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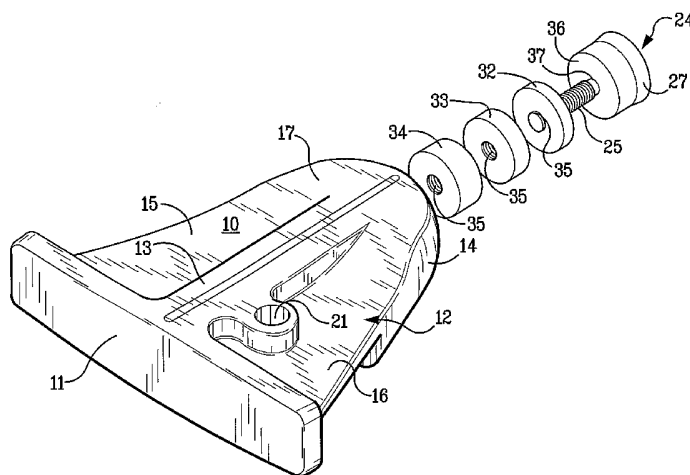
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(54) Title: **ADJUSTABLE WEIGHT PUTTER**



(57) Abstract: An adjustable weight golf putter (10) is provided with a body portion (12) of a material of low specific gravity, for example aluminum, and a weighted cap (24), receivable in a longitudinal recess (22) opening at the back extremity of the body portion. The weighted cap (24) is formed of a material of high specific gravity, for example a tungsten-copper alloy, and has a weight which is at least more than 20%, and preferably more than 30% of the weight of the lighter body portion, concentrating the weight of the putter head toward the back and locating its center of gravity more than half way toward the back of the putter head. The weighted cap (24) is secured by a threaded shaft (25) engageable in a recess extension (23) in the body (12). Optional weighted discs (32-34), of a high specific gravity material and each of a different weight, are threadedly engageable with the shaft (25) and are usable in various combinations for optimal weight adjustment. The optional weights (32-34) are applied in tight engagement with the weighted cap (24), to maintain weight concentration at the back.

ADJUSTABLE WEIGHT PUTTER

Background of the Invention

5 The present invention relates to golf putters and more specifically to an improved form of putter head incorporating novel and advantageous means for concentrating weight near the back end of the putter, spaced well behind the ball-striking face, and also providing for an improved, simplified and effective arrangement for adjustably weighting the putter head to enable the putter to be optimized to the desires and abilities of the golfer.

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There are numerous examples in the prior art of putters incorporating features providing for adjustable weighting of the putter head. The Bushner U.S. Patent 4,895,371, for example, discloses a putter head having one or more bores therein for receiving a rod, on which a weight is slideably mounted and secured
15 in position by a set screw. The rod is contained within the putter head by means of a threaded plug.

The D'Eath U.S. Patent 5,046,740 discloses a putter head in which a longitudinal cavity in the putter is filled with steel balls, in order to increase the
20 weight of the putter along its center line.

Other prior art concepts involve the placement of one or more weighted elements at various locations on the putter head to enable the golfer to vary the weight to suit his desires and/or abilities. Many of these known concepts are
25 largely unsuccessful as commercial products, either because they are complicated to work with, because they place the weight adjustment elements at locations that do not optimize the weight balance of the putter, and for other reasons.

Summary of the Invention

The present invention provides an adjustable weight putter head which is easy to use and which, to the greatest practical extent, optimizes the weight balance of the putter by concentrating weight at the back extremity of the putter head, along the center line axis of the putter head. In accordance with the present invention, a putter head is provided in which the body is elongated in the ball-striking direction and is provided with a body cavity, at the back end extremity of the putter head, for the reception of an adjustable weighting assembly. The main body of the putter is formed of a lightweight material, typically aluminum but certain engineering plastics, such as Celcon, are suitable.

