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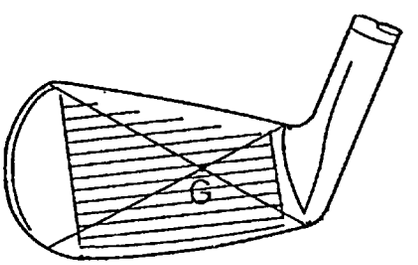
(54) Golf club

(57) An iron-type golf club has the centre of gravity of its head shifted towards the shaft end, compared to the conventional, and has a geometry and cross-section which helps to prevent "duffing" and other errors in addressing the ball.

FIG. 6



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Description

The present invention relates to a golf club by use of which the directional stability and flight distance of a shot ball can be improved.

In a conventional wooden club, as well as a metal wood club, the head is of such a shape that it gradually expands from a heel side near the shaft to a toe side. The centre of gravity of the head is set at a position toward the toe side rather than at the centre of the projection plane of the head, so that the head speed of the golf club may be increased at the time of impact with the ball.

Also, in a conventional golf club of an iron type, according to a similar theory, the shaft end of the back face of a club head is, when seen in plan view, smoothly connected to the hosel, through a neck part, forming a curve (See dashed line A in Fig. 3) and thus the centre of gravity of the club is set at a position slightly toward the toe end.

However, when the centre of gravity of the head lies toward the toe end, and when the head B is rotated whilst holding an end A of the club shaft, a radius R0 of the rotation, from a centre line of rotation positioned on the vertical line made by suspending an upper end of the shaft, increases, as shown by double-dashed lines in Figure 1. Therefore, the clubs are apt to give a covering motion (which means that the toe end moves faster than the shaft end as if the toe rotates around the shaft) at the club head toe just before impact.

As shown in Fig. 7, covering motion is not the only problem in known iron clubs; that is, the centre of gravity of the iron club lies slightly toward the toe end, therefore for advanced golfers whose down swings are faster than those of beginners, a "toe down" phenomenon is encountered, in which the neck part is twisted downwardly by an accelerated motion applied to the head and thus the toe end of the club face part tends to be lowered, resulting in a "duff" shot.

Accordingly, for the purpose of overcoming the defects of the conventional club head, the inventor, as a result of his research, has altered the basic concept of designing the club head in order to provide a golf club head of the iron type by use of which improvement in the directional stability and flight distance of the shot ball can be realised. That is the object of the present invention.

The present invention is based upon the effect of the sling motion of the club head round the centre of gravity thereof, in which a heavier part goes faster and a lighter part lags behind the heavier part. This results in the parts rotating around the centre of gravity, so that the conventional club head is subjected not only to the above-mentioned covering movement but also to a pull-back phenomenon at the shaft end of the head as a reaction to the covering movement, resulting in a substantial decrease of the speed of the head.

The present invention, therefore, provides a golf club comprising a club head of the iron type connected to a shaft via a hosel, the head extending from a heel end adjacent the hosel to a toe end, characterised in that the centre of gravity of the club head lies closer to the heel end than to the toe end of the head. So as to shift the centre of gravity of the head toward the shaft end, the club head may be formed with an increased mass at the Shaft end and with the mass of the head toe end decreased by an equivalent amount.

Mere shift of the centre of gravity of the head toward the shaft side is not enough to overcome the covering motion of the head; at the same time, the weight balance of the head must be maintained. Therefore, it is advantageous to increase the mass of the shaft end of the head as much as that of the toe end decreases so as to maintain the weight balance of the head. Due to this, the centre of gravity of the head is moved toward the shaft area by the amount having been shifted.

In clubs embodying the present invention, since the centre of gravity of the head lies toward the shaft side, when the head is rotated by holding the end of the club shaft, the radius R1 of rotation is smaller, as shown by full lines in Figure 1, than the conventional radius R0 of rotation. Moreover due to the increased mass of the shaft end of the head, there is an improvement in the speed of the head upon impact when a ball, which results from the reduced sling motion (in which the heavier part tends to go forward and the lighter part tends to be pulled backward just before impact. In clubs according to the invention it is difficult to cause the covering motion which in conventional clubs is apt to take place in the toe end and the draw phenomenon apt to take place in the shaft end of conventional clubs.

