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Lezatte

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[54] **WEIGHTED WOOD GOLF CLUB**

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[52] **U.S. Cl.** ..... **273/169,** 273/167 F, 273/173

[51] **Int. Cl.** **A63b 53/04**

[58] **Field of Search** ..... 273/77 R, 164, 167–175

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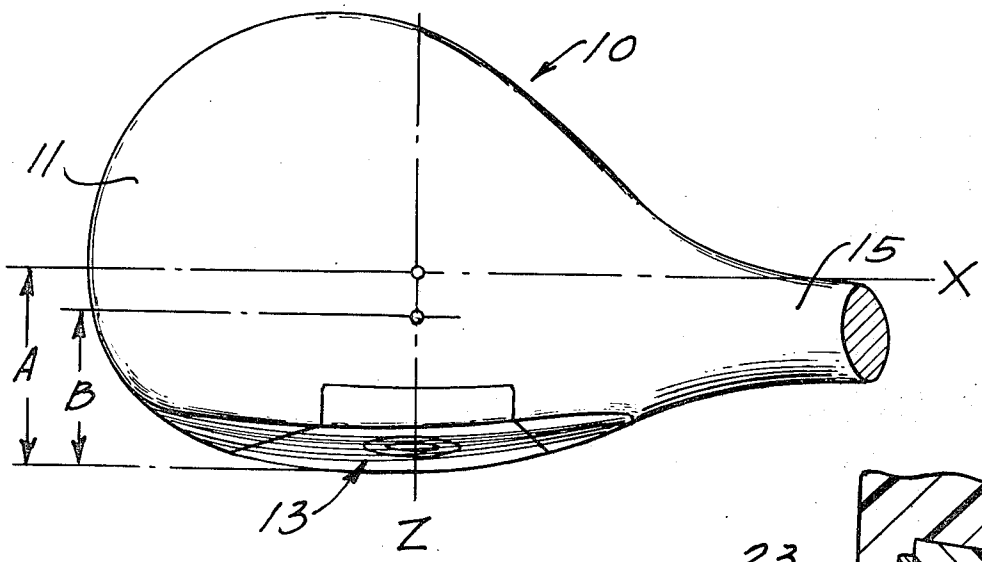
[57] **ABSTRACT**

An improved wood-type golf club having a club head in which a recess is formed, the recess being filled with an insert, a dense weighting means within the insert, and a layer of an impact resistant resin within the insert holding the weighting means therein, the weighting means being positioned to provide a center of gravity for the club head which is closer to the leading edge of the club face than in the absence of the weighting means.

