



US 20250256171A1

(19) **United States**

(12) **Patent Application Publication**
Locke et al.

(10) **Pub. No.: US 2025/0256171 A1**

(43) **Pub. Date: Aug. 14, 2025**

(54) **GOLF CLUB HEAD INCLUDING A
REMOVABLE WEIGHT**

Publication Classification

(51) **Int. Cl.**
A63B 53/04 (2015.01)

(52) **U.S. Cl.**
CPC A63B 53/047 (2013.01); **A63B 2053/0491**
(2013.01)

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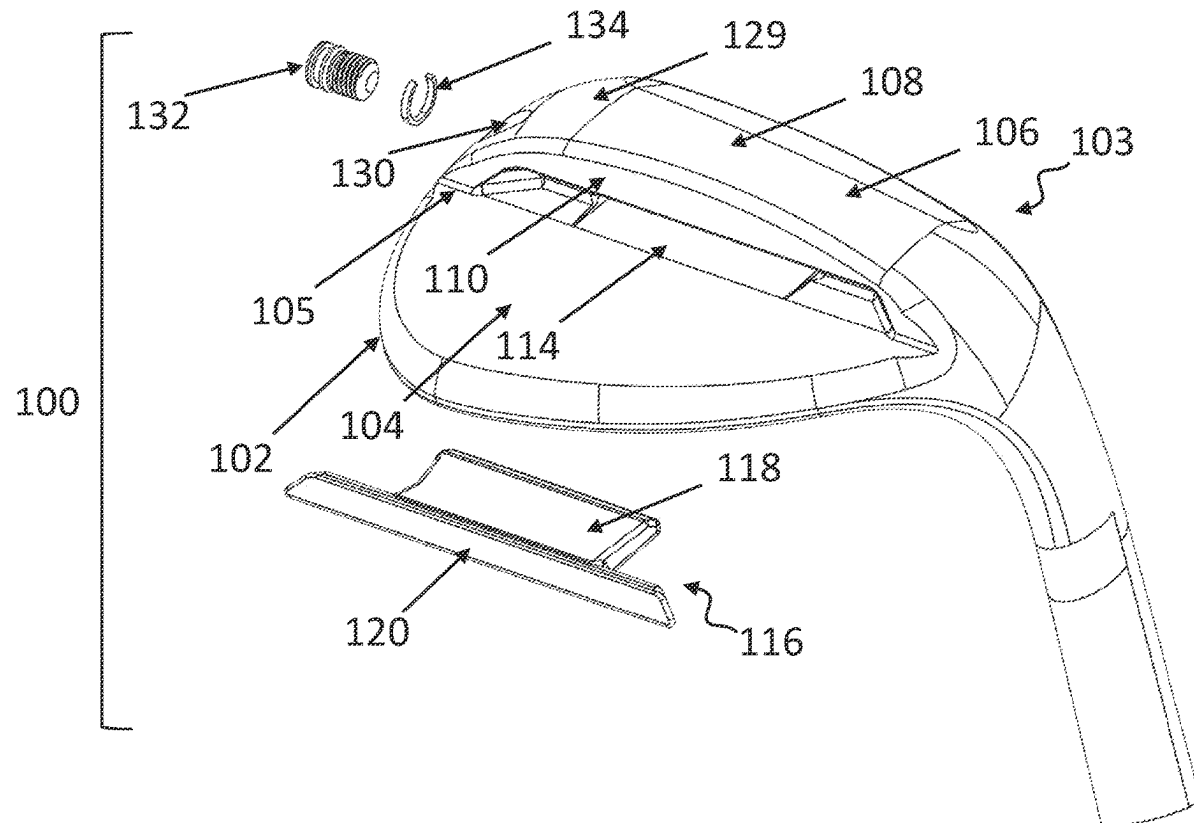
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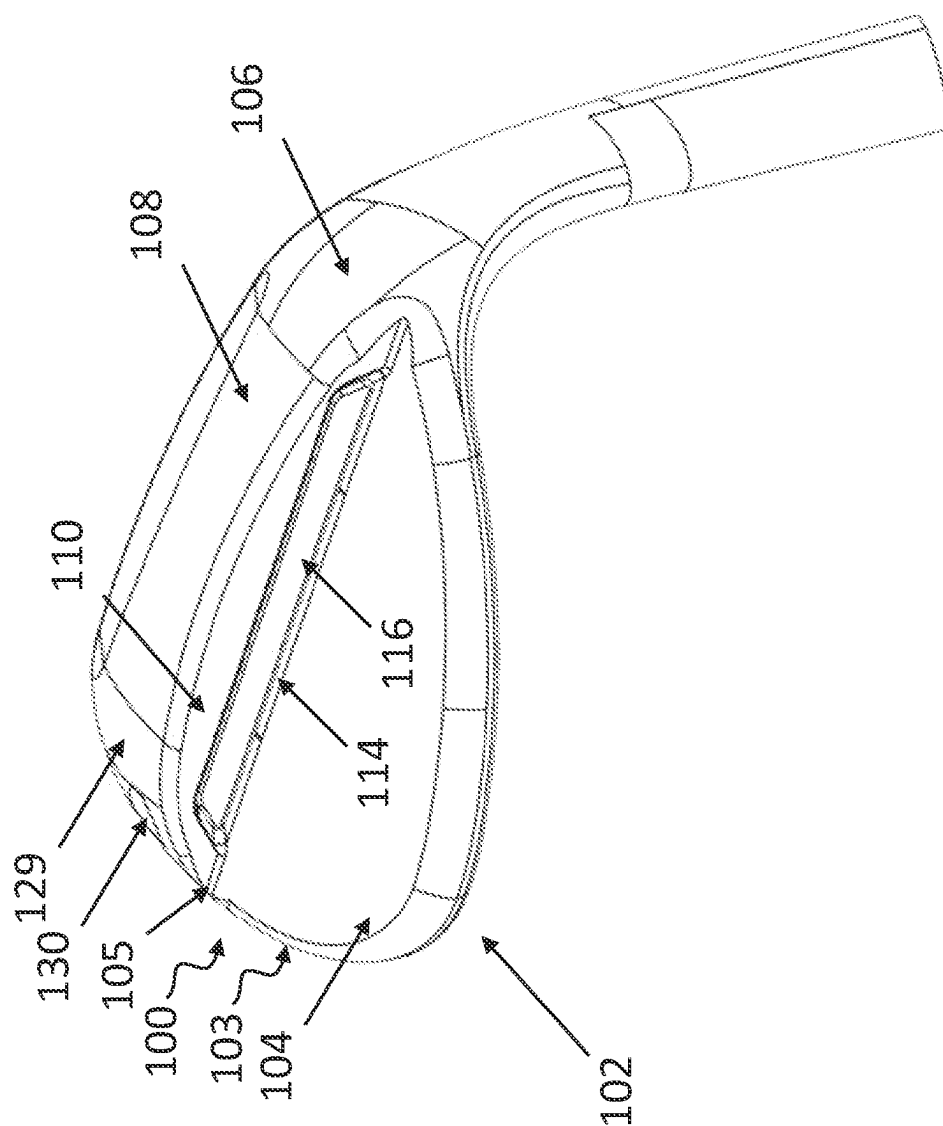
(21) Appl. No.: **18/441,387**

(22) Filed: **Feb. 14, 2024**

(57) **ABSTRACT**

The presently disclosed technology is directed to a golf club head. For example, the golf club head includes a striking face portion, a back portion, a removable weight, and a fastener. The back portion may include an upper blade portion, a gutter, and a lower muscle portion. The lower muscle portion may include a sole and a back flange including a weight recess. The sole may include a fastener through hole accessible to the weight recess. The removable weight may fit into the weight recess.





