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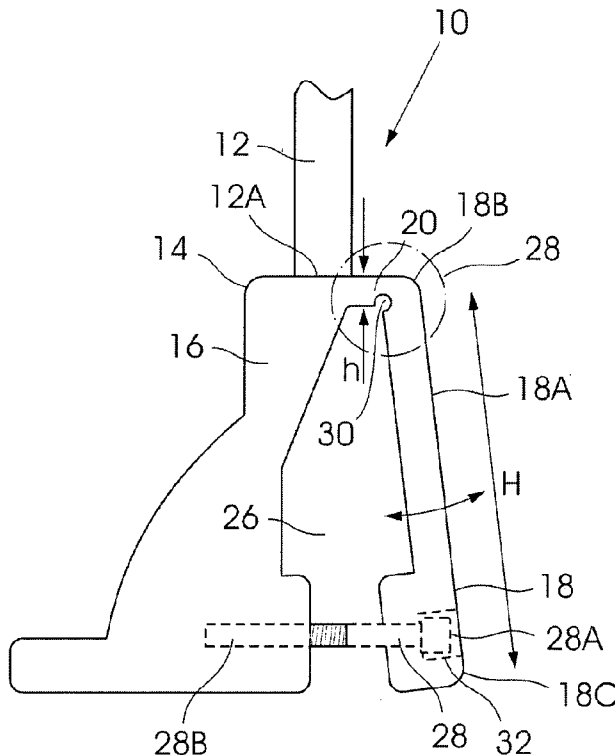
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ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: GOLF CLUB



(57) Abstract: This invention relates to a golf club, More specifically, the invention relates to a putter (10) having a striking face (18A) with a variable loft angle. The golf club includes a shaft (12) and a club head (14) connected to a first end of the shaft (12). The club head (14) comprises a body member (16), a striking member (18) defining a striking face (18A) set at a predetermined loft and a bridging member (20) connected at opposite ends to the body member (16) and the striking member (18) across a space (26) defined therebetween. The bridging member (20), the body member (16) and the striking member (18) jointly form one integral body, wherein the height (h) of the bridging member (20) is less than the height (H) for the striking face (18A) enabling movement of the striking member (18) relative to the body member (16) thereby to vary the loft angle of the striking face (18A) between the predetermined loft angle and a secondary loft angle. Movement of the striking member (18) relative to the body member (16) is enable through deformation of the bridging member (20), the body member (16) and/or the striking member (18) relative to one another.

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GOLF CLUB

BACKGROUND OF THE INVENTION

THIS invention relates to a golf club. More specifically, the invention relates to a putter having a striking face with a variable loft angle.

The ability to vary the loft angle of a golf club is generally known. In the simplest manner, the loft angles of ordinary golf clubs can be varied by bending the golf club at the hosel, that is, at or near the socket into which the shaft fits. This process, after repeated adjustments, can result in fatigue and the eventual breaking of the hosel. A further disadvantage of adjusting the loft angle in this manner is the undesired alteration of way the sole of the golf club sits on the turf at address, a position in golf where the player is standing over a golf ball ready to start a swing.

Loft angle adjustment has been made easier by the advent of variable loft golf clubs, which are typically categorised into one of the two categories, replaceable face insert type variable loft golf clubs and hinged face type variable golf clubs. The replaceable face insert type generally have a plurality of face inserts, each having a variable loft and means of attaching the face insert to the club head. The main disadvantage of this type of golf club is the high likelihood of misplacing one or more of the face inserts.

The hinged face type, to a large extent, addresses the disadvantages of the replaceable face insert type. However, as a result of the face being a separate part to the club head, it is thought that the feel of the golf club less than ideal.

Accordingly, it is an object of the present invention to provide a variable loft golf club, and specifically a putter, that addresses the disadvantages of the known methods of varying loft angle and the known variable loft golf clubs.