In accordance with one aspect of the invention, a weighted cap, positioned at the back end extremity of the putter body, is formed of a high specific gravity material in relation to the material of the putter body itself. The weighted cap forms a substantial part of the weight of the overall putter head assembly so as to provide a maximized concentration of weight at a location as far behind the putter face as practicable. In this respect, the weighted cap advantageously has a weight which is more than 20%, and preferably more than one third the weight of the main putter head. In addition, the weighted cap incorporates a threaded shaft extending forwardly therefrom which can receive one or more of a plurality of disc-like weights, also formed of a high specific gravity material. Preferably, each of the weights has a different weight, such that by mounting some or all (or none) of the weights on the threaded shaft, a wide variety of weight combinations can be incorporated into the putter, so suit the golfer's desires. Significantly, the weights can be applied over the threaded shaft to be in abutting relation to the front face of the weighted cap, such that the assembly of the weighted cap and the disc-like weights concentrates the weight mass as far back in the putter as practicable.

For a more complete understanding of the above and other features and advantages of the invention, reference should be made to the following detailed description of a preferred embodiment, and to the accompanying drawings.

5 Description of the Drawings

Fig. 1 is an exploded perspective view of a putter head according to the invention, illustrating particularly the weighted cap and the manner in which disc-like weights are applied thereto.

10 Fig. 2 is a top plan view of the putter head of Fig. 1.

Fig. 3 is a side elevational view of the putter head.

15 Fig. 4 is a cross sectional view of the putter head as taken generally on line 4-4 of Fig. 2.

Fig. 5 is an enlarged view of the weighted cap element with a disc-like weight applied thereto.

20 Description of a Preferred Embodiment

Referring now the drawings, the reference numeral 10 designates generally a putter head which is comprised of a ball-striking face 11 and an extended body portion 12 comprised of a stem 13, a body end portion 14, and gussets 15, 16 which extend along opposite sides of the stem 13 and join the
25 ball-striking face 11 with the back portion 14 of the body.

Although specific dimensions of the putter head can vary, USGA rules require that the length of the putter (in the ball-striking direction) be less than the width of the ball-striking face. For long-shafted putters, it may be desired to have
30 a larger putter head than for short-shafted putters. In all cases, however, the

length-width relationship specified by the USGA rules must be observed. In typical embodiments of the invention, the face width of the putter may be around 4.25 inches, for a short-shafted putter and around 5.00 inches for a long-shafted putter, with the body length preferably being between 85 and 90% of the width of the ball-striking face.

Preferably, the entire putter head is a one-piece molding of suitable, relatively lightweight material. Aluminum, with a specific gravity of around 2.65, is widely preferred by most golfers, although engineering plastics, such as Celcon®, an acetal copolymer, available from Ticona Engineering Polymers (Division of Celanese AG) are suitable. Celcon is considerably lower in specific gravity than aluminum.

The illustrated embodiment will be described as if proportioned for a short-shafted putter, it being understood that dimensions may be slightly larger for medium-shafted and long-shafted putters. However, the basic principles of the invention are not limited to specific dimensions, which as used herein are illustrative only.

In the illustrated putter head, the ball-striking face 11 preferably is relatively thin, for example, around 0.275 inch, with a face width of, for example, 4.25 inches and face height of about one inch. The stem 13 is substantially the same height as the putter face and may have a typical width of about 5/8th inch above the gussets and 3/8th inch below the gussets. The back portion 14 of the putter body comprises an arcuate upper portion 17 and a squared-off lower portion 18. The bottom surface 19 of the putter is contoured in a large radius convex arc, as shown in Figs. 3 and 4, and the bottom surface of the back portion 14 of the body conforms to that arcuate curvature. When the putter is in its "normal" position, as reflected in Fig. 3, the low point of the arcuate bottom

surface 19 preferably is located an inch or so behind the front of the ball-striking face 11.

As reflected in Figs. 1 and 2, the body portion of the putter head tapers from front to back, and the back extremity of the back portion is rounded and convexly contoured, as indicated at 20. The gussets 15, 16 join with the back side of the ball-striking face 11 and taper in a rearward direction until they merge with the back portion 14 of the body. The front wall of 14a of the back portion typically is spaced about two inches behind the front face 11 (slightly less for a short shaft putter and slightly more for a long shaft putter).

As indicated in Fig. 3 in particular, the gussets 15, 16 are relatively thin in relation to the overall thickness (height) of the putter head. By way of example, for a short-shafted putter having a thickness of about one inch, the gusset webs may have a thickness of about 1/8th inch. For a larger, long-shafted putter head, having an overall thickness of about 1.2 inch, the gusset thickness may be proportionately greater, for example, 0.156 inch.