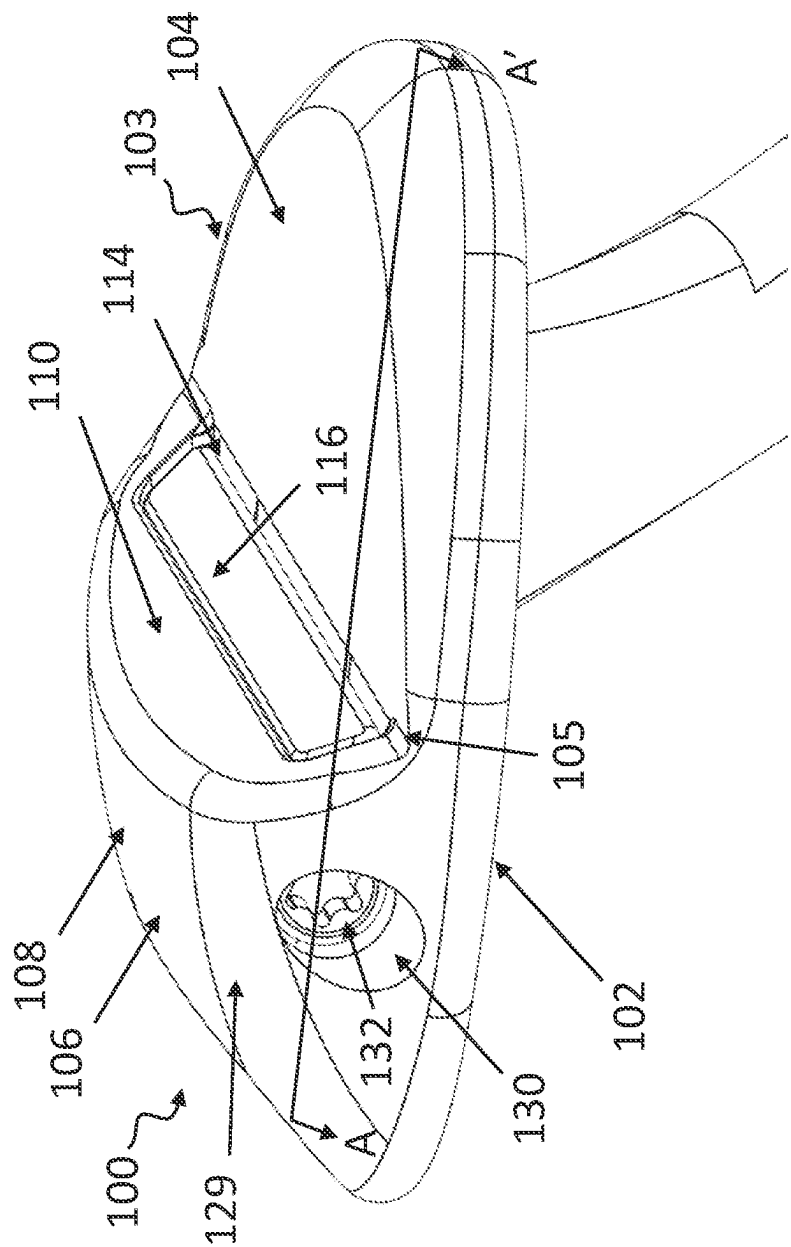
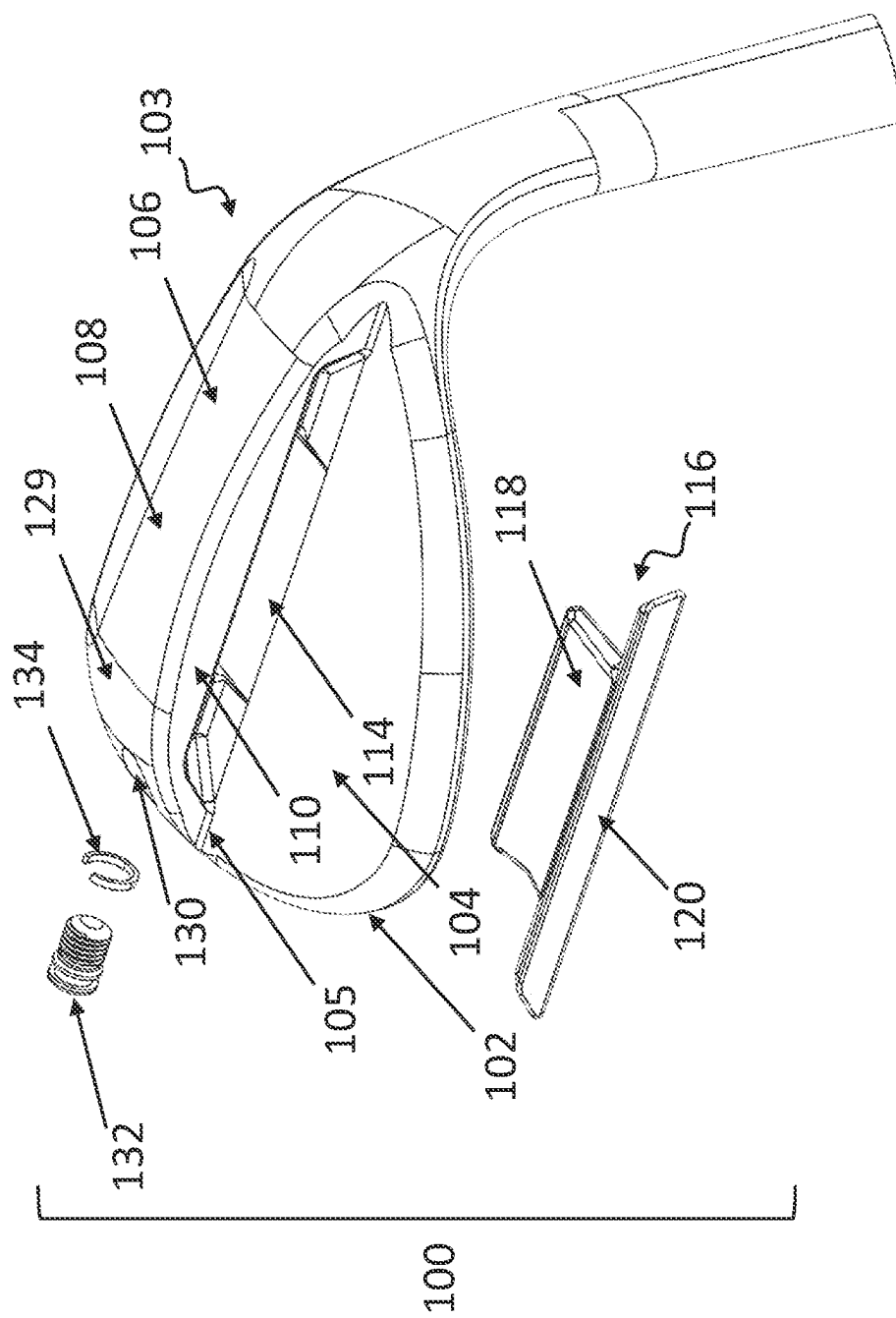
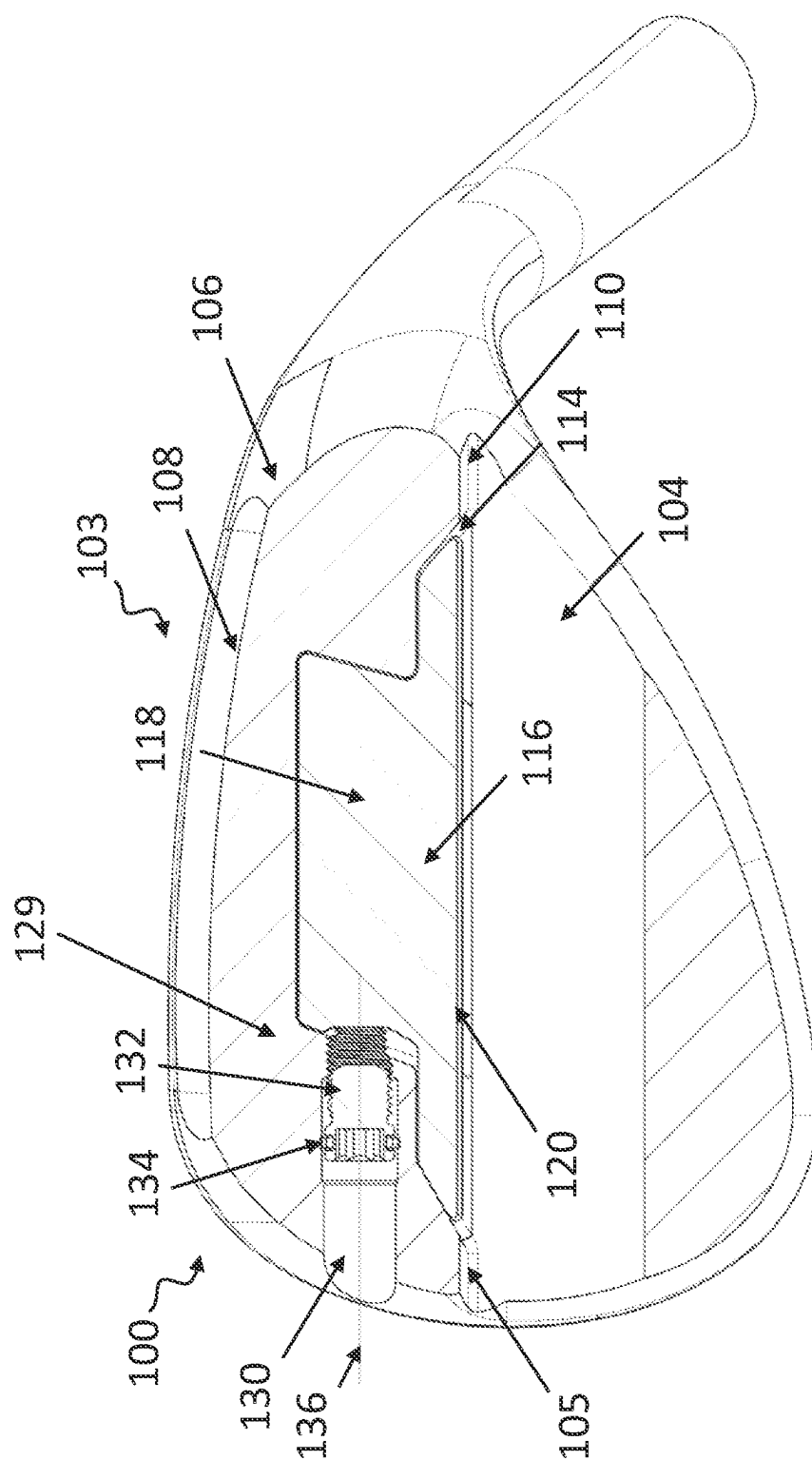


