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

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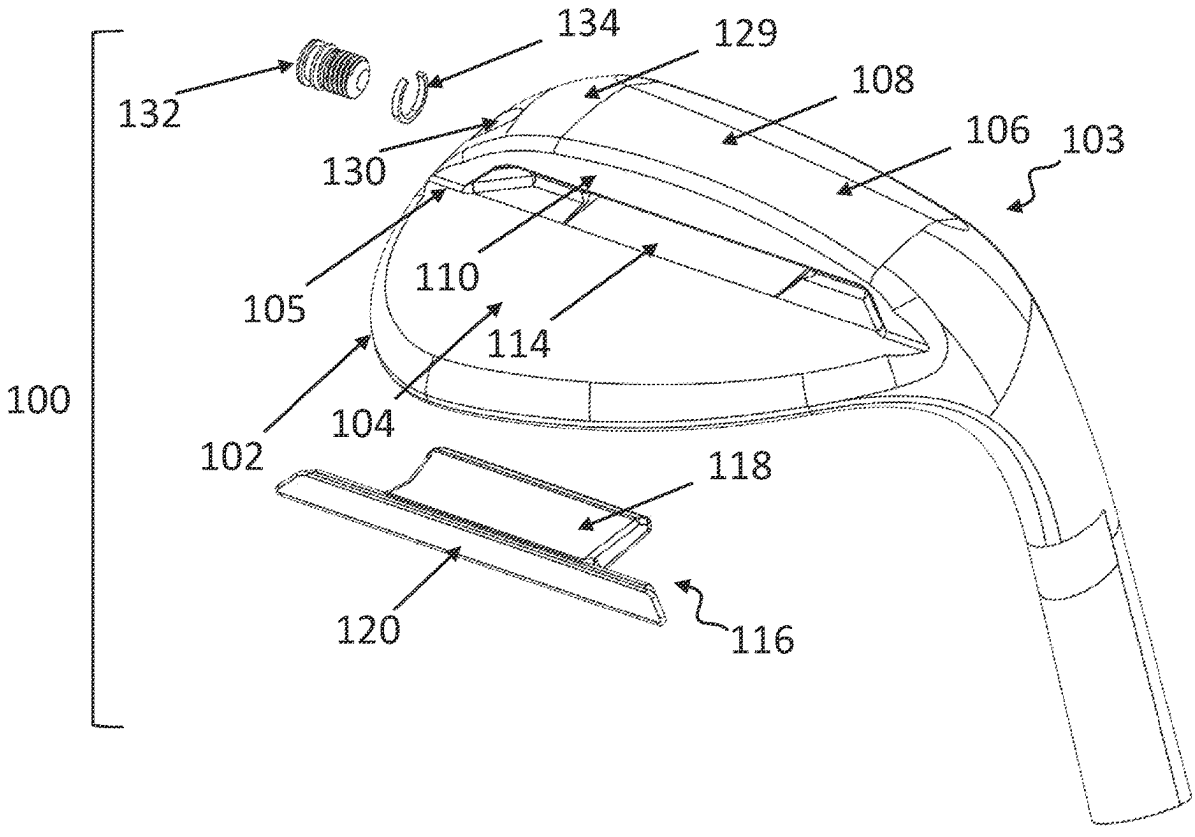
(57) **ABSTRACT**

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.