7 Claims, 5 Drawing Figures



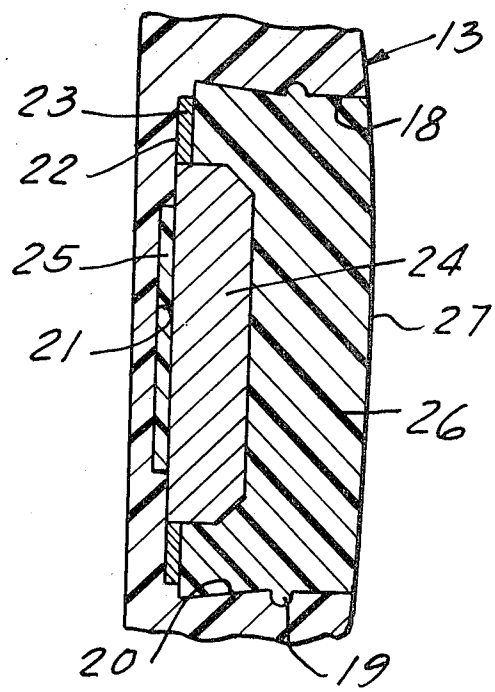


Fig. 1

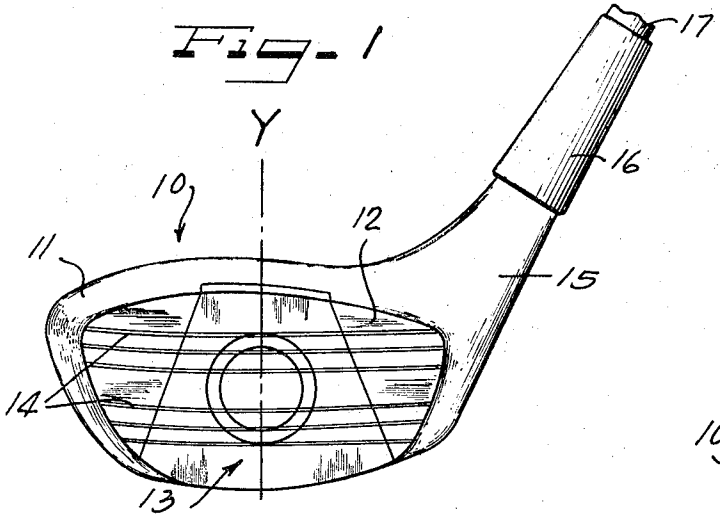


Fig. 2

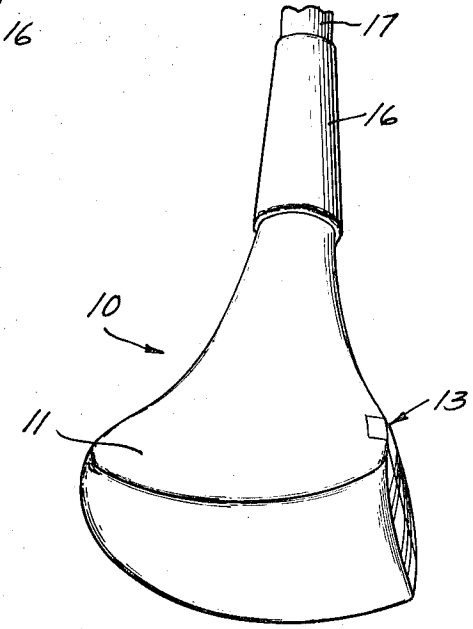


Fig. 3

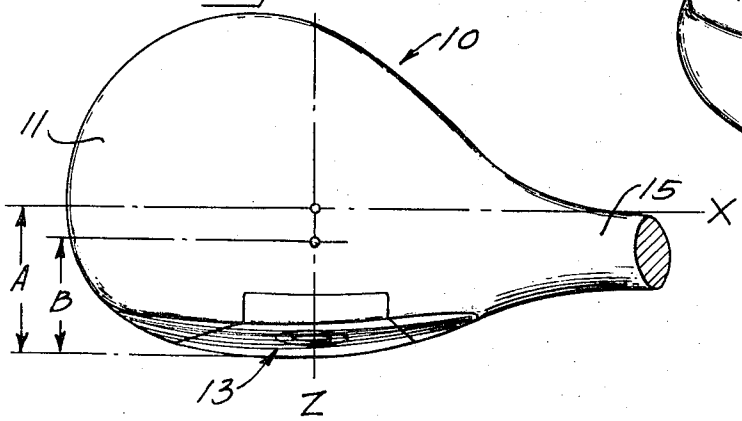


Fig. 5

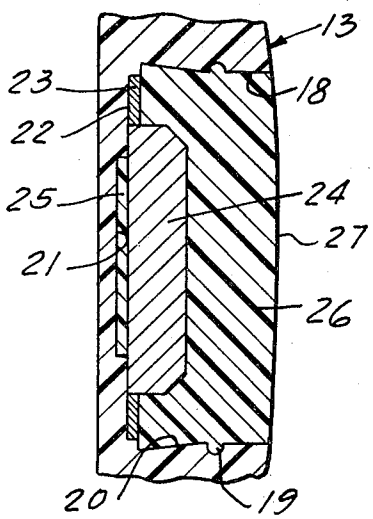
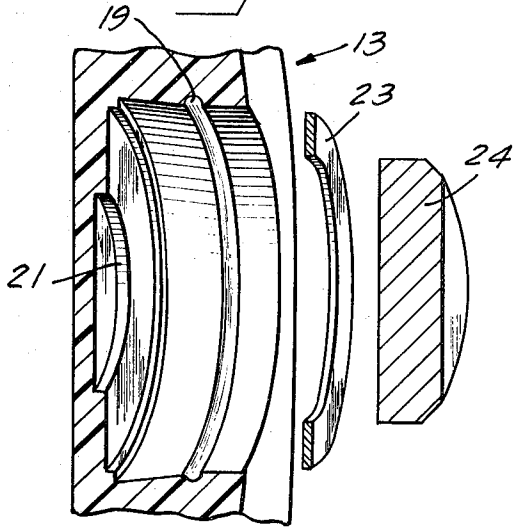


Fig. 4



WEIGHTED WOOD GOLF CLUB

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is in the field of wood-type golf clubs having weighting means which move the center of gravity for the club head forward and preferably into the plane which bisects the shaft of the club.

2. Description of the Prior Art

The problem of proper transfer of momentum from a golf club to the impact of a golf ball is one which has occupied the attention of golf club manufacturers for many years. The magnitude of the problem can be appreciated when it is realized that a golf club head may be moving at a speed in excess of **160** feet per second when it strikes a ball. The time of impact between the golf club and the ball has been estimated to be less than one millisecond so that there is a tremendous amount of energy absorption in a very brief period of time. In order for this transfer of energy to result in an adequate movement of the ball in terms of distance and direction, the effective mass of the club head should be properly positioned with respect to the area of impact on the ball.

