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(54) **ADJUSTABLE WEIGHT RETENTION ASSEMBLY**

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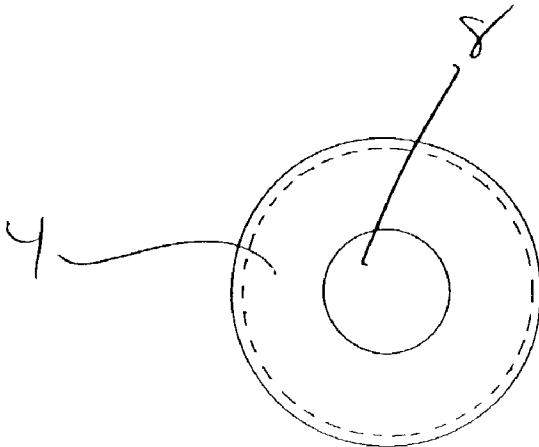
(57) **ABSTRACT**

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**Related U.S. Application Data**

(60) Provisional application No. 60/350,854, filed on Jan. 22, 2002.

An adjustable weight retention assembly comprising a hollow body having first outer diameter and a proximal and distal end; a flange abutting the proximal end having a second outer diameter greater larger than the first; and a plurality of concentric rings circumscribing the hollow body; wherein the assembly is formed of a high specific gravity polymer composition. A set of golf clubs containing a plurality of adjustable weight retention assemblies, as well as a set of adjustable weight retention assemblies are also described.