SUMMARY OF THE INVENTION

According to the invention there is provided a golf club including:

a shaft; and

a club head connected to a first end of the shaft, the club head having:

a body member;

a striking member defining a striking face set at a predetermined loft angle; and

a bridging member being connected at opposite ends to the body member and the striking member across a space defined therebetween, wherein the bridging member, the body member and the striking member jointly form one integral body and further wherein the height of the bridging member is less than the height of the striking face enabling, through deformation of the bridging member, the body member and/or the striking member relative to one another, movement of the striking member relative to the body member thereby to vary the loft angle of the striking face between the predetermined loft angle and a secondary loft angle.

In one alternative embodiment, the club head may be formed from the body member and a heel member connected to the body member and extending therefrom from an end opposite the end from which the bridging member and striking member extend.

Typically, the club head includes a means of adjusting and locking the striking member relative to the body member so as to set the loft angle of the striking face at the predetermined loft angle, the secondary loft angle or any selected loft angle therebetween.

Generally, the deformation is resilient deformation, the striking member being biased toward the predetermined loft position.

The bridging member, the body member and the striking member may be resiliently deformable with respect to one another about one or more deformation axes. Furthermore, the one or more deformation axes may be located along the bridging member, and/or along the body member and/or the striking member proximate a connecting vicinity where the connecting ends of the bridging member connect to the body member and the striking member.

Preferably, fillets are defined in the connecting vicinity to reduce the bending stress about the one or more deformation axes. More preferably, the one or more fillets is a channel defined along an inner interfacing corner between the bridging member and the striking member. Most preferably, the channel has a substantially circular cross-section and jointly with the bridging member and the striking member acts as a living hinge. In this description, reference to "substantially circular cross-section" will be taken to mean circular or any small deviation therefrom. For example, an oval cross-section will be accepted as falling within the definition of "substantially circular cross-section" for the purposes of this description.

The one or more deformation axes are typically substantially parallel with the striking face of the striking member. Generally, the predetermined loft angle is about 0 degrees and the secondary loft angle is about 10 degrees. In a particularly preferred embodiment, the predetermined loft angle is about 2 degrees and the secondary loft angle is about 7 degrees.

Generally, the adjusting and locking means is one or more tuning screws passing between the striking member and the body member, wherein rotation of the one or more tuning screws in a first direction has the effect of reducing the loft angle of the striking face, and further wherein rotation of the one or more tuning screws in a second opposite direction has the effect of increasing the loft angle of the striking face.

Furthermore, rotation of the one or more tuning screws in the first direction may have the effect of increasing the energy stored in the striking member and the striking face

due to the resilience of the club head, thereby providing a more solid feel during a golfing stroke.

Conversely, rotation of the one or more tuning screws in the second direction has the effect of decreasing the energy stored in the striking member and the striking face due to the resilience of the club head, thereby providing a softer feel during a golfing stroke.

Preferably, one full rotation of the one or more tuning screws through 360 degrees corresponds to 1 degree change in loft angle of the striking face. More preferably, the one or more tuning screws each comprise a tuning screw head and a shank being at least partially threaded. The tuning screw head may be accessible to a tool for rotary adjustment through access holes defined in the striking face of the striking member or in the body portion, with the threaded shank being in threaded engagement with a threaded bore defined in the other of the body portion or the striking member respectively. Most preferably, the tuning screw head is a Torx screw head.

The golf club may also include a loft angle indicator for displaying the selected loft angle of the striking face. Generally, the loft angle indicator is indicia corresponding to the selected loft angle, displayable through a viewing window. Typically, the indicia is marked on a moving indicator member, the indicator member being movable via rotation of the tuning screws and gears intermeshed between the indicator member and the tuning screws.

An operatively upper edge of the striking face may be rounded, thereby in use to provide a player with the ability to see a larger surface of the striking face so as to aid the player in properly aligning the striking face with a golf ball and a target line on which the ball is to be struck.

Furthermore, an operatively lower edge of the striking face may be rounded, thereby in use to reduce drag of the golf club in contact with the turf during a golfing stroke.

Typically, the space defined in the club head between the body member and the striking member is capable of receiving weights, thereby enabling the player to vary the

overall weight of the golf club. Preferably, the weights are securable within the space by the tuning screws.

The end of the shaft opposite the end connected to the club head defines a gripping formation.

Preferably, the golf club is a putter.