FIG. 2







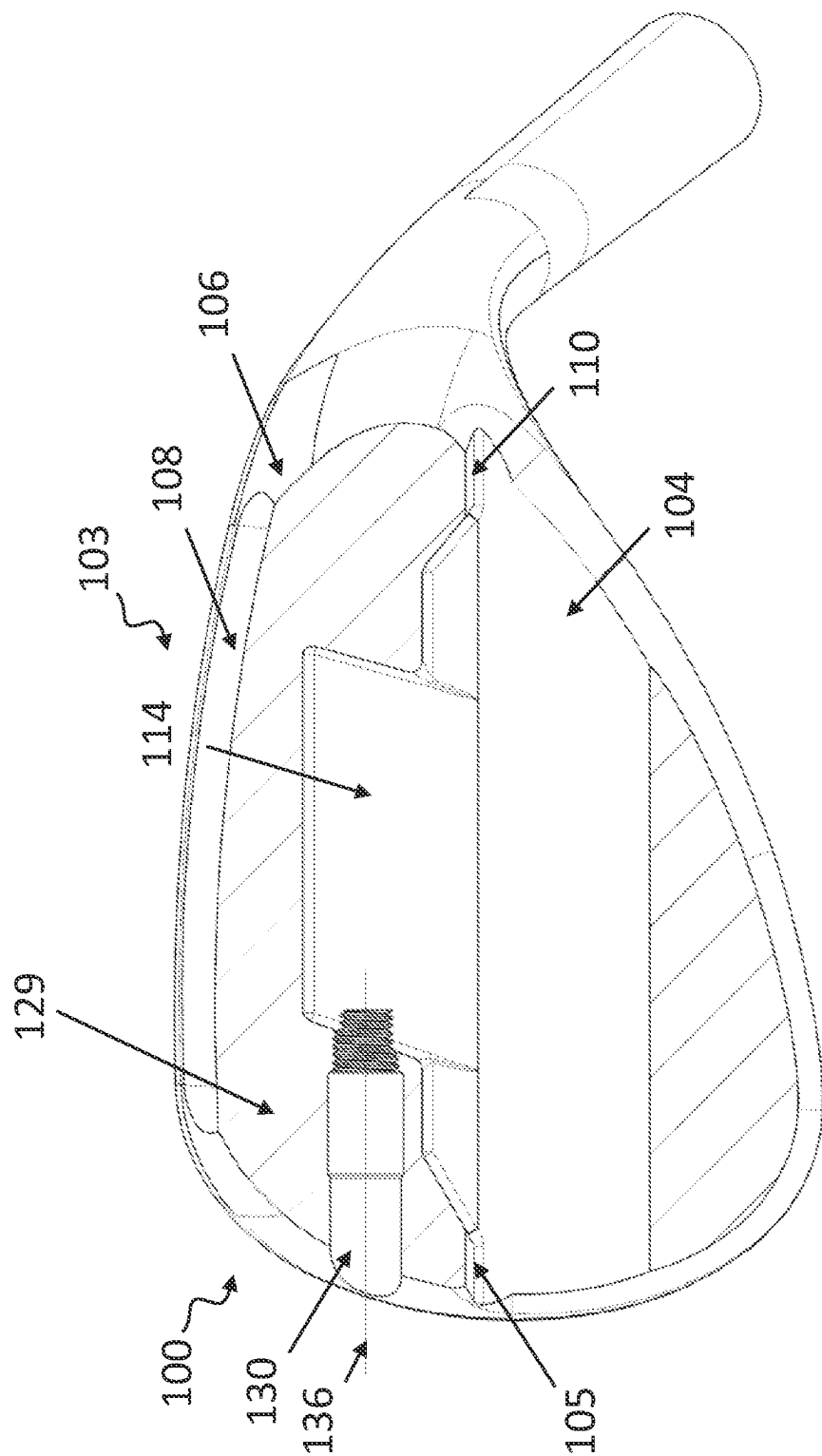


FIG. 5

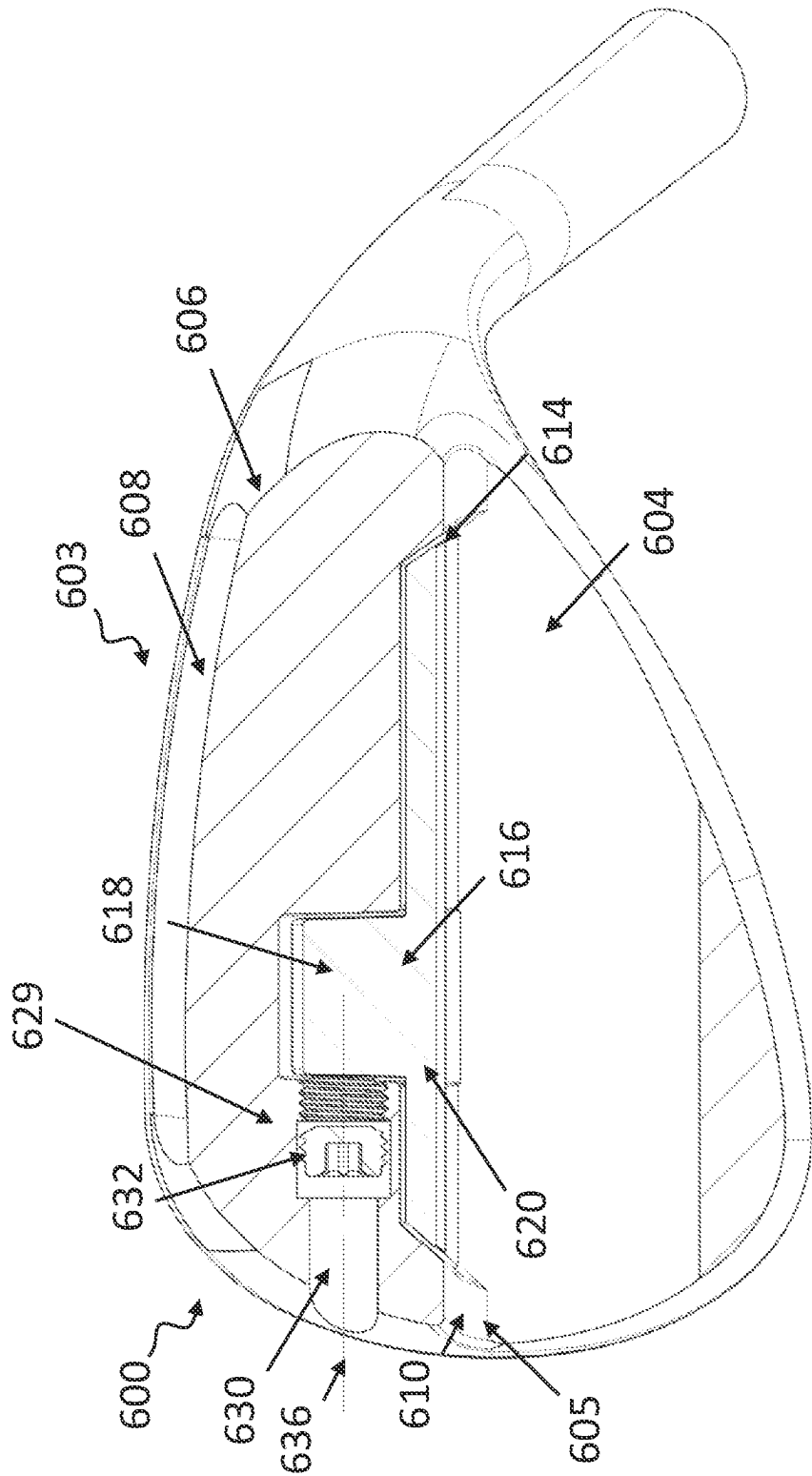


FIG. 6

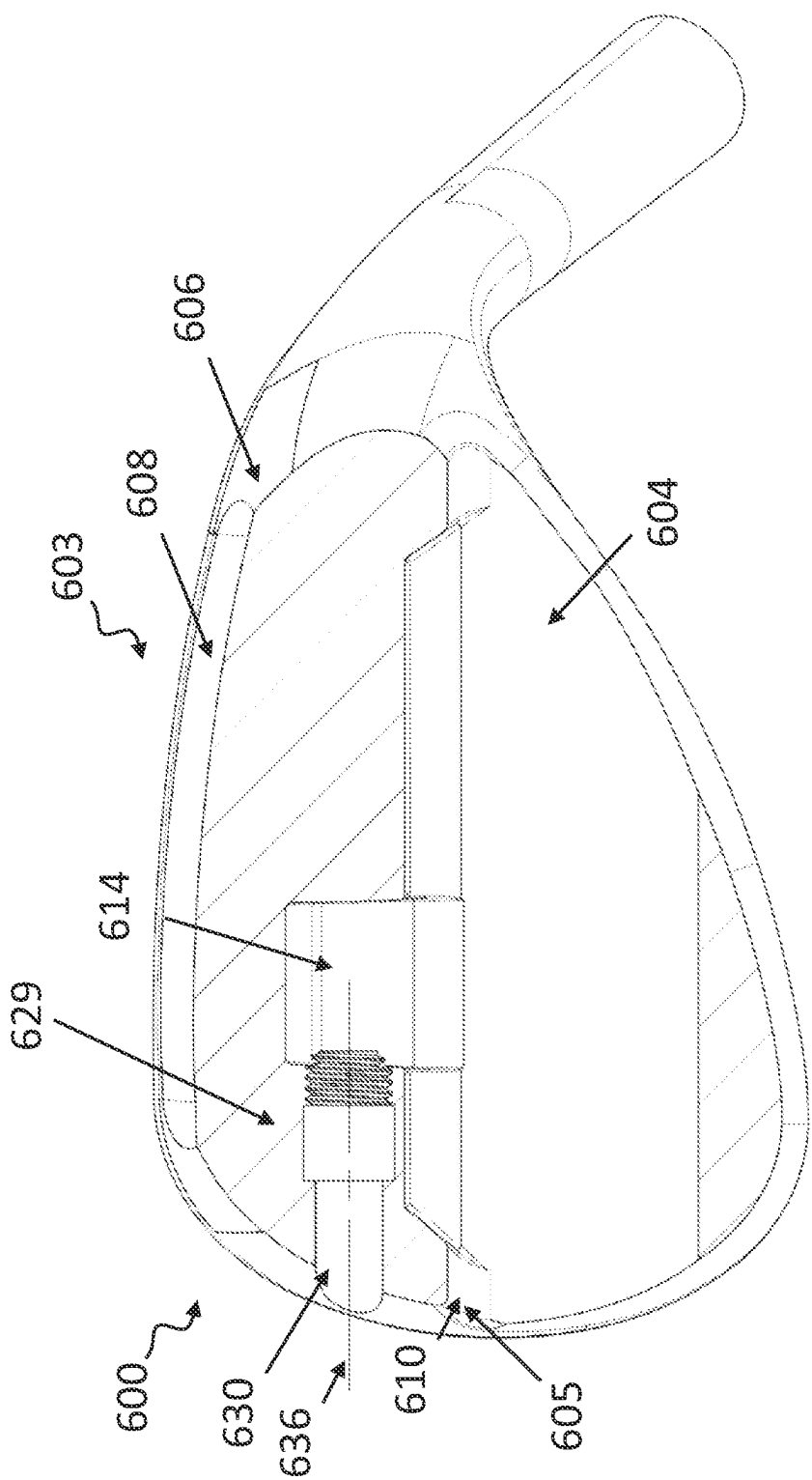


FIG. 7

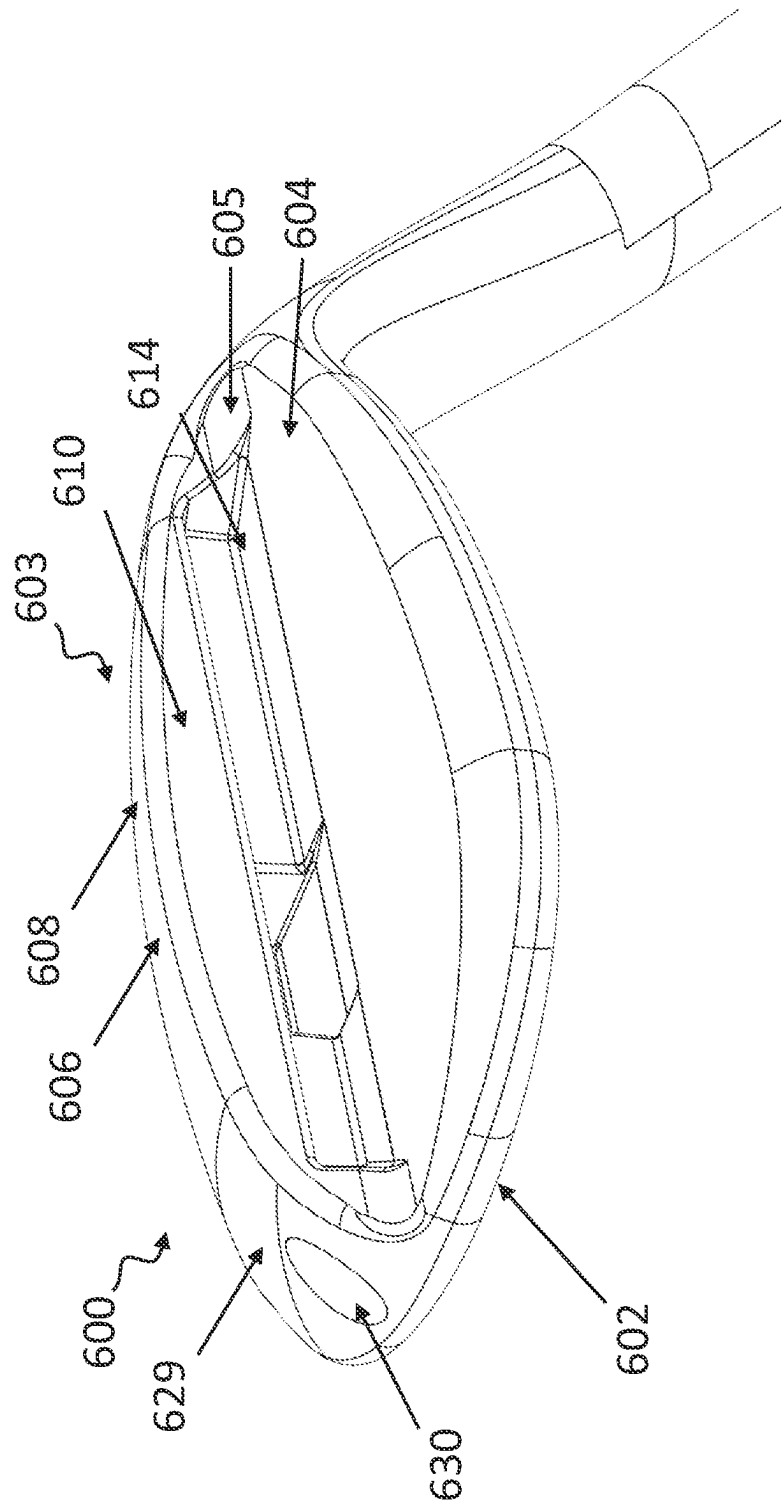
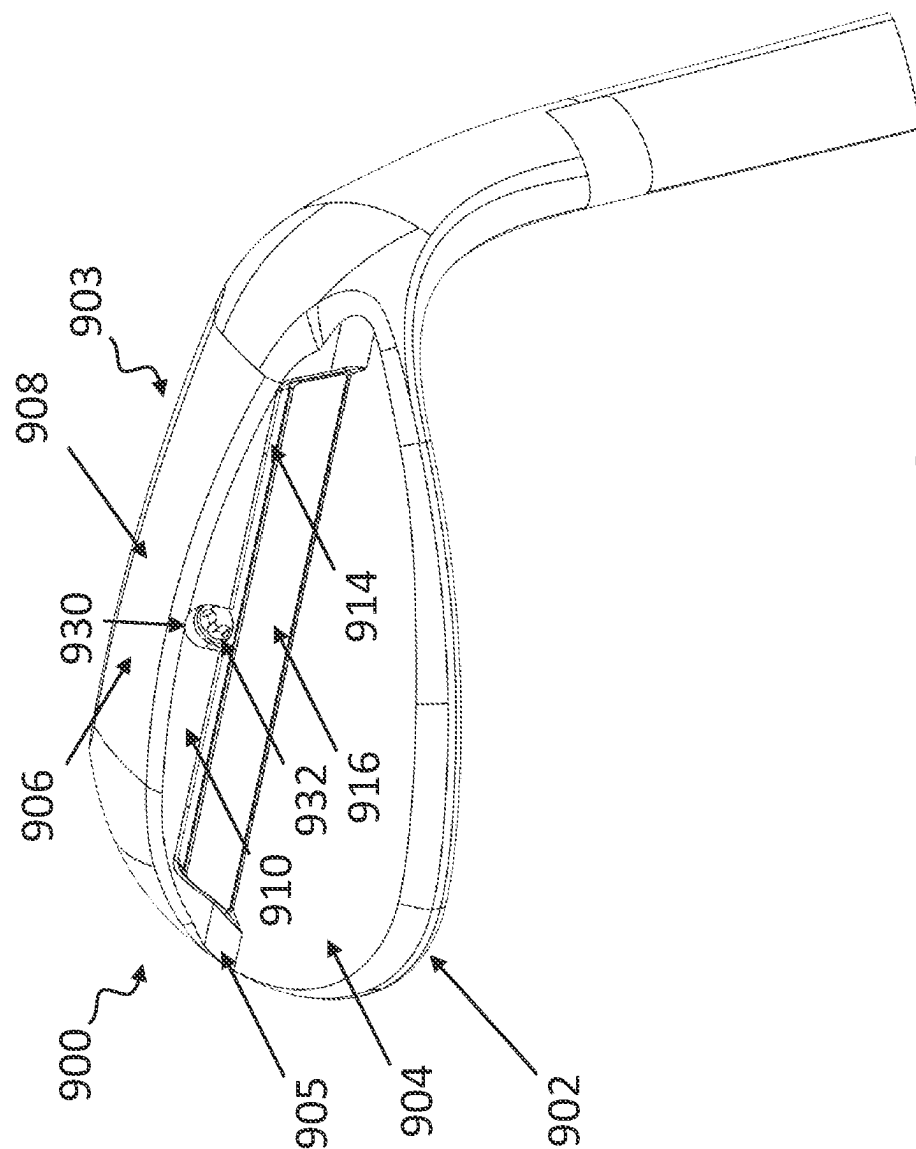