As shown in Figs. 3 and 4, the gussets 15, 16 are disposed in a horizontal plane, preferably slightly above the mid-height of the putter head, so as to be approximately aligned with the center of a ball to be struck. At one side of the stem 13 there is a shaft socket 21 that extends through the gusset 16 and to, or substantially to, the bottom surface 19 of the putter head. The shaft socket receives a putter shaft (not shown) by which the golfer handles the putter.

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Pursuant to the invention, the body back portion 14 is provided with a horizontal cylindrical recess 22, preferably extending longitudinally along an axis lying in the plane of the gussets 15, 16 and along the center of the spine 13. At the innermost end of the recess 22, there is a recess extension 23, of considerably smaller diameter, which is threaded. The recess 22, which typically

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may be about 3/4 quarters inch in diameter, is arranged to receive a weighted cap 24 (Fig. 5) from which extends a threaded shaft 25. The weighted cap 24 has a cylindrical body portion 26, which is adapted to be closely received within the cylindrical recess 22. The threaded shaft 25 extends forward to engage the threaded recess extension 23, which forms the means by which the weighted cap is secured within the recess 22. At its outer end, the weighted cap is formed with an outwardly divergent collar 27 adapted for mating reception within an outwardly divergent portion 28 of the body recess 22.

To install the weighted cap, it is inserted in the body recess 22 and its threaded shaft 25 is engaged with the threaded recess extension 23. The cap can then be rotated to be advanced into the recess, typically with the use of an Allen wrench engageable in a socket 29 at the end of the cap 24. When the divergent collar 27 seats in the divergent end portion 28 of the recess 22, the cap is positioned properly within the recess, and the recess is also sealed against the entry of moisture. Desirably, the outer end surface 30 of the weighted end cap 24 is convexly contoured to match and smoothly continue the convex contours 20 of the back of the body portion. Thus, when the weighted cap is installed, its presence is unobtrusive and does not detract from the aesthetics of the overall putter body.

In accordance with one aspect of the invention, the weighted cap 24 is formed of a material of much higher specific gravity than that of the remainder of the putter head. Whereas the putter head may be a one-piece molding of aluminum, with a specific gravity of around 2.65, the weighted cap 24 preferably is formed of a tungsten-copper alloy, having a specific gravity of about 17.06. Preferably, both the body of the weighted cap 24 and the threaded shaft are formed of the tungsten-copper alloy, although the threaded shaft could be formed of other material and fixed to the main body of the cap.

Pursuant to one aspect of the invention, the weighted cap and threaded shaft have a combined weight which is in excess of 20% of the weight of the other elements of the putter head, and preferably in excess of 30% of the weight of the other elements of the putter head. In all cases, the relationship of the putter head and the weighted cap is such that the center of gravity of the putter head, with the weighted cap installed, lies behind the mid-way point of the longitudinal axis of the putter head, concentrating weight toward the back of the putter. By way of example and not of limitation, a putter head for a short-shafted putter may have an "empty" weight of around 230 grams and its cap may have a weight of about 95 grams. A putter head for a medium shaft putter may have an empty weight of about 285 grams, with a cap of 65 grams. The considerably larger body for a long-shafted putter may have an empty weight of 370 grams and employ a weighted cap of 130 grams. For the medium shaft putter, which is somewhat of a hybrid design and which may utilize a short shaft in some cases and a mid-length shaft in others, the empty weight of the body is somewhat greater than for the short shaft, and the relative weight of the weighted cap is somewhat less, in order to keep the overall combined weight of body and cap at a level of around 250 grams.

In accordance with one aspect of the invention, a plurality of optional weights are provided, which can be used in various combinations, in conjunction with the weighted cap 24, in order to enable adjustment of the weight of the putter to suit a particular golfer's requirements. In a preferred embodiment, three additional weights are provided, identified by the reference numerals 32, 33 and 34 (Fig. 1). To advantage, the optional weights 32-34 are formed of the same tungsten-copper alloy as the weighted cap 24, and each is of a different weight. For example, the weight 32 may weigh 15 grams, the weight 33 may weigh 25 grams, and the weight 34 may weigh 35 grams. Each of the optional weights is in the form of a flat disc, of a diameter to be closely accommodated within the cylindrical recess 22, as reflected in Fig. 3, and each is provided with a central

