

[54] GOLF CLUB HEADS AND PROCESS

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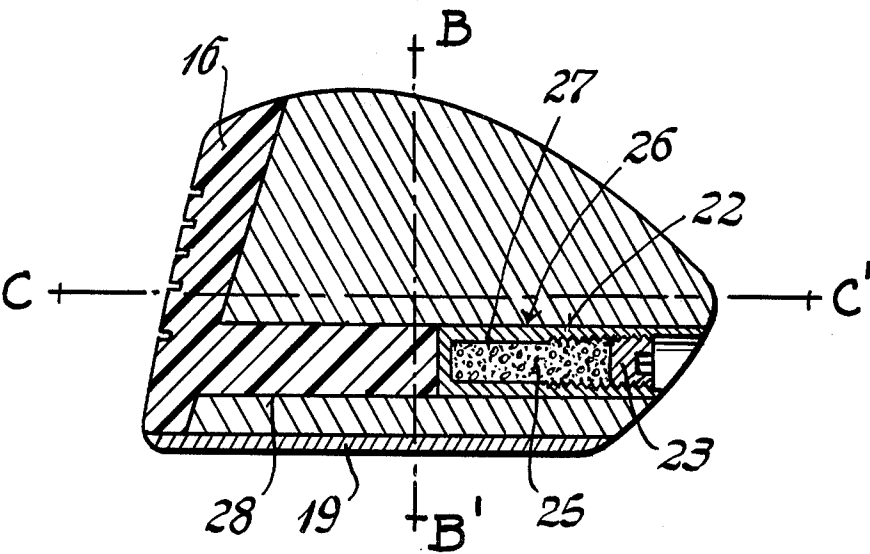
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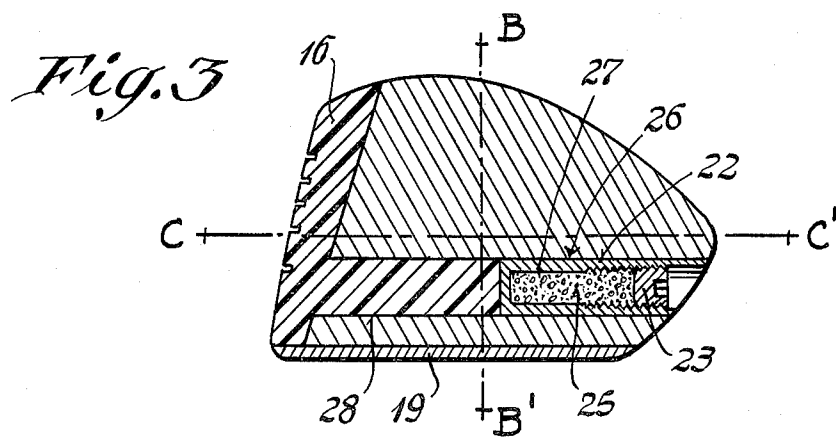
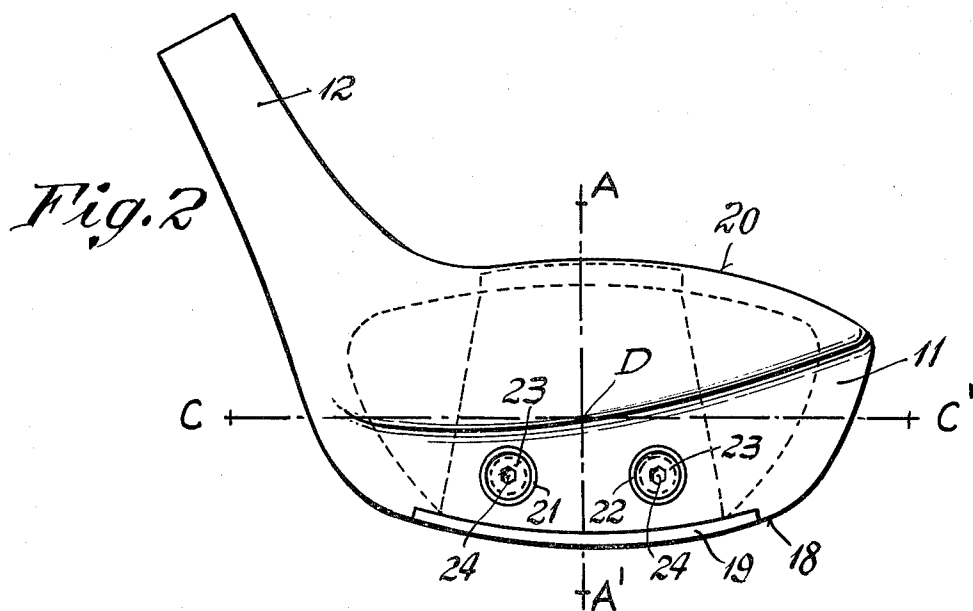
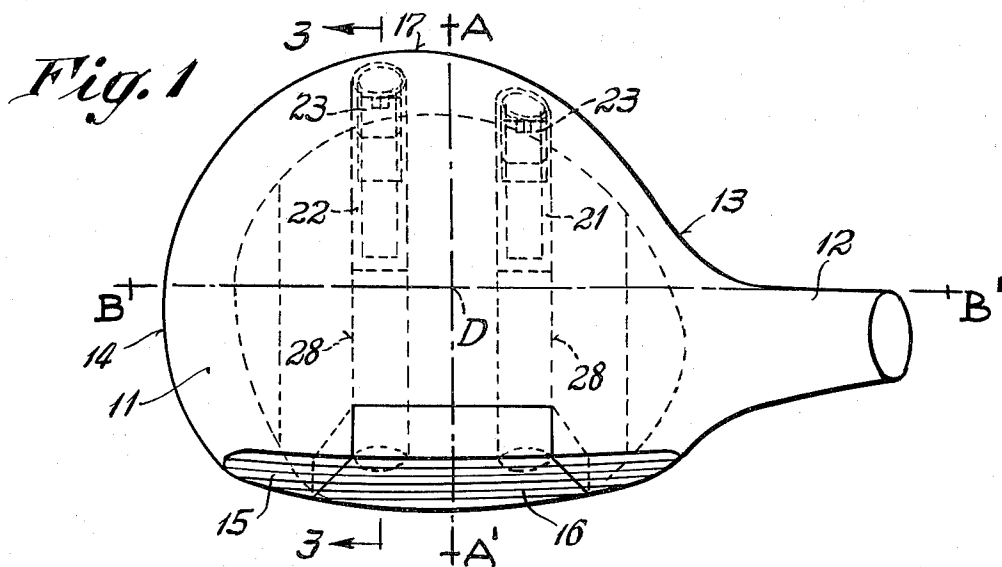
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[57] ABSTRACT