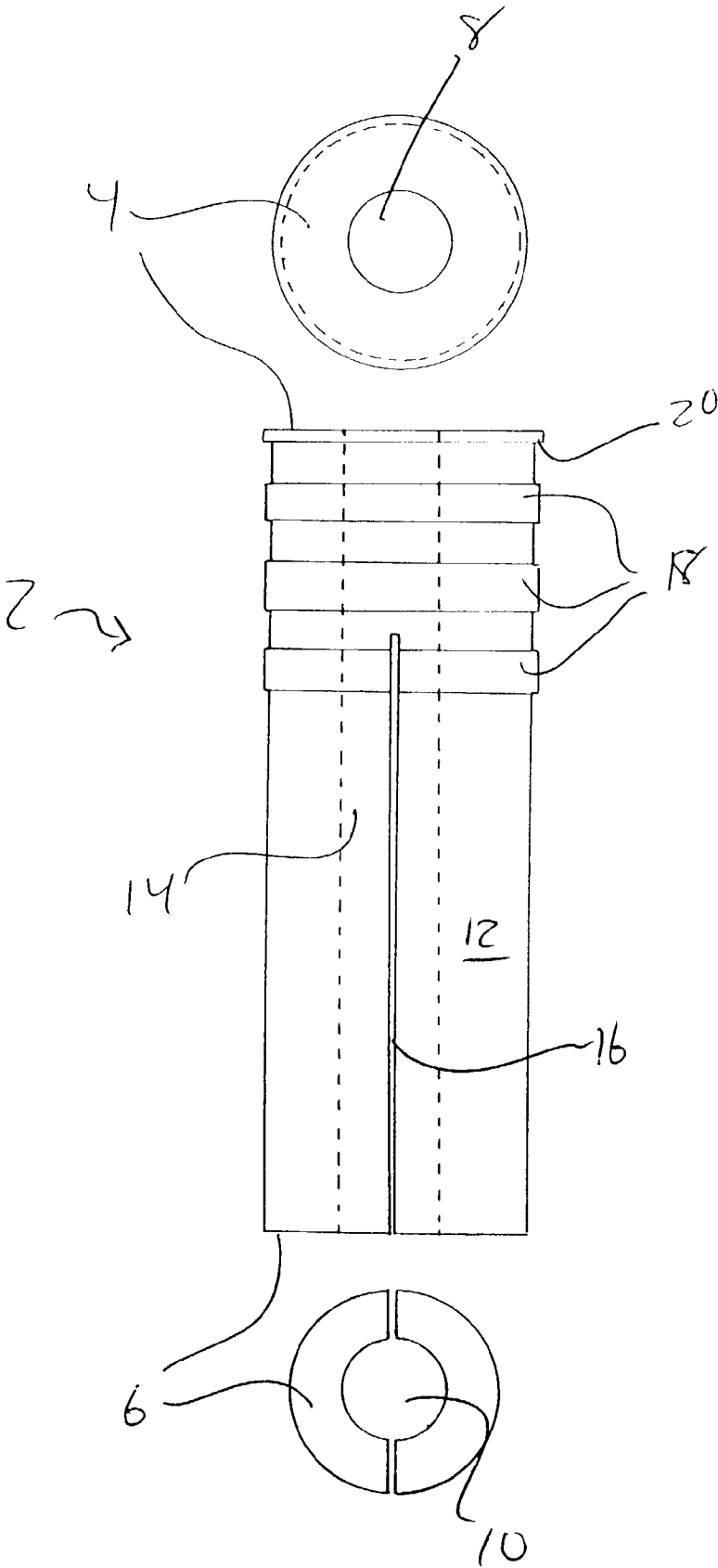


FIG. 1A

FIG. 1B

FIG. 1C

## ADJUSTABLE WEIGHT RETENTION ASSEMBLY

### FIELD OF THE INVENTION

[0001] This application claims priority to U.S. Provisional Application No. 60/350,854 filed Jan. 22, 2002. The invention is directed to a set of golf clubs and, in particular, to golf clubs having an weighting system in associated with the hosel.

### BACKGROUND OF THE INVENTION

[0002] Golfers and recreational golfers, in particular, rely on their equipment to aid in bettering their quality of play. It is well known that a golfer's game is greatly affected by the golf clubs and golf balls selected for play. While many recreational golfers fail to recognize the impact their club or ball selection may have on their game, many golfers spend considerable time in selecting the equipment that is best suited to their style of play. Because golf clubs are not intended to be "disposable," like are golf balls, the choice of a proper club is a crucial one. Once a club is purchased, most golfers do not make a change in clubs for at least a year or two and, in many cases, 5-10 years.

[0003] Among the factors that a golfer considers in selecting a golf club or a set of clubs are swing weight, weight distribution, shaft length, head volume, and center of gravity. These criteria are considered, to the extent that they can be, by golf club manufacturers in efforts to provide a customized product for the golfing public. Recreational golfers of differing sizes and shapes have a plethora of differing swings, swing planes, shot shapes, and lie angles, each of or all of which can vary from golfer to golfer, from round to round, and even from shot to shot. For example, a particular club used by a six foot, four-inch tall man is just as likely to be used by a five foot, eight-inch high school boy. Because clubs are designed for the "average" golfer rather than an individual golfer's needs and abilities, however, it is not feasible to find or assemble a set of clubs which perfectly matches any one individual golfer's psychological, physical, and skill requirements. Consequently, most commercially available clubs are weighted within a narrow range so that they can be used by the vast majority of golfers.

[0004] It is well known that the weight of the golf club can affect swing speed and, ultimately, distance. Unfortunately, there is no way to adjust the weight of a club short of buying a new set of clubs. Golf clubs are, for the most part, made for the "average" player and the club weight is not changeable. One can envision that the strength of a golfer may change as he or she gets older. It would be ideal that the weighing of the club could change concurrently.

[0005] Similarly, the location of the center of gravity of a club head can have a significant effect on a golf shot, such as on the trajectory, particularly with less skilled players. A small change in the center of gravity can also influence the tendency of a shot to hook or slice. Therefore, the ability for a manufacturer to allow a player to make an adjustment to the center of gravity of a club might allow the player to compensate, even if only slightly, for their hook or slice, without the player having to make a modification of their swing.

[0006] There remains a need, therefore, for a clubhead that affords a golfer an adjustment means of weight and center of

gravity. The present invention addresses a method to adjust the total clubhead weight and/or center of gravity of a given club based on the player's desired club performance characteristics.

### SUMMARY OF THE INVENTION

[0007] The present invention is directed to an adjustable weight retention assembly comprising a hollow body having first outer diameter and a proximal and distal end; a flange abutting the proximal end having a second outer diameter greater larger than the first; and a plurality of concentric rings circumscribing the hollow body; wherein the assembly is formed of a high specific gravity polymer composition.

[0008] The hollow body further includes a bisecting slit and the proximal end includes a first aperture and the distal ends comprises a second aperture. In one embodiment, the body comprises three concentric rings. The rings are preferably elevated above the first outer diameter, and are elevated between about 0.002 inches and about 0.010 inches. Alternatively, the rings are recessed below the first outer diameter, and are recessed between about 0.002 inches and about 0.010 inches.

[0009] The assembly polymer composition may include high specific gravity thermoplastic compounds; crystalline thermoplastics or elastomers with high-density fillers; nylons, polypropylenes, ABS, polyesters, polyester elastomers, PBT, nylon elastomers, urethanes, and mixtures thereof.

