



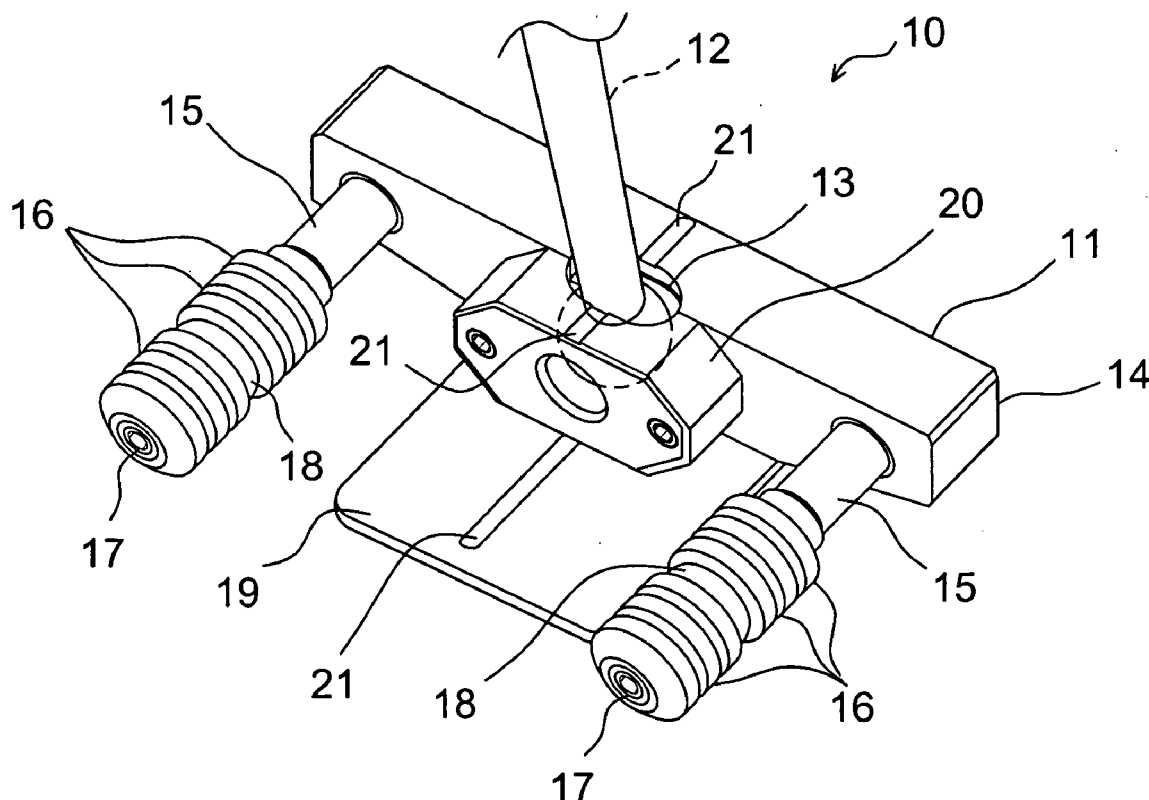
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(19) **United States**(12) **Patent Application Publication**
Dworzan(10) **Pub. No.: US 2007/0298904 A1**(43) **Pub. Date: Dec. 27, 2007**(54) **ADJUSTABLE PUTTER**(57) **ABSTRACT**(76) Inventor: **Bill Dworzan, Santa Ana, CA (US)**

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LAW OFFICES OF CLEMENT CHENG**17220 NEWHOPE STREET #127****FOUNTAIN VALLEY, CA 92708**(21) Appl. No.: **11/473,640**(22) Filed: **Jun. 24, 2006****Publication Classification**(51) **Int. Cl.**
A63B 53/00 (2006.01)(52) **U.S. Cl.** **473/340**

A golf putter comprises latitudinally elongated head having a generally rectangular hitting face against a golf ball. The head has an integral center plate extending longitudinally and rearward from the hitting face at its bottom. The center plate has a visible centerline for aiming at the ball. A ball joint for angularly fixing a shaft to the head includes a frictional sphere attached to the bottom end of the shaft. A truncated spherical socket is formed by a middle section of the head and a clamp member screw fastened to the head, whereby the shaft is locked in a truncated spherical interior wall at an adjusted angle to the head. Two swappable posts extend from the opposite side of the hitting face of the head near its latitudinal edges, each post having a centrally threaded bore and being threadedly attached to the head so that it may be replaced by a body of varying weight for plugging a void created by the threading of the post.