Wooden head for a golf club comprising a wooden body having a top surface, an undersurface carrying a soleplate, a rear surface and a face surface carrying a faceplate adapted to strike a golf ball during use of the golf club. The weight and balance of the head is adjustable by varying the weight of material present in spaced chambers within the wooden body. The chambers extend parallel to each other and to the swing axis of the head and are positioned towards the undersurface and rear surface of the wooden body, the rear surface being provided with openings through which covers can be removed from said chambers for purposes of varying the weight of material therein.

6 Claims, 3 Drawing Figures





GOLF CLUB HEADS AND PROCESS

The present invention relates to novel wooden heads for golf clubs which virtually assure more consistency of performance and greater distance and which may be adjusted with respect to their weight and the distribution thereof to suit them to the needs of the user. A variety of adjustably-weighted clubs have been proposed over the years in an effort to suit the weight and weight distribution of the club to the user. Primarily such prior proposals relate to various methods for positioned weights at the core or center of gravity of the club head or towards the face thereof, such weights generally being removable from the undersurface of the head through the soleplate. Such methods have the disadvantage of providing excess weight at the face surface of the club head causing the head to dip into the ball during the swing and reducing the loft or altitude imparted to the ball. Also, such methods generally involve a single central means for varying the weight of the club head, which means does not permit weight adjustment towards either the heel or the toe of the club head, as desired, and which modifies the swing balance or feel of the club.