FIG. 8



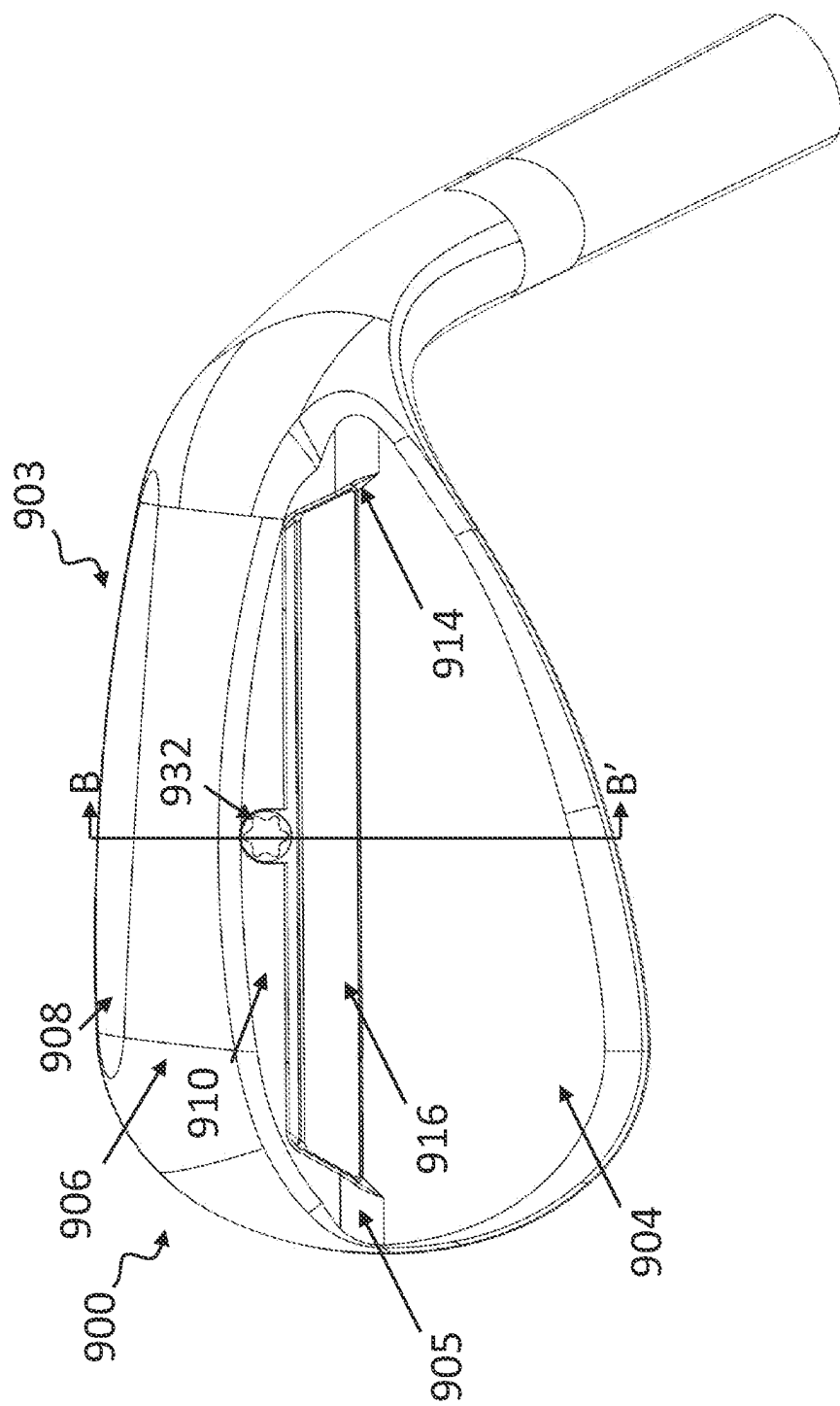
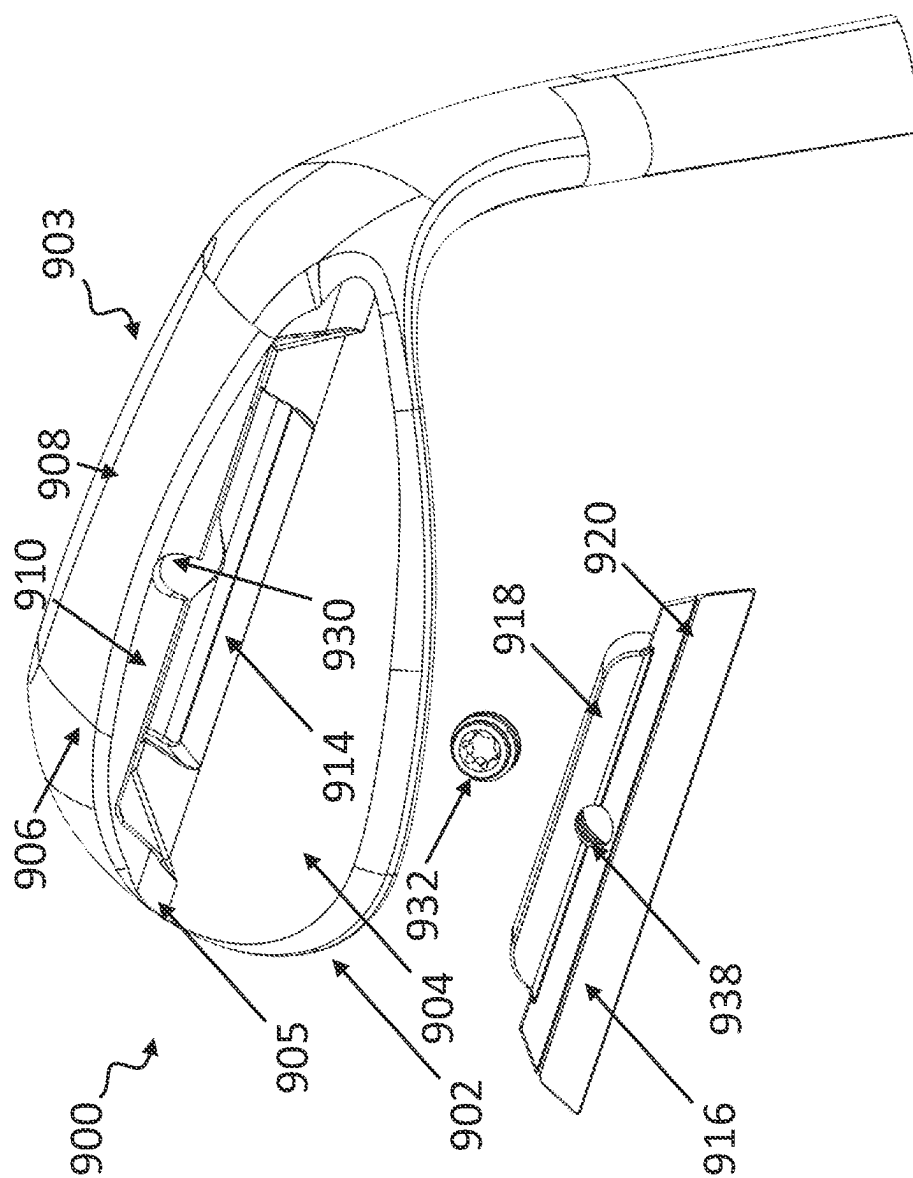