[0010] The polymer composition preferably has a specific gravity of between about 1.7 and about 10, and more preferably, between about 4 and about 10. The flange should have a thickness of between about 0.02 inches and about 0.05 inches and more preferably between about 0.03 inches and about 0.04 inches. The assembly hollow body preferably has a length of between about 0.5 inches and about 2 inches.

[0011] The present invention is also directed to a set of golf clubs comprising a plurality of adjustable weight retention assemblies comprising a hollow body having first outer diameter and a proximal and distal end; a flange abutting the proximal end having a second outer diameter greater larger than the first; and a plurality of concentric rings circumscribing the hollow body; wherein the assemblies are formed of a high specific gravity polymer composition and each assembly in the set has a differing and increasing weight.

[0012] The present invention is directed to a set of adjustable weight retention assemblies comprising a hollow body having first outer diameter and a proximal and distal end; a flange abutting the proximal end having a second outer diameter greater larger than the first; and a plurality of concentric rings circumscribing the hollow body; wherein the assemblies are formed of a high specific gravity polymer composition and each assembly in the set has a differing and increasing weight.

[0013] In one embodiment, the set comprises 5 assemblies comprising a first assembly having a first weight; a second assembly having a second weight greater than the first; a third assembly having a third weight greater than the second; a fourth assembly having a fourth weight greater than the third; and a fifth assembly having a fifth weight greater than the fourth. Preferably, the weights increase by at least about 2 g.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1A is a proximal end view of the adjustable weight retention assembly of the present invention;

[0015] FIG. 1B is a perspective view of the adjustable weight retention assembly of the present invention; and

[0016] FIG. 1C is a distal end view of the adjustable weight retention assembly of the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

[0017] The adjustable weight retention assembly (the “assembly”) 2 of the present invention comprises a proximal end 4 and a distal end 6, having a first aperture 8 and second aperture 10, respectively. The assembly 2 comprises a body 12 containing a bore 14 through and co-axial to the body 12 that connects the proximal 4 and distal 6 ends via the first and second apertures 8 and 10. The assembly body 12 further comprises a slit 16, defined by the diameter of the body 12, that runs a predetermined distance along co-linearly along the body 12.

[0018] Additionally, the assembly body includes “knurled” area containing a plurality of concentric rings 18 that circumscribe the circumference of the body 12. Preferably, the assembly includes three rings 18. The rings 18 may be raised above the body OD or they may be recessed. In either embodiment, it is preferred that the rings 18 are raised or recessed at least about 0.002 inches, more preferably between about 0.002 inches and about 0.010 inches, and most preferably between about 0.002 inches and about 0.008 inches.

[0019] The assembly also comprises a flange 20 at the proximal end 4 of the body 12. Preferably, the flange 20 has an outer diameter (“OD”) greater than the OD of the body 12 sufficient to prevent the assembly 2 from fully entering the hollow center of a golf club shaft. Preferably, the flange OD is at least about 0.3 inches, more preferably at least about 0.35 inches, and most preferably at least about 0.355 inches. It should be understood that the flange OD is determined by the inner and outer diameter of the golf club shaft. The flange 20 can have any thickness sufficient to withstand the rigors of a club repeatedly hitting a golf ball. Preferably the flange 20 has a thickness of at least about 0.01 inches, more preferably between about 0.02 inches and about 0.05 inches, and most preferably between about 0.03 inches and about 0.04 inches. In one embodiment, the flange thickness is 0.035 inches.

[0020] The assembly 2 and/or body 12 may have any geometry but is preferably cylindrical in nature. The walls of the cylinder may be parallel to sufficiently mate with parallel walls of a golf club shaft or, in an alternative embodiment, the walls of the body “cylinder” are converging or diverging.

[0021] The assembly 2 can have any length but is preferably less than about 2 inches, more preferably between about 0.5 inches and about 2 inches, and most preferably, about 1 inch.

[0022] The assembly 2 can have any size or weight sufficient for insertion into a golf club shaft and to affect the swing weight of the resulting golf club. Preferably, the assembly has a constant size and variable weight, and is packaged as a set of assemblies. For example, a set of five

assemblies may include a “base weight” assembly and four additional assemblies, each having differing and increasing weights (e.g., +2 g, +4 g, +6 g, and +8 g). Preferably the set of assemblies allows for at least about 5 g of weight to be added across the set, more preferably at least about 8 g, and most preferably at least about 10 g. In a preferred embodiment, a set of golf clubs includes a set of assemblies for adjusting the swing weight of individual clubs to best match a golfer’s desired performance characteristics.