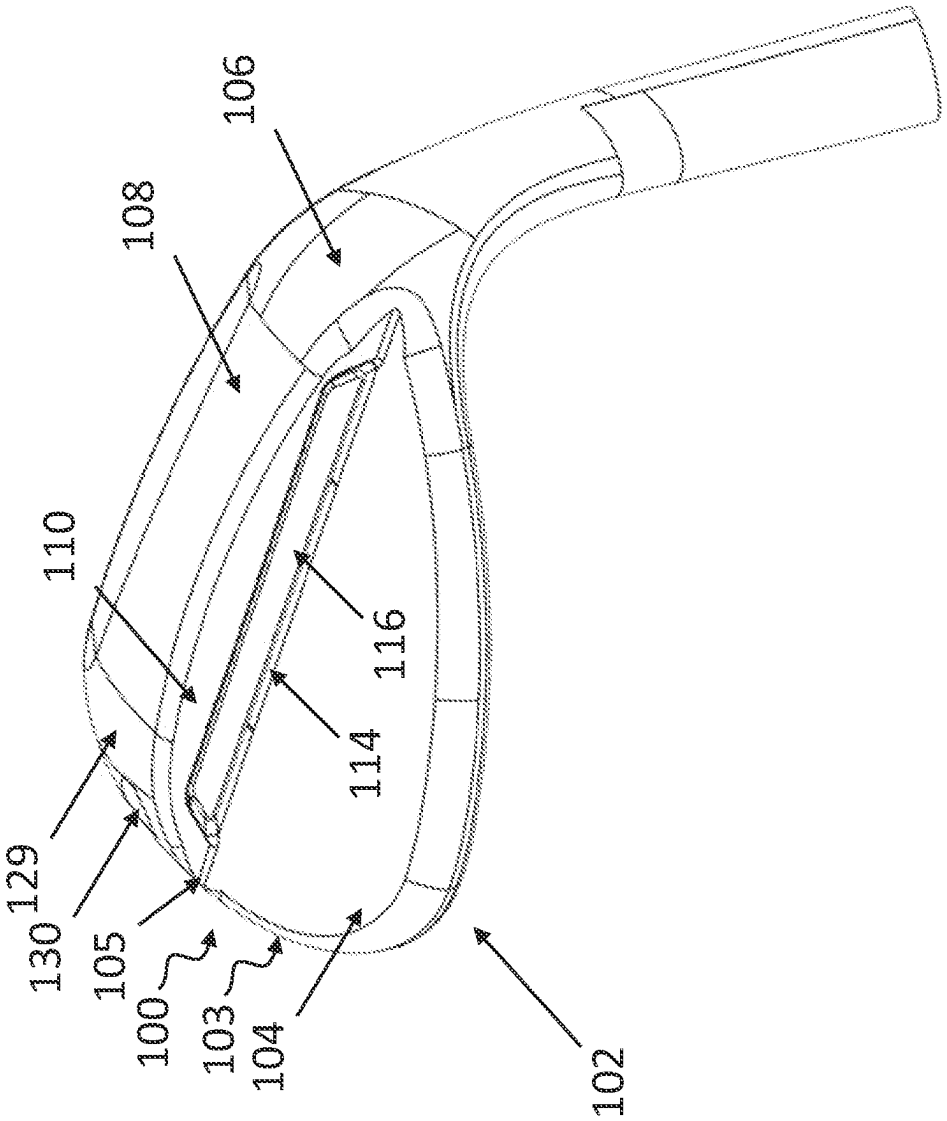


FIG. 1

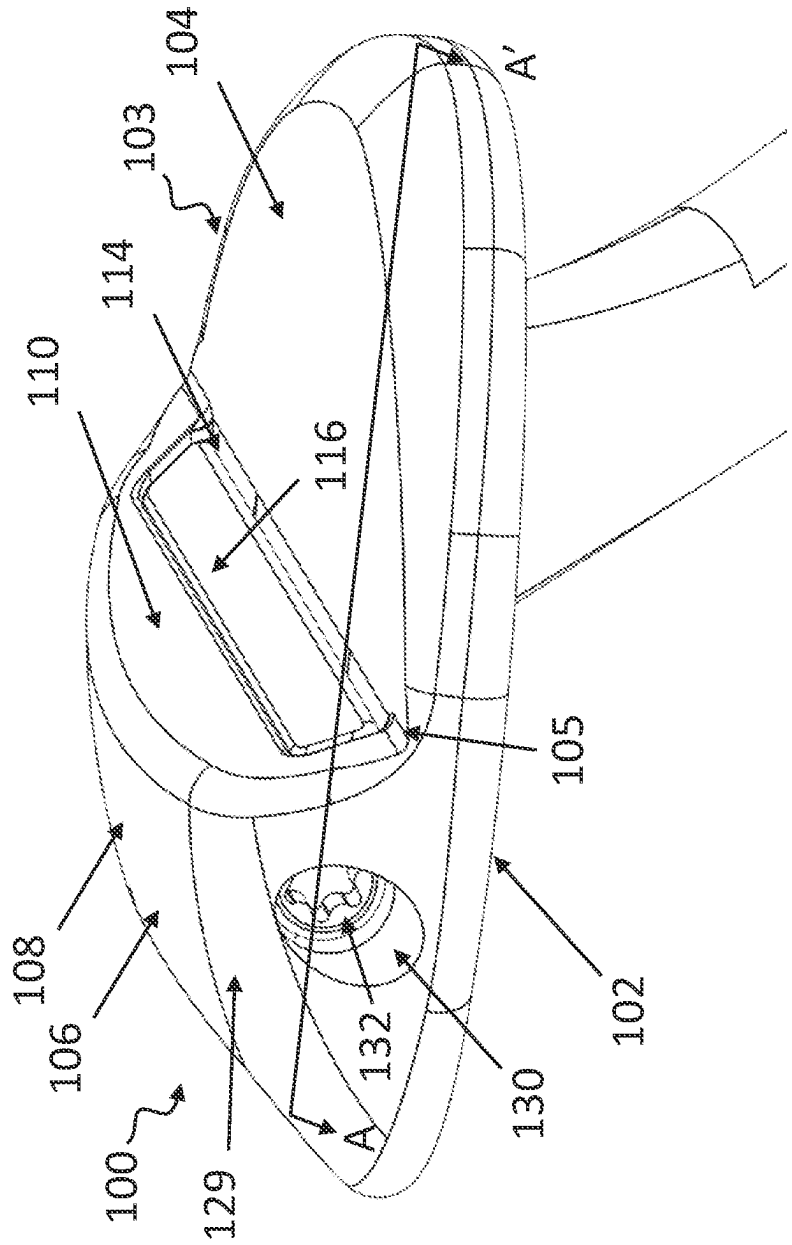


FIG. 2

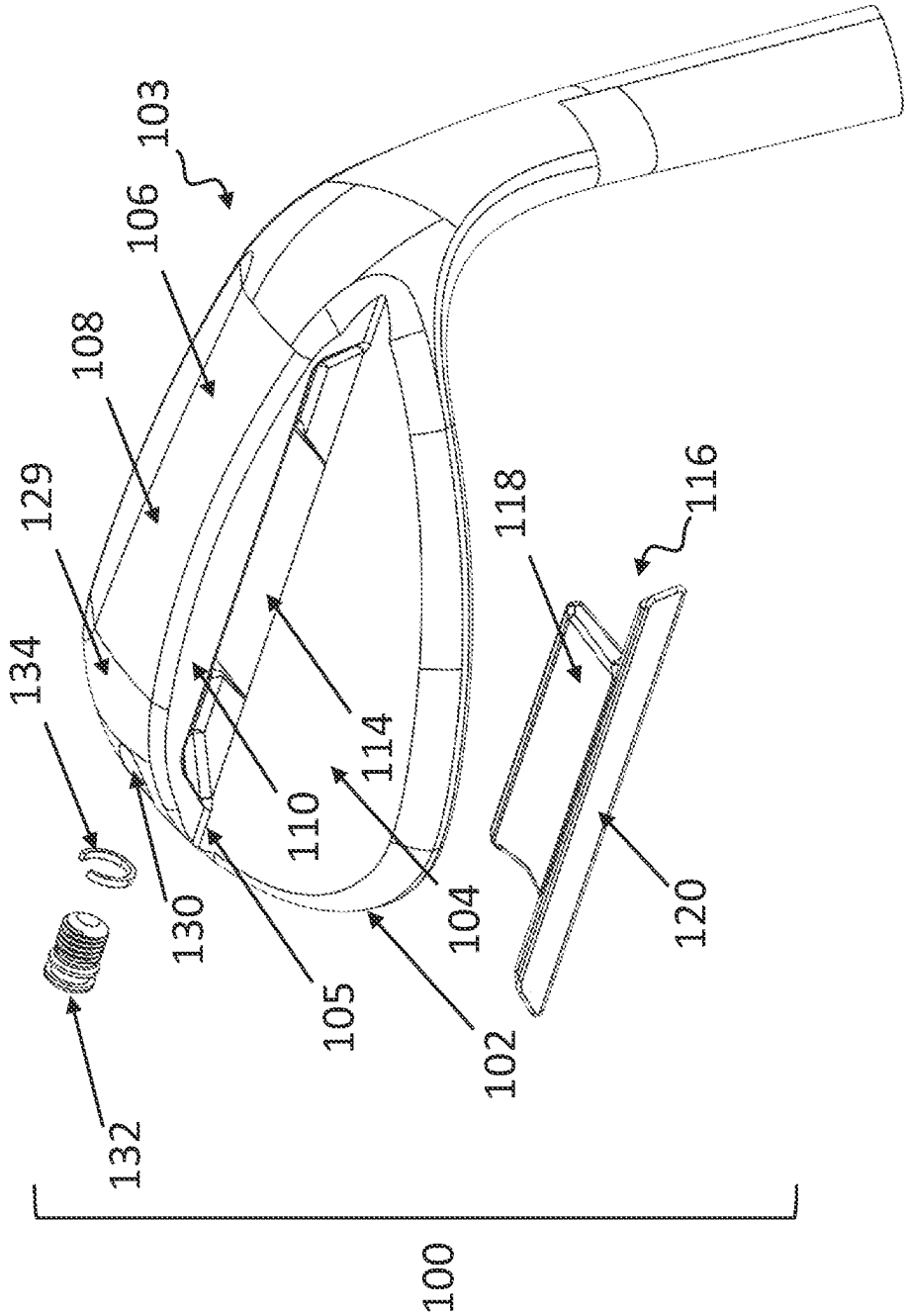


FIG. 3

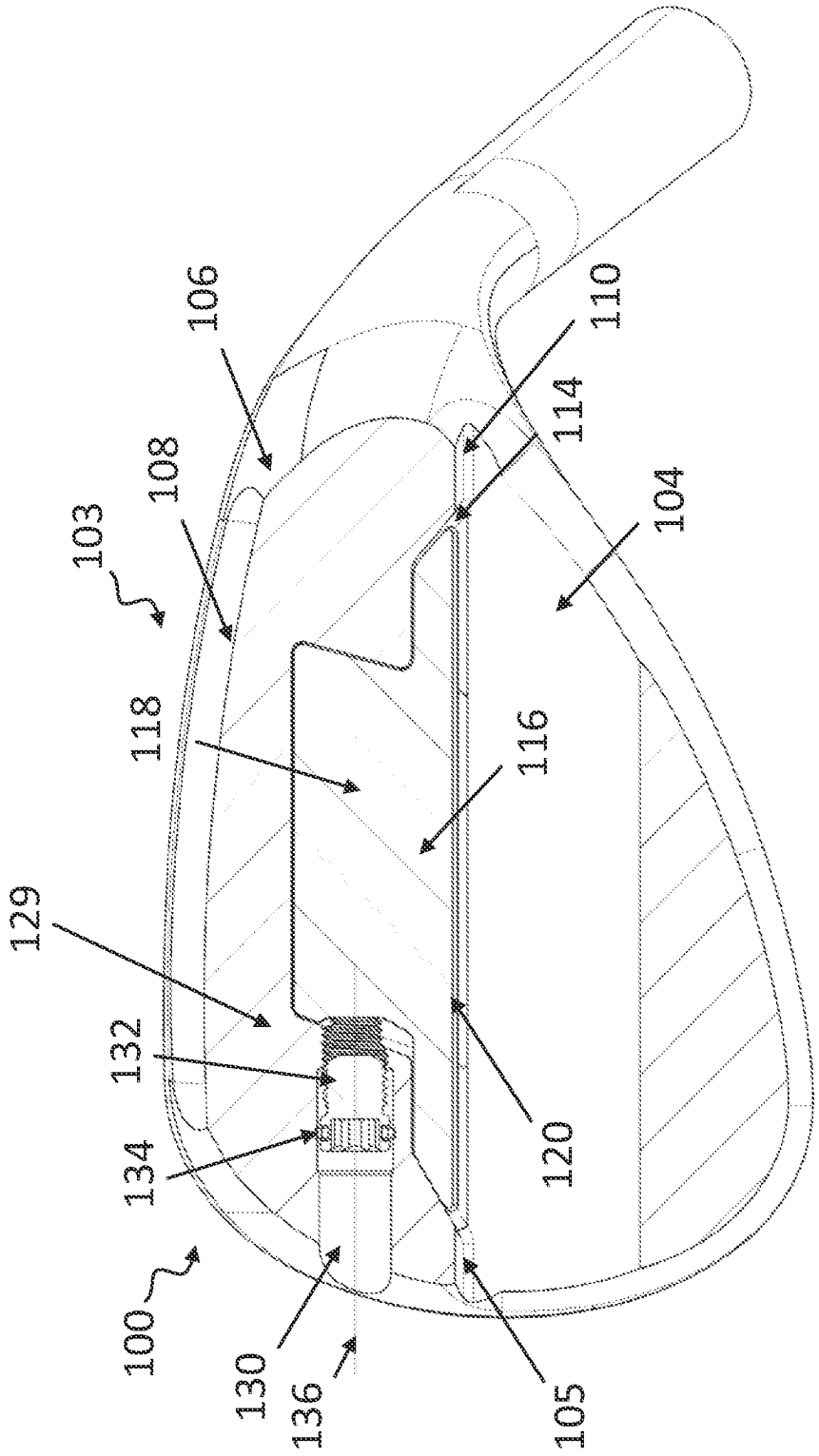


FIG. 4

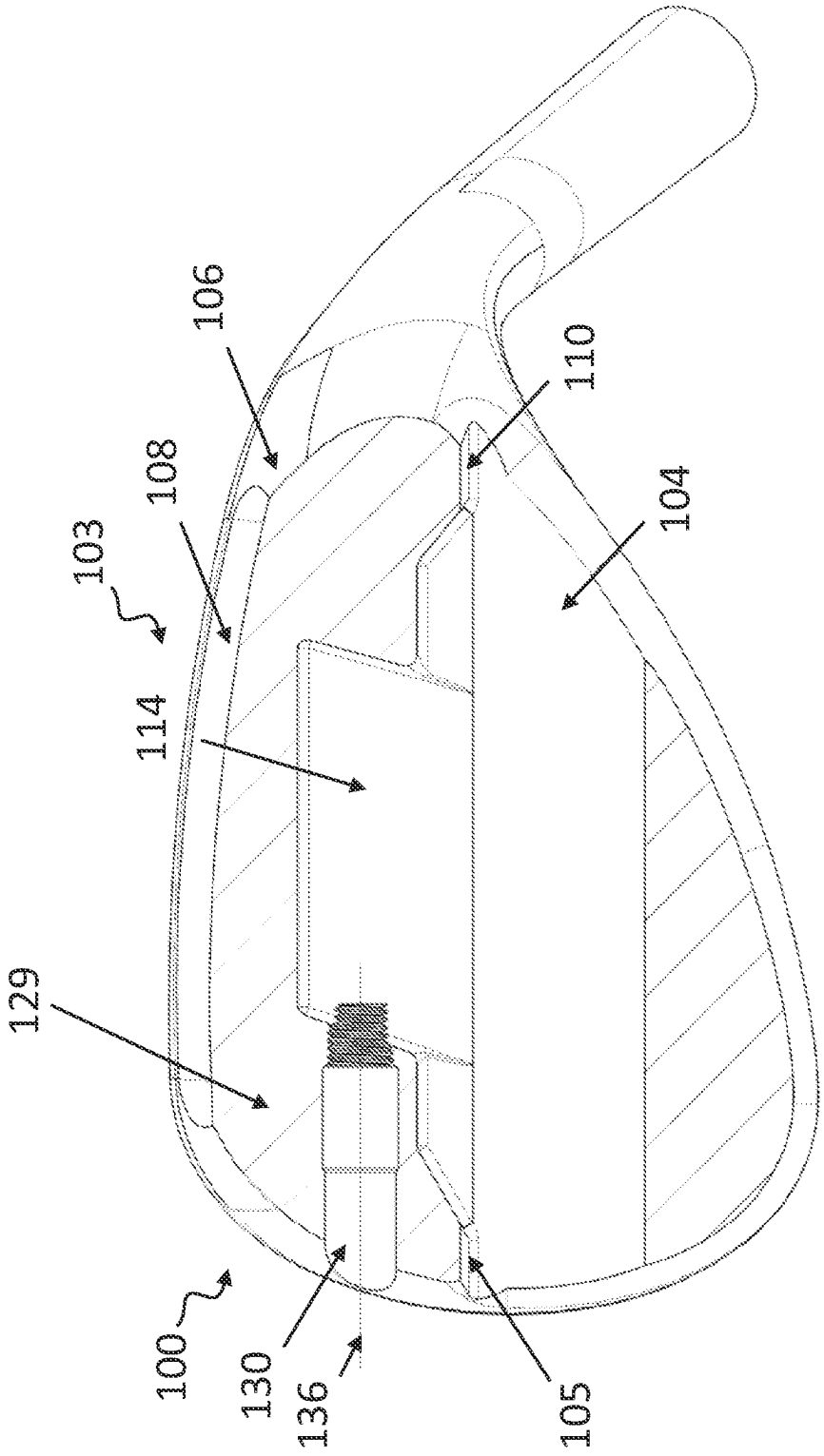


FIG. 5

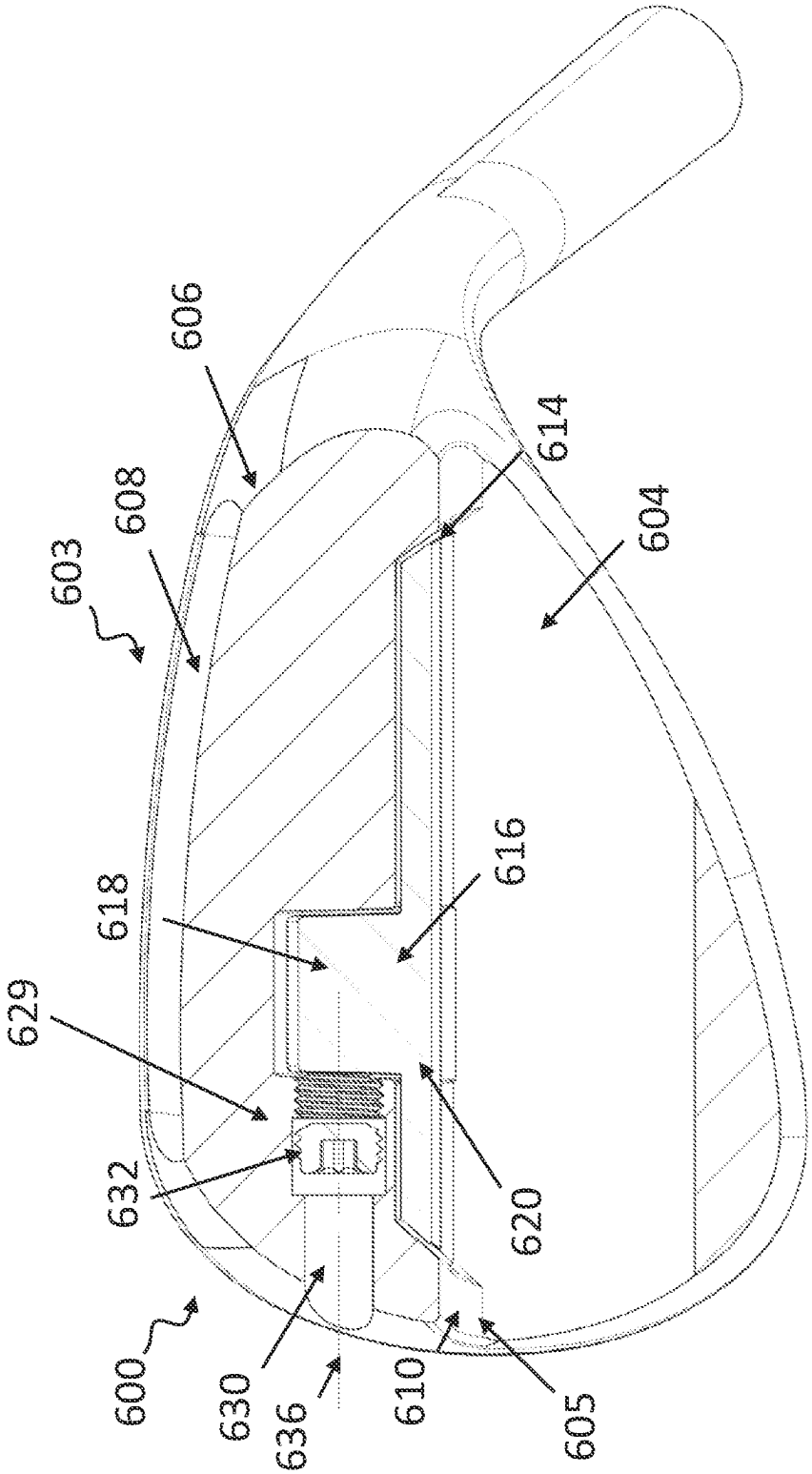


FIG. 6

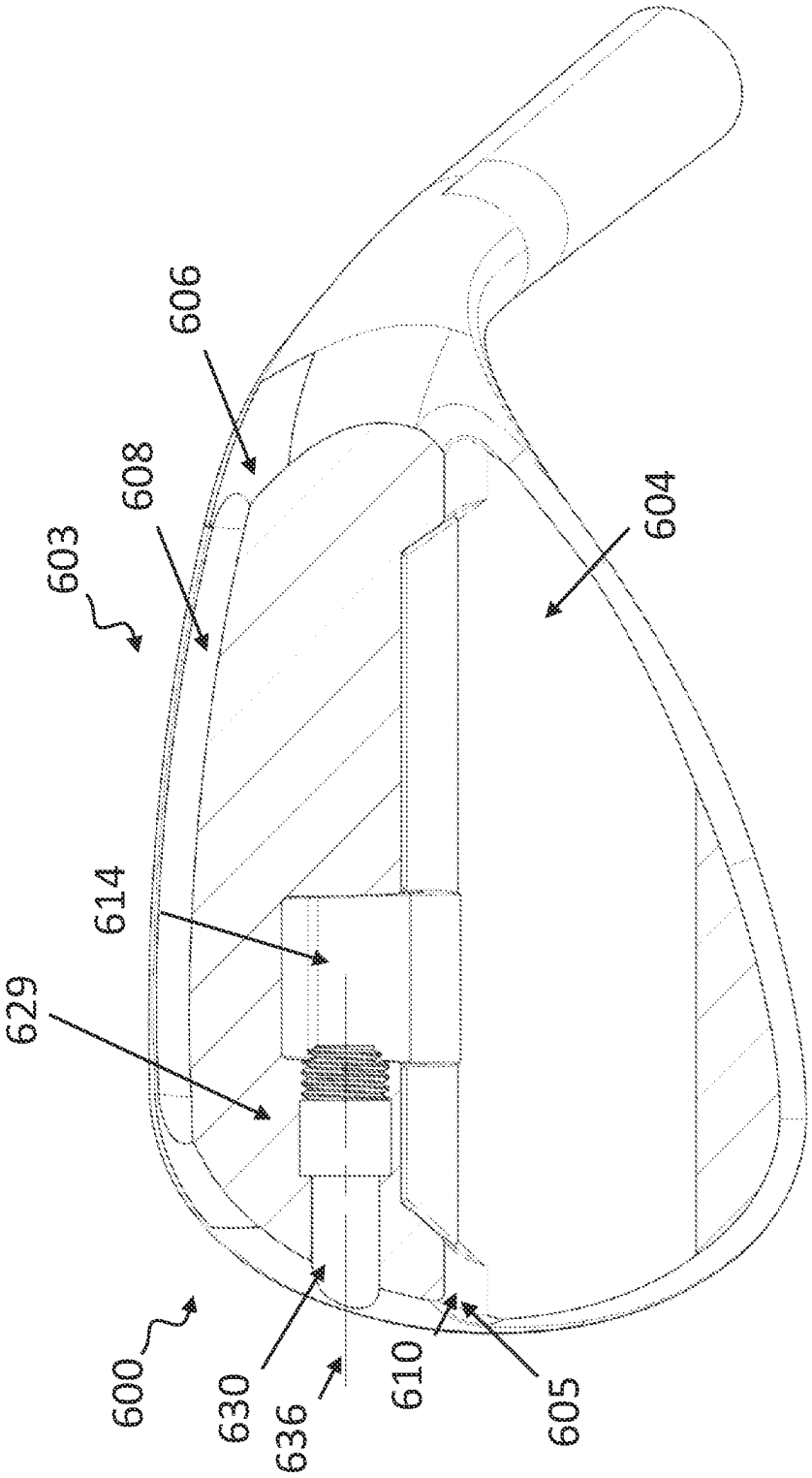


