12, dans lequel chaque couche (11) de gazon artificiel a été préalablement utilisée comme gazon artificiel pour une application différente.
14. Parcours de golf comprenant un bunker (10) selon l'une quelconque des revendications 1 à 7 ou un bunker tel qu'il est construit par le procédé de l'une quelconque des revendications 8 à 13.

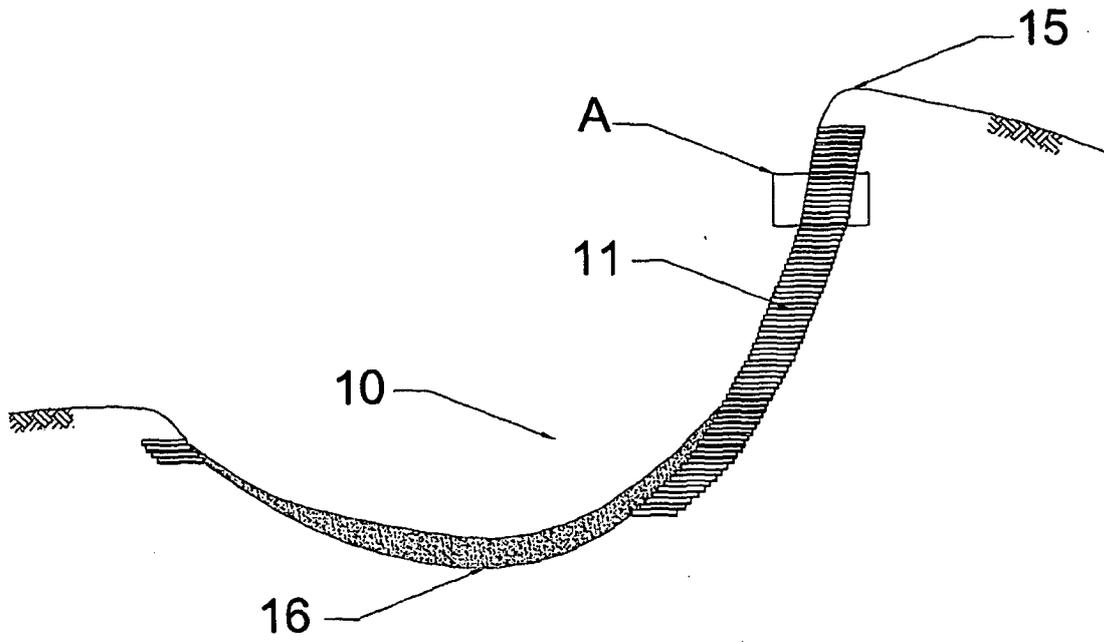


Fig. 1

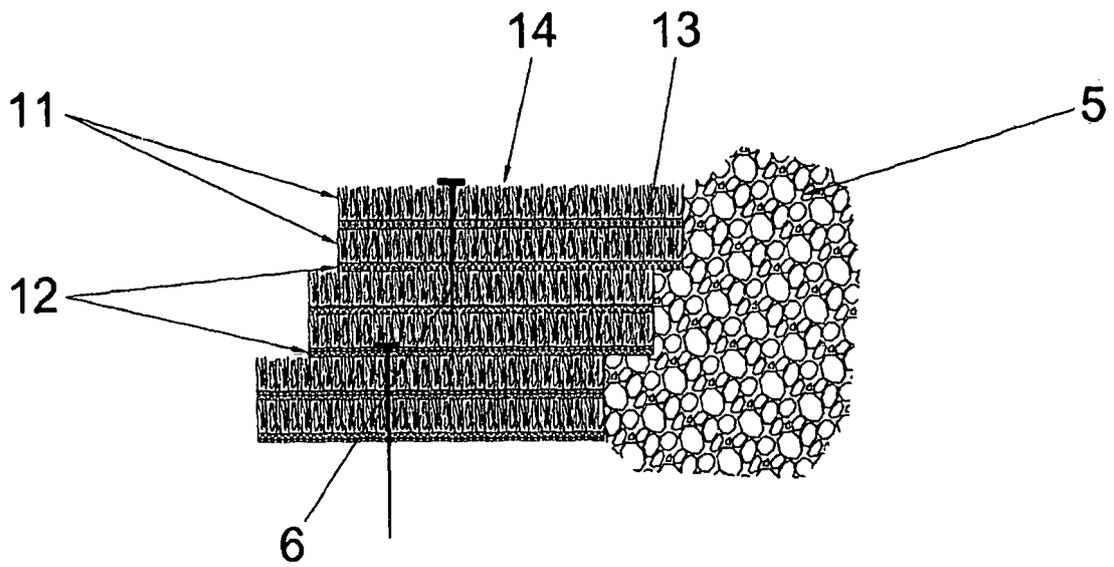


Fig. 2

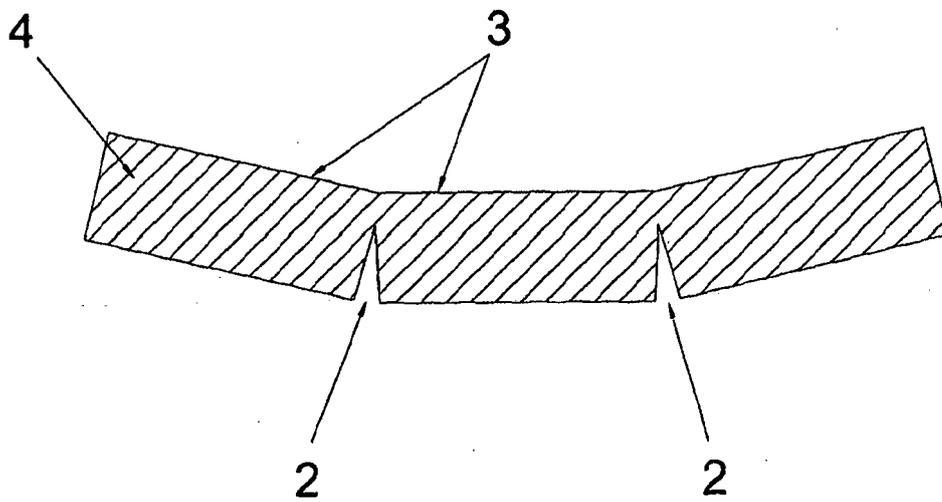


Fig. 3

