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"GOLF PUTTERS"

This invention relates generally to golf putters, and more particularly to enhancing putter stability when the putter is maneuvered to address and stroke a golf ball on a golf green.

It is commonly found that golf putters tend to twist in response to their placement downwardly on a green in ball addressing position. Such twisting results in mis-alignment of the front face of the putter relative to the ball, and requires one or more re-alignment adjustments. Putters can also twist during the back-swing away from the ball, and forward striking toward and with the ball. One cause of such twisting is variable engagement of the putter bottom surface with the turf during such swinging and stroking.

There is need for improved means to reduce or eliminate these mis-alignment effects, as referred to, as well as need to improve the overall performance of golf putters.

It is a principal object of the invention to provide an improved putter head so constructed as to reduce or eliminate the mis-alignment problem as referred to.

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Basically, the improved putter of the present invention comprises, in combination:

a) a putter body having a heel, toe, and sole defining a bottom wall, and a ball striking front face, the body being elongated between the heel and toe,

b) the body having at least one recess projecting forwardly toward a plane defined by the front wall,

c) and the body having a second recess sunk in the front wall, there being a non-metallic face plate having a periphery received in the second recess and bonded to the body.

It is another object to provide a control rail projecting downwardly from the bottom wall, the rail being elongated in the direction between the heel and toe to engage the turf as the putter is placed downwardly on a golf green, and in a manner to stabilize the head against twist during downward placement of the head. As will be seen, the rail is typically spaced rearwardly from the front face defined by the non-metallic front face along the major length of the rail. The rail also has a narrow bottom surface along its length, that surface being flat in a front-to-rear direction, widthwise of the rail. The rail bottom surface has substantially uniform width along the majority of the rail length, the rail extending lengthwise below the middle of the putter body between the heel and toe, and below the non-metallic face plate. The rail weight adds to anti-twist peripheral weighting marked by use of the non-metallic face plate.

It is another object of the invention to provide the control rail with a frontward facing surface which tapers downwardly and rearwardly to merge with a forward extent of the rail bottom surface. The rail desirably also has a rearward facing surface which tapers downwardly and forwardly to merge with a rearward extent of the rail hollow surface. Such surfaces engage the turf in such manner, during head stroking, as to result in forces tending to elevate the head and prevent the putter digging into the turf; and such surfaces typically extend equidistantly toward the toe and heel, from the said region of the head and rail, so that twisting forces due to turf engagement are counter balanced.

Yet another object is to provide a rail as referred to, which is curved, i.e., extends in a curved surface along the rail length, thereby to provide turf engaging rail support points that are not all in a line, so that stability against tilt of the head results from the rail biting into the turf as the head is placed downwardly in position, addressing the ball.

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

Fig. 1 is a frontal elevation showing a putter head incorporating the invention;

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Fig. 2 is a section taken on lines 2-2 of Fig. 1;

Fig. 3 is an enlarged fragmentary section, taken on lines 3-3 of Fig. 2;

Fig. 4 is a bottom plan view taken on lines 4-4 of Fig. 1;

Fig. 5 is a view like Fig. 4, showing a modification; and

Fig. 6 is a front elevation taken on lines 6-6 of Fig. 5.

In Figs 1-4 of the drawings, the putter head 10 has a body 11 defining a sole 12, a front or ball-striking face or surface 13, heel 14, and toe 14a. A shaft 16 is connected to the body and extends upwardly, as shown. The head may be metallic, and typically consists of brass. The body is elongated between the heel and toe, as shown.

In accordance with one aspect of the invention, a rail 20 projects downwardly from the bottom wall 12a of the sole, the rail 20 being elongated in a direction between the heel and toe to engage the turf 21 of the putting green, for projecting downwardly into the turf, as shown in Fig. 3, in a manner to stabilize the head for resisting twist as in either or both twist directions (indicated by arrows 22 and 22a in Fig. 4) as the putter sole is placed downwardly, on the green turf. See also the golf ball

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24 in Fig. 2, in front of face 13, the rail received in the turf tending to maintain the head face 13 squared relative to the ball, just prior to stroking of the head by manual swing of the shaft 16. See Fig. 3.

As shown, the elongated rail is spaced rearwardly from the front face 13, beneath the upright head front plate 23, for substantially balanced support of the head. The head has a bottom and rearward flange 25 projecting rearwardly from lower extent of body 11, to define the sole bottom wall 12a, as seen in Fig. 3. The bottom wall includes bottom wall extent 12a' frontwardly of the rail, and bottom wall extent 12a'' rearwardly of the rail. In this example, the front-to-rear width w_1, of 12a' is substantially less than the front-to-rear width w_2 of 12a'', and typically, w_2, is two to six times w_1. Bottom wall extent 12a' is typically flat in a front-to-rear direction, and shallowly downwardly convex in a heel-to-toe direction (see Fig. 1); and bottom wall extent 12a'' is also shallowly downwardly convex, similar to 12a', as in Fig. 1.