FIG. 10



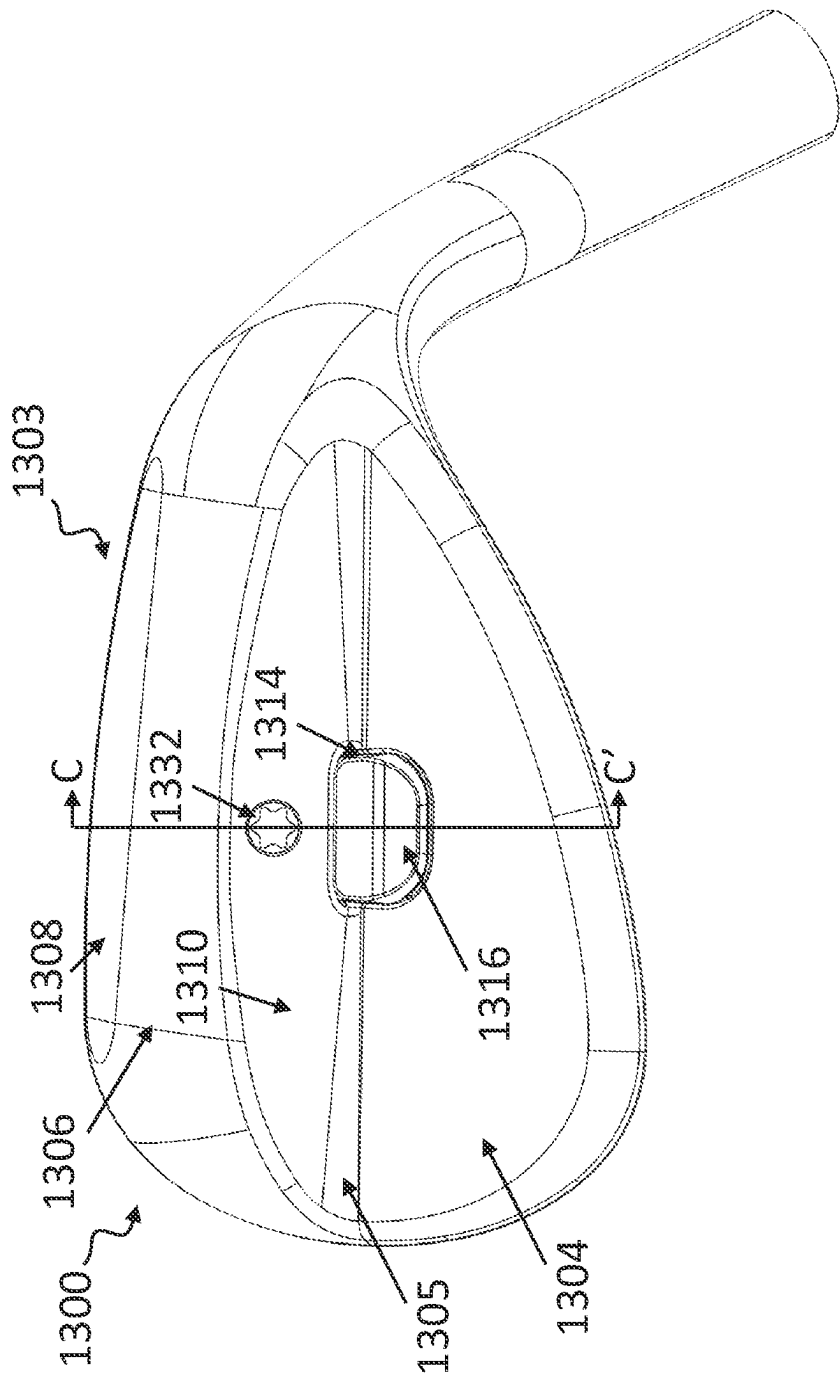
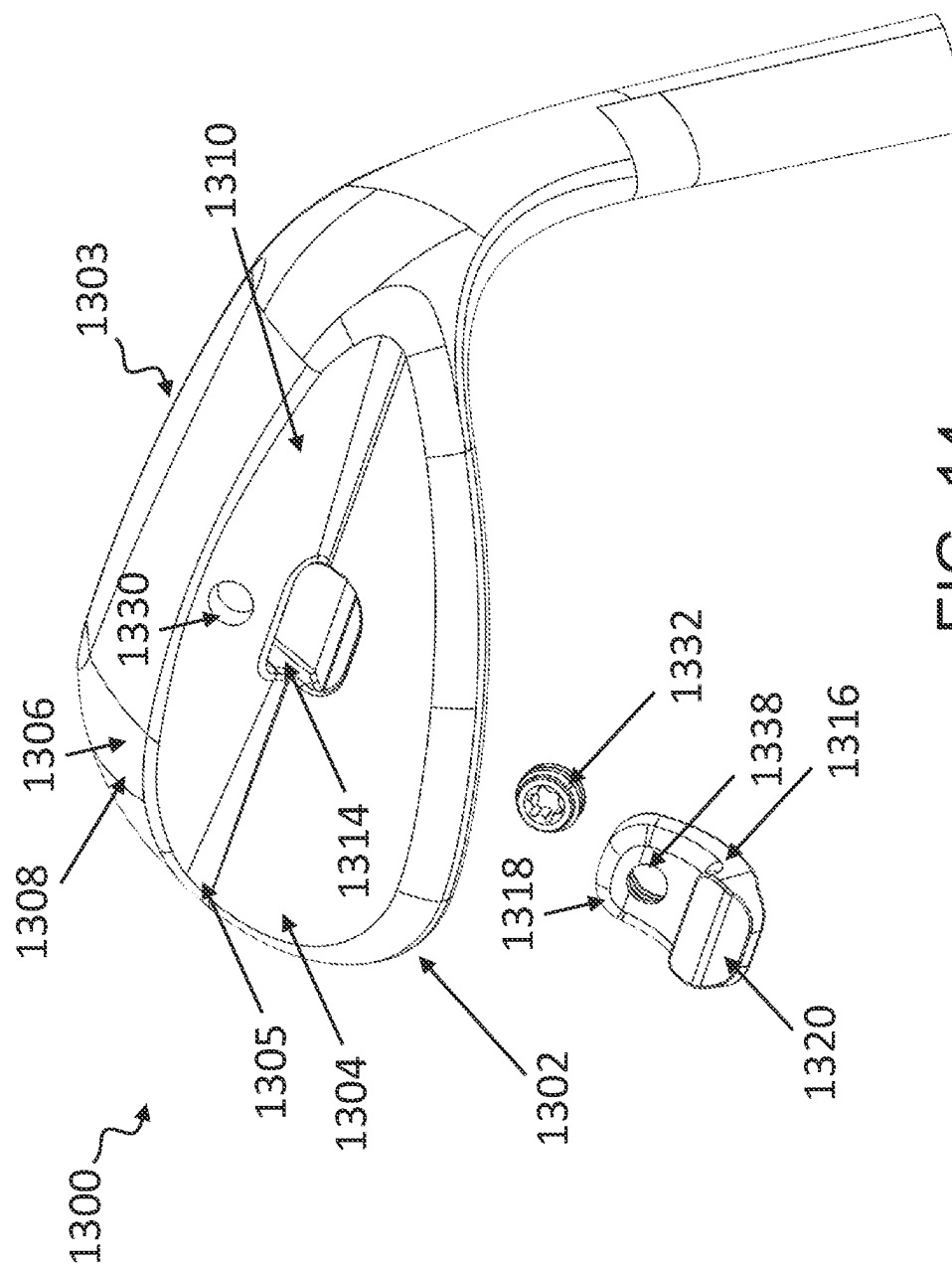


FIG. 13



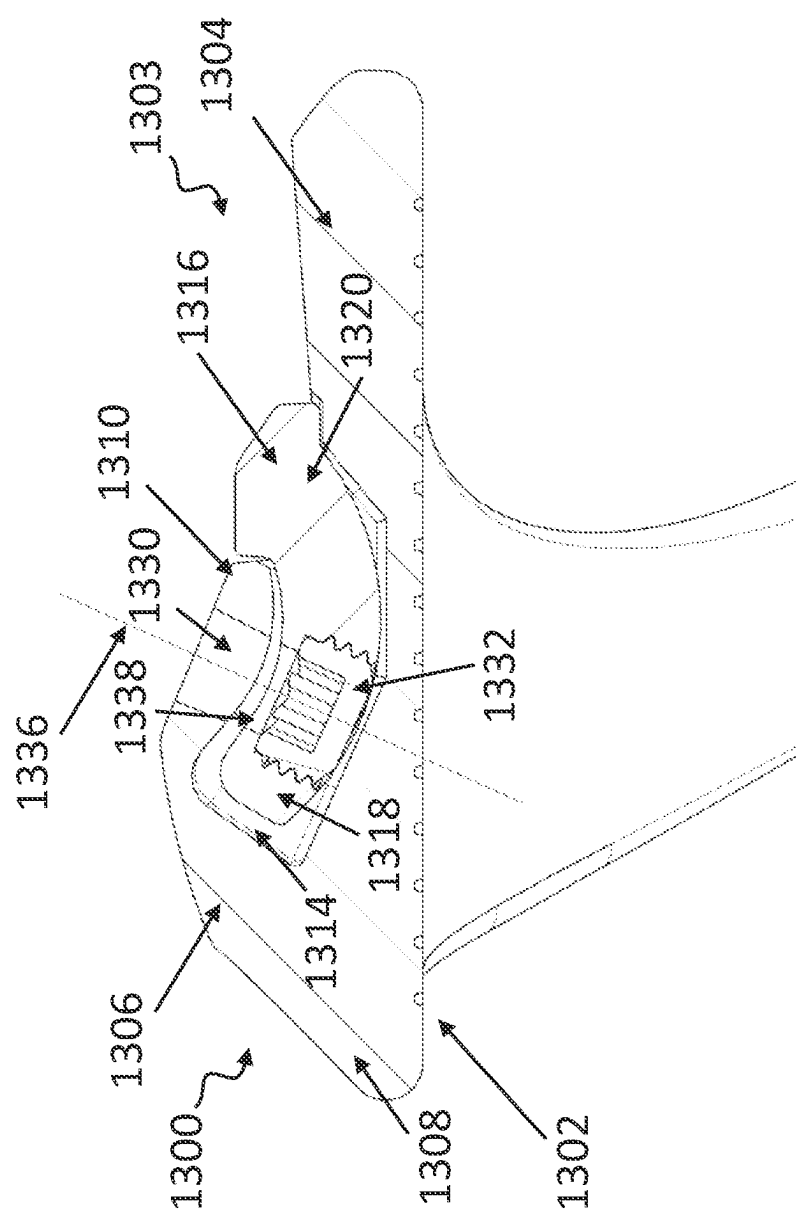


FIG. 15

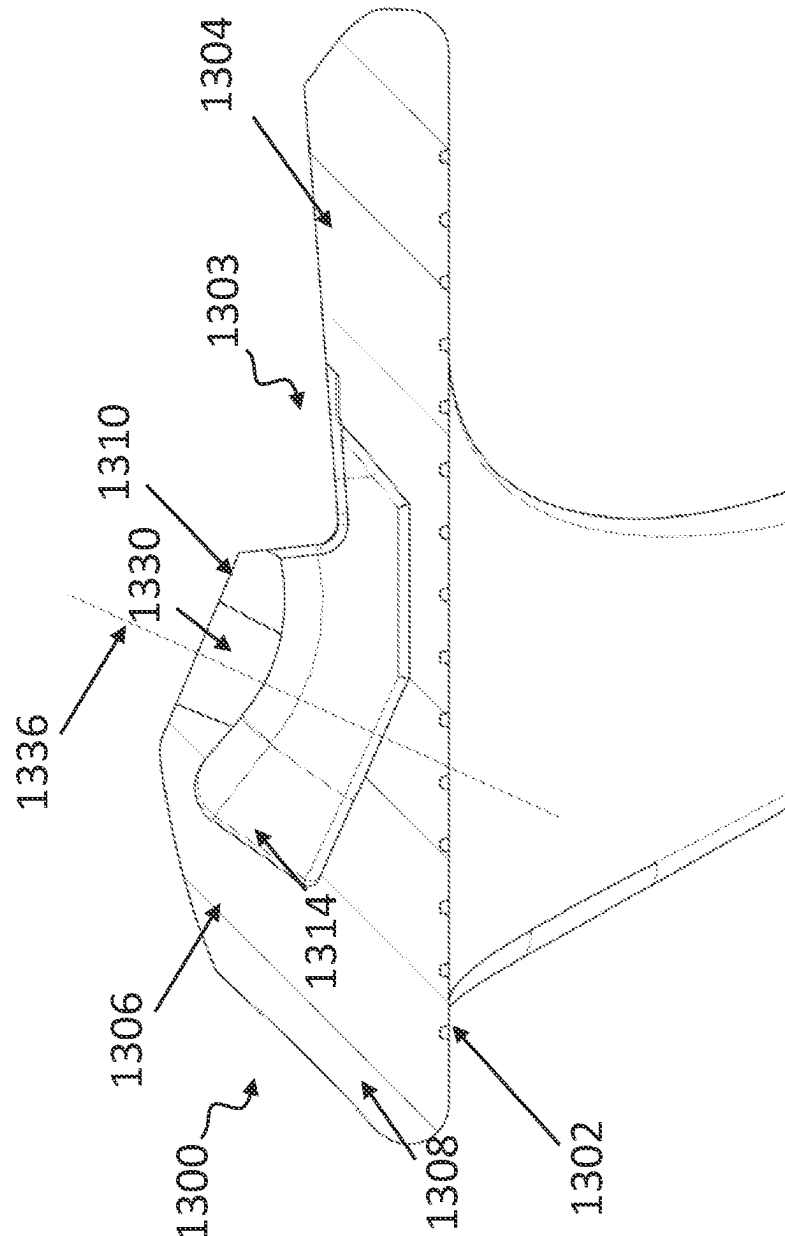


FIG. 16

GOLF CLUB HEAD INCLUDING A REMOVABLE WEIGHT

FIELD OF THE DISCLOSURE

[0001] The present disclosure generally relates to golf clubs, and more specifically to a golf club head including a removable weight.

