



US 20120115631A1

(19) **United States**

(12) **Patent Application Publication**
Tseng et al.

(10) **Pub. No.: US 2012/0115631 A1**

(43) **Pub. Date: May 10, 2012**

(54) **GOLF CLUB**

(30) **Foreign Application Priority Data**

Nov. 9, 2010 (TW) 099138485

(75) Inventors: **Chieh-Fu Tseng**, Kaohsiung City (TW); **Te-Fu Hsiao**, Kaohsiung City (TW)

Publication Classification

(51) **Int. Cl.**
A63B 53/00 (2006.01)

(73) Assignee: **Advanced International Multitech Co., Ltd.**

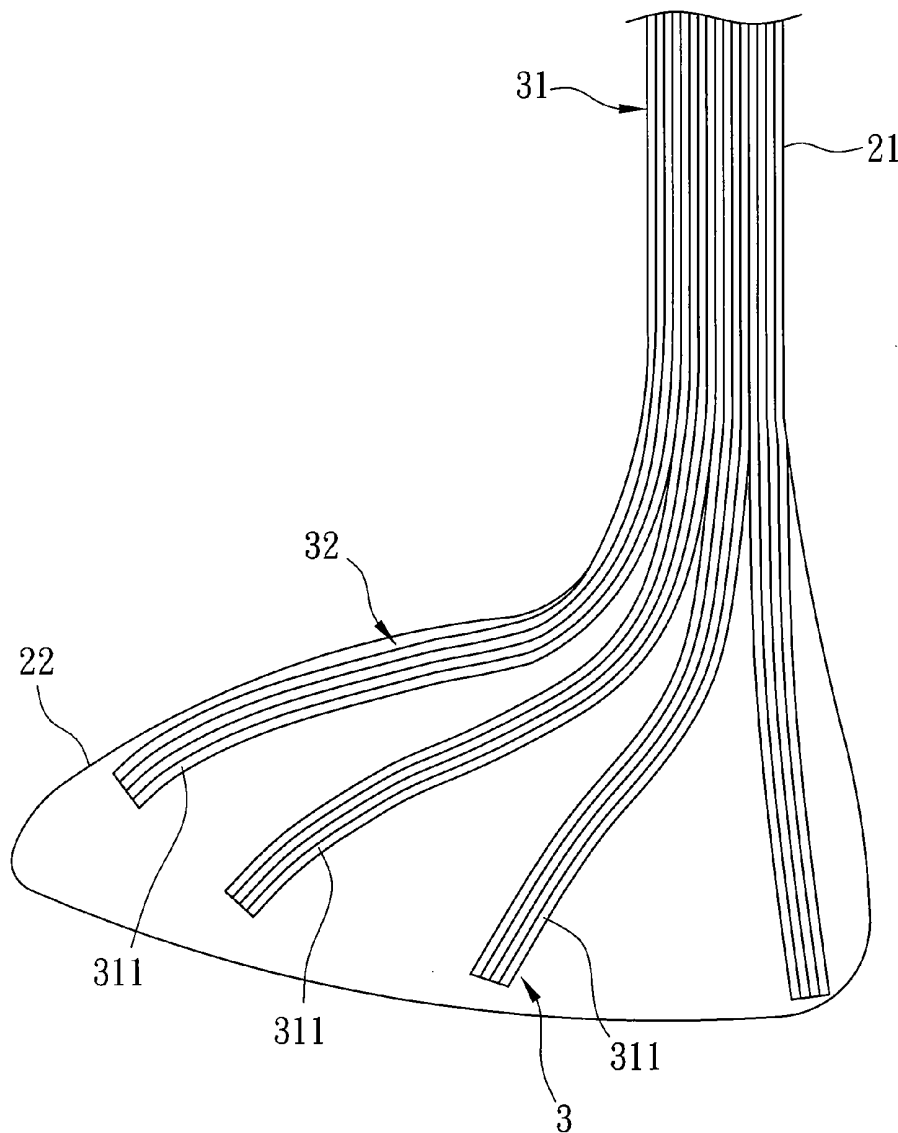
(52) **U.S. Cl.** **473/304**

(21) Appl. No.: **13/048,934**

(57) **ABSTRACT**

(22) Filed: **Mar. 16, 2011**

A golf club includes a golf club head, and a shaft extending from one side of the golf club head. The shaft and the golf club head are made as a one-piece body from a prepreg sheet including a fiber structure impregnated with a resin. The fiber structure extends continuously from the shaft to the golf club head.



