

⑫

EUROPEAN PATENT APPLICATION

⑳ Application number: **88870054.9**

⑤① Int. Cl.4: **A 63 B 69/36**

㉔ Date of filing: **08.04.88**

③① Priority: **10.04.87 US 36948**

④③ Date of publication of application:
12.10.88 Bulletin 88/41

⑧④ Designated Contracting States:
BE DE ES FR GB IT NL SE

⑦① Applicant: **Monsanto Company**
Patent Department 800 North Lindbergh Boulevard
St. Louis Missouri 63167 (US)

⑦② Inventor: **Arrant, Kearney Dale**
Route 3 Box 38
Farmerville Louisiana 71241 (US)

Breland, Richard Dewitt
1903 Tara Place
Dalton Georgia 30720 (US)

Myers, Robert Dayie
3129 Cloister Lane
Dayton Ohio 45449 (US)

⑦④ Representative: **McLean, Peter et al**
Monsanto Europe S.A. Patent Department Avenue de
Tervuren 270-272 Letter Box No 1
B-1150 Brussels (BE)

⑤④ **Golf driving mat.**

⑤⑦ A golf driving mat (10) is formed as a laminate structure. The upper layer (12) of the laminate is a knitted grass-like layer and the lower layer (14) is a resilient, shock absorbing support pad which is secured to the upper layer (12).

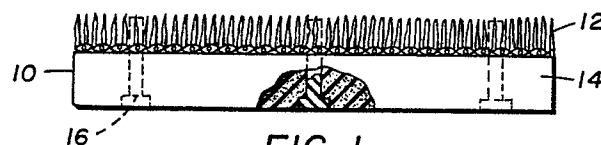


FIG. 1.

EP 0 286 620 A1

Description

GOLF DRIVING MAT

Background of the Invention

This invention relates to a synthetic golf driving mat. More specifically this invention relates to a golf driving mat constructed as a laminate having a knitted grass-like layer adhesively attached to a resilient support pad. More particularly this invention relates to a synthetic golf mat which demonstrates a high resistance to delamination under heavy use.

Golf driving mats have been quite common for a long period of time and have found use especially on golf driving ranges. Some of the prior art golf tees are small and represent only the hitting area with the player standing on an adjacent rubber mat or the like. These golf tees are generally constructed by embedding a plurality of bristle-like fibers into a rigid backing. A rubber insert is used as a tee to support the ball.

Another type of synthetic golf tee is shown in U.S. Patent 3,880,432 in which a synthetic grass-like fabric is mounted and stretched across a subsurface frame. The grass-like fabric is a pile carpet of knitted construction having a pile height of from about 6.4 mm (1/4") to about 19.2 mm (3/4").

Summary of the Invention

This invention is comprised of a synthetic golf driving mat which is formed in its simplest fashion as a laminate structure having a knitted grass-like pile layer which is adhesively attached to a resilient, shock absorbing support pad. Generally, the knitted grass-like pile layer is formed of a nylon knitted fabric having a construction similar to that described in U.S. Patent 3,332,828. The resilient, shock absorbing support pad may be formed as a polyvinylchloride-nitrile rubber closed cell foam pad or other resilient cushion padding which will provide a live feel to the user of the golf driving mat. The knitted grass-like pile layer is adhesively attached or laminated to the support pad.

Description of the Drawings

Figure 1 is a side view of the golf driving mat of this invention.

Figure 2 is a side view of the golf driving mat of this invention including a scrim layer.

Figure 3 is a top view of a golf driving mat of this invention.

Detailed Description of the Invention

Turning now to Figure 1, the golf driving mat of this invention is shown in a side view. The laminate structure of the golf driving mat 10 is easily seen. The golf driving mat 10 is formed as a laminate having an upper layer formed as a knitted grass-like layer 12 and a lower layer which is a resilient, shock absorbing support pad 14. The knitted grass-like layer 12 is adhesively secured to the resilient, shock absorbing support pad 14. The knitted grass-like layer may be formed of a nylon 6,6 knitted fabric which contains approximately 1690 grams per

square meter (50 ounces per square yard) of pile ribbon, approximately 270 grams per square meter (8 ounces per square yard) of a tire yarn polyester primary backing, and approximately 135 grams per square meter (4 ounces per square yard) of polyvinylidene chloride tuft bind material. It is also possible to use other materials to produce the knitted grass-like layer and to use differing quantities of material in its production. The synthetic grass-like fabric is a pile carpet of knitted construction. Other constructions such as tufted fabrics are not suitable for this application because it is very difficult to secure the vertically extending tufts tightly enough to the backing to prevent them from being loosened and removed therefrom upon repeated striking of the surface by a golf club. The use of a woven carpet also does not provide a suitable golf driving mat because they are difficult to laminate to a supporting pad.