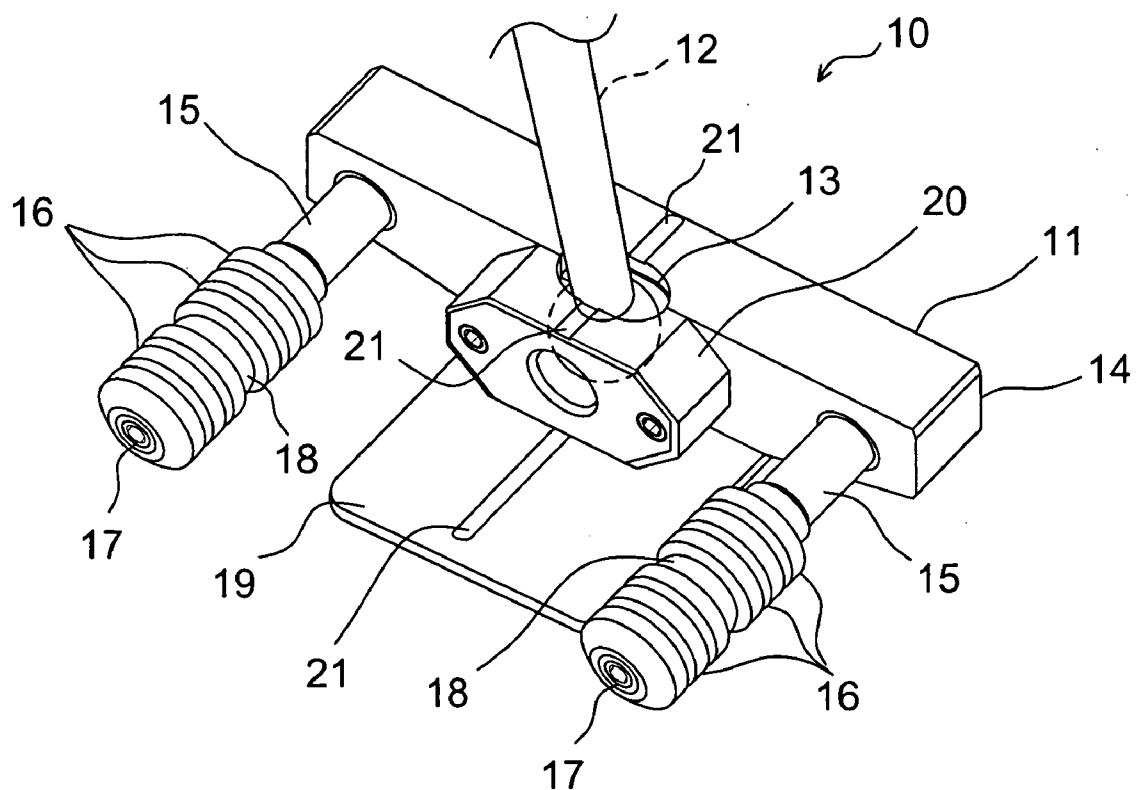


FIG. 1

FIG. 2

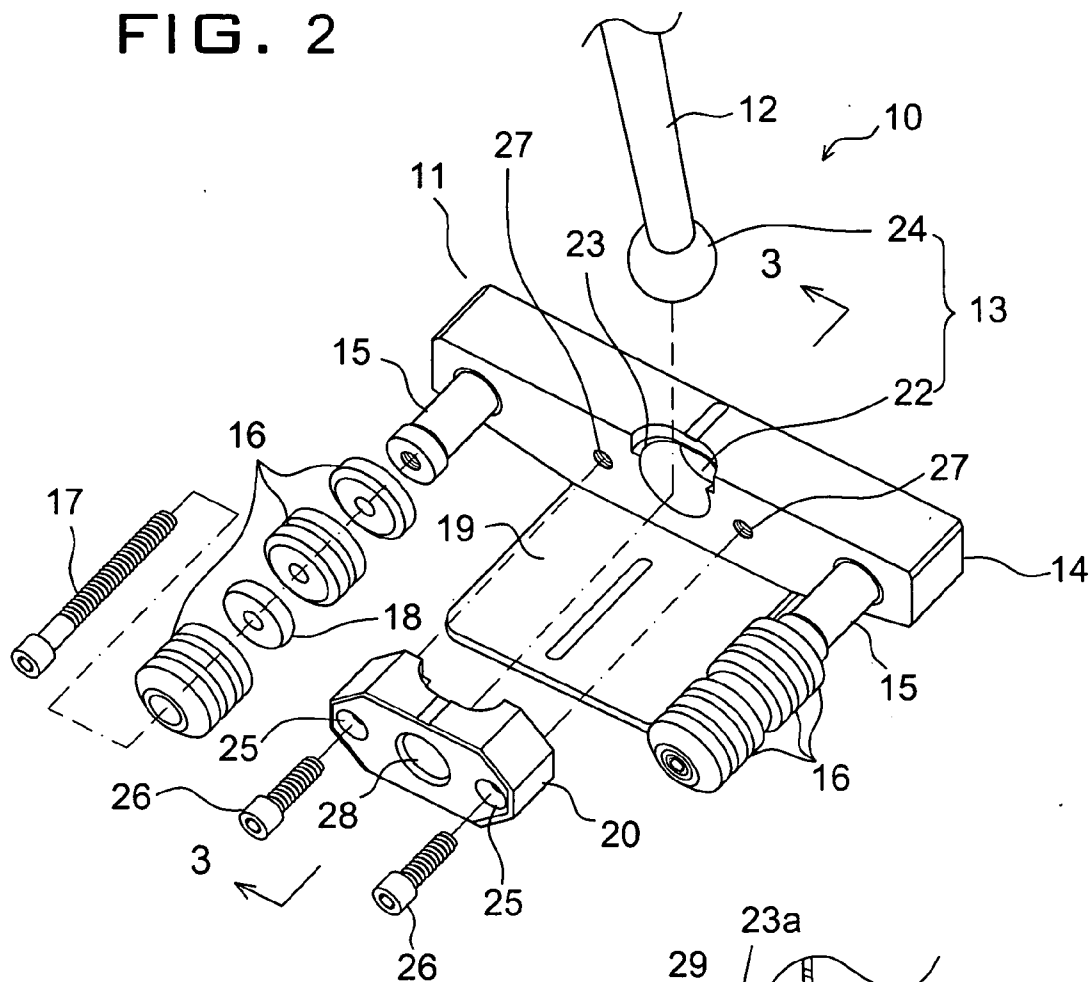
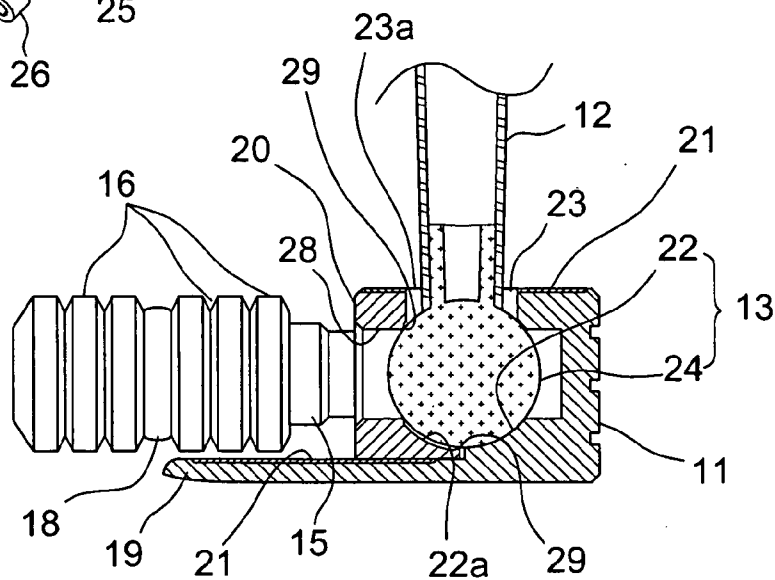