SUMMARY

[0002] Embodiments of the presently disclosed technology may include golf club heads. In accordance with some aspects of the presently disclosed technology, a golf club head may include a striking face portion, a back portion, a removable weight, and a fastener. The back portion may include an upper blade portion, a gutter, and a lower muscle portion. The gutter may extend downward from the upper blade portion. The lower muscle portion may extend downward from the gutter. The lower muscle portion may include a back flange and a sole. The back flange may include a weight recess. The sole may extend backward from a lower portion of the striking face portion to the back flange. The sole may include a toeward sole portion. The toeward sole portion may include a fastener through hole accessible to the weight recess. The removable weight may fit into the weight recess. The removable weight may include a body portion and a cover portion. The body portion may be covered by the sole in an installed position. The body portion may fit into a portion of the weight recess. The cover portion may cover the weight recess in the installed position. The fastener may secure the removable weight in the installed position. A portion of the fastener may engage a toeward portion of the body portion in the installed position.

[0003] In embodiments, the removable weight may include a metal.

[0004] In embodiments, the metal may include one of tungsten, steel, titanium, aluminum, scandium, zinc, nickel, copper, and iron.

[0005] In embodiments, a width of the removable weight may be more than about 80% of a width of the back flange.

[0006] In embodiments, a width of the body portion may be less than a width of the cover portion.

[0007] In embodiments, a width of the body portion may be about 25% of a width of the cover portion.

[0008] In embodiments, a height of the body portion may be larger than a height of the cover portion.

[0009] In embodiments, a depth of the body portion may be less than a depth of the cover portion.

[0010] In embodiments, the fastener may include a fastener axis running along a heel-to-toe direction.

[0011] In accordance with some aspects of the presently disclosed technology, a golf club head may include a striking face portion, a back portion, a removable weight, and a fastener. The back portion may include an upper blade portion, a gutter extending downward from the upper blade portion, and a lower muscle portion extending downward from the gutter. The lower muscle portion may include a back flange. The back flange may include a weight recess extending into a sole, a fastener through hole accessible to the weight recess, and the sole extending backward from a lower portion of the striking face portion to the back flange. The removable weight may fit into the weight recess. The removable weight may include a weight through hole accessible to the fastener through hole. The removable weight

may include a body portion covered by the sole in an installed position. The body portion may fit into a portion of the weight recess. The removable weight may include a cover portion to cover the weight recess in the installed position. The fastener may secure the removable weight in the installed position via the fastener through hole.

[0012] In embodiments, the removable weight may include a metal.

[0013] In embodiments, the metal may include one of tungsten, steel, titanium, aluminum, scandium, zinc, nickel, copper, and iron.

[0014] In embodiments, a width of the removable weight may be more than about 80% of a width of the back flange.

[0015] In embodiments, a width of the body portion may be less than a width of the cover portion.

[0016] In embodiments, the fastener may include a fastener axis. The fastener axis may be perpendicular to an exterior surface of the back flange.

[0017] In embodiments, a first portion of the removable weight may extend partially faceward in the installed position. A second portion of the removable weight may extend partially backward in the installed position.

[0018] In accordance with some aspects of the presently disclosed technology, a golf club head may include a striking face portion, a back portion, a removable weight, and a fastener. The back portion may include an upper blade portion, a gutter extending downward from the upper blade portion, and a lower muscle portion extending downward from the gutter. The lower muscle portion may include a back flange. The back flange may include a weight recess. The lower muscle portion may include a sole extending backward from a lower portion of the striking face portion to the back flange. The sole may include a toeward sole portion. The toeward sole portion may include a fastener through hole accessible to the weight recess. The removable weight may fit into the weight recess. The removable weight may include a body portion covered by the sole in an installed position. The body portion may fit into a portion of the weight recess. The removable weight may include a cover portion to cover the weight recess in the installed position. The width of the body portion is less than a width of the cover portion. A width of the removable weight may be more than about 80% of a width of the back flange. The fastener may secure the removable weight in the installed position. A portion of the fastener may engage a toeward portion of the body portion in the installed position.

[0019] In embodiments, the body portion may include a body through hole to engage the first portion of the fastener.

[0020] In embodiments, the removable weight may include a metal.

[0021] In embodiments, the fastener may include a fastener axis. The fastener axis may be perpendicular to an exterior surface of the back flange.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG. 1 is a perspective view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0023] FIG. 2 is a perspective view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0024] FIG. 3 is a perspective exploded view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0025] FIG. 4 is a cross-sectional rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2.

[0026] FIG. 5 is a cross-sectional rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2.

[0027] FIG. 6 is a cross-sectional rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2.

[0028] FIG. 7 is a cross-sectional rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2.

[0029] FIG. 8 is a perspective view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0030] FIG. 9 is a perspective view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0031] FIG. 10 is a rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0032] FIG. 11 is a cross-sectional side view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line B-B' in FIG. 10.

[0033] FIG. 12 is a perspective exploded view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0034] FIG. 13 is a rear view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0035] FIG. 14 is a perspective exploded view of a golf club head in accordance with one or more embodiments of the presently disclosed technology.

[0036] FIG. 15 is a cross-sectional side view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line C-C' in FIG. 13.

[0037] FIG. 16 is a cross-sectional side view of a golf club head in accordance with one or more embodiments of the presently disclosed technology taken along line C-C' in FIG. 13.

[0038] These and other features of the presently disclosed technology, as well as the methods of operation and functions of the related elements of structure and the combination of parts, may be clearer upon consideration of the following detailed description and the claims with reference to these drawings, all of which form a part of this specification, with like reference numerals designating corresponding parts in the various figures. It is to be expressly understood that these drawings are for illustration purposes and description and are not intended to be limiting. It should be noted that for clarity and ease of illustration these drawings are not necessarily made to scale. As used in the specification and in the claims, the singular form of "a," "an," and "the" may include plural referents unless the context clearly dictates otherwise.

DETAILED DESCRIPTION

[0039] Currently there are limited techniques to dynamically adjust a weight of a golf club iron or golf club wedge. Of the limited techniques, many are permanent and/or time-consuming. For example, this may include polishing off material on the golf club head, drilling holes, and/or adding tip plugs. The presently disclosed technology may allow a golf club head to be dynamically adjustable in mass, center of gravity (CG), and/or moment of inertia (MOI). The presently disclosed technology may include a removable weight. The presently disclosed technology may eliminate the need to remove or add material to the golf club head during assembly to meet customization requirements. This may provide dynamic fine tuning of the mass, CG, and/or MOI of the golf club head after manufacturing.

[0040] The presently disclosed technology is directed to a golf club head. The golf club head may include a striking face portion, a back portion, a removable weight, and a fastener. The back portion may include an upper blade portion, a gutter, and a lower muscle portion. The lower muscle portion may include a back flange and a sole. The back flange may include a weight recess. The removable weight may be used to adjust characteristics of the golf club head. For example, the golf club head may include components to adjust the CG of the golf club head, the mass of the golf club head, the MOI of the golf club head, the materials of the golf club head, the aesthetics of the golf club head, and/or other characteristics. The presently disclosed technology may allow a user to quickly and easily modify the characteristics of a manufactured golf club head depending on the user's needs.

[0041] FIGS. 1-5 illustrate golf club head 100 in accordance with one or more embodiments of the presently disclosed technology. For example, FIG. 1 is a perspective view of a golf club head 100 in accordance with one or more embodiments of the presently disclosed technology. FIG. 2 is a perspective view of a golf club head 100 in accordance with one or more embodiments of the presently disclosed technology. FIG. 3 is a perspective exploded view of a golf club head 100 in accordance with one or more embodiments of the presently disclosed technology. FIG. 4 is a cross-sectional rear view of a golf club head 100 in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2. FIG. 5 is a cross-sectional rear view of a golf club head 100 in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2. Each of these figures may provide different views of the same or similar components, and may be discussed together herein. Referring first to FIG. 1, golf club head 100 may include striking face portion 102, back portion 103, removable weight 116, and fastener 132 (at least shown in FIG. 2). Golf club head 100 may include metal, plastic, composite, and/or other materials. The metal may include tungsten, steel, titanium, aluminum, scandium, zinc, nickel, copper, iron, alloys, and/or other metals without departing from the spirit and scope of the presently disclosed technology. The plastic may include thermosets, thermoplastics, and/or other plastics. Composites may include a variety of materials known to those skilled in the art, including for example, graphite, carbon fiber, resins, ceramics, boron fiber, polymers, foams, and so on. Striking face portion 102 may refer to a frontal portion of a golf club head 100. Striking face portion 102

may be intended to strike a golf ball. A frontal surface of striking face portion 102 may be substantially planar.

[0042] Back portion 103 may include upper blade portion 104, gutter 105, and lower muscle portion 106. Upper blade portion 104 may include an upper portion of back portion 103. Upper blade portion 104 may refer to a blade portion of golf club head 100. Gutter 105 may extend downward from upper blade portion 104. For example, gutter 105 may extend from a lower portion of upper blade portion 104. Gutter 105 may include a substantially curved region. For example, gutter 105 may include a curve downward and backward from a bottom of upper blade portion 104. In some embodiments, gutter 105 may be a linear region. For example, gutter 105 may extend down and back from a bottom of upper blade portion 104. Gutter 105 may include a portion of weight recess 114, which will be described in greater detail below.

[0043] Lower muscle portion 106 may include back flange 110 and sole 108. Lower muscle portion 106 may extend downward from gutter 105. Lower muscle portion 106 may refer to a muscle portion of golf club head 100. For example, lower muscle portion 106 may extend downward from a bottom portion and/or backward portion of gutter 105. Back flange 110 may include weight recess 114. Back flange 110 may extend substantially backward from a bottom portion and/or backward portion of gutter 105. Weight recess 114 may receive or be configured to receive removable weight 116, which will be described in greater detail herein. Weight recess 114 may extend downward from back flange 110. For example, weight recess 114 may extend down in a parallel direction of a plane of a frontal surface of striking face portion 102. Weight recess 114 may be asymmetrical. For example, weight recess 114 may have more of a recess heelward than toward from a geometric center, or vice versa based on removable weight 116. In some embodiments, the asymmetry may be forward or backward from the geometric center. Matching the shape, size, and/or dimension of weight recess 114 to removable weight 116 may reduce, prevent or otherwise stop unwanted movement of removable weight 116 in the installed position and/or reduce, prevent or otherwise stop unwanted sound of removable weight 116 in the installed position.

[0044] Sole 108 may extend substantially downward away from back flange 110 toward striking face portion 102. For example, sole 108 may extend downward from a backward portion of back flange 110 to a bottom portion of striking face portion 102. Sole 108 may extend substantially backward from a bottom portion of striking face portion 102 to back flange 110. Sole 108 may include weight recess 114 and toward sole portion 129. Weight recess 114 may be between an exterior surface of sole 108 and striking face portion 102. Toward sole portion 129 may refer to a toward portion of sole 108. Toward sole portion 129 may include fastener through hole 130. Fastener through hole 130 may extend into weight recess 114. For example, fastener through hole 130 may extend from toward sole portion 129 heelward into weight recess 114. Fastener through hole 130 may be accessible to weight recess 114. In some embodiments, fastener through hole 130 may be recessed as compared to surrounding regions of golf club head 100. Referring to FIG. 2, fastener through hole 130 may receive a portion of fastener 132. For example, fastener through hole 130 may receive a bottom portion of fastener 132.

[0045] Referring to FIG. 3, golf club head 100 may include removable weight 116, which may include body portion 118 and cover portion 120. Removable weight 116 may fit or be configured to fit into weight recess 114. In an installed position, removable weight 116 may be flush with surrounding surfaces, including gutter 105, back flange 110, and/or sole 108 in the installed position. The installed position may be when removable weight 116 is fully inserted into weight recess 114. In the installed position, removable weight 116 may form a substantially continuous shape along back portion 103 to provide a uniform appearance to golf club head 100. A uniform appearance may make it hard to visually distinguish golf club head 100 from a traditional golf club head.