Various weighting means have been suggested in the prior art for reallocating the mass of the club head, such weighting means usually taking the form of a heavy metal slug which is located beneath the sole plate in various positions. It has been found, however, that the positioning of weights in this manner does not always result in improving the energy transfer between a golf wood head and the golf ball. Possibly, this is due to the fact that the line of action of the centers of gravity of the ball and the club head are not in line with the theoretical flight path so that an inefficient collision results between the head and the ball.

SUMMARY OF THE INVENTION

The present invention provides an improved wood-type golf club in which the club head is provided with a conventional recess in which an insert is tightly received. The configuration of the insert, however, differs from conventional inserts in that it has a bore therein at the inner extremity of which there is a shallow recess. A weighting disc composed of a dense metal such as a tungsten alloy or the like overlies and closes off this shallow recess. A layer of adhesive is provided in the shallow recess to secure the disc thereagainst. The bore in the insert has a flared portion of increased diameter spaced from the striking face, and a layer of impact resistant resin fills this bore about the disc and provides the striking face at the forward edge of the insert. The golf club may also be provided with an annular groove in the insert between the shallow recess and the striking face for receiving an additional amount of resin to securely lock the impact resistant resin within the insert.

The procedural steps involved in making the improved golf club of the present invention consist of positioning the weighting disc about the shallow recess of the insert and adhesively securing the two together. This is followed by pouring in an impact resistant resin into the cavity provided in the recess so that the resin sets and solidifies about the weighting disc confined therein. The resin expands slightly on setting, so that it completely fills the recess in the insert and is locked in place. This final step consists in grinding or otherwise shaping the striking face of the insert to conform it to the desired radius of the golf club head.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the invention will be readily apparent from the following description of certain preferred embodiments thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure, and in which:

FIG. **1** is a fragmentary side elevational view of the improved golf club of the present invention;

FIG. **2** is a fragmentary front elevational view of the golf club of the present invention;

FIG. **3** is a fragmentary plan view of the golf club head of the present invention;

FIG. **4** is an exploded view on an enlarged scale of the insert of the present invention, with the parts being tilted somewhat for showing the configuration more specifically; and

FIG. **5** is a fragmentary cross-sectional view on an enlarged scale of the insert of the present invention in the form in which it is received within the golf club head.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. **1**, reference numeral **10** indicates generally a golf club of the wood type, the specific club being illustrated being a No. 1 wood although it will be evident that the invention is also applicable to other wood clubs having different angles of inclination on the striking faces. The golf club **10** may be composed of a laminated construction as is common in the prior art and it includes a head **11** having a striking face **12** of relatively large radius of curvature, usually on the order of 10½ inches. Disposed within a suitable wedge-shaped recess in the striking face **12** is a wedge-shaped insert **13** which extends from the sole of the club to the upper portion of the striking face in the conventional manner. A set of grooves **14** is provided across the insert **13** as well as across the adjoining portions of the striking face **12** on either side of the insert **13.** The club head **11** also includes a neck portion **15** which is received within a neck collar **16** which also receives, at its opposite end, a shaft **17.**

The construction of the insert **13,** per se, is best illustrated in FIGS. **4** and **5** of the drawings. As there illustrated, the insert **13** has a relatively deep bore **18** which proceeds inwardly into the insert **13** from the striking face thereof. An annular groove **19** is formed in a medial portion of the bore **18** to serve as an additional locking means for the impact resistant resin which is poured into the bore, as will be apparent from a succeeding portion of this description. Inwardly of the annular groove **19,** the bore **18** is outwardly flared as indicated at reference numeral **20** by a few degrees or so to serve as an additional means for locking the impact resistant resin within the bore to resist disengagement of the resin from within the bore.

The innermost end of the bore is formed with a relatively shallow recess **21** and the bore also has an annular flange surface **22.** A decorative washer **23** composed of brass or the like is positioned along the annular flange **22** in surrounding relationship to a disc **24** composed of a dense metal such as a sintered, highly

dense compact of tungsten alloy powder. The disc **24** is secured over the recess **21** by means of a layer of adhesive **25** disposed in the recess **21** as best illustrated in FIG. **5.**

After the disc **24** is adhesively secured to the recess **21** by means of the adhesive **25,** and the washer **23** is placed therearound, the remaining void space is filled by means of an impact resistant resin layer **26.** For purposes of eye appeal, the impact resistant resin may be transparent material such as an epoxy resin or other suitable high impact material such as a polycarbonate, a polyester, or a polyimide resin.