threaded opening 35, enabling the disc to be threaded on to the shaft 25. The shaft 25 is threaded as close as practical to the end surface 36 of the weighted cap, and a small undercut 37 is provided adjacent the surface 36 to allow a weight to be threaded on to the shaft into tight abutting relation to the end surface 36 of the cap 24 (see Fig. 5). The optional weights 32-34 can be omitted or used in any combination of one, two or three with the cap 24. Altogether, this provides for eight different weighting possibilities (the end cap alone (1), each weight by itself (3), each weight with one of the others (3), and all three weights together (1). In all cases, it is preferred that all of the discs utilized be advanced on the threaded shaft 25 as far as possible toward the weighted cap 24, and into tight contact therewith, such that the cap and optional weights function to concentrate their combined weight as far back in the putter as practicable and also so that the weights remain reliably fixed in their intended positions.

The invention provides a unique and advantageous adjustable weight putter, which not only provides for a wide variety of weighting adjustments to suit the desires of the golfer, but also assures a concentration of weight as far behind the ball-striking face as is practicable. The design of the putter body and weighted end cap is such that the weighted end cap forms the back surface extremity of the putter, thus assuring that its weight is located as far to the back of the putter as is practicable. The putter body is provided with a relatively deep longitudinally extending recess, opening at the back, in which the weighted end cap is received, serving to close and seal the recess. The end cap is formed with a forwardly extending threaded shaft, engaging a threaded recess extension in the putter body, and which also receives optional weighted discs in various combinations. The weighted discs are threadedly received on the shaft and rotated until tightly abutted as far back on the shaft as possible, again providing that the concentration of added weight is located as far to the back of the putter as practicable. Both the weighted cap and the optional disc weights are advantageously formed of a very high specific gravity material, such as a

tungsten-copper alloy, which has a specific gravity more than six times that of an aluminum body.

5 By locating weight as far behind the ball-striking face as practicable, the putter head is given a high moment of inertia against rotation about a vertical axis. This imparts resistance against rotation when a ball is struck slightly off of the center line of the putter, resulting in greater accuracy in the putting stroke.

10 It should be understood, of course, that the specific forms of the invention herein illustrated and described are intended to be representative only, as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the following appended claims in determining the full scope of the invention.

I Claim:

1. An adjustable weight golf putter which comprises
 - (a) a putter head (10) having a ball-striking face (11) of predetermined width and a body portion (12) extending rearwardly from said striking face for a
5 distance equal to a substantial fraction of said predetermined width,
 - (b) said body portion (12) being formed of a relatively low specific gravity material and having a longitudinal axis disposed in perpendicular relation to said ball-striking face (11),
 - (c) said body portion (12) having a cylindrical recess (22) therein, open at a
10 back extremity of said body portion and extending forwardly therein along said longitudinal axis,
 - (d) a weighted cap (24), formed of a material of substantially greater specific gravity than said body portion, received in back extremities of said cylindrical recess (22) and closing said recess,
 - 15 (e) said weighted cap (24) having a threaded shaft (25) fixed to a forward end thereof and extending forwardly therefrom along said axis,
 - (f) said body portion having a recess extension (23) therein at a forward end of said cylindrical recess for closely receiving and confining a forward end portion of said threaded shaft (25),
 - 20 (g) one or more disc-like weights (32-34) having a diametrical dimension to be closely received within said cylindrical recess (22) and each having a central threaded opening (35) for selective threaded reception on said threaded shaft (25),
 - (h) said disc-like weights (32-34) being formed of a material of substantially
25 greater specific gravity than said body portion (12) and being positioned in substantially abutting relation to said weighted cap (24).
2. An adjustable weight golf putter according to claim 1, wherein
 - (a) said recess extension (23) is threaded to receive the forward end of said
30 threaded shaft (25), and

(b) said weighted cap (24) is held in its installed position by said threaded shaft.

3. An adjustable weight golf putter according to claim 1, wherein

5 (a) said weighted cap (24) has a weight in excess of 20% of the combined weight of said body portion (12) and said ball-striking face (11).