In applying the present invention to an iron club, it is preferable to form a back face 122 of a club face part 102 by extending the back face 122 until it passes through the centre axis (a) of the hosel part 103 (See Fig. 3), and moreover it is preferable to increase thickness A of the back 122 of the neck part 104 by shifting a part of the weight of the toe end B (See Fig. 5). Due to this, although the design differs from the conventional common knowledge concerning conventional toe-heel balance, the centre of gravity is located at, or almost at the intersection point of diagonals passing across the club face part, so that good balance is maintained, the tendency to turn the toe in hitting a ball is lessened by 70% and the problem of "duffing" can be solved (See Fig. 8). Therefore, secure down strokes can be ensured. Moreover in the light of the new design, the thickness of the club head blade can be increased, by which sufficient spinning of the ball can be conferred.

Further, since the centre of gravity is located at, or almost at the intersection point of diagonals passing across the club face part, different from the conventional iron, the toe down phenomenon apt to take place upon impact can be overcome (See Fig. 10) and the weight distribution helps prevention of "duffing" mistakes.

In the present invention, the club face can be designed so as to slightly open by about 1.5° against the ball upon addressing the ball, so that a defect of the

conventional club, in which the head easily turns after the impact and therefore golfers are apt to "duff" (See Fig. 8(a)), can be overcome. The impact is made in a slightly open position and immediately after this the position becomes square and then the head turns little by little, which makes the ball fly in a high draw trajectory (See Fig. 8(b)).

Fig. 1 is a comparative view showing sling motions of wooden clubs with the metal head according to the present invention and with the conventional metal head.

Fig. 2 is a rear view showing a head part of an iron club according to the present invention.

Fig. 3 is a sectional view along II-II line in Fig. 2.

Fig. 4 is a schematic perspective view showing the club according to the present invention.

Fig. 5 is a rear view showing an iron club according to another example of the present invention.

Fig. 6 is a front view showing a position of the centre of gravity according to the weight distribution of the present invention.

Fig. 7 is a comparative explanatory view showing a toe-down phenomenon in a club according to the present invention (solid line) and in a conventional club.

Fig. 8 is a comparative explanatory view showing a covering motion in an iron club according to the present invention (a) and in a conventional club (b).

Figs. 2 to 4 illustrate an iron-type golf club according to an example of this invention. A club head 101 is formed by integrally connecting a club face part 102 and a hosel part 103 at a neck part 104. The club head 101 is integrally manufactured with use of an iron material or a copper material by means of forging or casting, and is polished for finishing.

A fixed hole 130 is formed along the longitudinal direction of the hosel part 103. A shaft 105 is engaged with and fixed to the fixed hole 130 and at the upper end of the shaft, a grip (not shown) is provided.

The club face part 102 comprises a face 120 made open by 1.5° from square, a sole 121 and a back side 122. As shown in Fig. 2, the back 122 is formed in such a manner that the back surface 122 is extended to a position passing through the centre axis (a) of the hosel part 103 and connected to the hosel part 103 through an end surface. The thickness of the back 122 of the club face part 102, therefore, is increased and compared with the shape of a conventional club head, the neck part is made much smaller. As a result, the weight of the neck part is increased and, as shown in Fig. 6, the centre of gravity of the club head is located at or adjacent to an intersection point of diagonals of the club face.

Accordingly, when a golfer addresses a ball with this club, even though the club face part 102 is placed in a square position, it looks slightly open. The back 122 of the club head face 102 is extended to a position passing across the centre axis (a) of the hosel part 103. The neck part swells and the centre of gravity of the club face part 102 is positioned at the intersection point of the diagonals and lies slightly toward the heel end to stabilise the club head. When the club is swung under these conditions, it is easy for a golfer to give an impact to a ball in a square position and fly the bail straight, without a hook or a slice. Moreover even when advanced golfers swing downward at a high speed, since good rigidity around the hosel part 103 is given and the centre of gravity of the club face part 102 is located at the intersection point of the diagonals so as to lie slightly toward the heel end, the toe-down phenomenon hardly takes place and there results a smooth impact without "duffing".