[0046] Removable weight 116 may include a metal, a plastic, and/or a composite. In some embodiments, removable weight 116 may be a multi-material component. For example, body portion 118 may be a first material and cover portion 120 may be a second material. In some embodiments, a heelward portion of removable weight 116 may be a first material and a toward portion of removable weight 116 may be a second material. These materials may be different from the rest of golf club head 100. In some embodiments, some of the materials may be the same as the rest of golf club head 100. In embodiments, removable weight 116 may be solid. In some embodiments, removable weight 116 may be hollow. Removable weight 116 may be between about 1.0 g to about 70.0 g. In some embodiments, removable weight 116 may be between about 2.0 g to about 35.0 g.

[0047] Body portion 118 may be a bottom portion of removable weight 116. Body portion 118 may be covered by sole 108 and/or cover portion 120 in the installed position. Body portion 118 may fit into a portion of weight recess 114 in the installed position. For example, body portion 118 may fit into a bottom portion of weight recess 114. Cover portion 120 may be a top portion of removable weight 116. Cover portion 120 may extend upward from body portion 118. Cover portion 120 may cover body portion 118 and/or weight recess 114 in the installed position. A portion of cover portion 120 may fit into a portion of weight recess 114. For example, a bottom portion of cover portion 120 may fit into a top portion of weight recess 114. In some embodiments, cover portion 120 and/or removable weight 116 may cover at least 90% of a width of upper blade portion 104, gutter 105, lower muscle portion 106, sole 108, and/or back flange 110. In embodiments, cover portion 120 and/or removable weight 116 may cover at least 75% of the width of upper blade portion 104, gutter 105, lower muscle portion 106, sole 108, and/or back flange 110. A width of body portion 118 may be less than a width of cover portion 120. For example, the width of body portion 118 may be less than 95% of the width of cover portion 120. In some embodiments, the width of body portion 118 may be less than 75% of the width of cover portion 120. In some embodiments, body portion 118 may be a different material than cover portion 120. A height of body portion 118 may be larger than a height of cover portion 120. A depth, from face-to-back, of body portion 118 may be less than a depth of cover portion 120.

[0048] Referring to FIG. 4, golf club head 100 may include fastener 132. Fastener 132 may fasten removable weight 116 into the installed position, where fastener 132 may be fully fastened. Fastener 132 may include a threaded

end and a head end. The threaded end may be on a bottom end of fastener 132 and a head end may be on a top end of fastener 132. The threaded end may engage a threaded portion of fastener through hole 130. Fastener 132 may fasten along fastener axis 136, described in greater detail below. Fastener through hole 130 may include varying sized holes to accommodate different widths of fastener 132. For example, a toward portion of fastener through hole 130 may include a first hole with a first circumference to fit the head end. A heelward portion of fastener through hole 130 may include a second hole with a second circumference to fit the threaded end. The heelward portion of fastener through hole may be the threaded portion. The varying sized holes may help seat fastener 132. Fastener axis 136 may run along a heel-to-toe direction. Referring back to FIG. 3, golf club head 100 may include retaining ring 134. Retaining ring 134 may help prevent fastener 132 from being fully decoupled or unfastened from golf club head 100. This may prevent loss of fastener 132. Referring back to FIG. 4, in the installed position, a portion of fastener 132 may contact a portion of removable weight 116. For example, a bottom portion of a threaded end of fastener 132 may contact a toward portion of body portion 118 in the installed position. Fastener 132 may help retain and/or secure removable weight 116 in the installed position. In the installed position, a bottom portion of a threaded end of fastener 132 may contact a toward portion of body portion 118 which makes contact with an interior surface of golf club head 100 near a heelward end of a bottom portion of weight recess 114 which may help secure removable weight 116 in the installed position. In some embodiments, the toward portion of body portion 118 may be shaped, sized, and/or dimensioned to receive the bottom portion of the threaded end of fastener 132. For example, fastener axis 136 may be perpendicular to the toward portion of body portion 118 in contact with the threaded end of fastener 132 in the installed position. Fastener 132 may include metal, plastic, or other materials, as discussed herein.

[0049] FIGS. 6-8 illustrate golf club head 600 in accordance with one or more embodiments of the presently disclosed technology. Golf club head 600 may be the same or substantially similar to golf club head 100. For example, FIG. 6 is a cross-sectional rear view of golf club head 600 in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2. FIG. 7 is a cross-sectional rear view of golf club head 600 in accordance with one or more embodiments of the presently disclosed technology taken along line A-A' in FIG. 2. FIG. 8 is a perspective view of golf club head 600 in accordance with one or more embodiments of the presently disclosed technology. Each of these figures may provide different views of the same or similar components, and may be discussed together herein. Referring first to FIG. 6, the width of body portion 618 may be smaller than the width of cover portion 620. For example, the width of body portion 618 may be less than about 50% of the width of cover portion 620. In some embodiments, the width of body portion 618 may be less than about 25% of the width of cover portion 620. It should be appreciated that body portion 618 and cover portion 620 may be otherwise shaped, sized, and/or dimensioned without departing from the spirit and scope of the presently disclosed technology. Weight recess 614 may be shaped, sized, and/or dimensioned accordingly to fit body portion 618. For example, a bottom portion of

weight recess 614 may have a smaller width to accommodate a less wide 618, as compared to weight recess 114 and body portion 118 respectively. The rest of golf club head 600, which may include, for example, striking face portion 602, back portion 603, upper blade portion 604, gutter 605, lower muscle portion 606, sole 608, back flange 610, toward sole portion 629, fastener through hole 630, fastener 632, and/or fastener axis 636, may be the same as, or substantially similar to, other golf club heads discussed herein, which may include, for example, striking face portions, back portions, upper blade portions, gutters, lower muscle portions, soles, back flanges, toward sole portions, fastener through holes, fasteners, retaining rings, and/or fastener axes. FIG. 7 and FIG. 8 may provide additional views of weight recess 614.

[0050] FIGS. 9-12 illustrate golf club head 900 in accordance with one or more embodiments of the presently disclosed technology. For example, FIG. 9 is a perspective view of golf club head 900 in accordance with one or more embodiments of the presently disclosed technology. FIG. 10 is a rear view of golf club head 900 in accordance with one or more embodiments of the presently disclosed technology. FIG. 11 is a cross-sectional side view of golf club head 900 in accordance with one or more embodiments of the presently disclosed technology taken along line B-B' in FIG. 10. FIG. 12 is a perspective exploded view of golf club head 900 in accordance with one or more embodiments of the presently disclosed technology. Each of these figures may provide different views of the same or similar components, and may be discussed together herein. Golf club head 900, which may include, for example, striking face portion 902, back portion 903, upper blade portion 904, gutter 905, lower muscle portion 906, sole 908, and/or back flange 910 may be the same as, or substantially similar to, other golf club heads discussed herein, which may include, for example, striking face portions, back portions, upper blade portions, gutters, lower muscle portions, soles, and/or back flanges. Referring first to FIG. 9, back flange 910 may include fastener through hole 930. Fastener through hole 930 may not be threaded. In some embodiments, fastener through hole 930 may be fully or partially threaded. Referring to FIG. 10, fastener through hole 930 may be centered along a width of removable weight 916. In some embodiments, fastener through hole 930 may be centered on a CG of removable weight 916 or a geometric center of removable weight 916, though it should be appreciated that fastener through hole 930 may be otherwise located, shaped, sized, and/or dimensioned without departing from the spirit and scope of the presently disclosed technology. As illustrated, fastener through hole 930 may intersect or overlap with weight recess 914. For example, a continuous shape may be formed by fastener through hole 930 and weight recess 914.

[0051] Referring to FIG. 11, in the installed position, removable weight 916 may be substantially flush with surrounding regions of golf club head 900. For example, removable weight 916 may be flush with surrounding surfaces, including gutter 905, back flange 910, and/or sole 908 in the installed position. Removable weight 916 may include multiple surfaces. For example, from a side view, a first portion of removable weight 916 may extend partially faceward in the installed position, and a second portion of removable weight 916 may extend partially backward in the installed position. In one example, removable weight 916 may be flat on an exterior surface in the installed position

and angle substantially downward on a backward surface, angle backward and downward on the backward surface, angle faceward and downward on a downward surface, angle forward and upward on a forward surface, angle forward and upward on the forward surface, and angle upward and backward to the exterior surface. It should be appreciated that some or all of these angled surfaces may be curved without departing from the spirit and scope of the presently disclosed technology. It should also be appreciated that removable weight **916** may be shaped, sized, and/or dimensioned without departing from the spirit and scope of the presently disclosed technology.

[0052] Referring to FIG. 12, golf club head **900** may include removable weight **916**, which may be differently shaped, sized, and/or dimensioned than other removable weights discussed herein. For example, body portion **918** may be shorter in height than other body portions discussed herein. A bottom of body portion **918** may be more rounded than other bottoms of body portions discussed herein. In embodiments, the width of body portion **918** may be less than about 95% of the width of cover portion **920**. The width of body portion **918** may be larger than other widths of body portion discussed herein.

[0053] Removable weight **916** may include weight through hole **938**. Weight through hole **938** may receive a portion of fastener **932**. For example, weight through hole **938** may receive a threaded portion of fastener **932**. Weight through hole **938** may be threaded to engage the threaded portion of fastener **932**. Fastener through hole **930** may allow access to, or otherwise communicate with, weight through hole **938**. Fastener through hole **930** may be the same circumference or size as weight through hole **938**. In some embodiments, fastener through hole **930** may have a greater circumference or size as compared to weight through hole **938**. Referring back to FIG. 10, additional views of weight recess **914**, fastener through hole **930**, and fastener **932** may be illustrated that may clarify their shapes, though it should be appreciated that these component may be shaped, sized, and/or dimensioned differently without departing from the spirit and scope of the presently disclosed technology. Weight recess **914** may be differently shaped, sized, and/or dimensioned than other weight recesses discussed herein to receive and/or accommodate removable weight **916**.

[0054] Fastener **932** may be smaller than other fasteners discussed herein. For example, fastener **932** may be smaller in height than other fasteners discussed herein. Fastener **932** may have a single circumference throughout fastener **932**. In some embodiments, fastener **932** may be similar to other fasteners discussed herein. Fastener **932** may be threaded throughout its height. A height of fastener **932** may be larger than the height of weight through hole **938**. This may allow a bottom of fastener **932** to engage an interior surface of golf club head **900** near a faceward portion of weight recess **914** to secure removable weight **916** to golf club head **900**. In embodiments, a top of fastener **932** may engage both a threaded portion of fastener through hole **930** and weight through hole **938** to secure removable weight **916** to golf club head **900**. In some embodiments, the height of weight through hole **938** may be bigger or smaller than the height of fastener **932**. Referring back to FIG. 11, fastener axis **936** may run through geometric centers of fastener through hole **930** and weight through hole **938**. For example, fastener axis **936** may be perpendicular to an exterior surface of back

flange **910**. Fastener through hole **930** and weight through hole **938** may be aligned. In some embodiments, fastener through hole **930** and weight through hole **938** may have the same circumference. In embodiments, fastener through hole **930** may have a wider circumference than the circumference of weight through hole **938**.