4. An adjustable weight golf putter according to claim 1, wherein

10 (a) said one or more disc-like weights (32-34) comprising at least two such weights, each of a different weight, whereby combinations of one or more of said weights (32-34) with said weighted cap (24) provide a variety of weight balances for said putter.

5. An adjustable weight golf putter according to claim 1, wherein

15 (a) said body portion (12) is formed primarily of aluminum and said weighted cap (24) is formed primarily of a tungsten copper alloy.

6. An adjustable weight golf putter according to claim 5, wherein

20 (a) said tungsten copper alloy has a specific gravity of about 17.

7. An adjustable weight golf putter according to claim 1, wherein

(a) said weighted cap (24) is formed with an enlargement (27) at a back extremity thereof, and
(b) said cylindrical recess (22) is formed with an enlarged open end portion
25 (28) for reception of said enlargement (27), for positioning said weighted cap and sealing said cylindrical recess (22).

8. An adjustable weight golf putter according to claim 7, wherein

(a) back portions (14) of said body portion (12) are arcuately contoured, and

(b) said weighted cap (24) has a rearwardly facing surface (30) contoured to correspond with the contoured back portions (20) of said body portion and form a generally smooth continuation of the contours of said back portions.

5 9. An adjustable weight golf putter which comprises

(a) a putter head (10) having a ball-striking face (11) of predetermined width and a stem portion (13) extending rearwardly from said ball-striking face (11) at right angles thereto,

10 (b) said stem portion (13) having a longitudinal axis intersecting said ball-striking face in a central portion thereof and having a width substantially less than the width of said ball-striking face (11),

(c) a body end portion (14) joined with a rearward portion of said stem portion (13) and extending rearwardly therefrom,

15 (d) said body end portion (14) having a width greater than the width of said stem portion (13) and less than the width of said ball-striking face (11),

(e) said body end portion (14) having a cylindrical recess (22) therein, open at a back extremity of said body end portion and extending forwardly therein along said longitudinal axis,

20 (f) a weighted cap (24), formed of a material of substantially greater specific gravity than said stem and body end portions, received in back extremities of said cylindrical recess (22) and closing said recess,

(g) said weighted cap (24) having a threaded shaft (25) fixed to a forward end thereof and extending forwardly therefrom along said axis,

25 (h) one of said body end portion (14) and said stem portion (13) having a recess extension (23) therein at a forward end of said cylindrical recess,

(i) said recess extension (23) being threaded for engagement with a forward end portion of said threaded shaft (25) for securing said weighted cap (24) in said body end portion,

(j) said weighted cap (24) having a weight of at least about 20% of the combined weight of said ball-striking face (11), said stem portion (13) and said body end portion (14).

5 10. An adjustable weight golf putter according to claim 9, wherein

(a) one or more disc-like weights (32-34) are provided, each having a diametrical dimension to be closely received within said cylindrical recess (22) and each having a central threaded opening (35) for threaded reception on said threaded shaft (25),

10 (b) said shaft (25) being threaded to a point closely adjacent a front face of said weighted cap (24), whereby one of said weights (32-34) may be positioned in abutting relation to said front face.

11. An adjustable weight golf putter according to claim 10, wherein

15 (a) at least three such disc-like weights (32-34) are provided, each having a different weight, whereby combinations of some, all or none of said weights may be selectively mounted on said threaded shaft (25) to provide a variety of weight balances for said putter.

20 12. An adjustable weight golf putter according to claim 11, wherein

(a) said weighted cap (24) and said disc-like weights (32-34) are formed of a tungsten-copper alloy having a specific gravity of about 17.

13. An adjustable weight golf putter according to claim 12, wherein

25 (a) said stem (13) and body end portions (14) of said putter head are formed of aluminum.

14. An adjustable weight golf putter according to claim 9, wherein

30 (a) said cylindrical recess (22) is formed with an rearwardly divergent tapered entrance recess (28) at the back extremity of said body end portion (14), and

(b) said weighted cap (24) has a cylindrical forward portion (26), closely received in said cylindrical recess (22), and a rearwardly divergent collar (27) at a rearward end thereof,

(c) said rearwardly divergent collar (27) being received in said tapered entrance recess (28) to position said weighted cap and to seal said recess.