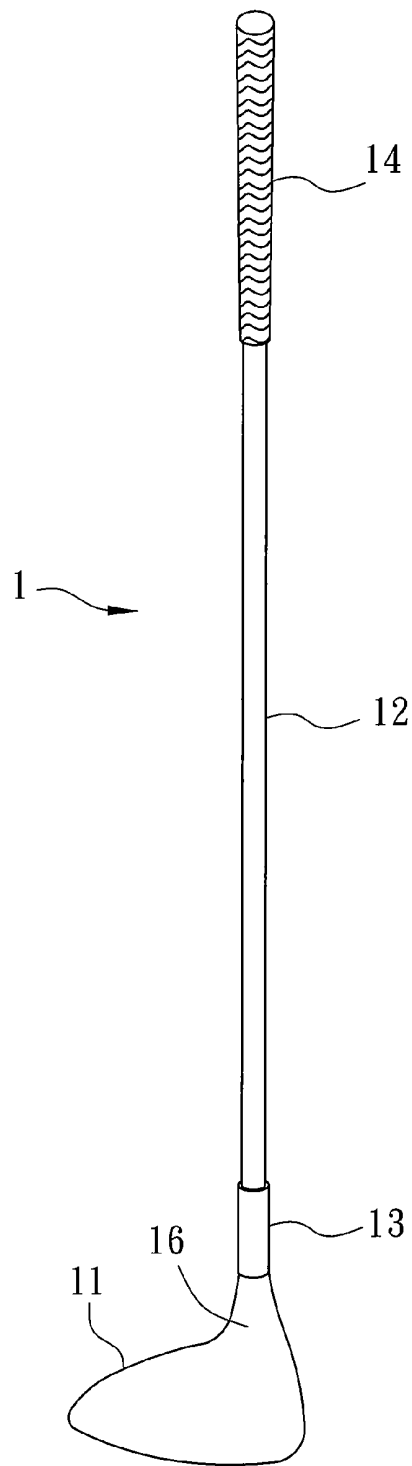


FIG. 1 PRIOR ART

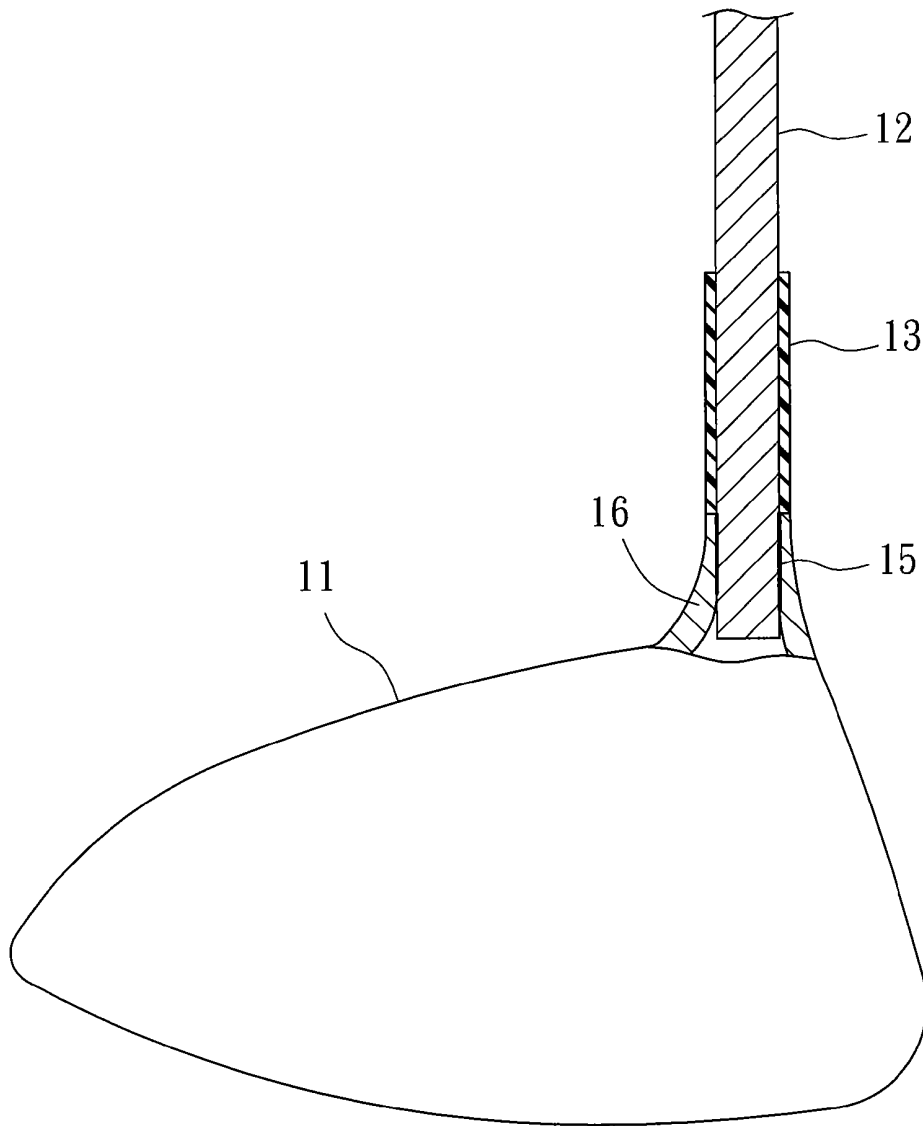


FIG. 2 PRIOR ART

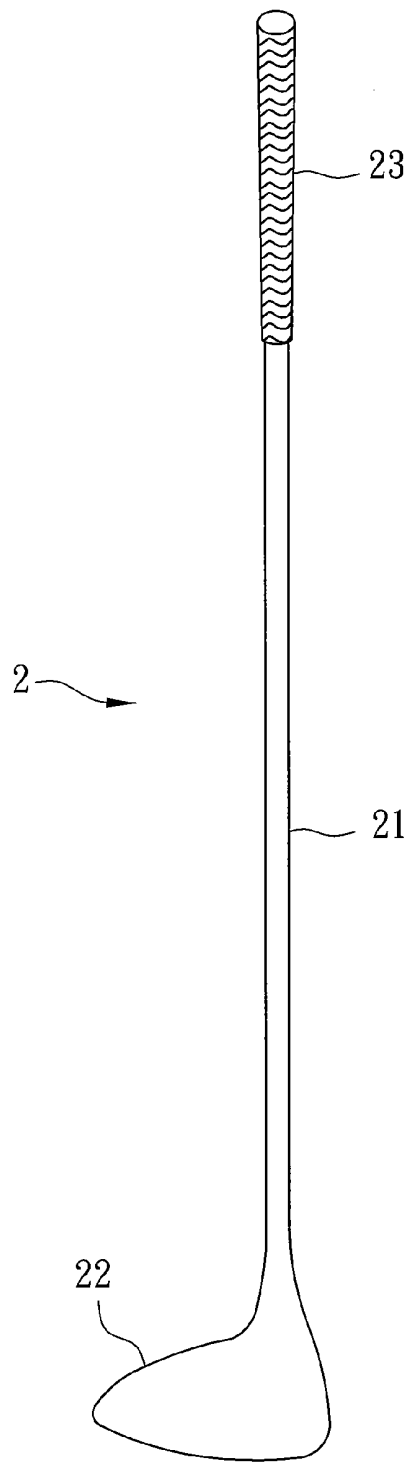


FIG. 3

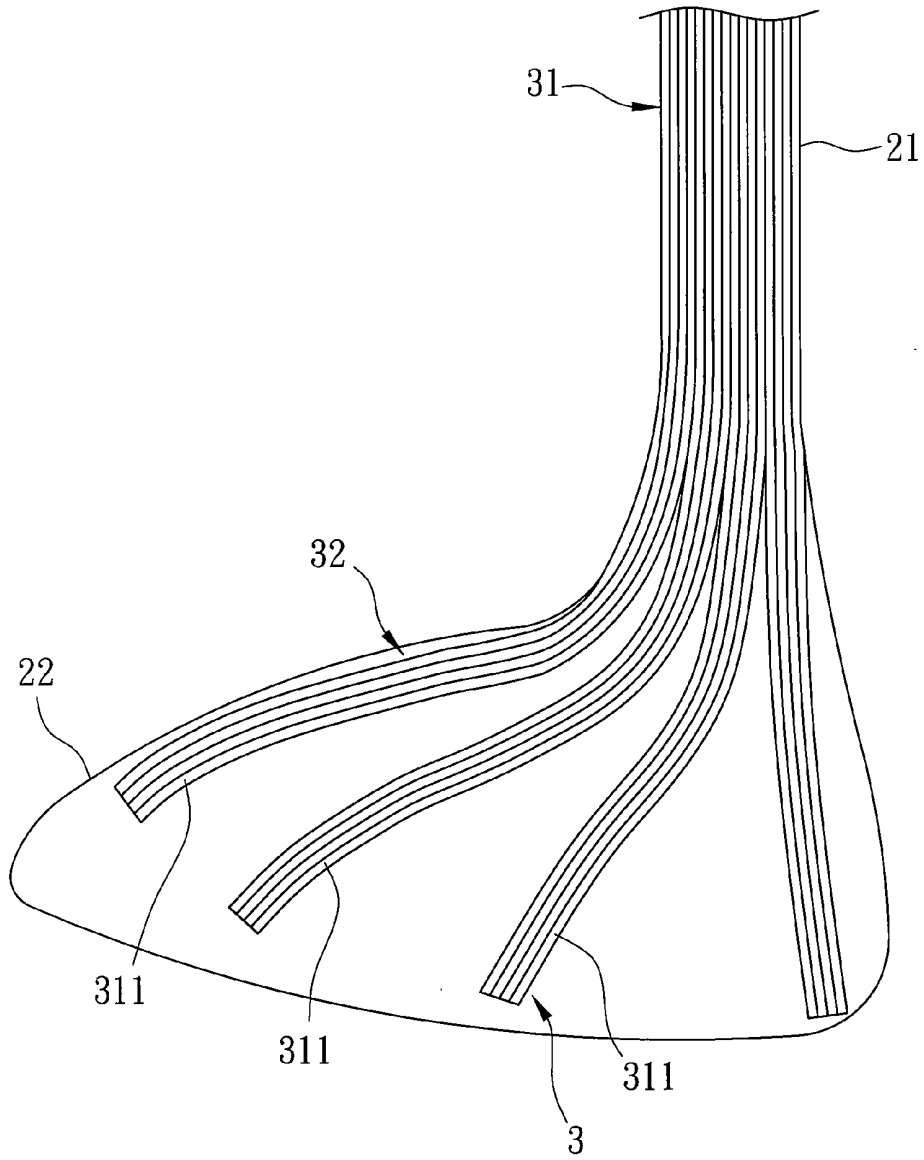


FIG. 4

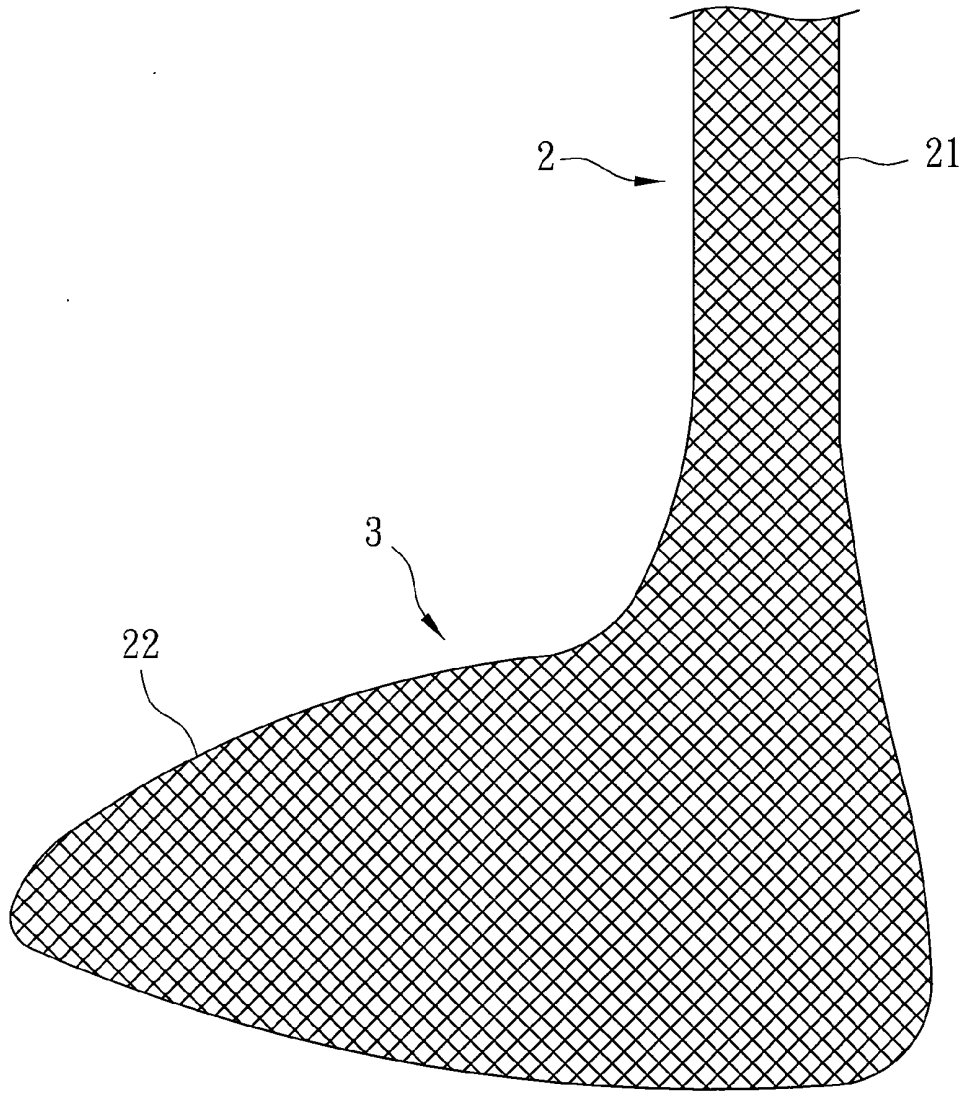


FIG. 5

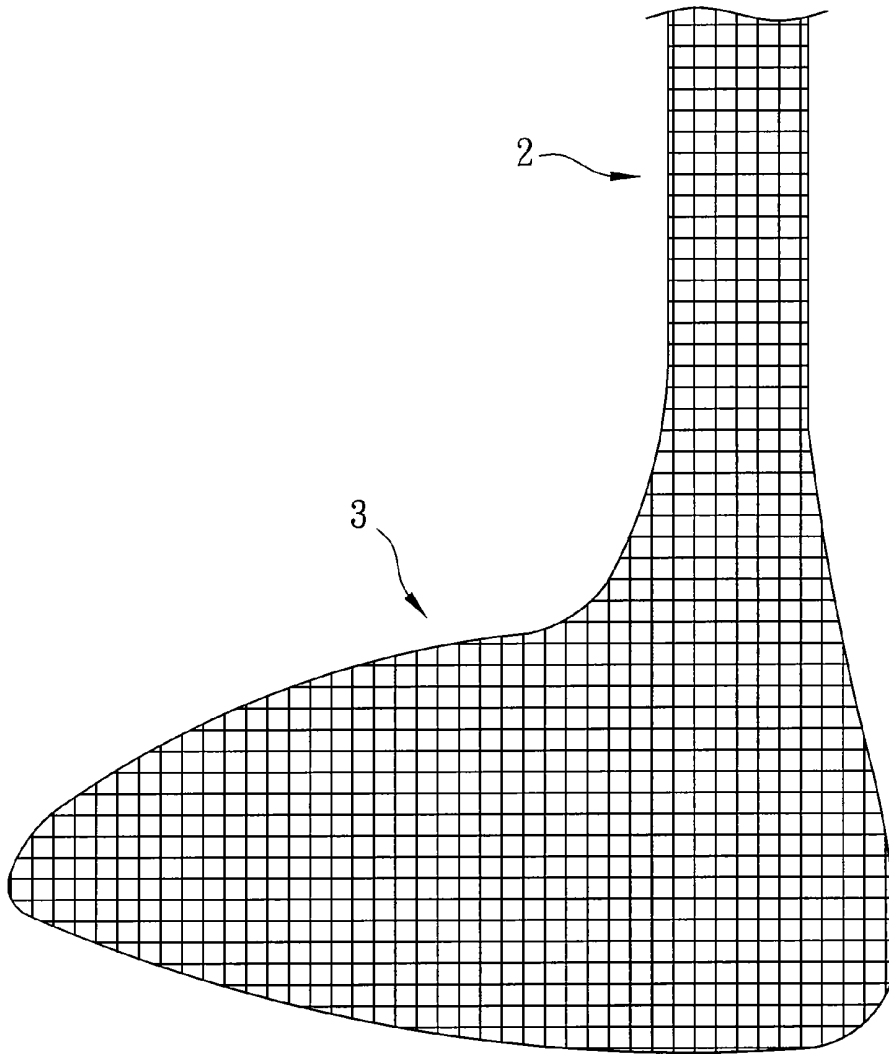


FIG. 6