FIG. 3



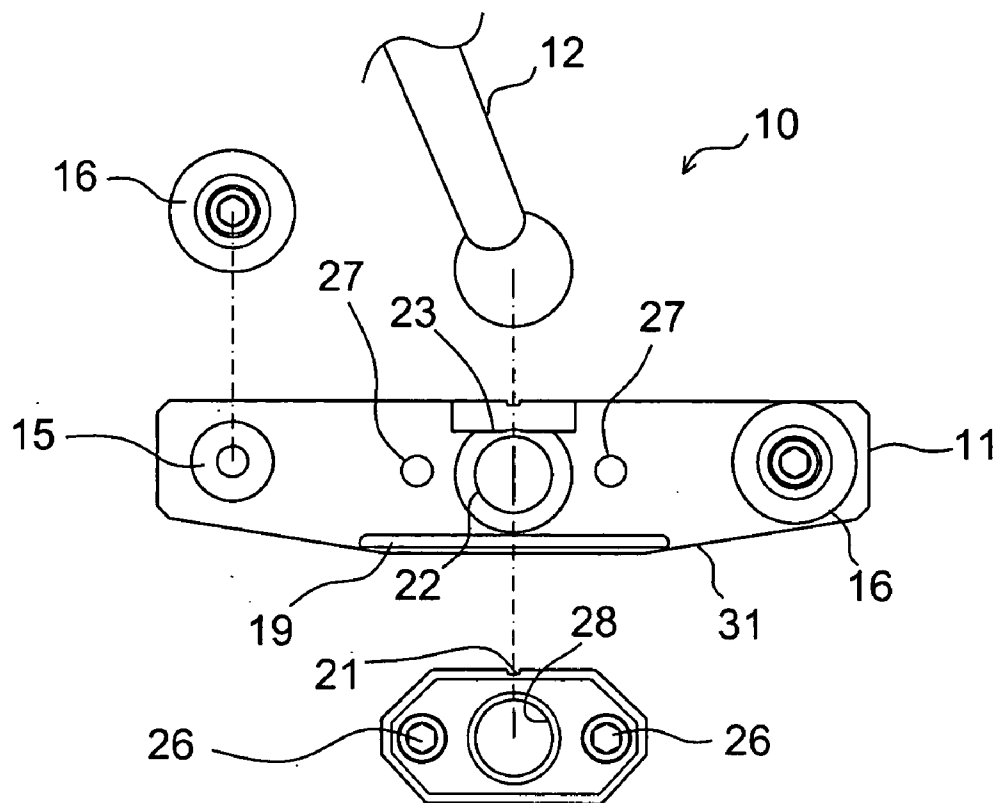


FIG. 4

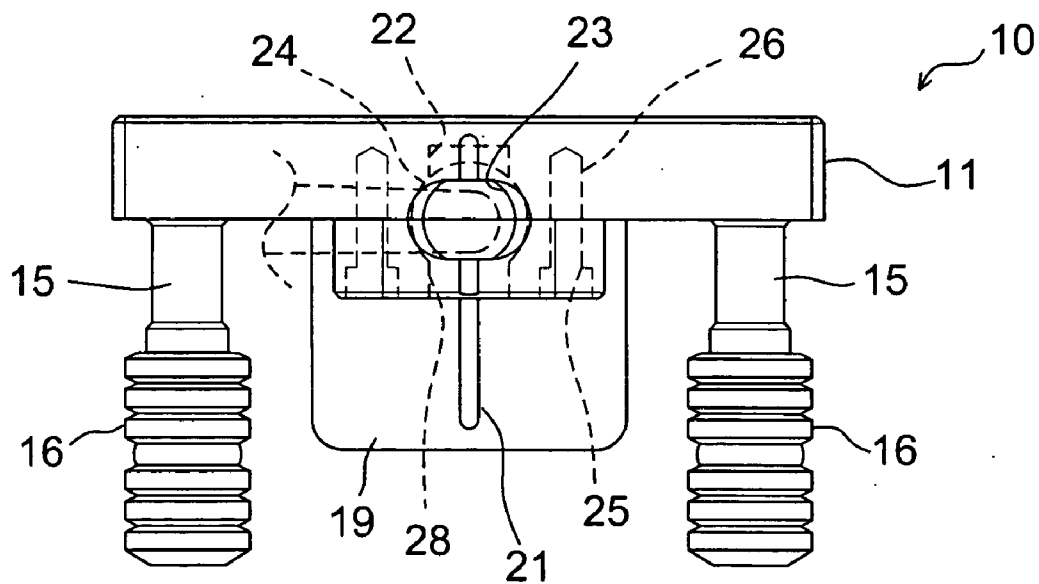


FIG. 5

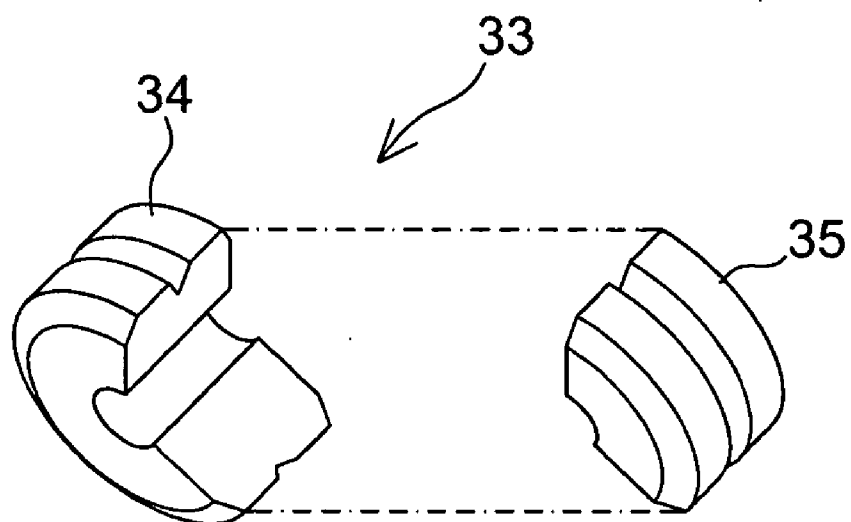