For the purposes of this description, the term “substantially parallel” will be taken to mean parallel or a variance therefrom of between 0 to 10 degrees. The height of the any member in this description will be taken to mean the dimension from that particular member’s operatively lowest point and it’s operatively highest point.

The term “loft angle” will be taken to mean the angle of the striking face with respect to axis of the shaft and/or a vertical plane.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows a front view of a golf club in accordance with the present invention, with a striking face thereof set at a first loft angle;

Figure 2 shows a front view of the golf club of figure 1 with the striking face thereof set at a second loft angle;

Figure 3 shows a perspective view if the golf club of figure 1; and

Figure 4 shows a perspective view of the golf club of figure 1 in use.

DETAILED DESCRIPTION OF THE DRAWINGS

A golf club, preferably in the form of a putter, according to a preferred embodiment of the invention is designated generally with the reference numeral 10 in the accompanying illustrations. For the purposes of this description, the golf club 10 will be described with reference to a putter 10 comprising a shaft 12 and a club head 14, the club head 14 having a body member 16, a striking member 18 and a bridging member 20.

The shaft 12 is connected at one end 12A to the club head 14 and comprises, at an opposite second end a gripping formation 22. Typically, the shaft 12 is connected to the club head 14 via a hosel 24.

The bridging member 20 is connected at its opposite ends to the body member 16 and striking member 18 across a space 26 defined therebetween to form one integral body. It will be appreciated that the integral body member 16, striking member 18 and bridging member 20 may form part of a toe assembly of the club head 14 connectible to a heel assembly to jointly form the club head 14. In the preferred embodiment illustrated in the accompanying figures, the entire club head (i.e. toe and heel assemblies) one single integral body.

The striking member 18 defines a striking face 18A for striking a golf ball 100 with a height H , being larger in dimension than the height h of the bridging member 20. The difference in heights H, h enable, through resilient deformation of the bridging member 20, the body member 16 and/or the striking member 18 relative to one another, movement of the striking member 18 relative to the body member 16 thereby to vary the loft angle of the striking face 18A between a predetermined loft angle (as illustrated in figure 1) and a secondary loft angle (as illustrated in figure 2).

The striking member 18 is deformable relative to the body member 16 between the predetermined loft angle and the secondary loft angle with the striking member 18 being resiliently biased toward the predetermined loft angle. Typically, the predetermined loft angle is about 7 degrees and the secondary loft angle is about 2 degrees. It will be appreciated that in an alternative embodiment the striking member

18 may be biased toward the secondary loft angle, or any loft angle between the predetermined loft angle and the secondary loft angle.

The bridging member 20, the body member 16 and the striking member 18 are resiliently deformable with respect to one another about one or more deformation axes, typically located along the bridge member 20 or near its ends within a connecting vicinity 28 where the bridging member 20 connects to the body member 16 and the striking member 18.

In a preferred embodiment of the invention as illustrated in the accompanying figures, the connecting vicinity 28 is at a point of connection between the bridging member 20 and the striking member 18, meeting at a filleted corner in the form of a substantially circular cross-sectioned channel 30. The substantially circular cross-sectioned channel 30 not only reduces stresses created as a result of deforming the club head 14 into the various loft positions, but acts as a living hinge about which the striking member 18 is deformable relative to the body member 16.

It will be appreciated that a longitudinal axis (not shown) of the substantially circular cross-sectioned channel 32 is or lies in close proximity with a deformation axis about which the striking member 18 is deformable relative to the body member 16. It will be appreciated further that the striking member 18 is deformable relative to the body member 16 about more than one deformation axis, which axes are typically substantially parallel with the striking face 18A of the striking member 18.

Deforming through bending of the striking member 18 relative to the body member 16 is enabled by the adjusting and locking means in the form of tuning screws 28 passing between the striking member 18 and the body member 16. The tuning screws 28 comprise a screw head 28A, preferably Torx screw heads, and an at least partially threaded shank 28B.

The screw heads 28A are accessible to an adjusting tool (not shown) through access holes 32 defined in the striking face 18A of the striking member 18. The threaded shank 28B of the tuning screws 28 engage with a threaded bore (not shown) defined in the body member 16.