The carpet pile height affects both product durability and the golfer's ability to complete his swing or follow-through. A pile height of less than 1/4" reduces fabric durability. Where the pile height is greater than 6.4 mm (1/4") and less than 19.2 mm (3/4"), the pile bends with the club head and tends to slide the club head forward and through the ball. A pile height of greater than 19.2 mm (3/4") is subject to pile matting which shortens the life of the golf driving mat.

The resilient, shock absorbing support pad 14 is preferably a pad formed of a polyvinylchloride (PVC) and nitrile rubber closed cell foam such as Ensolite® foam produced by Uniroyal. However, it is also acceptable to use a vinyl pad or a pad of other materials that provide sufficient shock absorbancy. The PVC-nitrile rubber pad forms a closed cell skin on the outer surface during the manufacturing process. Before it is used to produce the golf driving mat of this invention, the skin surface must be cracked or removed from the surface, for example, by cutting it with a knife, to provide a rough surface for the bonding of an adhesive. The golf driving mat is made using a shock absorbing support pad between approximately 6.4 mm (1/4") and approximately 25.4 mm (1") thick, and preferably approximately 15.9 mm (5/8") thick.

An adhesive is used to adhesively bond or laminate the knitted-grass like layer 12 to the support pad 14. The adhesive is preferably a single part urethane; however, it is also possible to use two-part epoxy and two-part urethane adhesives. The adhesive is foamed as it is applied to the skived surface of the resilient, shock absorbing support pad 14. Following the application of the foamed adhesive to the surface of the support pad 14, the knitted grass-like layer 12 is placed upon the adhesive and the laminate is allowed to cure at ambient temperature under pressure. Any amount of pressure may be used as it is only necessary to assure complete contact between the knitted grass-like layer 12 and the resilient support pad 14 to

prevent bubbles or uneven lamination. A slight pressure, such as between about 0.7 gms/cm² (0.01 psi) and about 140 gms/cm² (2.0 psi), is preferred and a pressure of about 7 gms/cm² (0.1 psi) is most preferred. Penetration of the foamed adhesive through the knitted backing of the grass-like layer 12 is required to achieve a mechanical and chemical bond between the support pad 14 and the grass-like layer 12 by completely encapsulating the polyester primary backing of the grass-like layer.

The golf driving mat is generally produced in the shape of a square or rectangle; however, any shape is possible, including triangles, circles, and hexagons. The square mat is typically about 1.5 meters square (about 5 feet square); however, the mat can be made any size that is desired. A hole is formed near the midpoint of each side of the mat and separated from the edge by a short distance, for example for a mat that is 1.5 meters square the hole would be located between about 15.3 cm (6") to about 45.7 cm (18") from the edge. The hole is counter-sunk, or recessed, on the bottom surface of the mat so that a T-shaped rubber golf tee 16 can be inserted through the golf driving mat to support a golf ball so that the ball will not be placed directly upon the grass-like surface. The hole must be counter-sunk, as shown in Figure 1, to prevent the formation of a hump in the golf driving mat when it is placed upon the ground for use. If a hump is present, it would be repeatedly struck by a golf club when the mat is in use and the mat could suffer an early failure at the location of the hump. The presence of a plurality of holes allows the golf driving mat to be rotated periodically to allow wear or abrasion to take place at several locations instead of one to extend the useful service life of the golf driving mat.

Rain or water used for cleaning, drains from the golf driving mat relatively quickly. However, the drainage may be improved so that the mat will dry even faster. This is accomplished by punching small holes through the golf driving mat so that the water can flow through the mat. The small holes should be located across the entire surface of the golf driving mat. It is recommended that the holes be placed in a regular or symmetrical arrangement and that each hole be spaced a sufficient distance from any other hole to prevent weakening the structural integrity of the golf driving mat. If the golf driving mat is not weakened by punching too many holes, then the number of holes, the size of each hole provided it has a relatively small diameter, and the hole pattern or the spacing between the holes are not critical. The inclusion of holes through the golf driving mat is particularly useful for improving the mat drainage when the mat is placed upon a porous surface such as earth; however, the drainage is also improved in those instances when the mat is placed on a nonporous surface such as concrete.