FIG. 6A

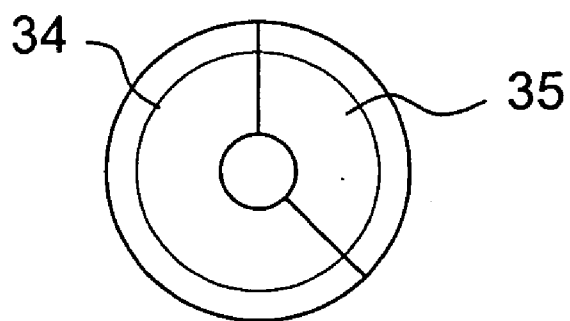


FIG. 6B

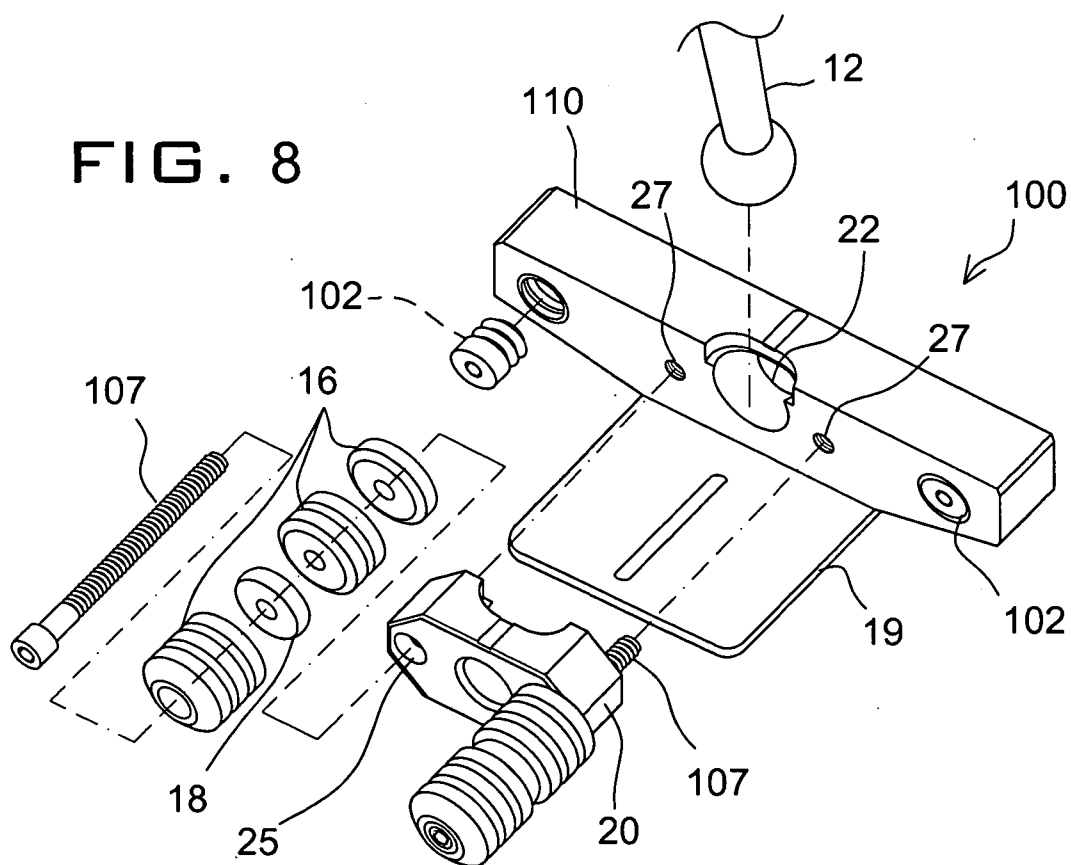
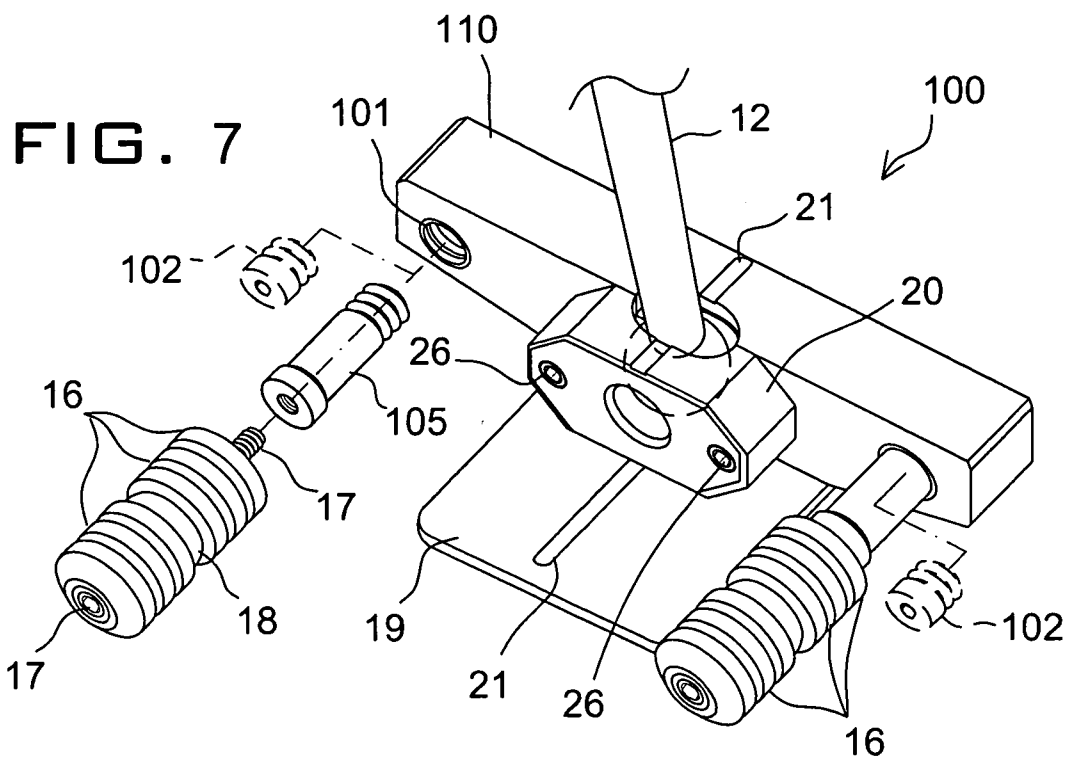