15. An adjustable weight golf putter according to claim 9, wherein

(a) said putter head is formed with integral, rearwardly tapered gussets (15, 16) extending from said ball-striking face (11) to said body end portion (14) along each side of said stem portion (13),

(b) said gussets (15, 16) having a thickness substantially less than said ball-striking face (11), said stem portion (13) and said body end portion (14).

16. An adjustable weight golf putter according to claim 15, wherein

(a) said body end portion (14) is formed with convexly arcuate back face contours (20),

(b) said weighted cap (24) is formed with a convexly contoured back face (30), and

(c) said weighted cap (24) is positioned by said rearwardly divergent recess (28) and collar (27) such that the contoured back face (30) of said cap (24) forms a continuation of the contours (20) of said body end portion (14).

17. An adjustable weight golf putter according to claim 15, wherein

(a) said gussets (15, 16) are aligned generally in a horizontal plane including said longitudinal axis.

18. An adjustable weight golf putter according to claim 9, wherein

(a) said putter head (12) is of predetermined length, and

(b) the respective weights of said putter head (12) and said weighted cap (24) are such that the center of gravity of the combined putter head (12) and weighted

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cap (24) is spaced behind said ball-striking face (11) a distance which is more than half of said predetermined length.

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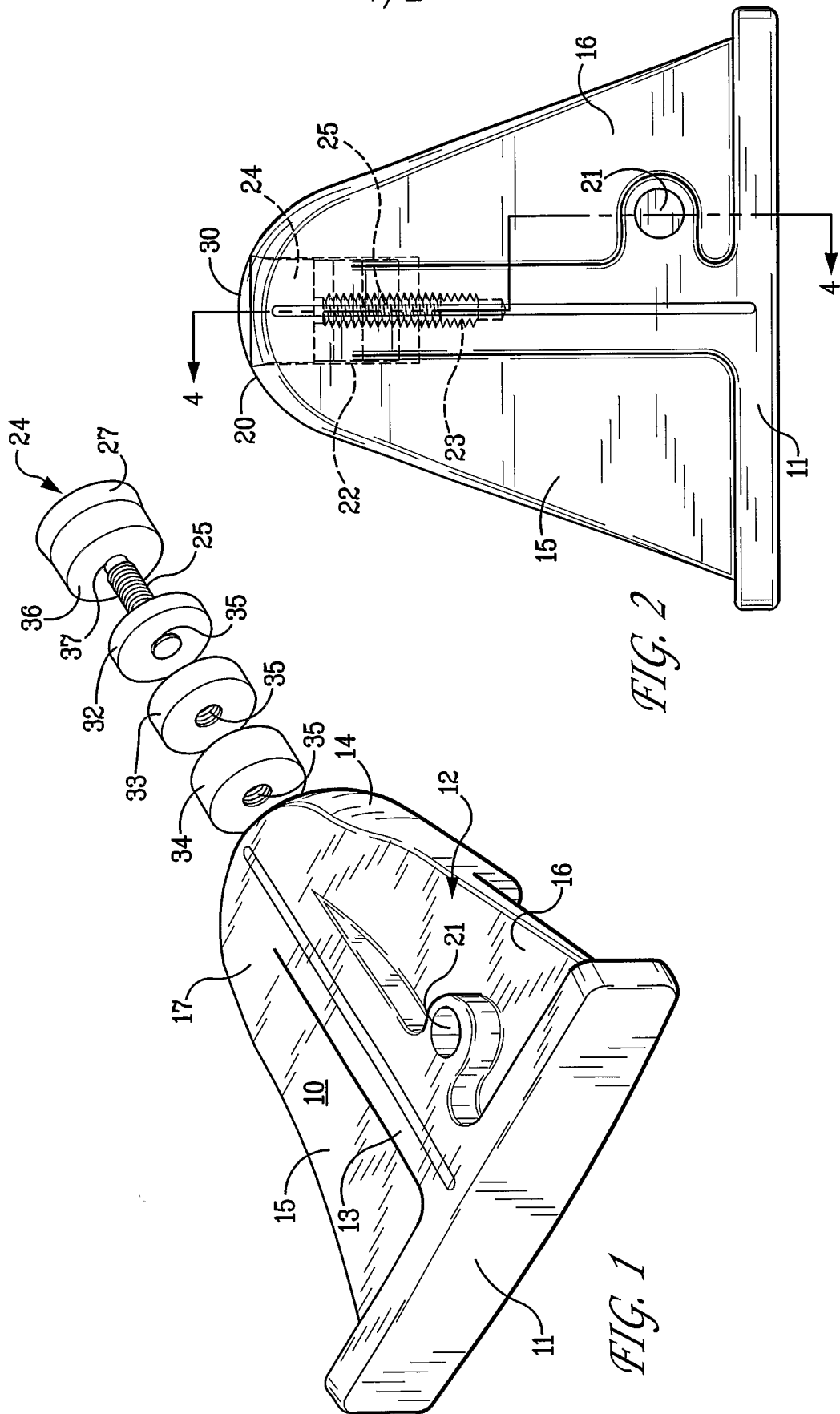