Figure 2 shows an alternative construction for the golf driving mat 10. The golf driving mat 10 is formed as a laminate having an upper layer formed as a knitted grass-like layer 12 and a lower layer which is a resilient, shock absorbing support pad 14. Between the grass-like layer 12 and the support pad 14, a layer of scrim 18 is placed. The three layers are

adhesively secured to one another to form the laminate structure of the golf driving mat 10. The scrim 18 is used to reinforce the laminate structure to reduce the possibility of delamination from repeated striking of the grass-like layer by the head of a golf club when the golf driving mat is in use. The scrim layer may have the same dimensions as the golf driving mat or it may have smaller dimensions wherein the scrim would be located to provide reinforcement at the holes for the golf tees. A counter-sunk, or recessed, hole is formed near the midpoint of each side of the mat 10 so that a T-shaped rubber golf tee 16 can be inserted through the golf driving mat to support a golf ball so that the ball will not be placed directly upon the grass-like surface. The shape of the golf driving mat and the spacing of the holes are similar to those discussed above in regard to Figure 1.

Figure 3 shows a top view of the golf driving mat 10 of Figure 2. The mat 10 is shown as a square with the rubber tees 16 shown spaced from the edge of the mat at approximately the midpoint of each side of the mat. It is contemplated that the scrim would be utilized as a layer having the same dimensions as the golf driving mat 10; however, it is possible to place the scrim only at the locations on the golf driving mat that will have the highest wear or abrasion. In Figure 3 the scrim is shown in the shape of a cross wherein the scrim is present in the area around the rubber tees 16 and at the center of the golf driving mat 10. In this configuration the scrim provides additional support around each rubber tee 16 to reduce the possibility of delamination from repeated striking of the surface by the head of a golf club. In addition, the scrim is present in the center of the golf driving mat 10 which is the location for the feet of the user of the golf driving mat. It would also be possible to provide the scrim as a small circle or other shape and to locate this shape so that it only reinforces the area around the holes supporting the tees.

While the invention has been described herein with regard to certain specific embodiments, it is not so limited. It is to be understood that variations and modifications thereof can be made by those skilled in the art without departing from the spirit and scope of the invention.

Claims

1. A golf driving mat comprising a laminate structure having an upper layer, said upper layer being a knitted grass-like layer, and a lower layer, said lower layer being a resilient, shock-absorbing support pad, said upper layer being secured to said lower layer.

2. The golf driving mat of Claim 1 wherein said upper layer is adhesively secured to said lower layer.

3. The golf driving mat of Claim 1 wherein the pile height of said knitted grass-like layer is greater than about 6.4 mm and less than about 19.2 mm.

4. The golf driving mat of Claim 1 further comprising at least one hole, said hole being formed to support a golf tee.

5. The golf driving mat of Claim 4 including at least one hole located along each side of said golf driving mat.

5

6. The golf-driving mat of Claim 1 further comprising a layer of scrim, said scrim being located intermediate said upper layer and said lower layer.

10

7. The golf driving mat of Claim 6 wherein said layer of scrim has the same dimensions as said laminate structure.

8. The golf driving mat of Claim 5 further comprising a layer of scrim intermediate said upper layer and said lower layer, said layer of scrim being located to reinforce the laminate structure near said holes for supporting golf tees.

15

9. The golf driving mat of Claim 6 further comprising a plurality of small holes through said laminate structure for drainage of water.

20

10. A golf driving mat comprising a laminate structure having an upper layer, said upper layer being a knitted grass-like layer, a lower layer, said lower layer being a resilient, shock absorbing support pad, said upper layer being adhesively secured to said lower layer, and a layer of scrim intermediate said upper layer and said lower layer; said laminate structure further including at least one hole formed to support a golf tee.

25

30

11. The golf driving mat of Claim 10 including at least one hole located along each side of said laminate structure, each of said holes being formed to support a golf tee.

35

12. The golf driving mat of Claim 10 further including a plurality of small holes through said laminate structure for drainage of water.

13. The golf driving mat of Claim 11 wherein each of said holes are countersunk into said lower layer to support a golf tee.