FIG. 9

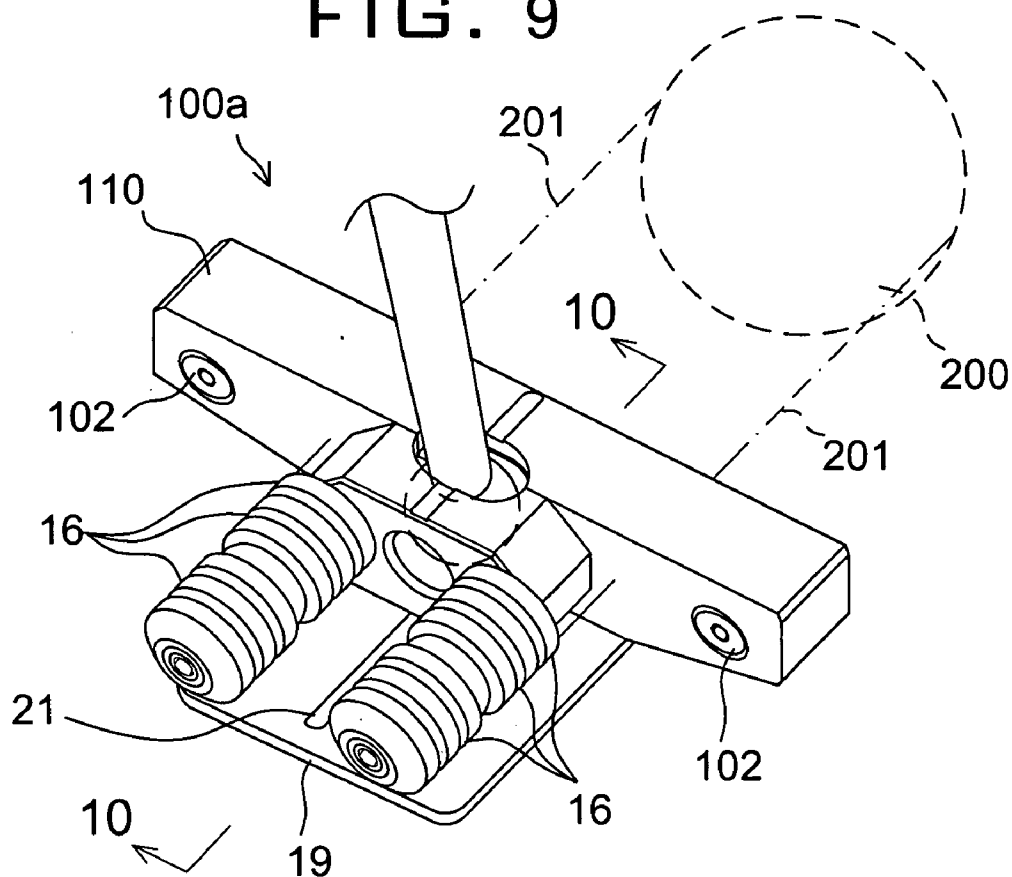
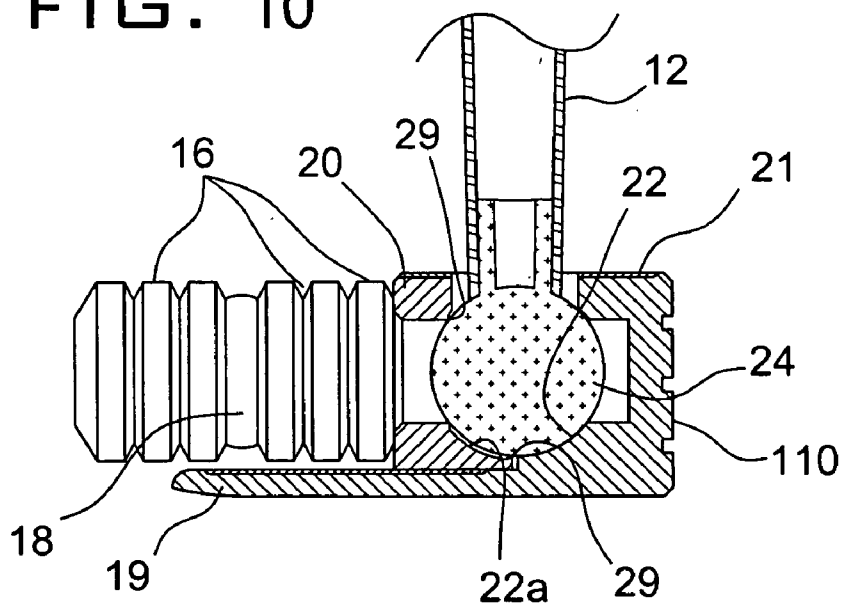


FIG. 10



ADJUSTABLE PUTTER

BACKGROUND OF THE INVENTION

[0001] A. Field of the Invention

[0002] The present invention relates to golf putters, and more particularly, an adjustable putter for its weighting, lie, loft, grip rotation right or left.

[0003] B. Description of the Prior Art

[0004] Golf putter is used for short strokes of a ball into a hole to complete a hole. This precision instrument of golf club generally consists of a grip, a shaft and a head. The head of the putter is normally designed to have a perpendicular clubface to the playing ground without a significant loft to give the ball a special trajectory.

[0005] There are correct methods of using the putter with calm wrists and arms, which in unity should make a pendulum motion sideways resulting in the ball rolling over a distance determined by the gripping force of the hands and the extent of a back swing. Specifically for short putting, wrist or fingers should not be involved in controlling forces to the ball to get the best result. With the well known basics of putting in mind golfers practice for lengthy period of time to attain their personal way of putting.

[0006] The immediate solution to the long-term practice could be to have a putter custom made in the first place to the golfer's individual specification including the right weight, a specially placed center of gravity, and the degree of bounce using the right face material of the head among other factors. Because of the expertise and thus time and cost, which only some golf enthusiasts want to bear there have been increasing efforts to incorporate the customizing factors into the mass-produced putters. Moreover, as the golfer improves in the performance level the putter may need future readjustments that can be done preferably without special skills or instruments.

[0007] Many mass-produced putter designs attempt to mimic custom putters by leaving one or two components to the users' discretions: an adjustable overall weight, a specially displaced center of gravity with the use of heel and toe inserts; the degree of bounce provided by a changeable face material of the head; club loft and lie, etc.

[0008] U.S. Pat. No. 1,167,387 to Daniel discloses a driving golf club with a cylindrical metal weight or disk-shaped weights fit in a socket housed in a club recess. By positioning the interior heavy disks with the use of light dummy disks in between, the balance of the club head is varied. For a putter application, the weight recess is provided parallel to the face of the head to conform to the narrowness of the putter.

[0009] U.S. Pat. No. 2,155,830 to Howard discloses a golf club having a universally adjustable joint between head and stem for right or left handed use of the club and slidably adjustable balance bodies positioned in a track extending in parallel with the face of the club head.

[0010] U.S. Pat. No. 5,244,210 to Au discloses a golf putter system with a head, which has an elongated threaded weight chamber extending from toe to heel. The chamber contains a number of coins, thrust/friction washers and some resilient spacers. Threaded end plugs are rotated to move the weight distribution and the center of gravity or sweet spot of the club.

[0011] U.S. Pat. No. 6,749,523 to Forzano shows a putter having at least one adjustable weight which can be posi-

tioned longitudinally along the putter head. A vibration dampening plate is used to provide the golfer with a good feel upon striking the ball.