Rail 20 has a bottom surface 28 extending along the rail length, that surface typically having constant, or substantially constant width, and being flat or substantially flat in a front to rear direction, widthwise of the rail. Such width should be between ⅛ and ⅜ inches (3 to 9mm), and the rail should project below the sole surface by an amount "t" where t decreases toward the toe, and also decreases toward the heel, from a mid-point 28a, along the rail length (see

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Fig. 1). The maximum amount "t" should be between 1/16 and ⅛ inch (1.5 to 3mm), so as to effectively seat into the green turf at the mid region of the head, without extending too deeply into the turf so as to impede head stroking. Rail bottom surface 28 has greater curvature than the curvature of sole 12 in a toe to heel direction to merge with the sole at 28c and 28d.

Further, the rail 20 has frontwardly facing surface 29 which tapers downwardly and rearwardly (see Fig. 3) so as to slide over the turf as the head is stroked, the impact of the turf against the tapered surface 29 tending to lift the putter head and prevent the head digging into the turf - or to minimize this effect - as the head is stroked. Surface 29 merges with surface 28 along a rounded edge 30, to enhance these effects.

Likewise, the rail 20 has a rearwardly facing surface 31 which tapers downwardly and forwardly (see Fig. 3) to merge with surface 28 along a rounded edge 32. Surfaces 31 and 32 enable rearward sliding of the putter over the green turf as the head is swung backwardly relative to the golf ball, tending to prevent or minimize digging of the head into the turf during the back-stroke.

Note that the rail middle extent extends lengthwise below the middle of the putter, i.e., the "sweet spot" region 32 of plate 23 directly rearwardly of the ball; also, the rail extends from that middle extent toward the heel and toward the toe to equal, or substantially equal extents, whereby rail engagement with the turf during the back and forward strokes is

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the same toward the toe and toward the heel (from the rail middle extent) to minimize twisting of the putter head as it is stroked.

In Figs. 1, 2 and 4, the putter shaft 16 is affixed to the body 11 to project downwardly between heel 14 and the arcuate heel end 23c of plate 23. The body 11 defines or contains a shaft receiving bore 40 wherein the shaft lower end 16a is joined to the bore, as by adhesive, at 41. The bore intersects the bottom surface of the heel at 14', as seen in Figs. 1 and 4; and the shaft end may also extend almost to the bottom surface between the heel and end 28d of the rail. Filler 48 fills space between the lower core of the shaft and the surfaces 12 and 28. Note that bore 40 extends upright and the shaft extends upwardly from that bore.

It will be noted that in Figs. 1-4, the rail lengthwise extent defines a flat, upright plane 50 extending between the toe and heel, forwardly of the shaft bore 40. See Fig. 4. Such a straight rail allows some pivoting or tilting of the head forwardly or rearwardly, as indicated by lines 51 and 52 in Fig. 2. To eliminate or reduce such capacity for tilting, i.e., to help maintain the head in an upright position as seen in Fig. 2, with face 13 squarely addressing the ball, the rail may be so formed as to be lengthwise curved, to provide enhanced support for the putter body on the turf, i.e., "3-point" support, in effect. See for example the curved plane 55 of the rail 56 in Fig. 5, and such curvatures may take various forms. Three

points of support, out of alignment, are seen at A, B and C, in Fig. 5. Such a rail 56, otherwise like the above described rail 20, provides all of the advantages of rail 20, plus the added, anti-pivot support for the putter body as described. Note that the front inclined surface of rail 56 has variable spacing from the ball-striking surface 113 of the putter head.

Note also in Figs. 5 and 6 that the putter shaft 116 now extends at angle α relative to vertical, where α is between 10° and 30°; and that the shaft lowermost extent 116a is recessed in a correspondingly angled bore 140 in head forwardly offset extent 111d at the heel 114. Bore 140 is now forward of the curved plane 56, the latter being convex forwardly toward the plane of flat face 113, whereby turf is engaged by the convex forward edge of the rail, otherwise having sectional shape, as in Fig. 3, to slide or glide over the turf, which acts to urge the head upwardly out of the turf during a putting stroke.

Referring again to Figs. 1-4, the putter body has at least one recess 150 projecting forwardly toward a plane defined by front wall or face 13. Recess 150 opens rearwardly, as seen in Fig. 2. The body also has a second recess 151 sunk in the front wall, and is sized to closely receive the periphery 23d of the plate 23, which is non-metallic. The periphery 23d may be bonded to the body inner wall 152 bounding recess 151. The plate seats against a body looping shoulder 153, facing forwardly at the bottom of recess 151. The rear side 23a of plate 23 openly faces shoulder 153; and the

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plate may be oval, as shown, with rounded, convex opposite ends 23b and 23c, and straight top wall 23h.