Claims

1. A golf club of the iron type having a metal head, the head (101) being connected to a shaft via a hosel (103) and extending from a heel end (A) adjacent the hosel to a toe end (B) characterized in that the centre of gravity of the club head is closer to the heel end than to the toe end, a section through the head on the line II-II of Figure 2 showing the conformation seen in Figure 3 with a portion (104) of that section at a transition from a back surface (122) of the club head to the hosel (103) being of at least as great thickness as the remainder of that section in the head whereby the centre of gravity (G) of the head is positioned at the intersection between diagonals drawn respectively from i) a transition from the hosel to the sole of the head to a transition from the end surface to the toe (B) to the upper surface of the head and ii) a transition from the hosel to the upper surface of the head to a transition between the end surface and the sole of the head.

FIG. 1

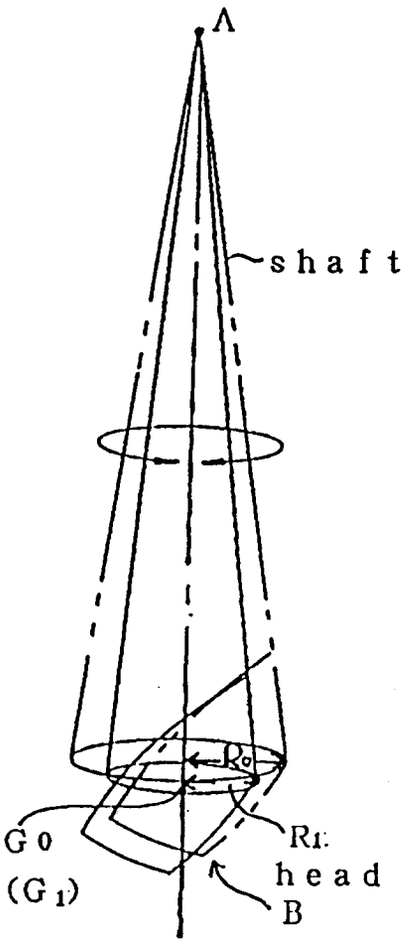


FIG. 2

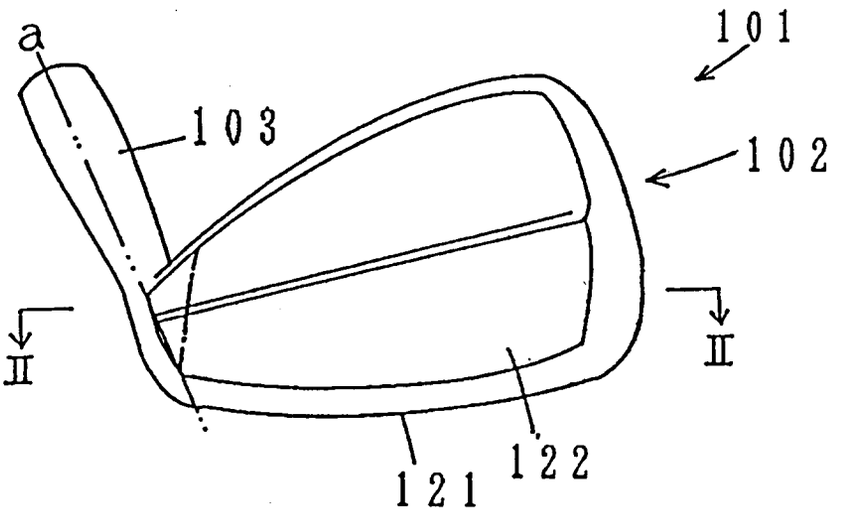


FIG. 3

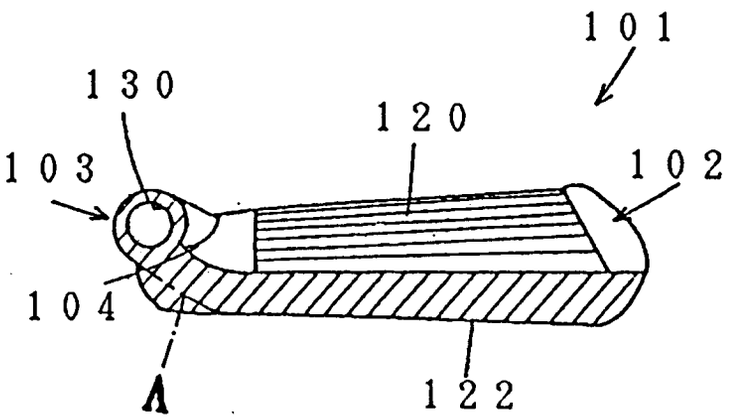


FIG. 4