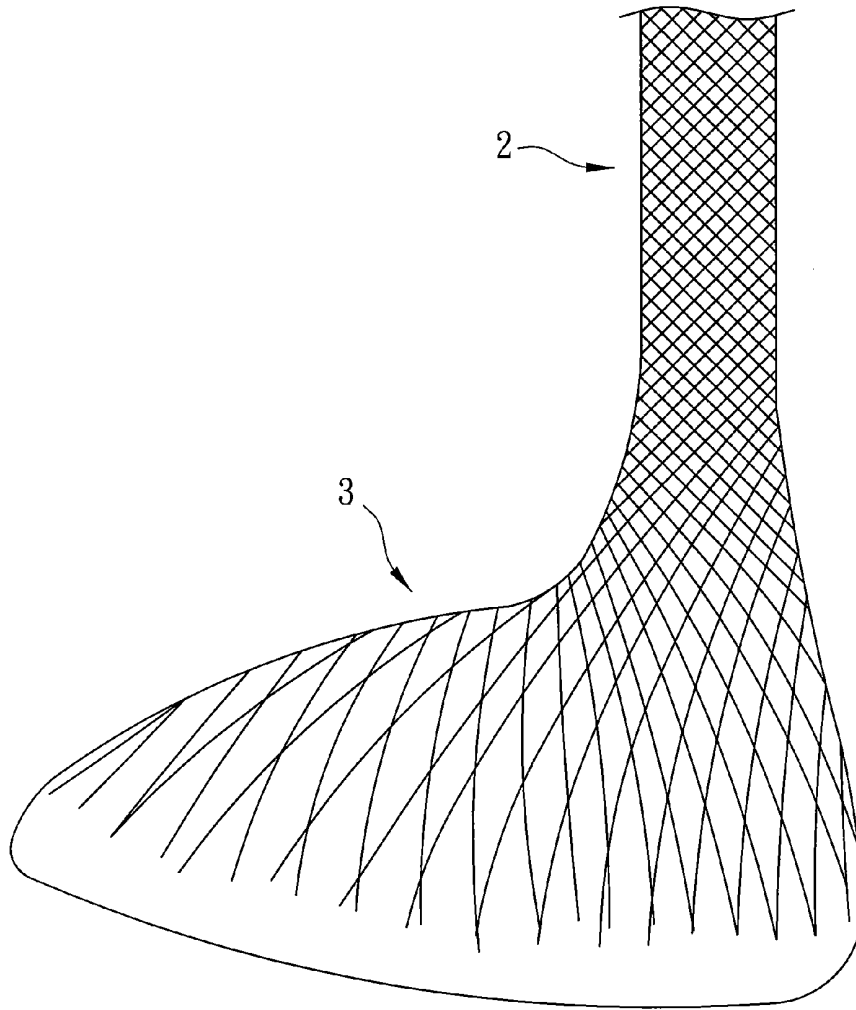


FIG. 7

GOLF CLUB**CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims priority of Taiwanese application no. 099138485, filed on Nov. 9, 2010.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to a golf club, more particularly to a golf club including a golf club head and a shaft made as a one-piece.

[0004] 2. Description of the Related Art

[0005] Referring to Figs. 1 and 2, a conventional golf club 1 includes a golf club head 11, a shaft 12 inserted into the golf club head 11, a ferrule 13 sleeved on the top of a hosel 16 that defines the portion of the golf club head 11 to which the shaft 12 is attached, and a grip 14 sleeved on an end of the shaft 12 opposite to the golf club head 11. In the hosel 16, the golf club head 11 is coupled to the shaft 12 using an adhesive 15. When using the golf club 1, the user's power is transmitted to a golf ball (not shown) via the grip 14, the shaft 12, and the golf club head 11. However, the conventional golf club 1 still has the following defects:

[0006] 1. The striking performance cannot be fully utilized. This is because the user's power, aside from hitting the golf ball, will also be partially diminished by the adhesive 15 and gaps formed among the constructive elements of the golf club 1.