40

45

50

55

60

65

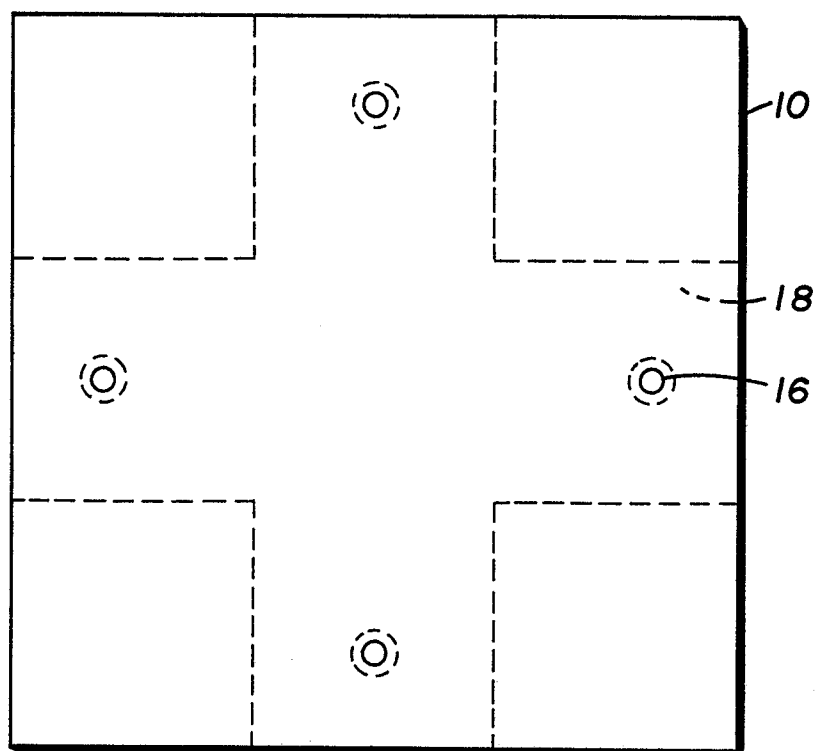
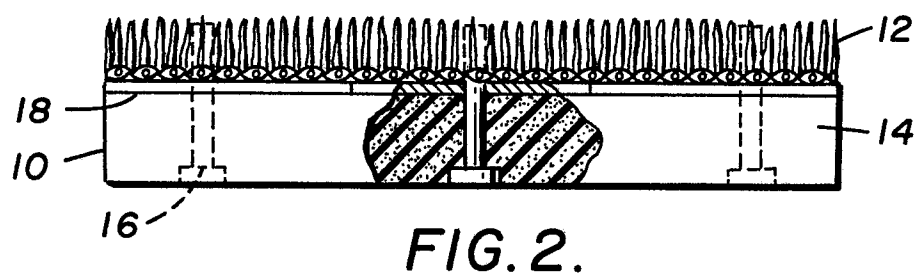
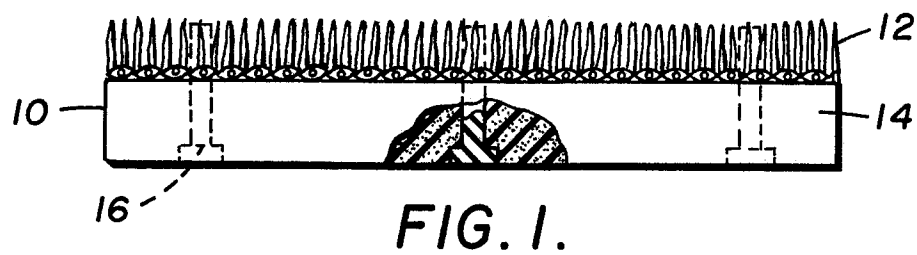


FIG. 3.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 87 0054

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
D,X	US-A-3 880 432 (COFFEY et al.) * Figure 1; abstract; column 1, lines 31-53 *	1,3	A 63 B 69/36
Y	----	2,4	
Y	GB-A-2 107 593 (CHARLES LAWRENCE GROUP) * Figures 1-2; page 1, lines 59-78 *	2,4	
X	US-A-3 599 982 (ELESH) * Figures 1-2; column 2, lines 2-22 *	1	
D,A	US-A-3 332 828 (FARIA & WRIGHT) * Column 1, lines 11-14; column 2, lines 12-14 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			A 63 B E 01 C
Place of search THE HAGUE		Date of completion of the search 17-06-1988	Examiner JONES T.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			