[0012] U.S. Pat. No. 7,018,304 to Bradford suggests a T-shaped putter head having a toe wing and a heel wing to which selected two of various weight members are threadedly attached respectively in order to compensate undesirable moments from a golf ball struck off center.

[0013] As the above patents indicate, known putters are still short of providing a comprehensive range of customizing with putter weight adjustments, loft adjustments, and/or bounce adjustments in an easy structure to make and use intuitively.

[0014] Therefore, the primary object of the present invention is to provide a practical golf putter structure that permits nearly all known aspects of putter adjustments with an easy interface for the golfer to intuitively find the best customized golf club for each individual.

[0015] Another object of the present invention is to provide the above putter with a strong structural integrity throughout various adjustable components, which are not only functional to play with but also esthetical to carry in the field.

SUMMARY OF THE INVENTION

[0016] A golf putter according to the present invention comprises latitudinally elongated head having a generally rectangular hitting face against a golf ball. The head has an integral center plate extending longitudinally and rearward from the hitting face at its bottom. The center plate has a visible centerline for aiming at the ball. A ball joint for angularly fixing a shaft to the head includes a frictional sphere attached to the bottom end of the shaft. A semi-spherical recess is formed in the middle of the head facing away from the hitting face less a semi-circular top opening for allowing angular adjustment of the shaft.

[0017] A clamp member having a complementary semi-spherical recess with a semi-circular top opening is screw fastened centrally to the semi-spherical recess of the head, whereby the shaft is locked in a truncated spherical socket at an adjusted angle to the head.

[0018] Two swappable posts extend from the opposite side of the hitting face of the head near its latitudinal edges, each post having a centrally threaded bore and being threadedly attached to the head so that it may be replaced by a body of varying weight for plugging a void created by the threading of the post. Two sets of longitudinal stacks of weight elements having incremental thickness are screw fastened to the head selectively through the threaded bore of the posts respectively to provide a first mode of expanded weight distribution or through the clamp member to provide a second mode of compacted weight positioning in a conventional putter head contour. The weight elements may be selectively added or deleted to adjust the weight of the putter locally in a plane parallel to the center plate and at least one elastic washer is inserted between adjacent ones of the weight elements in each set concentrically thereto to provide a bounce to the putter.

[0019] Alternatively, the posts may be integrally formed with the putter head to bear the adjustable stacks of weight at a certain distance from each other.

[0020] Acute edges are formed along the boundaries of the semi-spherical recesses and semi-circular top openings of both the head and clamp member to bite the frictional sphere

of the shaft in the ball joint locally to enhance the clamping speed as well as clamping force.

[0021] The weight element sets in the compact mode cooperate to visualize an aiming body in volume to assist the aiming centerline of the center plate for the golfer to hit the ball consistently.

[0022] The copper stabilization weights are stackable and removable to adjust overall putter head weight and head balance as well as being able to adjust impact feel from firm to soft using a simple tool of a hex driver. With its adjustable geometry, weight, balance, and feel, the present putter allows the golfer to make adjustment to suit personal preferences. The putter is so adaptable that it complements the golfer's own natural way of stroke instead of compromising each unique stroke to fit otherwise less adaptable putters.

[0023] The putter may be instantly customized for various aspects of the putter specifications.

[0024] Then, the present putter may be used as a reference model to which the golfer's any other putters matched in the personal tune.

[0025] The putter has a higher moment of inertia (MOI) than most existing putter available to provide an extreme stability and a big and forgiving sweet spot.

[0026] Embodiments of the invention will now be described by way of example with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 is a perspective view of a putter according to a first embodiment of the present invention.

[0028] FIG. 2 is an exploded perspective view of the putter of FIG. 1.

[0029] FIG. 3 is a cross sectional view taken along line 3-3 in FIG. 2.

[0030] FIG. 4 is a partially assembled rear view of the putter of FIG. 1.

[0031] FIG. 5 is a top view of the putter of FIG. 1.

[0032] FIG. 6A is a perspective view of an alternative composite weight ring according to the present invention.

[0033] FIG. 6B is a front view of the composite weight ring of FIG. 6A.

[0034] FIG. 7 is a partially assembled perspective view of a putter according to a second embodiment of the present invention.

[0035] FIG. 8 is an exploded perspective view of the putter of FIG. 7.

[0036] FIG. 9 is a perspective view of the putter of FIG. 7 in operation.

[0037] FIG. 10 is a cross sectional view taken along line 10-10 in FIG. 9.

[0038] Similar reference numbers denote corresponding features throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0039] With reference to FIG. 1, a putter 10 according to a first embodiment of the present invention generally has a head 11 and a shaft 12 connected to the putter head 11 through a ball joint 13. The putter head 11 is a solid metal block having a generally rectangular flat face 14 to hit the ball.

[0040] Extending rearwards of the head 11 are two threaded posts 15 formed integral to the head 11 at opposite

ends thereof. Each post 15 supports a stack of stability weights 16, which are varying thickness of heavy bored discs threaded together by socket head screws 17 to the post 15. At least one elastic washer 18 is removably threaded within the weight stack 16 to each post 15 to provide a cushioning effect to the hit ball resulting in an adjusted rebound characteristics of the putter 10 and its feel as well as the overall weight and balance.

[0041] Because of the ball joint 13 of the shaft 12, the putter 10 is adaptable to both left and right-handed addressing. Between the balance posts 15 a rectangular center plate 19 projects from a rear bottom edge of the head 11. The center plate 19 provides a directional contour to the putter 10 to aid in the desired putting action as well as a deeper or backward center of gravity.

[0042] Above the top surface of the center plate 19 a clamp 20 is screw fastened to the rear of the head 11 to hold the shaft 12. On the top surface of the putter 10 a central aiming line 21 is marked through the head 11, clamp 20 and center plate 19 in an exact alignment with the ball joint 13 so that the golfer may have consistent sense of view and feel of the ball impact spot in the putter 10.

[0043] Referring to FIGS. 2 and 3, the detail of the putter 10 of the present invention follows.

[0044] The weight set 16 is shown to have three incremental thicknesses of one to three times. They may be formed of copper to provide weight and resist rusting at the same time. At the golfer's discretion, more or less weight discs may be assembled to the putter 10 using the straight forward fastening means of screw 17. Moving the elastic washer 18 to front or back in the weight set 16 also adjusts the center of gravity of the putter 10.