It will be appreciated that rotation of the tuning screws 28 in a first direction will pull the striking member 18 closer to the body member 16 with the effect of reducing the loft angle of the striking face 18A. It is envisaged that the increased energy and/or tension created in the striking member 18 as a result of pulling of striking member 18 closer to the body member 16, will result in a more solid feel off the striking face 18A during the execution of a golf stroke.

Conversely, rotation of the tuning screws 28 in a second opposite direction to the first direction will push the striking member 18 away from the body member 16 with the effect of increasing the loft angle of the striking face 18A. It is envisaged that the reduced energy and/or tension created in the striking member 18, which is as a result of the striking member 18 being moved closer to the predetermined loft angle to which it is resiliently biased, will result in a softer feel off the striking face 18A during the execution of a golf stroke.

The tuning screws 28 are preferably calibrated such that one full rotation thereof through 360 degrees corresponds to a 1 degree change in loft angle of the striking face 18A. A loft angle indicator (not shown) may be included on the club head 14 to provide a user 200 with a visual display of the loft angle to which the striking face 18A is set. It is envisaged that the loft angle indicator is indicia marked on a moving indicator member being movable, via intermeshed gearing between the loft angle indicator and the tuning screws 28, such that the relevant loft indicia is displayable through a viewing window.

To assist the user 200 in aligning the golf club 10 with the golf ball 100 and an intended target line on which the ball 100 is to be struck, the striking face 18A defines a rounded operatively upper edge 18B enabling the user 200 to view a larger surface of the striking face 18A. An operatively lower edge 18C of the striking face 18A is also rounded to reduce drag of the golf club 10 when coming into contact with the turf during a golfing stroke.

Although the invention has been described above with reference to preferred embodiments and examples, it will be appreciated that many modifications or variations of the invention are possible without departing from the spirit or scope of the invention.

For example, the screw heads 28A of the tuning screws 28 could be accessible to the adjusting tool through access openings defined in the body member 16, with the shank 28B engaging threaded bores in the striking member 18.

Also, the space 16 defined between the body member 16 and the striking member 18 may be capable of receiving weights therein to alter the overall weight of the golf club 10, the weights being realisablely securable within the space 26 by the tuning screws 28.

CLAIMS

1. A golf club including:

a shaft; and

a club head connected to a first end of the shaft, the club head having:

a body member;

a striking member defining a striking face set at a predetermined loft angle; and

a bridging member being connected at opposite ends to the body member and the striking member across a space defined therebetween, wherein the bridging member, the body member and the striking member jointly form one integral body and further wherein the height of the bridging member is less than the height of the striking face enabling, through deformation of the bridging member, the body member and/or the striking member relative to one another, movement of the striking member relative to the body member thereby to vary the loft angle of the striking face between the predetermined loft angle and a secondary loft angle.

2. A golf club according to claim 1, wherein the club head is formed from the body member and a heel member connected to the body member and extending therefrom from an end opposite the end from which the bridging member and striking member extend.