[0007] 2. The error tolerance for striking is poor. The inclusion of the ferrule 13, the adhesive 15, and other joining structures (not shown) among the elements of the golf club 1 moves a center of gravity of the golf club 1 upward and increases the weight of the golf club 1. This may reduce the error tolerance of striking, and is adverse to the adjustment of the center of gravity and weight of the golf club 1.

SUMMARY OF THE INVENTION

[0008] Therefore, an object of the present invention is to provide a golf club that can overcome the aforesaid drawbacks associated with the prior art.

[0009] Accordingly, a golf club of this invention comprises a golf club head, and a shaft extending from one side of the golf club head. The shaft and the golf club head are made as a one-piece body from a prepreg sheet including a fiber structure impregnated with a resin, the fiber structure extending continuously from the shaft to the golf club head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of the invention, with reference to the accompanying drawings, in which:

[0011] FIG. 1 is a perspective view of a conventional golf club;

[0012] FIG. 2 is a fragmentary partly sectional view of the golf club of FIG. 1;

[0013] FIG. 3 is a perspective view of a golf club according to the present invention;

[0014] FIG. 4 is a fragmentary schematic view for illustrating the first preferred embodiment of the fiber structure of the golf club according to this invention;

[0015] FIG. 5 is a fragmentary schematic view for illustrating the second preferred embodiment of the fiber structure of the golf club according to this invention;

[0016] FIG. 6 is a fragmentary schematic view for illustrating the third preferred embodiment of the fiber structure of the golf club according to this invention; and

[0017] FIG. 7 is a fragmentary schematic view for illustrating the fourth preferred embodiment of the fiber structure of the golf club according to this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Before the present invention is described in greater detail with reference to the accompanying preferred embodiments, it should be noted herein that like elements are denoted by the same reference numerals throughout the disclosure.

[0019] Referring to FIG. 3, a golf club 2 according to this invention includes a golf club head 22, a shaft 21 extending from one side of the golf club head 22, and a grip 23 sleeved on one end of the shaft 21 opposite to the golf club head 22.

[0020] Further referring to FIG. 4, the shaft 21 and the golf club head 22 are made as a one-piece body from a prepreg sheet 3 including a fiber structure impregnated with a resin. The fiber structure extends continuously from the shaft 21 to the golf club head 22.

[0021] The golf club 2 is formed by laminating a plurality of the prepreg sheets 3 (only one is shown). The prepreg sheets 3 may respectively include first prepreg sections 31 to form the shaft 21, and second prepreg sections 32 to form the golf club head 22.

[0022] The fiber structure in each of the prepreg sheets 3 includes a fiber selected from the group consisting of carbon fiber, glass fiber, Kevlar fiber, boron fiber, and combinations thereof. In the preferred embodiment, the fiber is carbon fiber.

[0023] Preferably, each of the first prepreg sections 31 has a fiber orientation angle of 0 degree with respect to an extending direction of the shaft 21.

[0024] Preferably, each of the prepreg sheets 3 is cut into a plurality of strips 311 in a respective one of the second prepreg sections 32. The strips 311 are pulled apart from each other so that the strips 311 have different fiber orientation angles with respect to the extending direction of the shaft 21.

[0025] The golf club 2 of this invention may be formed by the following steps. First, an airbag (not shown) made of silicone rubber or rubber latex is formed and shaped into a golf club. Then, the prepreg sheets 3 are attached to the airbag one above the other so that the strips 311 of one of the prepreg sheets 3 are staggered with those of an adjacent one of the prepreg sheets 3. Thereafter, the airbag and the prepreg sheets 3 are disposed and heat-pressed together in a mold to form the golf club 2, followed by deflating and removing the airbag.

[0026] By virtue of the fiber structure of the golf club 2 of this invention, the golf club head 22 has improved toughness, and the user's power can be effectively transmitted to the golf club head 22 through the shaft 21 during striking.

[0027] Accordingly, the golf club 2 of this invention has the following advantages:

1. Good Striking Efficiency

[0028] Since the fiber structure extends continuously from the shaft 21 to the golf club head 22, and since the shaft 21 and the golf club head 22 are formed as the one-piece body, gaps among constructive elements of the golf club 2, which may

diminish the user power, can be effectively avoided and the adhesive is not necessary. Thus, the user's power is almost completely transmitted to the golf club head **22** to result in an improved striking efficiency.

