A modification to a golf club including a shaft extension and a balance weight provides a significant modification of the golf club mass distribution to affect the combination of forces and torques that the body, via the arms and hands, must exert on the golf club grip in order to impart motion to the golf ball towards the cup. A preferred design reduces the torque that the hands impart on the golf club grip to move the golf club through its controlled arc motion to strike the golf ball. The distributed weight of the golf club shaft contributes to a smoother motion of the golf club.
FIGURE 2

PRIOR ART
FIGURE 3

PRIOR ART
MASS BALANCED GOLF CLUB

REFERENCE TO RELATED APPLICATIONS

[0001] This application claims one or more inventions which were disclosed in Provisional Application No. 61/730, 625, filed Nov. 28, 2012, entitled “MASS BALANCED PUTTER”. The benefit under 35 USC §119(e) of the United States provisional application is hereby claimed, and the aforementioned application is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention pertains to the field of golf clubs. More particularly, the invention preferably pertains primarily to golf putters and to a lesser extent to golf pitching clubs and short irons.

[0004] 2. Description of Related Art

[0005] Golf putters as presently configured are not designed considering the static balance of the golf club. Both torque and linear force must be imparted to the golf club grip to effect its arc motion to strike the golf ball. Belly putters and long putters are attempts to improve on conventional golf putters but such designs are being brought into question as legal golf club designs within the rules of golf.

[0006] Other modifications to the weight distribution of a golf club are known in the art. U.S. Pat. Nos. 7,261,641, 7,699,718, 7,770,460, and 7,770,461, as well as U.S. Patent Application Nos. 2004/0147339 and 2003/0148819, for example, add weights from the hand grip end of the club down the shaft toward the club head end of the club.

[0007] The above-mentioned references are hereby incorporated by reference herein.

SUMMARY OF THE INVENTION

[0008] A modification to a golf club including a shaft extension and a balance weight provides a significant modification of the golf club mass distribution to affect the combination of forces and torques that the body, via the arms and hands, must exert on the golf club grip in order to impart motion to the golf ball towards the cup. A preferred design reduces the torque that the hands impart on the golf club grip to move the golf club through its controlled arc motion to strike the golf ball. The distributed weight of the golf club shaft contributes to a smoother motion of the golf club.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows schematically a prior art golf perter.

[0010] FIG. 2 shows schematically a prior art golf putter termed a belly putter.

[0011] FIG. 3 shows schematically a prior art golf putter termed a long putter.

[0012] FIG. 4 shows schematically a statically mass balanced golf club in a preferred embodiment of the present invention.

[0013] FIG. 5 shows schematically a golf club with the balance weight having a specific shape conforming to the putter shaft in a preferred embodiment of the present invention.

[0014] FIG. 6 shows schematically the static torque on the putter grip involved in the putter stroke using a prior art golf putter.

[0015] FIG. 7 shows schematically a golf club with the static torque on the putter grip counter balanced in a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0016] Although descriptions herein are generally for golf clubs, principles of the invention are most relevant to a golf putter, but may be applicable to other types of golf clubs, including, but not limited to, pitching clubs and short irons.

[0017] FIG. 1 shows the most common type of conventional golf putter (10) with a putter head (11), a putter hand grip (13), and a putter shaft (12), which connects the putter head (11) to the putter hand grip (13). There are many swing styles; however, most are variations of a pendulum motion about a point (19) between the putter grip (13) and the shoulder of the golfer, the pendulum being of length (14) plus length (15).

[0018] FIG. 2 shows a prior art golf putter (20) termed a “belly putter”. The top end of the putter shaft (22) is anchored at approximately the player’s belt line (29). Thus location (29) is the anchor point for a pendulum of length (24) plus length (25) in the pendulum motion of the putter (20), whereby the hands apply a substantially linear force to the putter grip (13) during the putter stroke.

[0019] FIG. 3 shows a prior art golf putter (30) termed a “long putter”. The top end of the putter shaft (32), which is a pendulum of length (34) plus length (35), is held in a substantially fixed position (39) by one hand and the other hand imparts the pendulum motion to the golf putter (30) by applying a linear force to the putter grip (13) during the putter stroke.

[0020] For the belly putter (20) and the long putter (30), the top end (29, 39) of the putter shaft (22, 32) is substantially anchored. Therefore, the putting force exerted on the hand grip (13) by the player’s hand or hands is substantially linear. Little or no torque is required to move the club (20, 30) in its respective pendulum motion.

[0021] FIG. 4 shows the simplest form of a golf club (40) in a preferred embodiment of the present invention. The center-line of the shaft (42) passes through the center of mass (41) of the club head (11). The shaft (42) extends a distance (44) between the center of mass (41) of the club head (11) and the center of the hand grip (13). A shaft extension (47) extends upwardly from the hand grip (13) to the balance weight (46), which has a center of mass (43). The shaft extension (47) extends a distance (45) between the center of mass (43) of the balance weight (46) and the center of the hand grip (13). The shaft extension (47) and balance weight (46) together form a balancing projection. The center of mass (43) of the balance weight (46) is located in substantial alignment with the center of the hand grip (13) and the center of mass (41) of the club head (11).