Face plate 23 typically consists of synthetic resin, and defines ball-striking surface 23f, forwardly of recess 151. Also, it has uniform thickness and is preferably substantially transparent, to present viewing of alpha-numeric characters 160 (the word "LABEL" being merely representative) identifying the golfer, manufacturer, or some other entity. Characters 160 may define a monogram, internally of the plastic material and viewable from the front of the plate.

As shown in Figs. 2 and 3, the body defines a third recess 170 sunk in the front wall, rearwardly of recess 151, and to a depth greater than that of 151. Recess 170 periphery intersects the first recess 150, as shown. The peripheries of the three recesses are stepped, as at 150', 151', and 170', as seen in Fig. 3, inwardly of the rail 20. Thus, ball impact force transmitted to the plastic face plate 23 is in turn transmitted to the metal body by the periphery of the face plate, in the plane of the rail, i.e., ball-striking forces on the plate 33; and turf forces on the rail, during stroking, are concentrated at lower region 180 of the head, where head forward momentum acts, for balance. Use of lightweight plastic for plate 23 also enables peripheral weight concentration of head metal, to resist twist of the head, during stroking.

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CLAIMS:

1. A golf putter head (10) for use with a putter shaft (16) supporting the head, the head comprising, in combination:

a) a putter body (11) having a heel (14), a toe (14a) and sole (12) defining a bottom wall (12a), and a front wall (13), the body being elongated between the heel and toe,

b) the body (11) having at least one recess (150) projecting forwardly toward a plane defined by the front wall (13),

c) and the body (11) having a second recess (151) sunk in said front wall, there being a non-metallic face plate (23) having a periphery received in said second recess (151) and bonded to said body (11), the face plate for instance being transparent.

2. The combination of claim 1 wherein said face plate (23) has a rearward side exposed to said first recess (150).

3. The putter of claim 1 wherein said face plate (23) consists of synthetic resin and defining a ball-striking surface forwardly of said first recess (150), and optionally said face plate (23) has substantially uniform thickness.

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4. The putter of claim 3 wherein the said face plate (23) is substantially transparent, and includes a monogram carried thereby rearwardly of a front face defined thereby and viewable through the transparent material of said face plate.

5. The putter of claim 2 wherein the body (11) defines a third recess (170) sunk in said front wall (13) to a depth greater than said second recess (151) and which peripherally intersects said first recess (150) in rearwardly spaced relation to the periphery of said face plate.

6. The putter of claim 1 wherein said face plate (23) has a first end portion (23b) convex toward said toe (14a), and a second end portion (23c) convex toward said heel (14), and optionally, said face plate has a straight top edge (23h) elongated between said heel and toe, and intersecting said convex end portions (23b, 23c).

7. The putter of claim 1 including a shaft bore inset body spaced from said recess (150) and from said face plate (23).

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8. The putter of claim 7 wherein said bore (40) intersects said sole bottom wall (12a) proximate said heel (14).

9. The putter according to any preceding claim, including a rail (20) projecting downwardly from said bottom wall (12a) below the level of the front face (13), the rail (20) being elongated in a direction between the heel (14) and toe (14a) to engage the turf as the putter is placed downwardly on golfing green for stabilizing the head (11) against twist during said downward placement, the rail (20) preferably being spaced rearwardly from said front face (13) along the major length of the rail.

10. The putter of claim 9 wherein the rail (20) has a bottom surface (28) extending along the rail length and which is substantially flat in a front-to-rear direction widthwise of the rail, and for instance the rail (20) has a frontward face surface (29) along its length, and which tapers downwardly and rearwardly to merge with forward extent of the rail bottom surface (28), the rail also having a rearward face surface (31) which tapers downwardly and forwardly to merge with a rearward extent of the rail bottom surface (28).

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11. The putter of any preceding claim wherein the putter body (11) is metallic and has a face plate (23) of non-metallic material, and a rail (20) which is metallic.

12. The putter of claim 11 wherein the body (11) has an L-shaped cross section in upright planes normal to the length direction of the rail (20), the rail projecting below said L-shaped cross sections and being spaced rearwardly from said front face (13).

13. The putter of claim 10 wherein the rail (20) extends below the material of the putter body (11) between the heel and toe (14, 14a), directionally lengthwise, the rail bottom surface (28) having substantially uniform width along the majority of its length, said width e.g. being ⅛" - ⅜" (3-9mm), for instance $^{5}/_{16}$" (7.5mm).

14. The putter of claim 10, wherein the rail (20) defines an upright plane which extends between the heel and toe and is flat, and e.g. the rear flat bottom surface is downwardly convex along the rail length in a direction between the heel (14) and toe (14a) of the head (11).

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15. The putter of claim 10 wherein the rail (20) defines an upright plane which extends between the toe (14a) and heel (14) and which is curved, whereby the rail bottom surface is curved along its length to provide enhanced putter body support on the turf.

16. The putter of claim 1 wherein the body (11) has an additional recess extending outwardly from said one recess directly rearwardly of the face plate proximate the periphery thereof.

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