2. Good Error Tolerance for Striking

[0029] As described above, since the shaft **21** and the golf club head **22** are formed as the one-piece body, joining structures for assembling the constructive elements or the adhesive for bonding together the shaft **21** and the golf club head **22** are not necessary. Thus, the total weight of the golf club **2** can be reduced, and the center of gravity of the golf club **2** is relatively low. This is beneficial for the adjustment of the center of gravity and weight of the golf club **2** to increase the error tolerance for striking.

[0030] FIG. **5** illustrates the second preferred embodiment of the golf club **2** according to this invention (see also FIG. **3**). The second embodiment differs from the first embodiment only in that each of the shaft **21** and the golf club head **22** has fiber orientation angles of 45 degrees and -45 degrees with respect to the extending direction of the shaft **21**. Furthermore, because the fiber orientations of this embodiment are different from that of the first embodiment, each of the prepreg sheets **3** of the second preferred embodiment is not required to be cut into a plurality of strips **311**.

[0031] In this embodiment, the golf club **2** may be formed by attaching the prepreg sheets **3**, each having a unidirectional fiber orientation, to the airbag in different directions so as to obtain the shaft **21** and the golf club head **22** having the above-mentioned fiber orientation angles. Alternatively, the shaft **21** and the golf club head **22** that have the above-mentioned fiber orientation angles may be formed by attaching the prepreg sheets **3**, each having the fiber orientation angles of 45 degrees and -45 degrees (i.e., at will-weave structure), to the airbag.

[0032] Besides, in this embodiment, since each of the shaft **21** and the golf club head **22** has the above-mentioned fiber orientations, not only shall the golf club **2** have the advantages of the first preferred embodiment, but the fiber structure in the golf club **2** can be twisted to absorb a reaction force due to striking. Therefore, the golf ball can fly more straightly and precisely. FIG. **6** illustrates the third preferred embodiment of the fiber structure of the golf club **2** according to this invention (see also FIG. **3**). The third embodiment differs from the second embodiment only in that each of the shaft **21** and the golf club head **22** has fiber orientation angles of 0 degree and 90 degrees with respect to the extending direction of the shaft **21**. In this preferred embodiment, each of the prepreg sheets

3 has a plain-weave fiber structure, and the golf club **2** further has a relatively good impact resistance.

[0033] FIG. **7** illustrates the fourth preferred embodiment of the fiber structure of the golf club **2** according to this invention (see also FIG. **3**). The fourth embodiment differs from the second embodiment only in that the fiber structure of each of the prepreg sheets **3** is a tubular multiaxial woven fabric. In this embodiment, the golf club **2** further has a relatively good impact resistance.

[0034] While the present invention has been described in connection with what are considered the most practical and preferred embodiments, it is understood that this invention is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretations and equivalent arrangements.

What is claimed is:

1. A golf club comprising a golf club head, and a shaft extending from one side of said golf club head, said shaft and said golf club head being made as a one-piece body from a prepreg sheet including a fiber structure impregnated with a resin, said fiber structure extending continuously from said shaft to said golf club head.

2. The golf club of claim 1, wherein said golf club is formed by laminating a plurality of said prepreg sheets respectively including first prepreg sections to form said shaft, and second prepreg sections to form said golf club head.

3. The golf club of claim 2, wherein each of said first prepreg sections has a fiber orientation angle of 0 degree with respect to an extending direction of said shaft.

4. The golf club of claim 3, wherein each of said prepreg sheets is cut into a plurality of strips in a respective one of said second prepreg sections, said strips being pulled apart from each other so that said strips have different fiber orientation angles with respect to the extending direction of said shaft.

5. The golf club of claim 1, wherein each of said shaft and said golf club head has fiber orientation angles of 45 degrees and -45 degrees with respect to an extending direction of said shaft.

6. The golf club of claim 1, wherein each of said shaft and said golf club head has fiber orientation angles of 0 degree and 90 degrees with respect to an extending direction of said shaft.

7. The golf club of claim 1, wherein said fiber structure is a tubular multiaxial woven fabric.

8. The golf club of claim 1, wherein said fiber structure includes a fiber selected from the group consisting of carbon fiber, glass fiber, Kevlar fiber, boron fiber, and combinations thereof.

* * * * *