[0055] FIGS. 13-16 illustrate golf club head **1300** in accordance with one or more embodiments of the presently disclosed technology. For example, FIG. 13 is a rear view of golf club head **1300** in accordance with one or more embodiments of the presently disclosed technology. FIG. 14 is a perspective exploded view of golf club head **1300** in accordance with one or more embodiments of the presently disclosed technology. FIG. 15 is a cross-sectional side view of golf club head **1300** in accordance with one or more embodiments of the presently disclosed technology taken along line C-C' in FIG. 13. FIG. 16 is a cross-sectional side view of golf club head **1300** in accordance with one or more embodiments of the presently disclosed technology taken along line C-C' in FIG. 13. Each of these figures may provide different views of the same or similar components, and may be discussed together herein. Golf club head **1300**, which may include, for example, striking face portion **1302**, back portion **1303**, upper blade portion **1304**, gutter **1305**, lower muscle portion **1306**, sole **1308**, and/or back flange **1310** may be the same as, or substantially similar to, other golf club heads discussed herein, which may include, for example, striking face portions, back portions, upper blade portions, gutters, lower muscle portions, soles, and/or back flanges. Referring first to FIG. 13, golf club head **1300** may include removable weight **1316**. A width of removable weight **1316** may be less than about 50% of widths of upper blade portion **1304**, gutter **1305**, lower muscle portion **1306**, and/or sole **1308**. In some embodiments, the width of removable weight **1316** may be less than about 25% of the widths of upper blade portion **1304**, gutter **1305**, lower muscle portion **1306**, and/or sole **1308**. Removable weight **1316** may be differently shaped, sized, and/or dimensioned than other removable weights discussed herein. Weight recess **1314** may be shaped, sized, and/or dimensioned to fit and/or accommodate removable weight **1316**, as discussed herein.

[0056] Golf club head **1300** may include fastener through hole **1330**. For example, back flange **1310** may include fastener through hole **1330**. Fastener through hole **1330** may not be threaded. In some embodiments, fastener through hole **1330** may be fully or partially threaded. Fastener through hole **1330** may be centered along a width of removable weight **1316**. In some embodiments, fastener through hole **1330** may be centered on a CG of removable weight **1316** or a geometric center of removable weight **1316**, though it should be appreciated that fastener through hole **1330** may be otherwise located, shaped, sized, and/or dimensioned without departing from the spirit and scope of the presently disclosed technology. Referring to FIG. 15, in the installed position, removable weight **1316** may protrude beyond surrounding surfaces of golf club head **1300**, including, for example, gutter **1305**, back flange **1310**, and/or sole **1308** in the installed position. The protruded cover portion **1320** may allow a user to more easily handle removable weight **1316**, including removal and installation.

[0057] Referring to FIG. 14, back portion **1303** may include weight recess **1314**. Upper blade portion **1304**, gutter **1305**, lower muscle portion **1306**, and/or sole **1308**

may include portions of weight recess **1314**. Fastener through hole **1330** may be separated from weight recess **1314**. For example, there is no intersection and/or overlap between an opening created by fastener through hole **1330** and an opening created by weight recess **1314**. Fastener **1332** may be the same as, or substantially similar to fasteners discussed herein.

[0058] Removable weight **1316** may include body portion **1318**, cover portion **1320**, and weight through hole **1338**. Removable weight **1316** may be curved. For example, referring to FIG. **15**, in a side view, a bottom of removable weight **1316** may curve faceward toward the middle of removable weight **1316** and curve backward toward the top of removable weight **1316**. In this side view, removable weight **1316** may appear u-shaped. Body portion **1318** may have a larger height than cover portion **1320**. Referring back to FIG. **14**, body portion **1318** may have a same width as cover portion **1320**.

[0059] Referring back to FIG. **15**, fastener axis **1336** may go through a geometric center of fastener through hole **1330** and weight through hole **1338**. Fastener through hole **1330** may have the same circumference of weight through hole **1338**. Fastener axis **1336** may run perpendicular to the exterior surface of back flange **1310**. Fastener axis **1336** may run along geometric centers of fastener through hole **1330** and weight through hole **1338**. Fastener through hole **1330** and weight through hole **1338** may be aligned such that both geometric centers are along the same axis, such as, for example, fastener axis **1336**. In some embodiments, fastener through hole **1330** and weight through hole **1338** may have the same circumference. In embodiments, fastener through hole **1330** may have a wider circumference than the circumference of weight through hole **1338** or vice versa.

[0060] Referring to FIG. **16**, a shape of weight recess **1314** may be more apparent in this view. Weight recess **1314** may be curved to match the shape, size, and/or dimension of removable weight **1316**. In embodiments, a bottom of weight recess **1314** may be larger from a back of weight recess **1314** to a front of weight recess **1314** at a bottom than at the top of weight recess **1314** when measured perpendicular from one of the side walls in weight recess **1314**.

[0061] Other than in at least some of the operating examples, or unless otherwise expressly specified, all of the numerical ranges, amounts, values and percentages such as those for amounts of materials, moment of inertias, center of gravity locations, loft, angles, various ratios, and others in the aforementioned portions of the specification may be read as if prefaced by the word “about” even though the term “about” may not expressly appear in the value, amount, or range. Accordingly, unless indicated to the contrary, the numerical parameters set forth in the above specification and appended claims are approximations that may vary depending upon the desired properties sought to be obtained by the presently disclosed technology. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should at least be construed in light of the number of reported significant digits and by applying ordinary rounding techniques.

[0062] Notwithstanding that the numerical ranges and parameters setting forth the broad scope of the presently disclosed technology are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical value, however, inher-

ently contains certain errors necessarily resulting from the standard deviation found in their respective testing measurements. Furthermore, when numerical ranges of varying scope are set forth herein, it is contemplated that any combination of these values inclusive of the recited values may be used.

[0063] While various embodiments of the disclosed technology have been described above, it should be appreciated these are examples only, and not limiting. Likewise, the various figures may depict an example configuration or structure to aid in understanding the features and functionality that can be included in the disclosed technology. The presently disclosed technology is not intended to be restricted to the illustrated example configurations and structures, and the desired features can be implemented with a variety of alternative configurations and structures. It may be apparent to one of skill in the art how alternative embodiments can be implemented to impart the desired features of the presently disclosed technology. Therefore, it will be understood that the appended claims are intended to cover all such modifications and embodiments, which would come within the spirit and scope of the presently disclosed technology.

[0064] While the presently disclosed technology may be described herein in terms of various exemplary embodiments, it should be understood that the various features described in any individual embodiment is not limited to its particular embodiment, and can be applied, whether alone or in combinations with features of other embodiments, to another embodiment, whether or not such an embodiment is described herein or described as part of a single embodiment. Thus, the breadth and scope of the presently disclosed technology should not be limited to any of the above-described exemplary embodiments.

[0065] Words, phrases, and their variations that are used herein, unless otherwise expressly stated, should be construed as open ended, not as limiting. For example, the term “include” should be read to mean “include, without limitation”; the term “example” should be read to mean the following provides exemplary instances, not an exhaustive or limiting list thereof; “a” or “an” should be read as meaning “at least one,” “one or more” etc.; and “traditional,” “normal,” and similar terms should not be construed as limiting to a given time period, but should be read to encompass traditional, normal, like technologies that may be known now or at any future point. In addition, references herein to technologies that would be apparent or known to one of ordinary skill in the art includes such technologies that are apparent or known to one of ordinary skill in the art now or at any time in the future.

[0066] The presence of words and phrases such as “one or more,” “at least,” “not limited to,” or other similar phrases shall not be read to necessarily mean that the narrower case is intended in instances where such broadening phrases may be absent. The presence of words such as “first,” “second,” or other similar words shall not be read to mean that there can only be one or two elements.

We claim:

1. A golf club head, comprising:

a striking face portion;

a back portion comprise:

an upper blade portion;

a gutter extending downward from the upper blade portion; and

a lower muscle portion extending downward from the gutter, wherein the lower muscle portion comprises:
 a back flange, wherein the back flange comprises a weight recess; and
 a sole extending backward from a lower portion of the striking face portion to the back flange, wherein the sole comprises a toward sole portion, wherein the toward sole portion comprises a fastener through hole accessible to the weight recess,
 a removable weight to fit into the weight recess, comprising:
 a body portion covered by the sole in an installed position, wherein the body portion fits into a portion of the weight recess; and
 a cover portion to cover the weight recess in the installed position; and
 a fastener to secure the removable weight in the installed position, and wherein a portion of the fastener engages a toward portion of the body portion in the installed position.

2. The golf club head of claim 1, wherein the removable weight comprises a metal.

3. The golf club head of claim 2, wherein the metal comprises one of tungsten, steel, titanium, aluminum, scandium, zinc, nickel, copper, and iron.

4. The golf club head of claim 1, wherein a width of the removable weight is more than about 80% of a width of the back flange.

5. The golf club head of claim 1, wherein a width of the body portion is less than a width of the cover portion.

6. The golf club head of claim 1, wherein a width of the body portion is about 25% of a width of the cover portion.

7. The golf club head of claim 1, wherein a height of the body portion is larger than a height of the cover portion.

8. The golf club head of claim 6, wherein a depth of the body portion is less than a depth of the cover portion.

9. The golf club head of claim 1, wherein the fastener comprises a fastener axis running along a heel-to-toe direction.

10. A golf club head, comprising:
 a striking face portion;
 a back portion comprise:
 an upper blade portion;
 a gutter extending downward from the upper blade portion; and
 a lower muscle portion extending downward from the gutter, wherein the lower muscle portion comprises:
 a back flange, wherein the back flange comprises:
 a weight recess extending into a sole; and
 a fastener through hole accessible to the weight recess; and
 the sole extending backward from a lower portion of the striking face portion to the back flange;
 a removable weight to fit into the weight recess, comprising:
 a weight through hole accessible to the fastener through hole;
 a body portion covered by the sole in an installed position, wherein the body portion fits into a portion of the weight recess; and

a cover portion to cover the weight recess in the installed position; and
 a fastener to secure the removable weight in the installed position via the fastener through hole.

11. The golf club head of claim 10, wherein the removable weight comprises a metal.

12. The golf club head of claim 10, wherein the metal comprises one of tungsten, steel, titanium, aluminum, scandium, zinc, nickel, copper, and iron.

13. The golf club head of claim 10, wherein a width of the removable weight is more than about 80% of a width of the back flange.

14. The golf club head of claim 10, wherein a width of the body portion is less than a width of the cover portion.

15. The golf club head of claim 10, wherein the fastener comprises a fastener axis, and wherein the fastener axis is perpendicular to an exterior surface of the back flange.

16. The golf club head of claim 10, wherein a first portion of the removable weight extends partially faceward in the installed position, and wherein a second portion of the removable weight extends partially backward in the installed position.

17. A golf club head, comprising:
 a striking face portion;
 a back portion comprise:
 an upper blade portion;
 a gutter extending downward from the upper blade portion; and
 a lower muscle portion extending downward from the gutter, wherein the lower muscle portion comprises:
 a back flange, wherein the back flange comprises a weight recess; and
 a sole extending backward from a lower portion of the striking face portion to the back flange, wherein the sole comprises a toward sole portion, wherein the toward sole portion comprises a fastener through hole accessible to the weight recess,
 a removable weight to fit into the weight recess, comprising:
 a body portion covered by the sole in an installed position, wherein the body portion fits into a portion of the weight recess; and
 a cover portion to cover the weight recess in the installed position, wherein a width of the body portion is less than a width of the cover portion;
 wherein a width of the removable weight is more than about 80% of a width of the back flange; and
 a fastener to secure the removable weight in the installed position, and wherein a portion of the fastener engages a toward portion of the body portion in the installed position.

18. The golf club head of claim 17, wherein the body portion comprises a body through hole to engage the first portion of the fastener.

19. The golf club head of claim 17, wherein the removable weight comprises a metal.

20. The golf club head of claim 17, wherein the fastener comprises a fastener axis, and wherein the fastener axis is perpendicular to an exterior surface of the back flange.

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