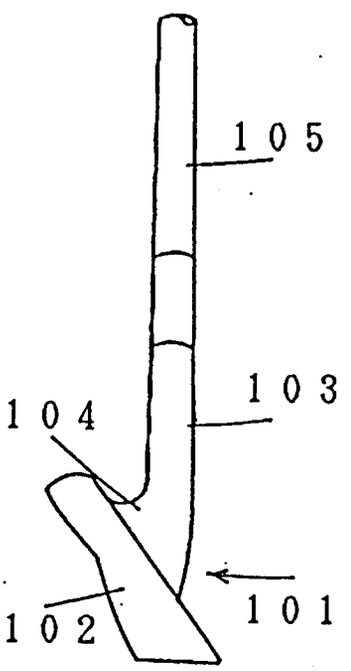


FIG. 5

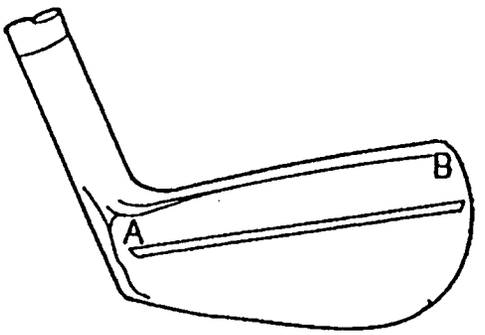


FIG. 6

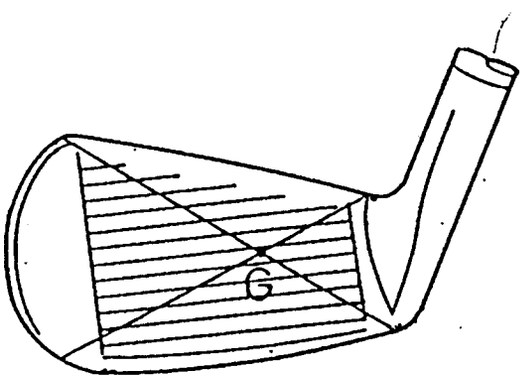


FIG. 7

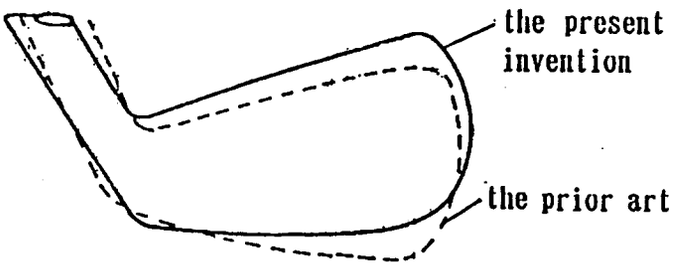
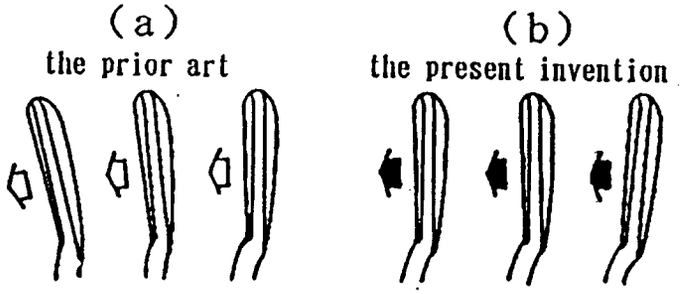

the present invention
the prior art

FIG. 8


(a)
the prior art
(b)
the present invention

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EUROPEAN SEARCH REPORT

Application Number
EP 96 12 0334

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.6)
X	GB 658 017 A (KLEIN) * the whole document *	1	A63B53/04
X	& US 2 683 036 A (KLEIN)	1	
X	GB 414 516 A (SCOTT) * page 1, column 11-34 * * page 1, line 77 - page 2, column 16; figures *	1	
X	US 4 211 416 A (SWANSON) * the whole document *	1	
A	US 3 020 048 A (CARROLL) * column 1, line 23-53 * * column 2, line 32-66; figures *	1	
A	GB 876 414 A (STECHER) * page 2, left-hand column, line 46 - right-hand column, line 117; figures *	1	
A	US 3 059 926 A (JOHNSTONE) * column 6, line 46 - column 7, line 9; figures 1,5 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 February 1997	Giménez Burgos, R

CATEGORY OF CITED DOCUMENTS

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