[0023] Any polymer materials; preferably high specific gravity thermoplastic compounds; crystalline thermoplastics or elastomers with high-density fillers; various grades of nylons, polypropylene, ABS, polyesters, PBT, elastomers of nylon, urethane, and mixtures thereof. Most preferably, the assembly comprises polyurethane or polyester elastomer. An example of a high specific gravity thermoplastic compounds is THERMOCOMP HSG®, commercially available from LNP Engineering Plastics of Santa Ana, Calif. Other commercially available plastics include PREVAIL® 3150, a polyurethane/ABS mixture manufactured by Dow.

[0024] The assembly material should have a specific gravity greater than about 1, more preferably between about 1.7 and about 10; and most preferably between about 4 and about 10. The assembly can be attached to a golf club shaft in a variety of means, but preferably is attached adhesively.

[0025] As used herein, the term “about,” used in connection with one or more numbers or numerical ranges, should be understood to refer to all such numbers, including all numbers in a range.

[0026] The invention described and claimed herein is not to be limited in scope by the specific embodiments herein disclosed, since these embodiments are intended as illustrations of several aspects of the invention. Any equivalent embodiments are intended to be within the scope of this invention. Indeed, various modifications of the invention in addition to those shown and described herein will become apparent to those skilled in the art from the foregoing description. Such modifications are also intended to fall within the scope of the appended claims.

What is claimed is:

1. An adjustable weight retention assembly comprising:
  - a hollow body having first outer diameter and a proximal and distal end;
  - a flange abutting the proximal end having a second outer diameter greater larger than the first; and
  - a plurality of concentric rings circumscribing the hollow body;
 wherein the assembly is formed of a high specific gravity polymer composition.
2. The assembly of claim 1, wherein the hollow body further comprises a bisecting slit.
3. The assembly of claim 1, wherein the proximal end comprises a first aperture and the distal ends comprises a second aperture.
4. The assembly of claim 1, wherein the body comprises three concentric rings.
5. The assembly of claim 1, wherein the rings are elevated above the first outer diameter.
6. The assembly of claim 5, wherein the rings are elevated between about 0.002 inches and about 0.010 inches.

7. The assembly of claim 1, wherein the rings are recessed below the first outer diameter.

8. The assembly of claim 7, wherein the rings are recessed between about 0.002 inches and about 0.010 inches.

9. The assembly of claim 1, wherein the polymer composition comprises high specific gravity thermoplastic compounds; crystalline thermoplastics or elastomers with high-density fillers; nylons, polypropylenes, ABS, polyesters, polyester elastomers, PBT, nylon elastomers, urethanes, and mixtures thereof.

10. The assembly of claim 1, wherein the polymer composition has a specific gravity of between about 1.7 and about 10.

11. The assembly of claim 10, wherein the specific gravity of between about 4 and about 10.

12. The assembly of claim 1, wherein the flange has a thickness of between about 0.02 inches and about 0.05 inches.

13. The assembly of claim 12, wherein the flange has a thickness of between about 0.03 inches and about 0.04 inches.

14. The assembly of claim 1, wherein the hollow body has a length of between about 0.5 inches and about 2 inches.

15. A set of golf clubs comprising a plurality of adjustable weight retention assemblies comprising:

a hollow body having first outer diameter and a proximal and distal end;

a flange abutting the proximal end having a second outer diameter greater larger than the first; and

a plurality of concentric rings circumscribing the hollow body;

wherein the assemblies are formed of a high specific gravity polymer composition and each assembly in the set has a differing and increasing weight.

16. A set of adjustable weight retention assemblies comprising:

a hollow body having first outer diameter and a proximal and distal end;

a flange abutting the proximal end having a second outer diameter greater larger than the first; and

a plurality of concentric rings circumscribing the hollow body;

wherein the assemblies are formed of a high specific gravity polymer composition and each assembly in the set has a differing and increasing weight.

17. The set of assemblies of claim 16, wherein the set comprises 5 assemblies comprising:

a first assembly having a first weight;

a second assembly having a second weight greater than the first;

a third assembly having a third weight greater than the second;

a fourth assembly having a fourth weight greater than the third; and

a fifth assembly having a fifth weight greater than the fourth.

18. The set of claim 17, wherein the weights increase by at least about 2 g.

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