FIG. 7

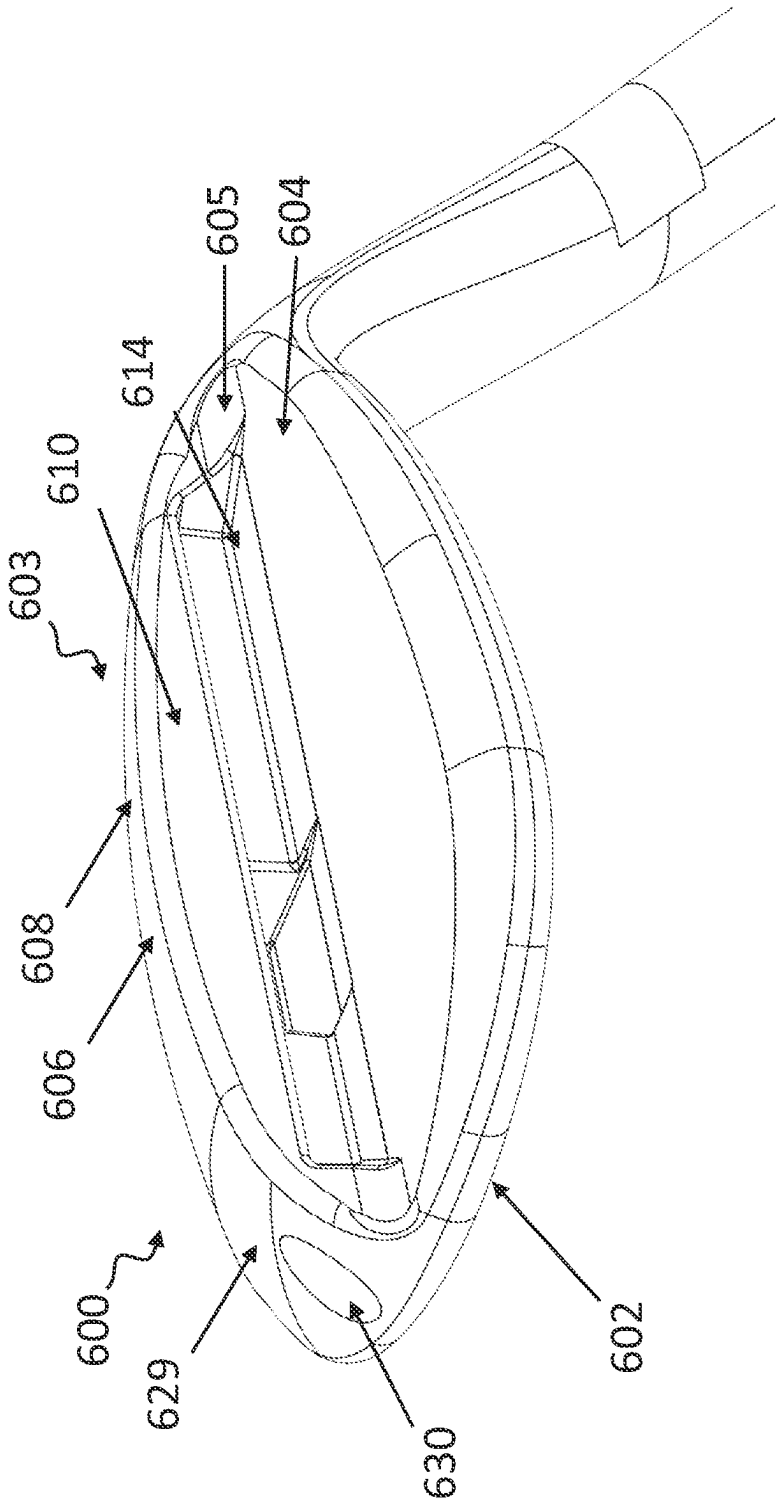


FIG. 8

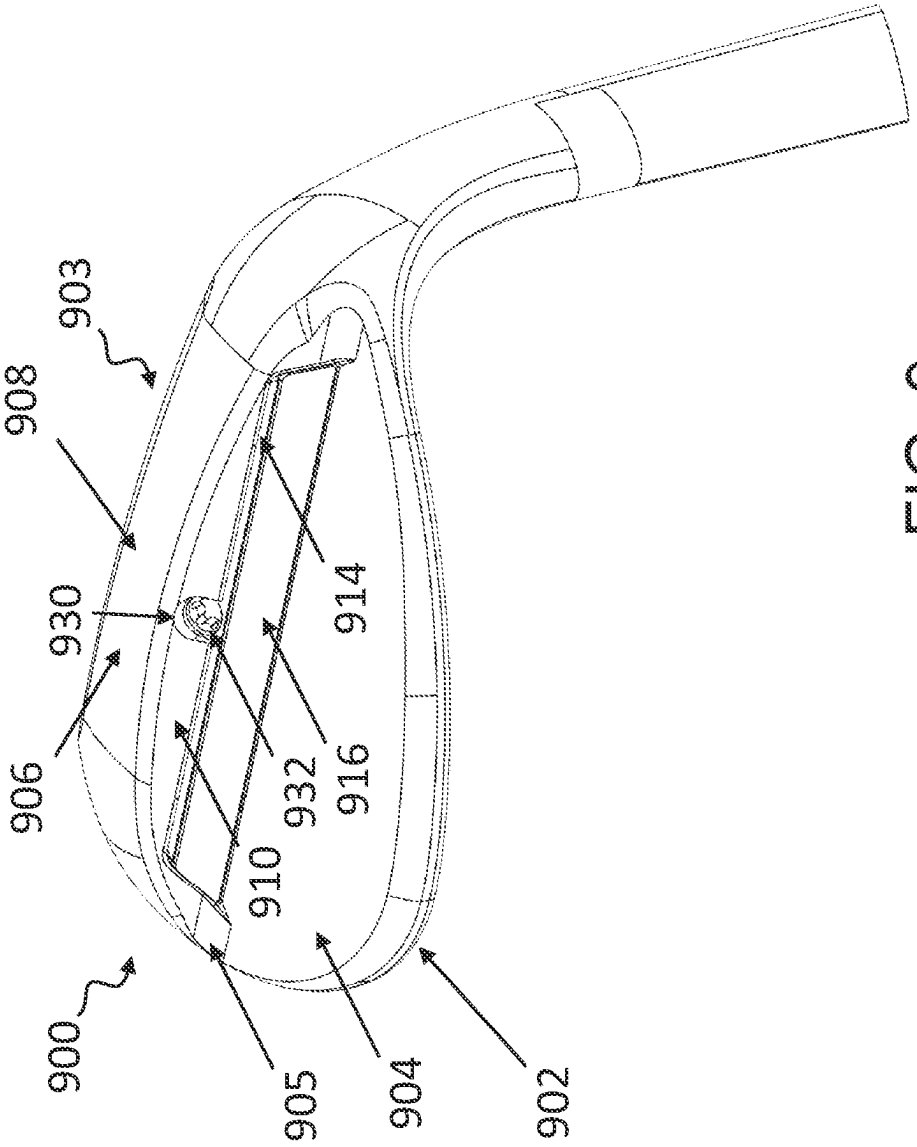


FIG. 9

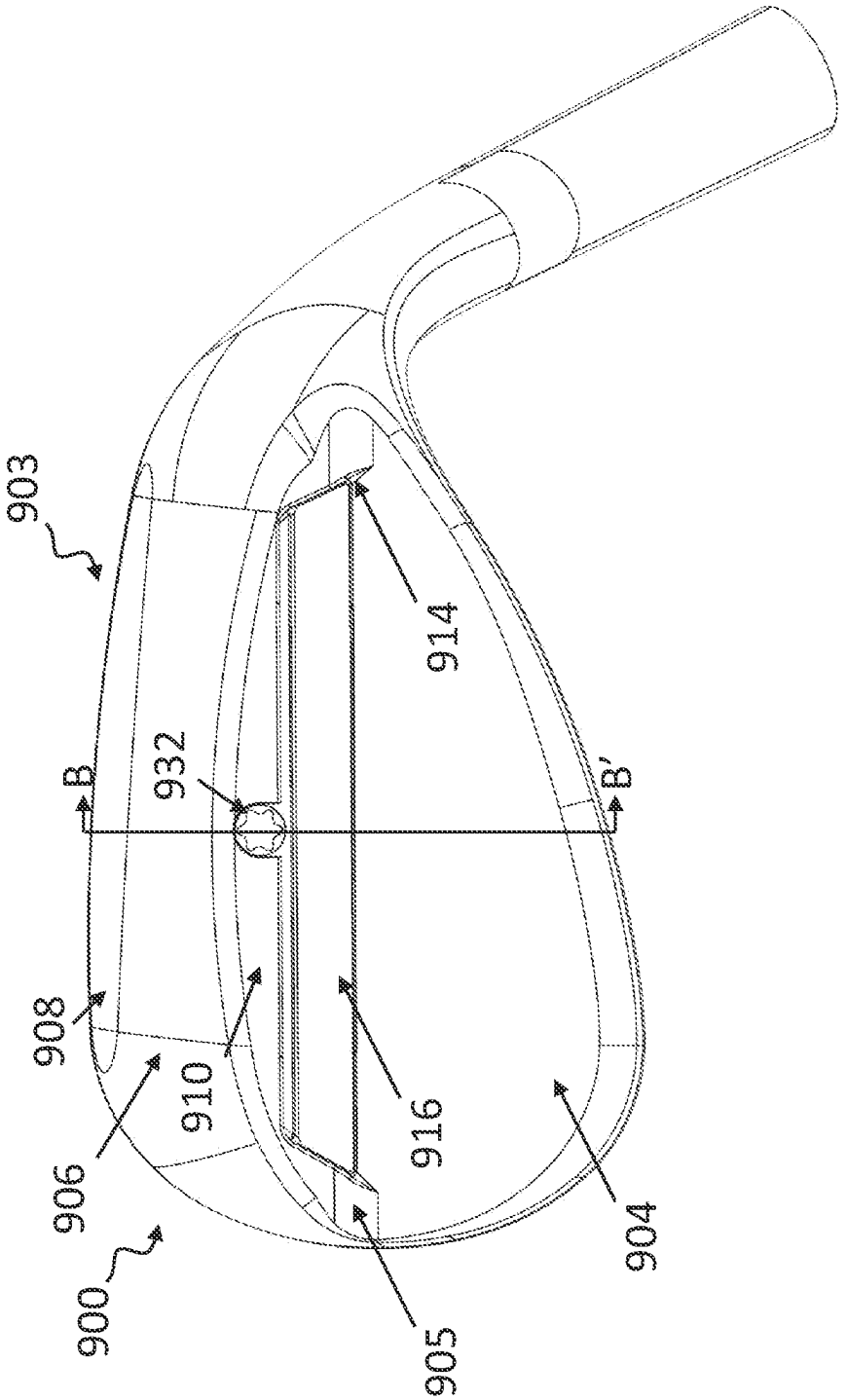


FIG. 10

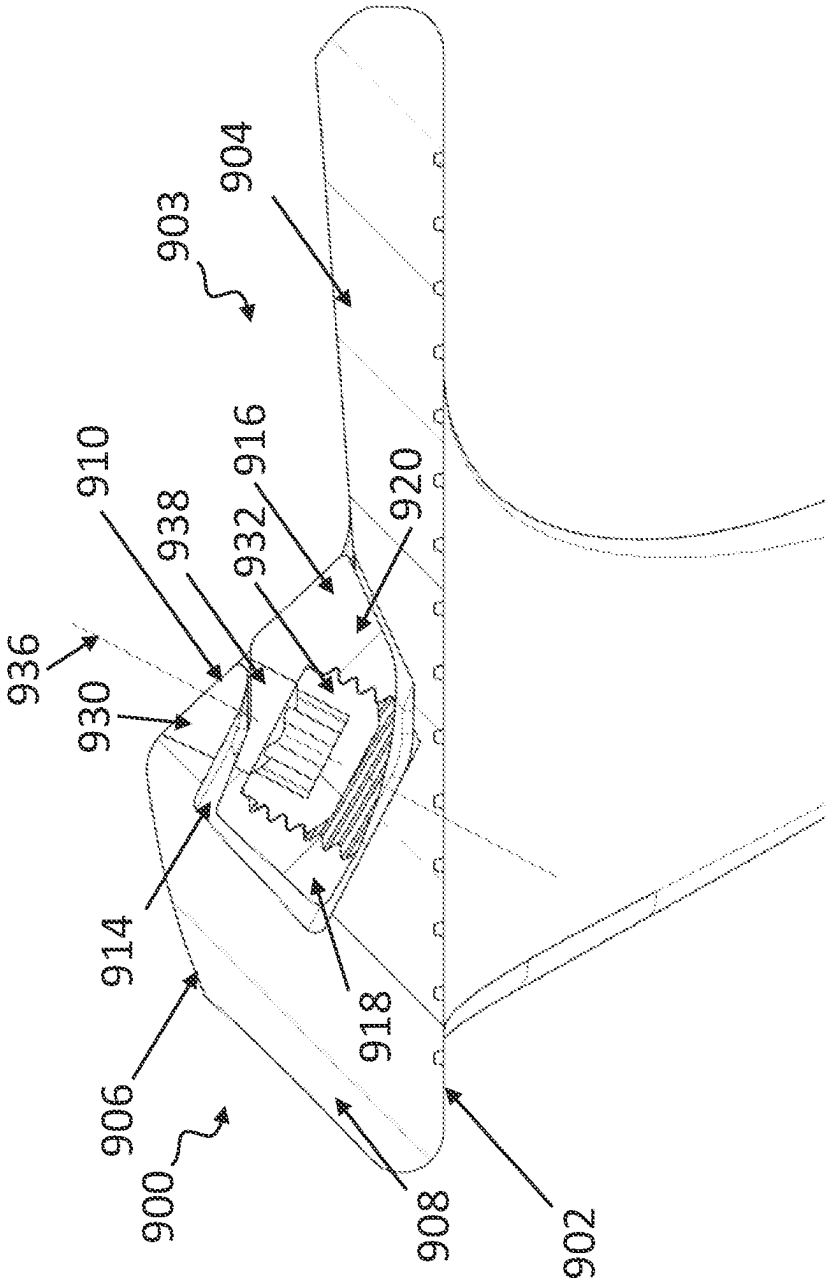


FIG. 11

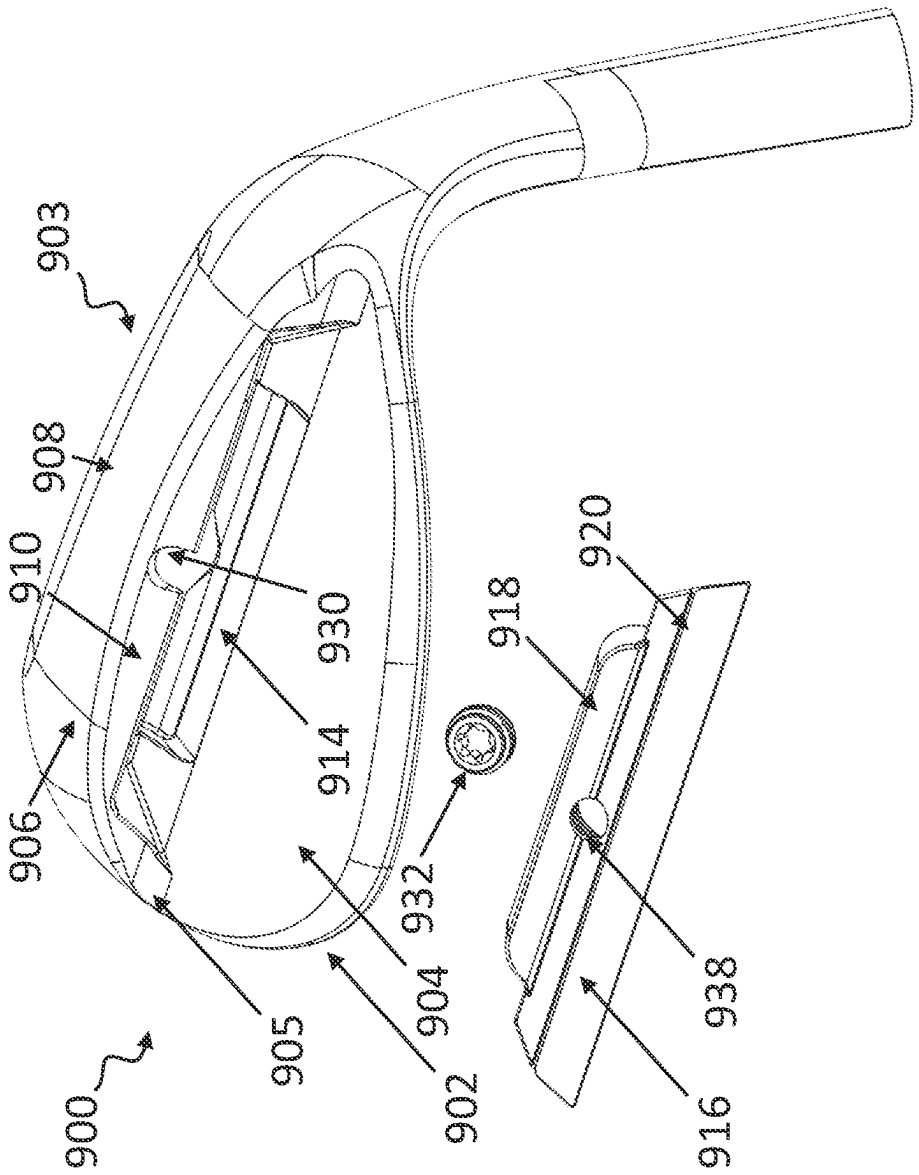


FIG. 12

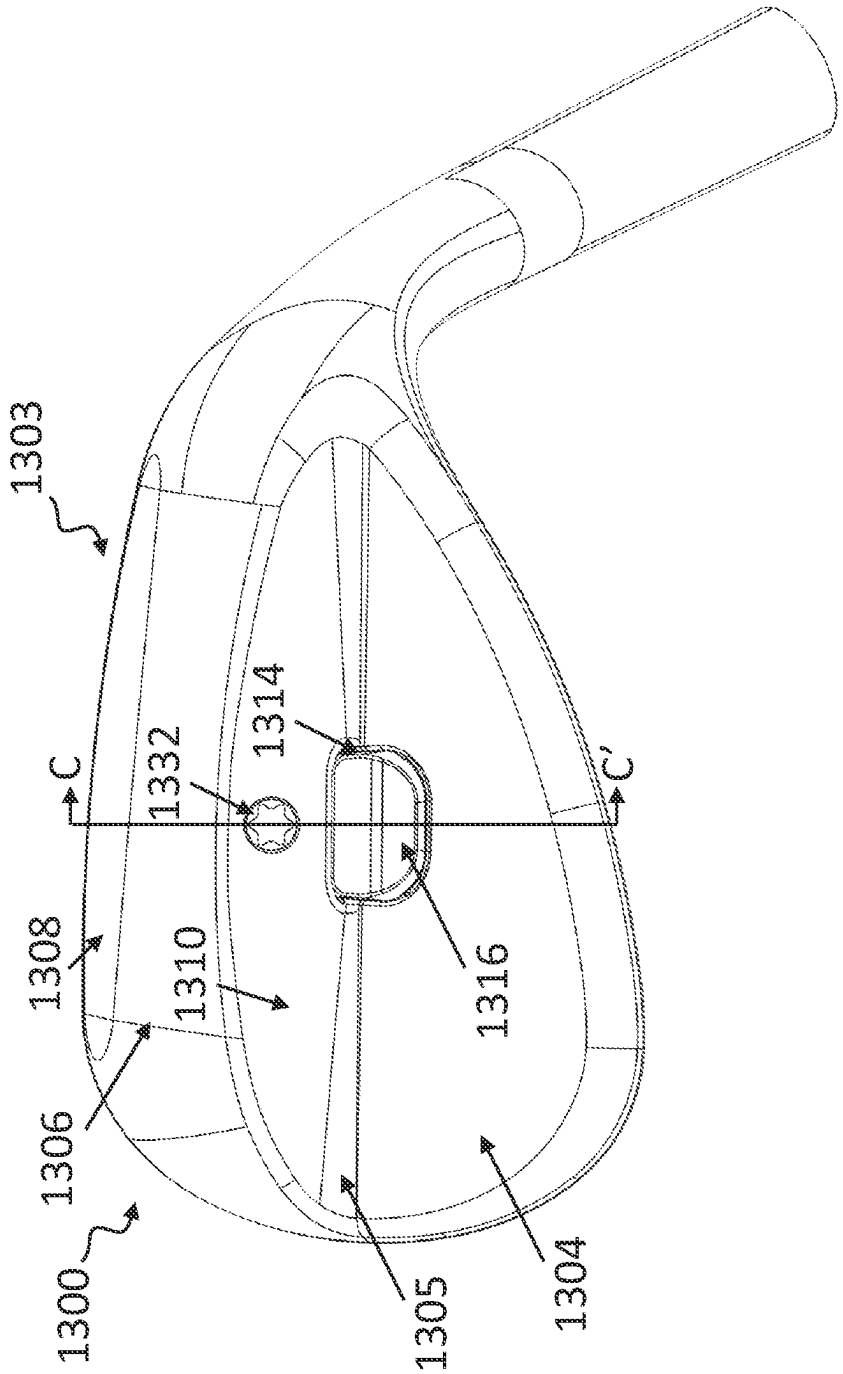


FIG. 13