Other proposals have been made to provide movable weights within a club head and adapted to contact the interior surface of the faceplate during contact with the ball. Such proposals also have the disadvantage of locating the weight distribution too far forward of the center of gravity of the club head, causing the face surface to dip into the ball and reducing the loft of the shot.

It is the principal object of the present invention to provide a novel golf club head construction which permits alteration of the weight and the weight distribution of the club head without modifying the swing balance or feel of the club during use.

It is another object of the present invention to provide a variable-balanced club head which delivers a longer delayed impact thrust than prior known club heads.

It is yet another object of the present invention to provide a variable-balanced club head with a gravity point which is lower and further from the faceplate than prior known club heads.

It is an advantage of the present invention that the present club heads can be adjusted in weight and weight distribution by anyone with a minimum amount of training, effort and time and without removing the soleplate or faceplate of the head.

These and other objects and advantages of the present invention will be apparent to those skilled in the art in view of the present description including the drawings, in which:

FIG. 1 is a plan view of a golf club head according to an embodiment of the present invention.

FIG. 2 is a rear view of the golf club head of FIG. 1.

FIG. 3 is a vertical cross-section of the golf club head of FIG. 1 taken along the line 3—3.

The novel golf club heads of the present invention are based upon a novel weighting and balancing principle which I have discovered to adapt the head to be custom suited to the user by the user himself with a minimum of training, time and effort. The invention is based upon the discovery that variable weights in a wooden golf club head produce the greatest results when the following specifications are adhered to, such specifications being contrary to those followed in the

designing of prior known golf club heads. First, the variable weights must be below and behind the core of the wooden head, the core being defined as the center point of the mass of the wood head. Second, the variable weights must be positioned parallel to and equidistant from the central vertical axis of the wood head, at least one on each side thereof for balance adjustment. Third, the means for varying the weights must permit ease of operation, possibility of varying one weight independently of the other, and possibility of making minute or gradual weight adjustments until the desired feel and performance is produced by the user by trial and error techniques.

Referring to the drawings, the wooden golf club heads 10 according to one embodiment of this invention comprise a wooden body 11 having a stem 12 at the heel section 13, a toe section 14 and a face section 15 having mounted therein a faceplate 16, a rear section 17, all shown in FIG. 1. As shown by FIG. 2, the head 10 also has a base or sole section 18 having mounted therein a soleplate 19, and a top or upper section 20. In all these respects, the present wooden club heads are identical to known wooden club heads. However the novel variable weighting means and the positioning thereof illustrated by the drawings represent a substantial departure from and improvement over known structures.

The variable weighting means of the present invention comprise hollow tubular chambers 21 and 22 which are parallel to each other and to the central vertical axis A-A' of the wooden body 11 which intersects the core D, as illustrated by FIGS. 1 and 3, the interior location of chambers 21 and 22 being illustrated by broken lines in FIG. 1. Chambers 21 and 22 open to the rear section 17 of the wooden body 11 and are provided with threaded covers 23 which threadably engage the interior walls of the chambers and are provided with exposed key means 24 such as slots or hexagonal recesses for engagement with a screw driver or hexagonal wrench to remove or tighten the covers on the chambers for purposes of inserting or removing weight material such as lead powder 25, illustrated by FIG. 3.