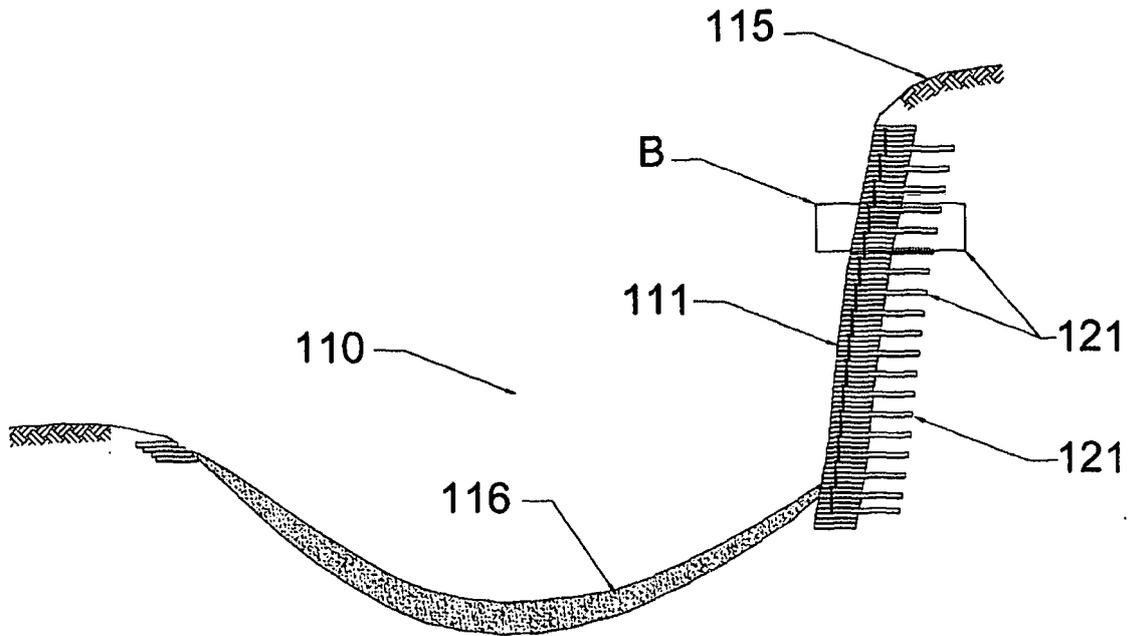


Fig. 4

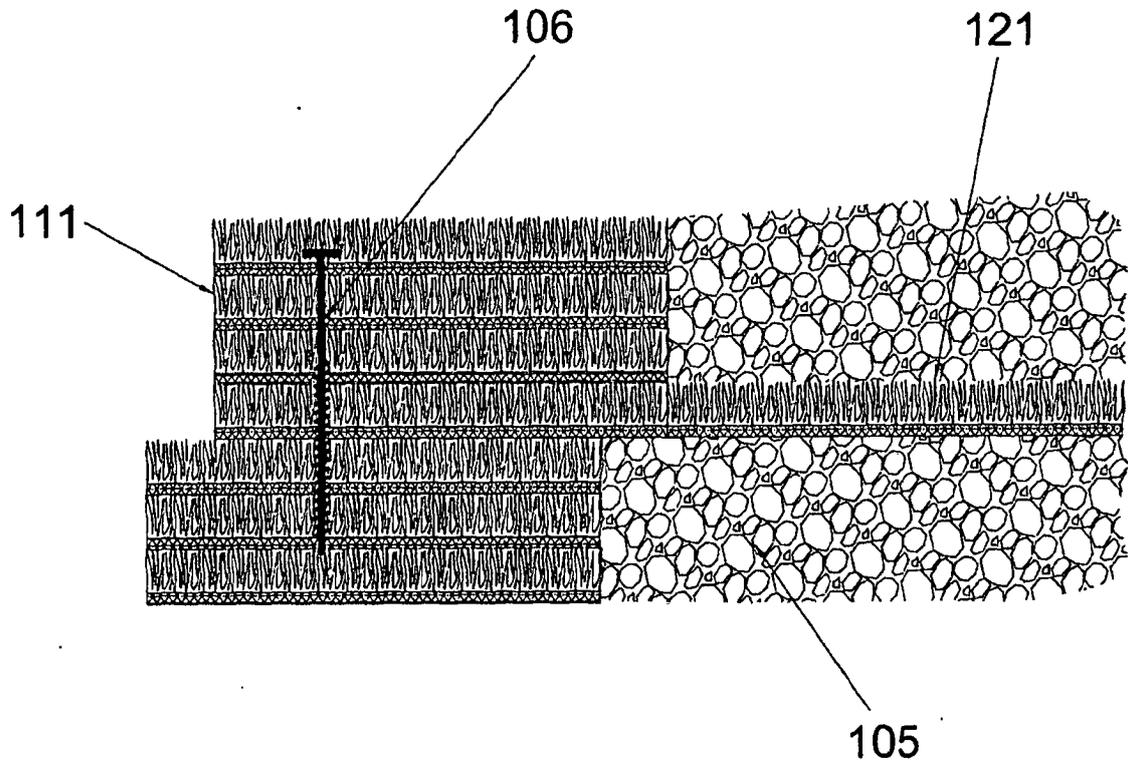


Fig. 5

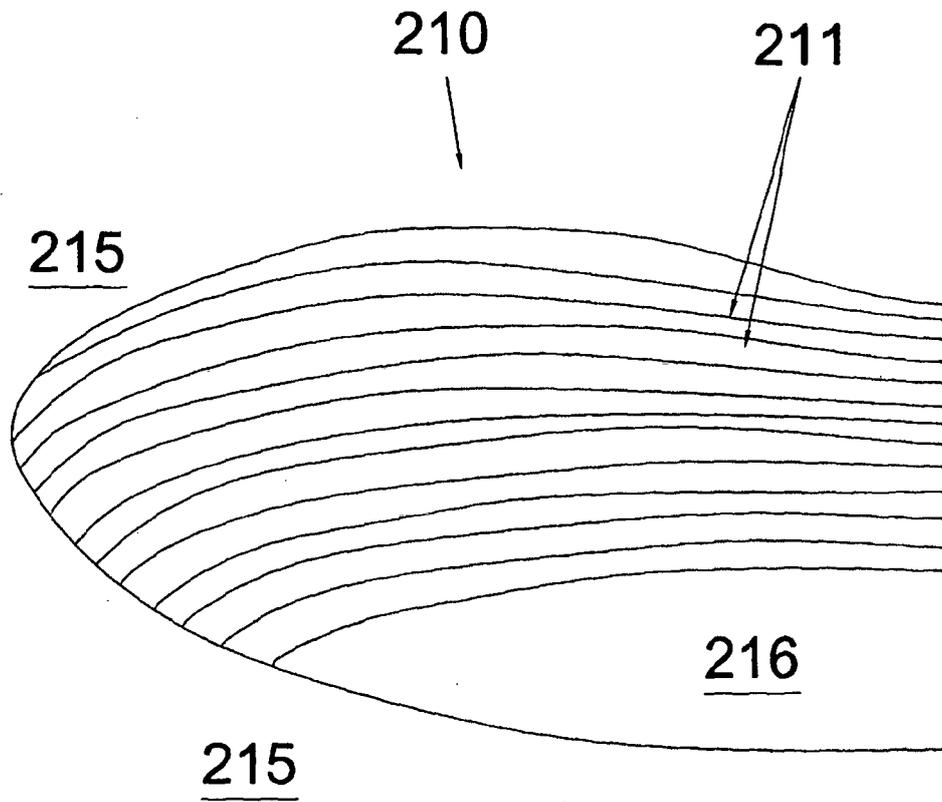


Fig. 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 0753329 A [0009]
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