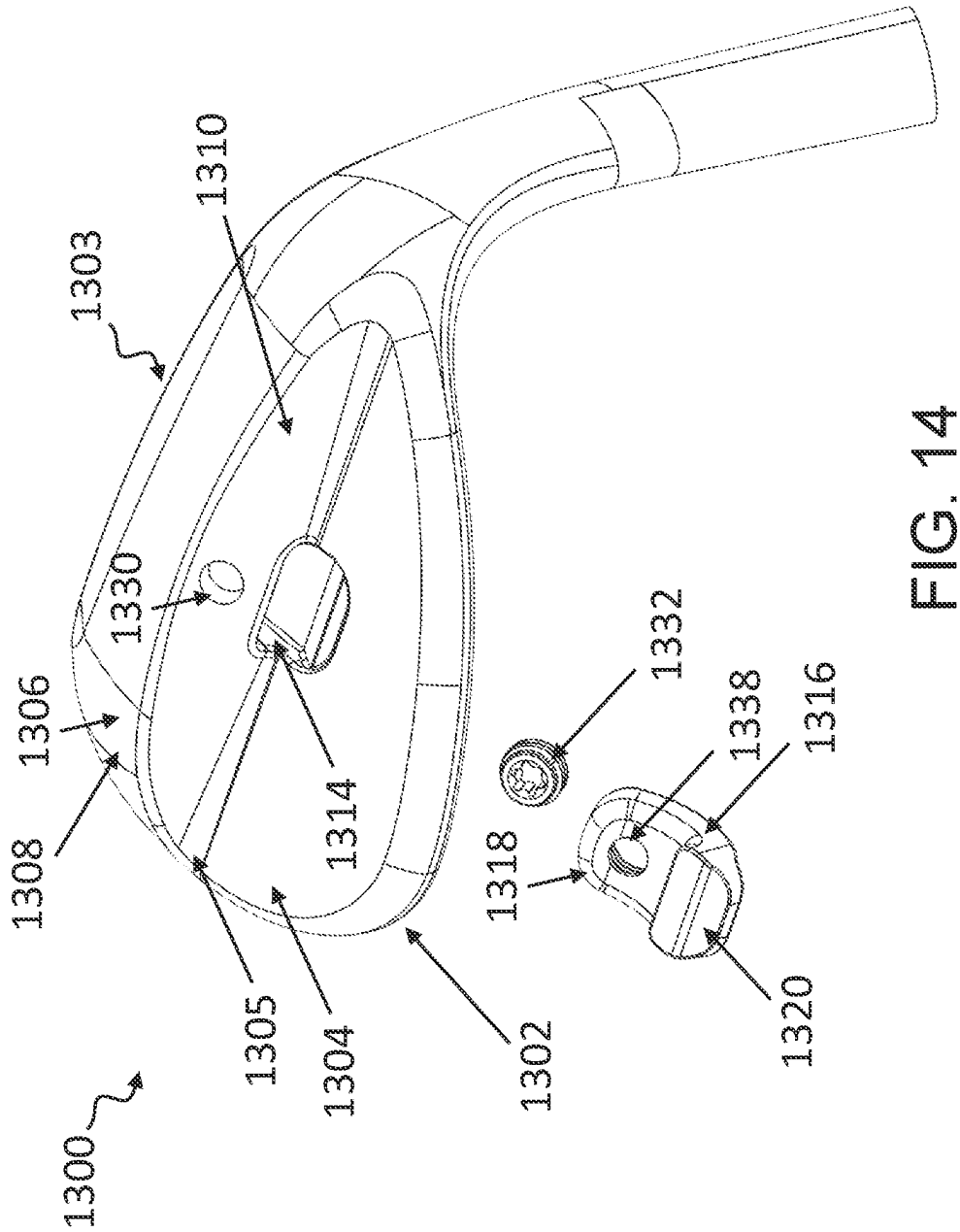

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FIG. 14

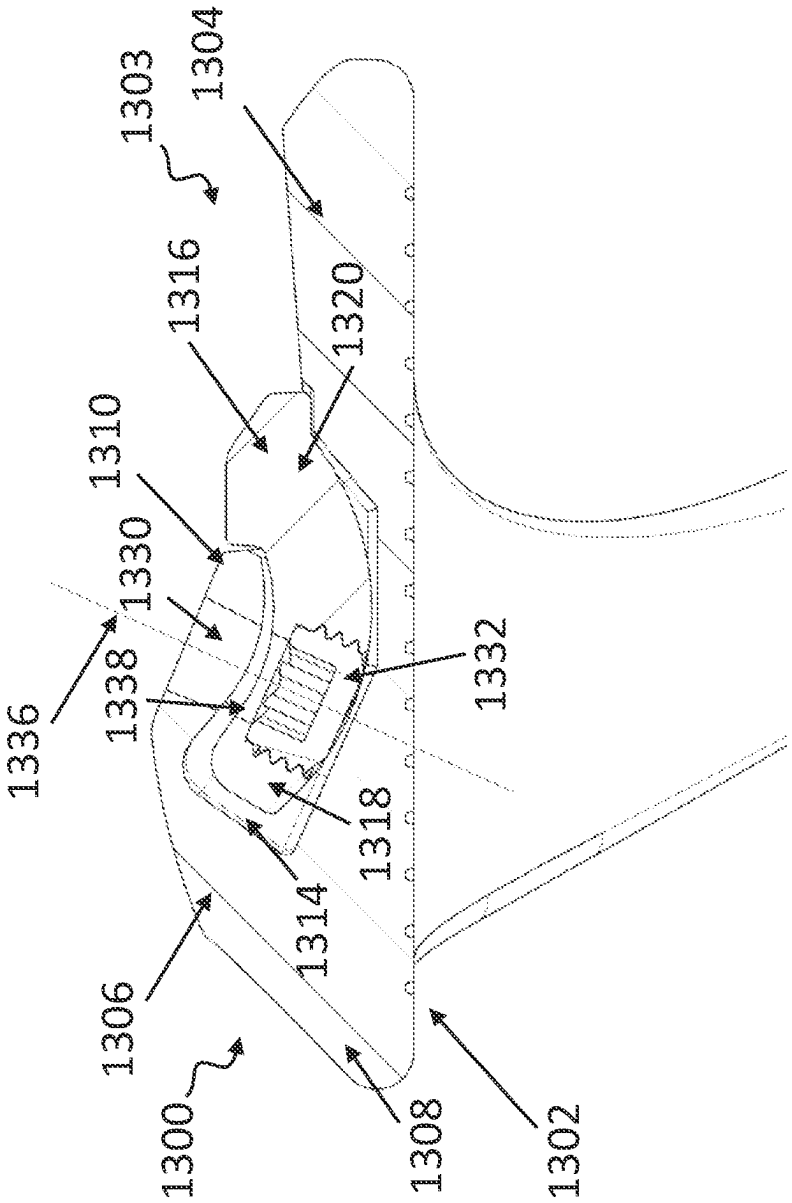
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FIG. 15

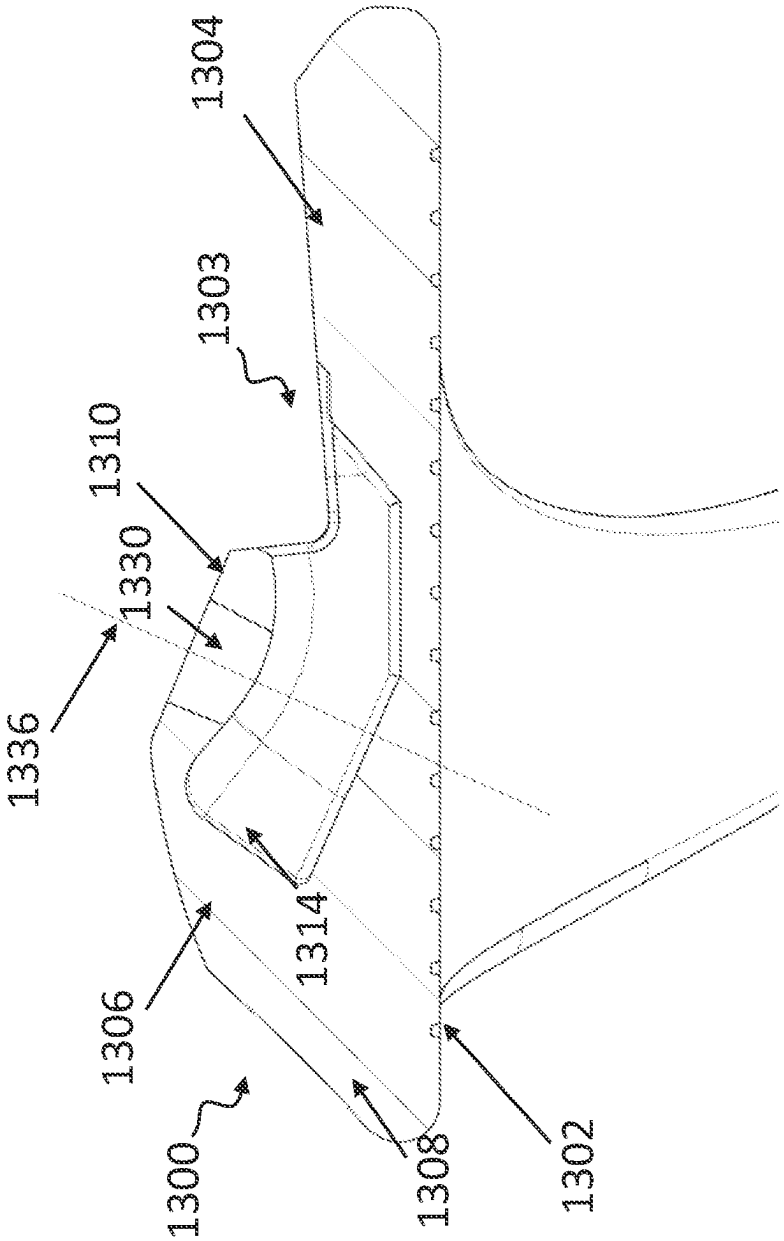

FIG. 16

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 headmay 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 toeward 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 toeward sole portion **129**. Weight recess **114** may be between an exterior surface of sole **108** and striking face portion **102**. Toeward sole portion **129** may refer to a toeward portion of sole **108**. Toeward 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 toeward 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 toeward 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 toeward 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 toeward 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 toeward 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 toeward 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 toeward 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**, toeward 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, toeward 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, inherently 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 toeward sole portion, wherein the toeward 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 toeward 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 toeward sole portion, wherein the toeward 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 toeward 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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