In setting, an impact resistant epoxy resin undergoes a slight expansion so that the resin may extend beyond the confines of the striking face of the insert. Any such excess can be removed by grinding, machining, or other means to provide a striking face **27** having a relatively large radius of curvature such as 10½ inches or so. At that time, the grooves **14** can be scribed in the striking face of the resin **26** as well as in the adjoining portions of the club head.

The disc **24** is located immediately behind the proper point of impact on the striking face **27.** Referring to FIG. **3,** if the insert **13** is made of a completely homogeneous material, that is, without the combination of the insert and the impact resistant resin, the center of gravity of the club head will be located at a distance A from the tangent to the leading edge of the club face, as illustrated in that figure. With the improvements of the present invention, however, the center of gravity of the club head lies at a distance B from the leading edge of the club face and is substantially in the plane which bisects the shaft **17.**

The positioning of the disc **24** also serves to change the moment of inertia of the club head about its principal axes. These axes are identified in FIGS. **1** and **3** as the *x*, *y* and *z* axes. The ideal weight distribution would be such as to increase the moment of inertia about the center of gravity in the *x*—*z* plane, i.e., in a plane parallel to the ground and passing through the vertical level of the center of gravity of the club head. With such a weight distribution, the club head would be the most stable during a swing and there would be less tendency to hit off-line shots. The location of the disc **24** in the insert as indicated serves to increase the moment of inertia in this *x*—*z* plane, thereby making the club head more stable than a conventional head.

To illustrate the effect of positioning the weighting disc in the center of the face insert, some measurements were made with a No. 1 wood of conventional design. It was found that the center of gravity of the wood club with a conventional insert existed at a point which was 1 -3/16 inches from the leading edge of the sole, ⅞ of an inch vertically from the leading edge, and 9/32 of an inch behind the axis of the shaft. When the same club was provided with an insert including a tungsten alloy weighting disc ¾ of an inch in outer diameter and ⅛ inch thick, weighing approximately 9/16 of an ounce, the center of gravity of the club head was found to exist at a point which was ⅞ of an inch from the leading edge of the sole, 13/16 of an inch vertically from the leading edge, and only 1/32 of an inch behind the axis of the shaft.

The movement of the center of gravity of the head has been found to improve significantly the energy transfer between the head of the club and the golf ball when properly struck. The line of action of the centers of gravity of the ball and the club head are more directly in line with the theoretical flight path resulting in a more efficient collision between the club head and the ball. Another advantage is achieved in the combined coefficient of restitution between the ball and the insert. The use of the dense weighting disc in the hitting area increases the amount of energy available in a measurable quantity.

By positioning the weighting disc with its centerline coinciding with the center of the proper hitting area on the striking face, more mass is concentrated in precisely the region in which it does the most good. There is a corresponding lesser tendency to have a component of the impact force at an angle other than normal to the vertical tangent plane of the ball, so that the tendency to hit shots off line is somewhat reduced.

It should be evident that various modifications can be made to the described embodiments without departing from the scope of the present invention.

I claim as my invention:

1. A wood-type golf club comprising a club head having a recess in the striking area, an insert filling said recess, a dense disk weighting means within said insert, a layer of an impact resistant resin within said insert covering one face and at least a portion of the periphery of said disk, the layer of resin having a smoothly contoured, uninterrupted surface forming part of the striking face of said club, the disk weighting means being positioned to provide a center of gravity for said club head which is closer to the leading edge of the club face than in the absence of said weighting means.

2. The golf club of claim **1** in which said weighting means is positioned so that center of gravity is substantially in the plane which bisects the shaft of the club.

3. The golf club of claim **1** which includes an annular recess in said insert forwardly of said weighting means for anchoring said layer of resin within said annular recess.

4. The golf club of claim **1** in which said insert includes an angular taper in said recess for locking said layer of resin therein, said recess having a larger diameter at its base than at its striking face.

5. The golf club of claim **1** in which said resin is an epoxy resin.

6. A wood-type golf club comprising a club head having a wedge-shaped recess therein in the striking area, a wedge-shaed insert received within said recess, said insert having a bore with a relatively shallow recess at its innermost extremity, a weighting disc overlying and closing off said shallow recess, a layer of adhesive in said shallow recess securing said disc thereagainst, said bore in said insert having a flared portion of increased diameter spaced from said striking face, and a layer of impact resistant resin filling said bore about said disc and having a large diameter radius surface forming the striking area of said club.

7. The golf club of claim **6** which includes an annular groove in said insert between said shallow recess and said striking face for receiving said resin in locking engagement.

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