The drawings illustrate the critical positioning of the weighting chambers relative to each other and relative to the faceplate 16 by means of axis lines. Axis line A-A' is the central vertical axis plane which intersects core D and the center of the faceplate, and divides the wooden body 11 into the toe half and the heel half. Axis line B-B' is the transverse vertical axis plane which also intersects core D, is perpendicular to line A-A', and divides the wooden body 11 into the face half and the rear half. Axis line C-C' is the central horizontal axis plane which also intersects core D, is perpendicular to lines A-A' and B-B', and divides the wooden body 11 into the sole half and the top or upper half. Thus the drawings clearly illustrate that the chambers 21 and 22 are both located in what might be termed the rear sole quadrant sections of the wooden body 11, below the core D, equispaced from and parallel to the central vertical axis A-A', perpendicular to and positioned rearward of the transverse vertical axis B-B' and parallel to but positioned below the central horizontal axis C-C'.

According to a preferred embodiment as illustrated by the drawings, the hollow tubular chambers 21 and 22 comprise self-contained capsules which are cemented in place within holes bored into or through the

wooden body 11. Referring to FIG. 3 which illustrates a cross-sectional view of the chamber 22, the chamber comprises a self-contained cylindrical capsule 26, such as of aluminum, having a walled body 27 threaded adjacent the open end and sealed by a threaded cover 23 adapted to be screwed into the capsule beyond the smooth surface of the wooden body 11. The capsule may be from about $\frac{3}{4}$ inch to 2 inches in length and have a diameter of from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch, depending upon the size of the wooden body. A preferred size is $1\frac{1}{4}$ inch long and $\frac{3}{8}$ inch in diameter. If desired, the open end of the capsule may extend beyond the surface of the wooden body 11 and may be sanded smooth therewith for finished appearance.

FIG. 3 also illustrates a preferred means for positioning and cementing the capsule 26 in place, it being understood that the disclosure relating to capsule 26 also applies to an identical capsule which is positioned as chamber 22 on the opposite side of axis A-A'. As shown by FIGS. 2 and 3, the wooden body 11 is provided with hollow tubular cylindrical bores 28 which pass through the wooden body 11 from the face section 15 to the rear section 17, parallel to axis planes A-A' and B-B', are coaxial with the desired position of the capsule 26 and have a diameter slightly greater than that of the capsule so that the latter can be fitted therein, positioned as indicated and cemented. Thereafter the bores 28 can be filled with plastic which may conveniently be a high impact resin such as an epoxy or polyurethane resin used to fill the bores and simultaneously form the faceplate integral therewith as shown by FIG. 3. The resin also tends to flow into any space between the capsule 26 and the bore 28 to insure motion-preventing bonding therebetween.

Obviously the chambers or capsules adapted to contain the weight material may have any desired shape so long as they are tubular so as to extend parallel to axis A-A' and perpendicular to axis B-B' whereby the weight therein is centered in a direction parallel to the swing of the club and to the flight of the ball. Any deviation from the parallel position of the chambers 21 and 22 interferes with the feel of the club during the swing and reduces or spreads the impact thrust of the head against the ball. Any deviation from the rearward and soleward location of the chambers 21 and 22 also interferes with the feel of the club during the swing and destroys the balance of the head during the swing whereby it is front-heavy and dips into the ball with a downward thrust rather than having rear balance as afforded by the present invention, which rear balance keeps the head level through a smooth-feeling swing and directs the momentum of the club weight parallel to the swing and in direct line beneath the point of impact between the faceplate and the ball and balanced on each side thereof. This low, balanced momentum causes the club head to follow through the ball in the path of the circular swing, imparting greater lift and distance to the ball than otherwise possible. Furthermore, the rearward location of the weights imparts a delayed impact thrust to the ball whereby the ball remains in contact with the club for a longer period of time, which, though minute, greatly increases the effect of the momentum with respect to distance.