[0022] Club head torque, as used herein, refers to the integral or the incremental summation of the products of the masses or weights of the lower portion of the golf club below the center of the hand grip and their distances from the center of the hand grip. Balance torque, as used herein, refers to the integral or the incremental summation of the products of the masses or weights of the upper portion of the golf club above the center of the hand grip and their distances from the center of the hand grip.

[0023] Assuming the distributed effect of the weight of the shaft (42) and the weight of the shaft extension (47) to be negligible, static mass balance is achieved when the weight of
the balance weight (46) times the distance between the center of mass of the balance weight (46) and the center of the hand grip (13) equals the weight of the club head (11) times the distance between the center of mass of the club head (11) and the center of the hand grip (13). In other words, static mass balance is achieved when the weight of the balance weight (46) times the length (45) of the shaft extension (47) equals the weight of the club head (11) times the length (44) of the shaft (42) distance.

[0024] In a preferred embodiment, the distance (45) of the shaft extension (47) is one half the distance (44) of the shaft (42). In this embodiment, static mass balance is achieved when the weight of the balance weight (46) is twice the weight of the club head (11).

[0025] FIG. 5 shows a golf club (50) in a preferred embodiment with the balance weight (56) shaped to conform to the outside shape (58) of the shaft extension (57). Thus, the only indication of the balance weight would be the length (55) of the shaft extension (57). This would most likely be an acceptable configuration for the “Rules of Golf”.

[0026] In some embodiments, an objective is to emulate as to a degree the feel, the dynamics, and the smooth motion of the belly putter (20) and the long putter (30), as these putter configurations are being questioned relative to “The Rules of Golf”.

[0027] Referring back to FIG. 4, the location of the balance weight (46) above the hand grip (13) at the top of the shaft (47) has an anchoring effect on the top of the shaft much like the anchor points (29) and (39) respectively of the belly putter (20) and the long putter (30). The center of pendulum motion (49) is located a distance (distance (48)) above the center of mass (43) of the balance weight (46).

[0028] Referring to FIG. 6, the putter head (11) of a conventional golf putter is cantilevered from the putter grip. The hands must exert a counterclockwise torque (63) on the grip (13) equal to the product of the putter head (11) weight (61) times the horizontal distance (64) to maintain the angle (65) between the putter shaft (12) and the horizontal substantially constant during the putter stroke.

[0029] Referring to FIG. 7, the clockwise torque of the balance weight (46), which has weight (77) times the horizontal distance (75), acts to reduce or negate the counterclockwise torque (73) produced by club head (11) weight (71) times distance (74) to provide a mass balanced golf club (40).

[0030] The balance weight being located above the hand grip provides a stabilizing influence/smoothing effect on the golf club motion during the stroke. The location of significant weight at each end of the golf club shaft aids in maintaining the angle (76) of the golf club shaft (42) substantially constant during the golf stroke. This has been qualitatively verified in initial tests of a prototype statically balanced putter.

[0031] The magnitude of static balance may be changed to provide different measures of feel to the golf club. “Feel” as described herein is the combination of torques and linear forces that the body, via the arms and hands, must exert on the hand grip (13) in order to impart motion to the golf ball towards the cup.

[0032] It is important to note that the prior art concepts of the belly putter (20) and the long putter (30) are concepts that, in addition to anchoring the top end (29) and (39) of the golf club, affect the feel of the putter by changing the forces and torques the hands impart on the putter grip (13) using the body and/or hands in a certain manner. In contrast, the embodiments described herein use the balance weight (46) and shaft extension distance (45) to affect the forces and torques.

[0033] The magnitude of mass balancing may vary in accordance to the preference of individual golfers. Referring to FIG. 7 in a preferred embodiment of minimum balancing, the weight (77) of the balance weight (46) is about 25 percent of the weight (71) of the club head (11) and the length (45) of the shaft extension (47) is about 20 percent of the length (44) of the golf club shaft (42). This minimum balancing would provide a balance torque that is 5 percent of the club head torque. Preferred embodiments may have the weight (77) of the balance weight (46) vary between 25 percent and 200 percent of the weight (71) of the club head (11) in combination with the variation of the length (45) of the shaft extension (47) between 20 percent and 100 percent of the length (44) of the golf club shaft (42).

[0034] In other embodiments, the balancing torque provided by the balancing projection is closer in value to the club head torque. In some embodiments, the balancing torque is at least 10 percent of the club head torque. In some embodiments, the balancing torque is in the range of 10 percent to 25 percent of the club head torque. In some embodiments, the balancing torque is at least 25 percent of the club head torque. In some embodiments, the balancing torque is in the range of 50 percent to 100 percent of the club head torque. In some embodiments, the balancing torque is about 100 percent of, or equal to, the club head torque.

[0035] In some embodiments, the shaft extension is an integral extension of the shaft of the golf club. In other embodiments, the shaft extension is permanently fastened to the grip end of the golf club. Any permanent fastening mechanism may be used within the spirit of the present invention. In preferred embodiments, however, the shaft extension is removable attached to the grip end of the club so that different shaft extensions of different lengths and weights may be attached to a golf club. In preferred embodiments, the shaft extension is designed to be removable from the grip end of a conventional golf club. In other embodiments, the grip end of the golf club is designed to receive the shaft extension. Any reversible fastening mechanism may be used within the spirit of the present invention, including, but not limited to, a screw or a bolt.