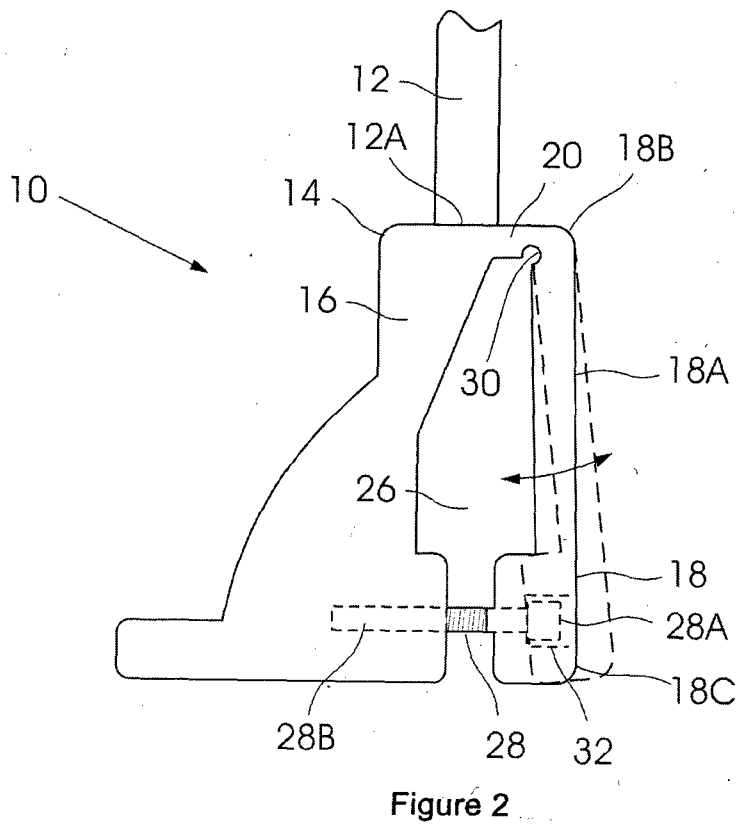
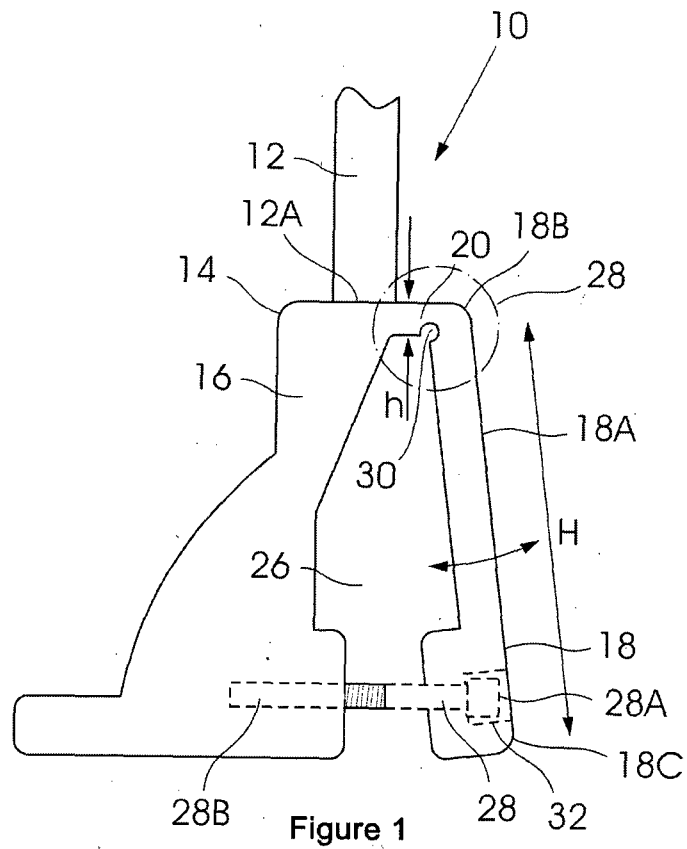
3. A golf club according to claim 1 or claim 2, including a means of adjusting and locking the striking member relative to the body member so as to set the loft angle of the striking face at the predetermined loft angle, the secondary loft angle or any selected loft angle therebetween.