FIG. 1

FIG. 2

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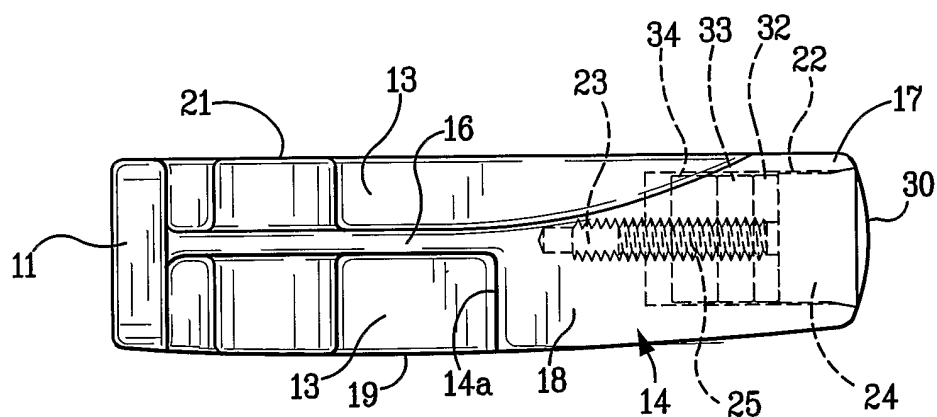


FIG. 3

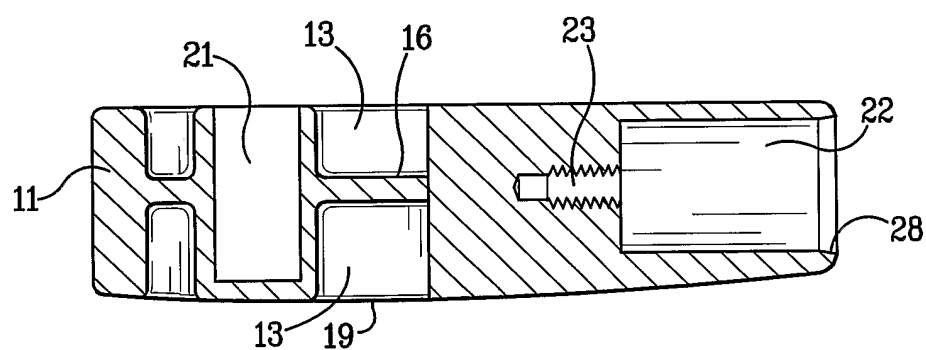


FIG. 4

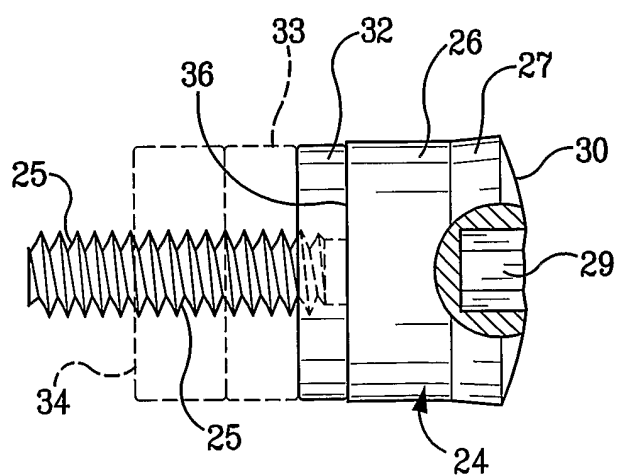


FIG. 5