[0036] In some embodiments, the balance weight is integral to an end of the shaft extension. In other embodiments, the balance weight is permanently fastened to the shaft extension. Any permanent fastening mechanism may be used within the spirit of the present invention. In preferred embodiments, however, the balance weight is removable attached to the end of the shaft extension so that different shaft extensions of different lengths may be combined with different balance weights of different weights. Any reversible fastening mechanism may be used within the spirit of the present invention, including, but not limited to, a screw/screw hole or a bolt/bolt hole.

[0037] In a preferred embodiment, the balance weight is pro shop changeable via an attachment technique such that the balance is adjustable to the individual’s preference. Some individual golfers may prefer less mass balancing, whereas others may prefer a balance weight that gives substantial balancing.
[0038] In a preferred embodiment, the balance weight attachment technique is significantly secure such that it cannot be changed on the golf course by the golfer during play. This would most likely be an acceptable configuration within the “Rules of Golf”. In some embodiments, a locking mechanism between the golf club and the balancing projection prevents the golfer from removing the balancing projection from the golf club on the golf course.

[0039] The description above generally describes the present invention as it applies to a golf club. In some embodiments, the golf club is a putter and the club head is a putter head. In other embodiments, the golf club is a pitching club and the club head is a pitching club head. In other embodiments, the golf club is a short iron and the club head is a short iron head.

[0040] Accordingly, it is to be understood that the embodiments of the invention herein described are merely illustrative of the application of the principles of the invention. Reference herein to details of the illustrated embodiments is not intended to limit the scope of the claims, which themselves recite those features regarded as essential to the invention.

What is claimed is:

1. A golf club comprising:
   a hand grip for gripping the golf club having a hand grip center between a lower hand grip end and an upper hand grip end opposite the lower hand grip end;
   a shaft projecting downward from the lower hand grip end at a first shaft end and having a second shaft end opposite the first shaft end;
   a club head at the second shaft end having a club face for striking a golf ball;
   a shaft extension projecting upward from the upper hand grip end at a first shaft extension end and having a second shaft extension end opposite the first shaft extension end; and
   a balance weight at the second shaft extension end.

2. The golf club of claim 1, wherein a length of the shaft extension and a weight of the balance weight are selected to provide a balance torque to offset at least a portion of a club head torque caused by a weight of the club head at a club head distance away from the hand grip center.

3. The golf club of claim 2, wherein the length of the shaft extension and the weight of the balance weight provide the balance torque to offset at least 50% of the club head torque.

4. The golf club of claim 2, wherein the length of the shaft extension and the weight of the balance weight provide the balance torque to offset at least 25% of the club head torque.

5. The golf club of claim 2, wherein the length of the shaft extension and the weight of the balance weight provide the balance torque to offset at least 50% of the club head torque.

6. The golf club of claim 2, wherein the length of the shaft extension and the weight of the balance weight provide the balance torque of 100% of the club head torque.

7. The golf club of claim 2, wherein the length of the shaft extension is in the range of 20% to 100% of a distance from the hand grip center to the club head.

8. The golf club of claim 2, wherein the weight of the balance weight is in the range of 25% to 200% of the weight of the club head.

9. The golf club of claim 2, wherein the length of the shaft extension is in the range of 20% to 100% of a length of the shaft and the weight of the balance weight is in the range of 25% to 200% of the weight of the club head.

10. The golf club of claim 1, wherein the club head is a putter head.

11. The golf club of claim 1, wherein the club head is a pitching club head.

12. The golf club of claim 1, wherein the club head is a short iron head.

13. The golf club of claim 1, wherein the shaft extension is removably fastened to the upper hand grip end.

14. The golf club of claim 1, wherein the balance weight is removably fastened to the second shaft extension end.

15. The golf club of claim 1, wherein a center of mass of the balance weight is aligned with a center of the shaft extension, the hand grip center, a center of the shaft, and a center of mass of the club head.

16. A method of offsetting at least a portion of a club head torque of a golf club caused by a weight of a club head at a club head distance away from a hand grip center comprising:
   a) selecting a balancing projection comprising a shaft extension having a shaft extension length, a first shaft extension end, and a second shaft extension end opposite the first shaft extension end and a balance weight at the second shaft extension end; and
   b) attaching the first shaft extension end to an upper hand grip end of the golf club, the golf club comprising:
      the hand grip for gripping the golf club having a hand grip center between a lower hand grip end and the upper hand grip end opposite the lower hand grip end;
      a shaft projecting downward from the lower hand grip end at a first shaft end and having a second shaft end opposite the first shaft end;
      a club head at the second shaft end having a club face for striking a golf ball.

17. The method of claim 16, wherein the shaft extension length and a weight of the balance weight of the balancing projection are selected to provide a predetermined offset of the club head torque based on a length of the shaft and a weight of the club head.

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