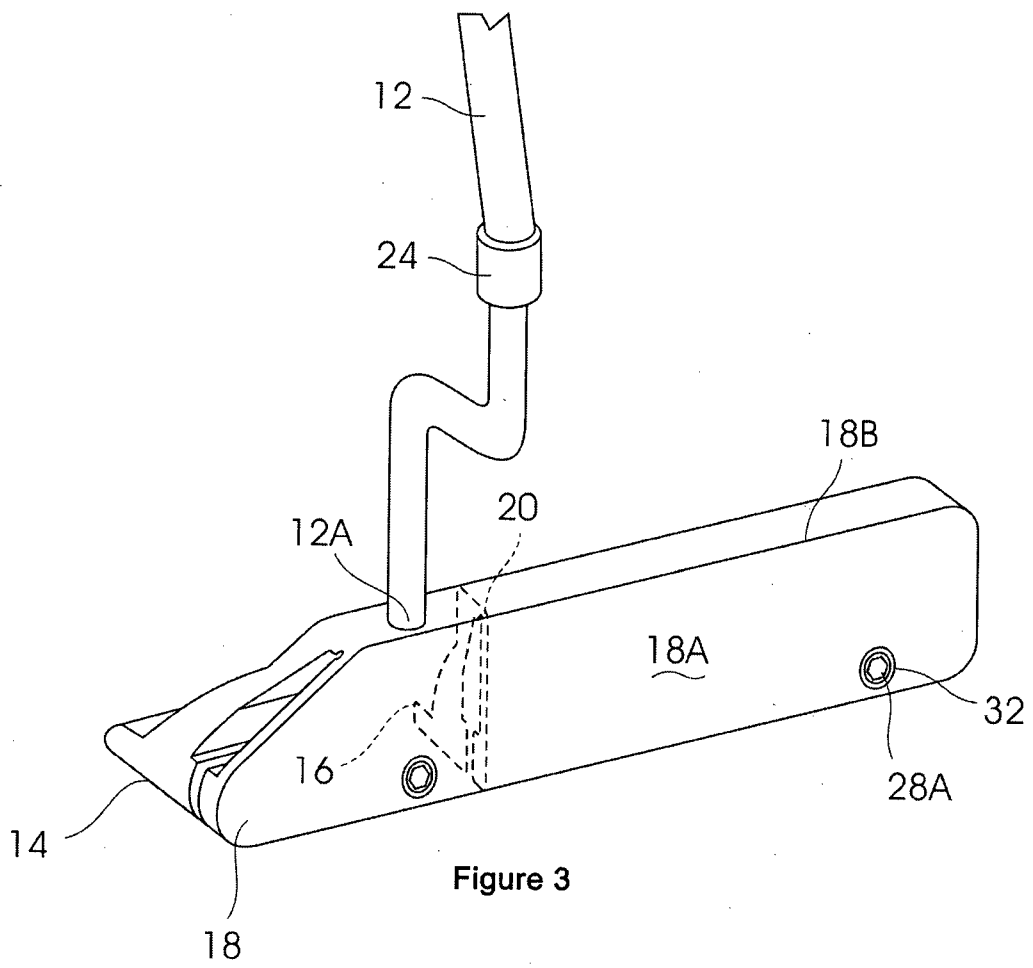
4. A golf club according to claim 3, wherein the deformation is resilient deformation, the striking member being biased toward the predetermined loft position.
5. A golf club according to claim 4, wherein the bridging member, the body member and the striking member are resiliently deformable with respect to one another about one or more deformation axes.
6. A golf club according to claim 5, wherein the one or more deformation axes are located along the bridging member, and/or along the body member and/or the striking member proximate a connecting vicinity where the connecting ends of the bridging member connect to the body member and the striking member.
7. A golf club according to claim 6, wherein fillets are defined in the connecting vicinity to reduce the bending stress about the one or more deformation axes.
8. A golf club according to claim 7, wherein the one or more fillets is a channel defined along an inner interfacing corner between the bridging member and the striking member.
9. A golf club according to claim 8, wherein the channel has a substantially circular cross-section and jointly with the bridging member and the striking member acts as a living hinge.
10. A golf club according to claim 9, wherein the one or more deformation axes are substantially parallel with the striking face of the striking member.
11. A golf club according to claim 10, wherein the predetermined loft angle is about 0 degrees and the secondary loft angle is about 10 degrees.
12. A golf club according to claim 11, wherein the predetermined loft angle is about 2 degrees and the secondary loft angle is about 7 degrees.
13. A golf club according to claim 12, wherein the adjusting and locking means is one or more tuning screws passing between the striking member and the body

member, wherein rotation of the one or more tuning screws in a first direction has the effect of reducing the loft angle of the striking face, and further wherein rotation of the one or more tuning screws in a second opposite direction has the effect of increasing the loft angle of the striking face.