[0045] The putter head 11 also includes at its middle area a recess 22, which has approximately a semi-spherical interior with a semi-circular top opening 23 while the shaft 12 has a rigid bulb 24 fixed to the bottom thereof. The recess 22 is sized to accept the bulb tip 24 of the shaft 12 partly as the main portion of the shaft 12 extends through the top opening 23.

[0046] The clamp 20 is made of an elongated metal block and provides the other halves of the recess 22 and top opening 23 as shown at 22a and 23a in FIG. 3. Thus, when the clamp 20 is aligned centrally of the head 11 facing the recess 22, a truncated spherical interior is formed where the shaft bulb 24 may be tightly positioned. For a swift fastening, the clamp 20 has two through holes 25 at its opposite sides. Each hole 25 has smooth interior surfaces and is shaped to receive a hex screw 26 snugly and entirely. At the corresponding locations in the head 11 there are formed two threaded blind holes 27 where a couple of the hex screws 26 passing through the holes 25 may be threaded to make a tight engagement between the head 11 and clamp 20 enclosing the shaft bulb 24 in order to lock the shaft 12 in an adjusted one of virtually any angles about the head 11. In order to provide a near permanent fastening of the shaft 12, the bulb 24 has a finely roughened surface through sand blasting or chemical treatment.

[0047] The clamp region has a recess that is preferably a generally cylindrical recess 22 in the spherical profile. The generally cylindrical recess in the striking face cooperates with the generally cylindrical recess in the clamp 20 member to form a double ring clamp where the sphere 24 is engaged against a pair of opposing rings. The opposing generally cylindrical recesses have circumferential lips that act as

rings. The double ring clamp configuration is the preferred embodiment where the contact between the lip of the cylindrical recess and the spherical member forms a ring shaped pressure distribution on the surface of the spherical member.

[0048] Facing rearwards of the clamp 20 is a round window 28 through which a part of the bulb 24 of the shaft 12 is visible from the outside. As shown in cross section in FIG. 3, inner edge 29 of the window 28 protrudes into the recess 22 at the side of the clamp 20. The similar acute edge 29 is formed at the recess 22 of the head 11. This acute edges 29 bite into the bulb 24 circularly to contribute to the positive locking engagement between the shaft 12 and head 11.

[0049] Therefore, even a slight tightening of the screws 26 holds the shaft 12 in a preliminary adjusted position in the ball joint 13 until the shaft 12 is completely locked in position by turning the screws 26 to the end where the heads of the screws 26 lie flush with the outer surface of the clamp 20. In this way, the user may lock in the desired lie and loft of the putter 10 in a short duration of trial and error with a ball to play any time the golfer needs a tuning of such parameters due to different green speeds or other reasons. Using the simple ball joint 13, turning the head face 14 about makes it easy to reconfigure the putter 10 into a left or right-handed player's instrument.

[0050] FIGS. 4 and 5 together show more technical views of the putter 10, which has a flat top surface 30 and generally chamfered bottom 31. The center plate 19 conforms to the bottom 31 and has chamfered side edges. The latitudinal positional relations among the head 11, center plate 19 and back weights 16 are more evident in FIG. 4.

[0051] FIGS. 6A and 6B show an alternative weight disc 33, which is composite so that it has an eccentric radial weight about the post screw 17. The disc 33 may comprise a bigger metal section 34 and a smaller plastic section 35 that complements the metal section 34 to form a complete disc. Two disc sections 34,35 may be heat bonded together. Otherwise, the smaller plastic section 35 may be molded to enclose the metal section 34 resulting in the equal weight distribution in the disc 33.

[0052] The composite disc 33 may replace part or all of the disc members in the weight set 16. When two or more of such discs 33 are loaded on the posts 15, the golfer may turn each disc 33 about its axis, i.e. respective screw 17 to change the center of gravity in height also as an extra control to fine tune the weight arrangement of the putter 10 in three dimensions.

[0053] FIGS. 7 and 8 illustrate a second embodiment of the present invention wherein a putter 100 is similar in shape and function to the putter 10 of the first embodiment except that it includes a swappable post 105 to configure the whole putter 100 in conventional design under traditional regulations governing normal golf instruments while retaining the novel weighting scheme of the present invention.

[0054] The post 105 may be fastened to a threaded bore 101 formed at either rear lateral side of the head 110 in a training session where the weight sets 16 located edgewise provide more pronounced weight distribution in the putter 100 because the positions of the posts 15 space the MOI of the putter head 11 at a maximum distance.

[0055] In transformation, the putter 100 may be concentrated into a traditional shape by replacing the posts 105 with the plugs 102 and the post screws 17 with longer clamp

screws 107 respectively so that the weight sets 16 shift to the axes of the clamp holes 25, as shown in FIG. 8.

[0056] The transformed putter 100a is shown in FIGS. 9 and 10 which can be brought to an official tournament with the familiarity of muscle memories gained on the same putter that was suited to the practice purpose. Therefore, the advantage of the transformable embodiment of the putter is to adapt one putter to more varieties of environments.

[0057] In addition, the outer edges of two weight sets 16 of the putter 100a extend in parallel within the diameter of a golf ball 200 which enhances ball aiming power of the central line 21 to a three dimensional level. By this arrangement of the weight discs the golfer will visually align the outer boundary lines 201 of the ball 200 with the double tubular sections 16 of the putter 100a while directing the central line 21 to an imaginary center line of the ball 200. Combined with the quick fine-tuning of visual weights, the putter of the present invention results in more desirable hits with less unexpected rolls of balls.

[0058] Surface grooves on the hitting face 11 are optional and may be implemented as shallow grooves that allow additional degree of control over the striking face interaction with the ball. The shallow grooves preferably travel as parallel lines across the face of the striking face.

[0059] Therefore, while the presently preferred form of the golf putter has been shown and described, and several modifications thereof discussed, persons skilled in this art will readily appreciate that various additional changes and modifications may be made without departing from the spirit of the invention, as defined and differentiated by the following claims.