As for accuracy, the positioning of the weight chambers on opposite sides of the central vertical axis A-A' of the head provides a balance which can be modified by the user to compensate for his own tendency to

hook or to slice the ball during play. The tendency to hook the ball can be compensated for by gradually increasing the weight in chamber 21 on the heel side of the head or conversely by gradually reducing the weight in chamber 22 on the toe side of the head to produce the balance required for the individual to overcome the problem. The process is reversed if the individual has a tendency to slice the ball during play. As for distance, the weight is increased equally in both chambers until the individual finds the weight at which he obtains greatest possible distance in his shot while retaining the required degree of accuracy.

While the present invention requires the equispacing of one or more weight chambers at each side of the central vertical axis A-A' for proper balance, it is recognized that the advantages of the invention can also be obtained by including another weight chamber which is centered therebetween along the axis A-A'. Also it should be understood that in some cases one or more of the weight chambers may be left free of added weight material if the weight of the closure means is sufficient to provide the required balance. In this connection, interchangeable closure means of different known weights may be used and the interior wall of the chambers may be threaded to the base of the chambers to permit the weighted closure means to be screwed into the chambers to any desired location therein found to provide the required balance, such closure means being included within the phrase "weight material" used herein.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. Wooden head for a golf club comprising a wooden body having a core comprising its center of gravity, heel and toe sections on opposite sides of said core and separated by a central vertical axis plane which intersects said core, face and rear sections on opposite sides of said core and separated by a transverse vertical axis plane which intersects said core at an angle perpendicular to said central axis, sole and upper sections below and above said core and separated by a horizontal axis plane which intersects said core, and at least two hollow tubular openings in said wooden body extending from the surface of said face section to the surface of said rear section, each of said hollow tubular openings having cemented therein adjacent the surface of the rear section a self-contained capsule comprising a hollow tubular walled element adapted to contain variable amounts of weight material for purposes of adjusting the balance of the club head, the remaining portions of said tubular openings being filled with plastic material, the interior wall of each capsule being threaded for engagement with a threaded cover forming the closure means therefor, an equal number of said tubular openings being located within said wooden body on opposite sides of said central vertical axis plane in said heel and toe sections, behind said core and behind said transverse vertical axis plane in said rear section and beneath said core and horizontal axis plane, said tubular openings extending parallel to each other and to the central vertical and horizontal axis planes and having the closure means of the capsules exposed and removable through openings in the rear surface of the wooden body.

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2. Wooden head for a golf club according to claim 1 in which the surface of the face section comprises a plastic face plate which is integral with the plastic material within said openings.

3. Process for producing a wooden head for a golf club comprising a wooden body having a core comprising its center of gravity, heel and toe sections on opposite sides of said core and separated by a central vertical axis plane which intersects said core, face and rear sections on opposite sides of said core and separated by a transverse vertical axis plane which intersects said core at an angle perpendicular to said central axis, sole and upper sections below and above said core and separated by a horizontal axis plane which intersects said core, comprising the steps of boring an equal number of hollow tubular openings through said wooden body extending from said face section to said rear section in each of the heel and toe sections of said wooden body, on opposite sides of said vertical axis plane, beneath said core and horizontal axis plane and parallel to each other and to the central vertical and horizontal axis planes of said wooden body, inserting self-contained tubular walled elements into said tubular openings

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comprising capsules and securing said capsules at the rear sections of said openings behind said core and behind said vertical axis plane, said capsules being adapted to receive variable amounts of weight material and provided with closure means which are exposed and removable through openings in the rear surface of the wooden body, and filling the remaining portions of said tubular openings with a plastic material.

4. Process according to claim 3 which comprises inserting a closure means into each of said capsules, selected from a group of closure means each having a distinct known weight, to adjust the balance of the wooden head.

5. Process according to claim 3 in which a portion of said face section of the wooden body is cut away and is filled with the plastic material used to fill said tubular openings to form a plastic faceplate integral with the plastic in the tubular openings.

6. Process according to claim 3 which comprises inserting different weight materials into said capsules to adjust the balance of the wooden head.

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