14. A golf club according to claim 13, wherein rotation of the one or more tuning screws in the first direction has the effect of increasing the energy stored in the striking member and the striking face due to the resilience of the club head, thereby providing a more solid feel during a golfing stroke.
15. A golf club according to claim 14, wherein rotation of the one or more tuning screws in the second direction has the effect of decreasing the energy stored in the striking member and the striking face due to the resilience of the club head, thereby providing a softer feel during a golfing stroke.
16. A golf club according to claim 14 or claim 15, wherein one full rotation of the one or more tuning screws through 360 degrees corresponds to 1 degree change in loft angle of the striking face.
17. A golf club according to claim 16, wherein the one or more tuning screws each comprise a tuning screw head and a shank being at least partially threaded, the tuning screw head being accessible to a tool for rotary adjustment through access holes defined in the striking face of the striking member or in the body portion, with the threaded shank being in threaded engagement with a threaded bore defined in the other of the body portion or the striking member respectively.
18. A golf club according to claim 17, wherein the tuning screw head is a Torx screw head.
19. A golf club according to claim 18 including a loft angle indicator for displaying the selected loft angle of the striking face.
20. A golf club according to claim 20, wherein the loft angle indicator is indicia corresponding to the selected loft angle, displayable through a viewing window.

21. A golf club according to claim 20, wherein the indicia is marked on a moving indicator member, the indicator member being movable via rotation of the tuning screws and gears intermeshed between the indicator member and the tuning screws.
22. A golf club according to claim 21, wherein an operatively upper edge of the striking face is rounded, thereby in use to provide a player with the ability to see a larger surface of the striking face so as to aid the player in properly aligning the striking face with a golf ball and a target line on which the ball is to be struck.
23. A golf club according to claim 22, wherein an operatively lower edge of the striking face is rounded, thereby in use to reduce drag of the golf club in contact with the turf during a golfing stroke.
24. A golf club according to claim 23, wherein the space defined in the club head between the body member and the striking member is capable of receiving weights, thereby enabling the player to vary the overall weight of the golf club.
25. A golf club according to claim 24, wherein the weights are securable within the space by the tuning screws.
26. A golf club according to claim 25, wherein the end of the shaft opposite the end connected to the club head defines a gripping formation.
27. A golf club according to claim 27, wherein the golf club is a putter.
28. A golf club substantially as herein described and illustrated.