Call Out List of Elements

[0060]	10: Putter
[0061]	11: Head
[0062]	12: Shaft
[0063]	13: Ball Joint
[0064]	14: Flat Face
[0065]	15: Post
[0066]	16: Weight
[0067]	17: Post Screw
[0068]	18: Elastic Washer
[0069]	19: Center Plate
[0070]	20: Clamp
[0071]	21: Central Aiming Line
[0072]	22: Recess
[0073]	23: Opening
[0074]	24: Bulb
[0075]	25: Through Hole
[0076]	26: Hex Screw
[0077]	27: Blind Hole
[0078]	28: Window
[0079]	29: Acute Edge
[0080]	30: Top Surface
[0081]	31: Chamfered Bottom
[0082]	33: Disc
[0083]	34,35: Disc Sections
[0084]	100: Putter
[0085]	101: Threaded Bore
[0086]	102: Plugs
[0087]	105: Swappable Post
[0088]	107: Clamp Screw
[0089]	110: Head
[0090]	200: Golf Ball

1. A golf putter comprising:
 - a latitudinally elongated head having a generally rectangular hitting face against a ball, the head having an integral center plate extending longitudinally and rearward from the hitting face at its bottom, the center plate having a visible center line for aiming at the ball;
 - a ball joint for angularly fixing a shaft to the head, the joint including a frictional sphere attached to the bottom end of the shaft, a semi-spherical recess formed in the middle of the head facing away from the hitting face less a semi-circular top opening for allowing angular adjustment of the shaft, and a clamp member having a complementary semi-spherical recess with a semi-circular top opening and screw fastened centrally to the semi-spherical recess of the head, whereby the shaft is locked in a truncated spherical interior wall at an adjusted angle to the head
 - two longitudinal posts extending from the opposite side of the hitting face of the head near its latitudinal edges, each the post having a centrally threaded bore;
 - two sets of longitudinal stacks of weight elements having incremental thickness and screw fastened to the threaded bore of the posts respectively, the weight elements being selectively added or deleted to adjust the weight of the putter locally in a plane parallel to the center plate; and
 - at least one elastic washer inserted between adjacent ones of the weight elements in each set concentrically thereto to provide a bounce to the putter.
2. The golf putter of claim 1, further comprising acute edges along the boundaries of the semi-spherical recesses and semi-circular top openings of both the head and clamp member whereby the frictional sphere of the shaft in the ball joint is enhanced in clamping speed as well as clamping force.
3. The golf putter of claim 1, wherein the weight elements are made of metal shaped into single to multiple concentric washers, the multiple washers being joined integrally to provide a visual consistency allowing a quick addition or deletion of weight into a target distribution of weight of the putter.
4. The golf putter of claim 1, wherein the weight elements are made of composite materials including a metal and a plastic to provide an eccentric weighting for extending the planar weight adjustment to a vertical level of the putter.
5. The golf putter of claim 4, wherein the metal is copper.
6. A golf putter comprising:
 - a latitudinally elongated head having a generally rectangular hitting face against a golf ball, the head having an integral center plate extending longitudinally and rearward from the hitting face at its bottom, the center plate having a visible center line for aiming at the ball;
 - a ball joint for angularly fixing a shaft to the head, the joint including a frictional sphere attached to the bottom end of the shaft, a semi-spherical recess formed in the middle of the head facing away from the hitting face less a semi-circular top opening for allowing angular adjustment of the shaft, and a clamp member having a complementary semi-spherical recess with a semi-circular top opening and screw fastened centrally to the semi-spherical recess of the head, whereby the shaft is locked in a truncated spherical interior wall at an adjusted angle to the head;
 - two swappable posts extending from the opposite side of the hitting face of the head near its latitudinal edges, each the post having a centrally threaded bore and being threadedly attached to the head so that it may be replaced by a body of varying weight for plugging a void created by the threading of the post;
 - two sets of longitudinal stacks of weight elements having incremental thickness and screw fastened to the head selectively through the threaded bore of the posts respectively to provide a first mode of expanded weight distribution or through the clamp member to provide a second mode of compacted weight positioning in a conventional putter head contour, the weight elements being selectively added or deleted to adjust the weight of the putter locally in a plane parallel to the center plate; and
 - at least one elastic washer inserted between adjacent ones of the weight elements in each set concentrically thereto to provide a bounce to the putter.
7. The golf putter of claim 6, further comprising acute edges along the boundaries of the semi-spherical recesses and semi-circular top openings of both the head and clamp member whereby the frictional sphere of the shaft in the ball joint is enhanced in clamping speed as well as clamping force.
8. The golf putter of claim 6, wherein the weight elements are made of metal shaped into single to multiple concentric washers, the multiple washers being joined integrally to provide a visual consistency allowing a quick addition or deletion of weight into a target distribution of weight of the putter.
9. The golf putter of claim 1, wherein the weight elements are made of composite materials including a metal and a plastic to provide an eccentric weighting for extending the planar weight adjustment to a vertical level of the putter.
10. The golf putter of claim 9, wherein the metal is copper.
11. The golf putter of claim 6, wherein the weight element sets in the compact mode cooperate to align and aim the head body and assist the aiming center line of the center plate for the golfer to hit the ball consistently.
12. A golf putter comprising:
 - a putter head having a generally rectangular face, the head having an integral alignment plate extending longitudinally and rearward from the hitting face, the center plate having a visible aiming center line;
 - a shaft;
 - a ball joint angularly affixing the shaft to the putter head, the ball joint having a sphere attached to the bottom end of the shaft, a head recess allowing angular adjustment of the shaft; and
 - a clamp member having a complementary recess with a top opening, wherein the clamp member is screw fastened to the head recess, wherein the shaft is locked during use;
 - two longitudinal posts extending from the opposite side of the hitting face of the head near its latitudinal edges, each the post having a centrally threaded bore;
 - two sets of longitudinal weight elements having incremental thickness and screw fastened to the threaded bore of the posts respectively, the weight elements being selectively added or removed to adjust the weight of the putter locally in a plane parallel to the center plate.

13. The golf putter of claim **12**, wherein the sphere has a power coat to control surface roughness.

14. The golf putter of claim **12**, wherein the weight elements are formed as stacks.

15. The golf putter of claim **12**, further comprising at least one elastic washer inserted between adjacent ones of the weight elements in each set concentrically thereto to provide a bounce to the putter.

16. The golf putter of claim **15**, wherein the weight elements are formed as stacks and wherein the weight elements are made of composite materials including a metal and a plastic to provide an eccentric weighting for extending the planar weight adjustment to a vertical level of the putter.

17. The golf putter of claim **15**, further comprising surface grooves on the hitting face.

18. The golf putter of claim **12**, wherein the head recess and the complementary recess provide a double ring clamp configuration.

19. The golf putter of claim **18**, wherein the weight elements are formed as stacks.

20. The golf putter of claim **18**, wherein the weight elements are made of composite materials including a metal and a plastic to provide an eccentric weighting for extending the planar weight adjustment to a vertical level of the putter.

* * * * *