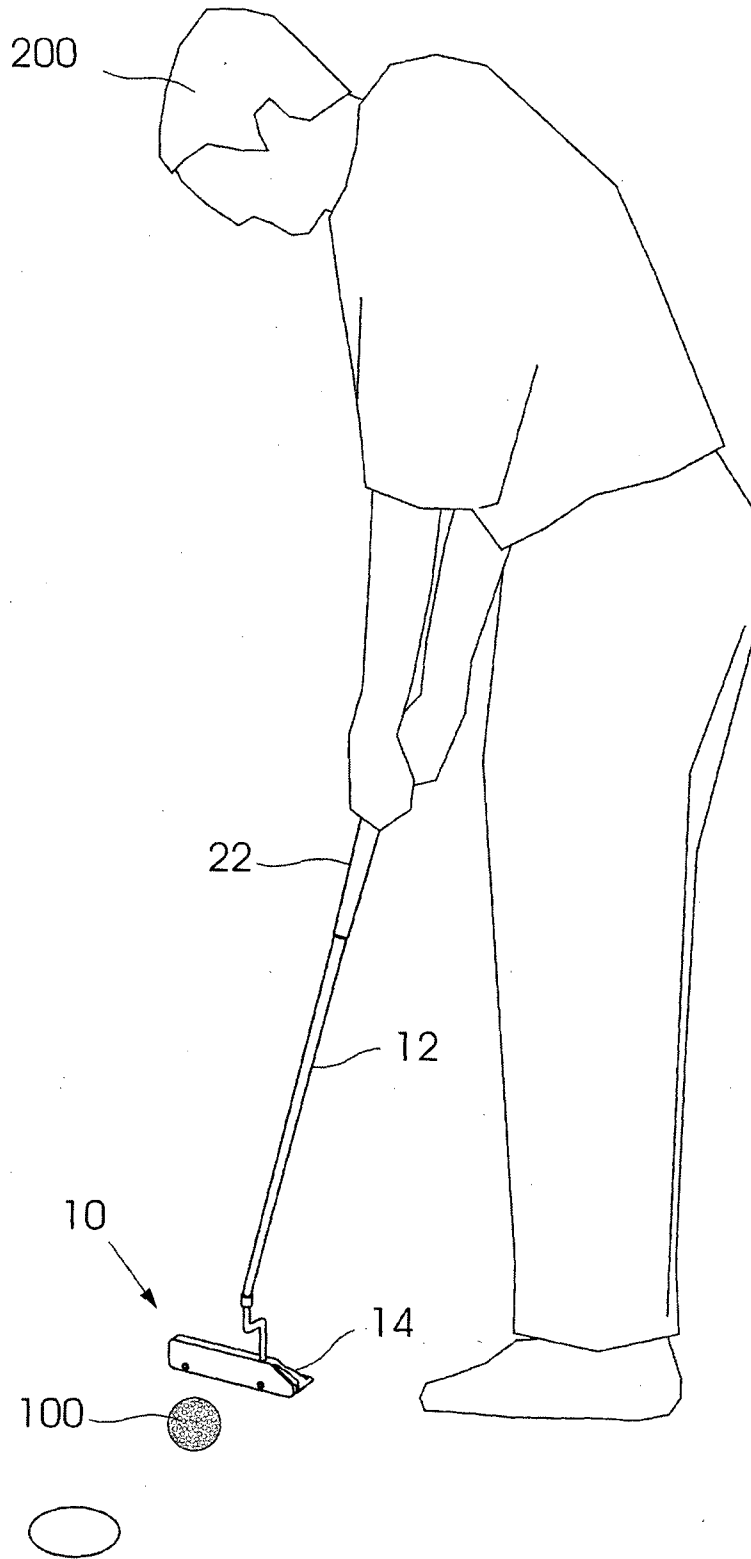


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2013/000025

A. CLASSIFICATION OF SUBJECT MATTER IPC: A63B 53/06 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A63B 53/04, 53/06, 53/08, 69/36 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Epodoc		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2377586 A2 (COBRA GOLF INCORPORATED) 19 October 2011 (19.10.2011) Fig. 1, 13 - 16; [0049] - [0054], claims 9 and 12	1, 2, 3
A	US 2011207552 A1 (FINN MICHAEL E, OLDKNOW ANDREW G.V, OLDKNOW ANDREW G. V) 25 August 2011 (25.08.2011) Fig.1 - 12; [0036], [0037], [0041] - [0043], [0055] - [0057], [0067], [0070], [0072]	1, 3 - 6, 10 - 15, 26
A	US 6203444 B1 (MCRAE BRIAN J) 20 March 2001 (20.03.2001) Fig. 2, 3, 4, 11, 12; column 3, line 66 - column 4, 42	1 - 4, 13 - 15, 21, 27
A	US 2026749 A (PESTER RAY) 07 January 1936 (07.01.1936) Fig. 1 - 5; column 2, line 6 - column 3, line 17	1, 3, 19, 21
<input checked="" type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date		"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means		"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 23 July 2013 (23.07.2013)	Date of mailing of the international search report 12 August 2013 (12.08.2013)	
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INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2013/000025

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4618149 A (MAXEL, JOHN M) 21 October 1986 (21.10.1986) Fig. 3 - 11; column 6. lines 36 - 53; column 7, lines 46 - 68	1, 24
A	US 1665523 A (BOYCE EDWARD C) 10 April 1928 (10.04.1928) Fig. 1 - 9; page 1, line 90 - page 2, line4; page 2, lines 54 - 123	1, 3, 19

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2013/000025

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: 28

because they relate to subject matter not required to be searched by this Authority, namely:

Claim 28 does not confirm to Rule 6 (2) since it relies on references to the description

2. Claims Nos.:

because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT / ZA 2013/000025

Patent document cited in search report			Patent family member(s)			Publication date
EP	A2	2377586	CN	A	102218209	2011-10-19
			JP	A	2011224366	2011-11-10
			EP	A2	2377586	2011-10-19
			US	A1	2011256954	2011-10-20
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			US	A1	2011207552	2011-08-25
			WO	A2	2011102930	2011-08-25
US	B1	6203444	US	B1	6203444	2001-03-20
US	A	2026749	US	A	2026749	1936-01-07
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