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(54) **VARIABLE BOUNCE HEIGHT CLUB HEADS AND RELATED METHODS**

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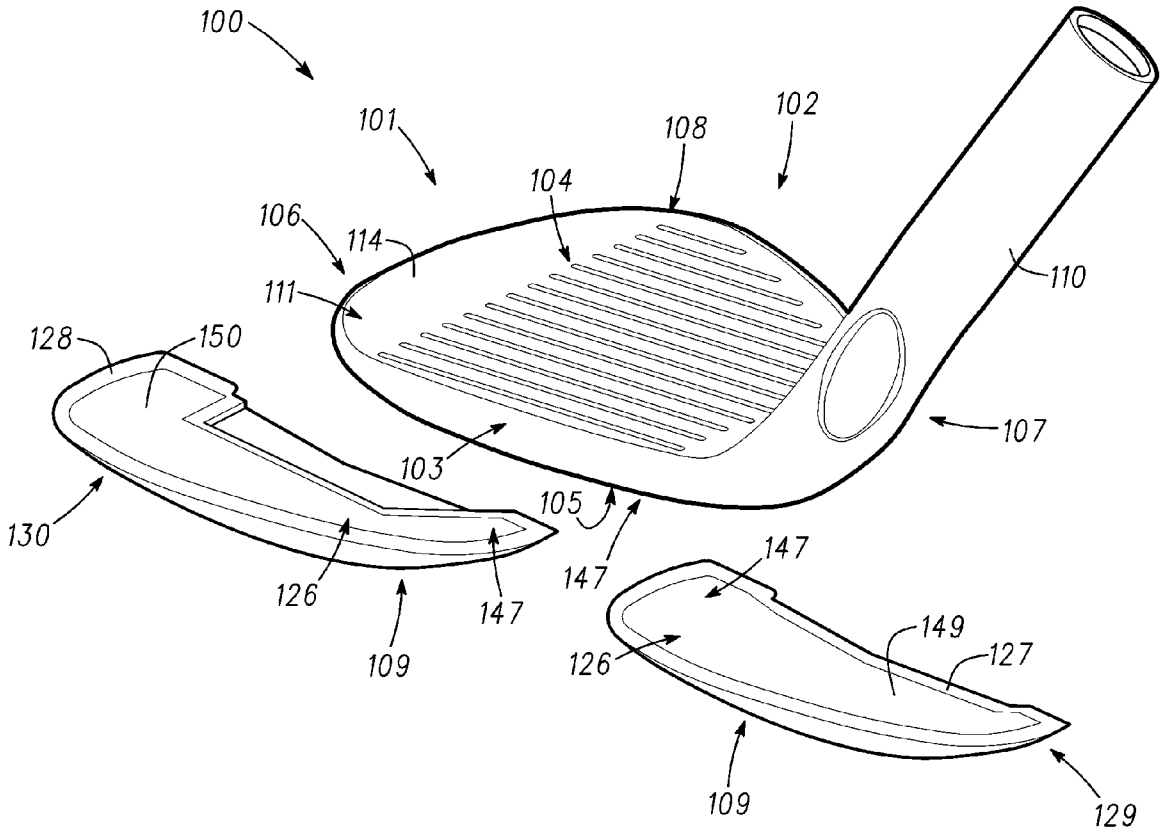
(57) **ABSTRACT**

Some embodiments include a variable bounce height club head. Other embodiments of related club heads and methods are also disclosed.



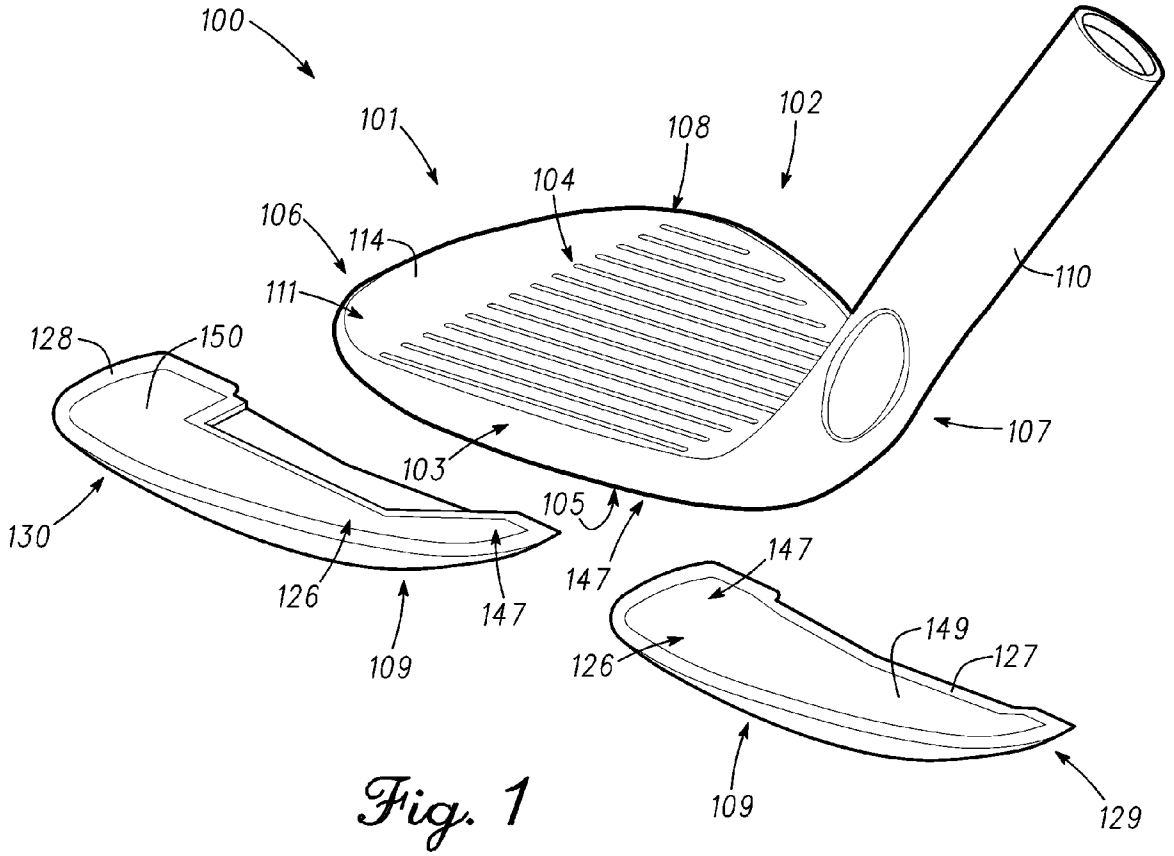

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Fig. 1

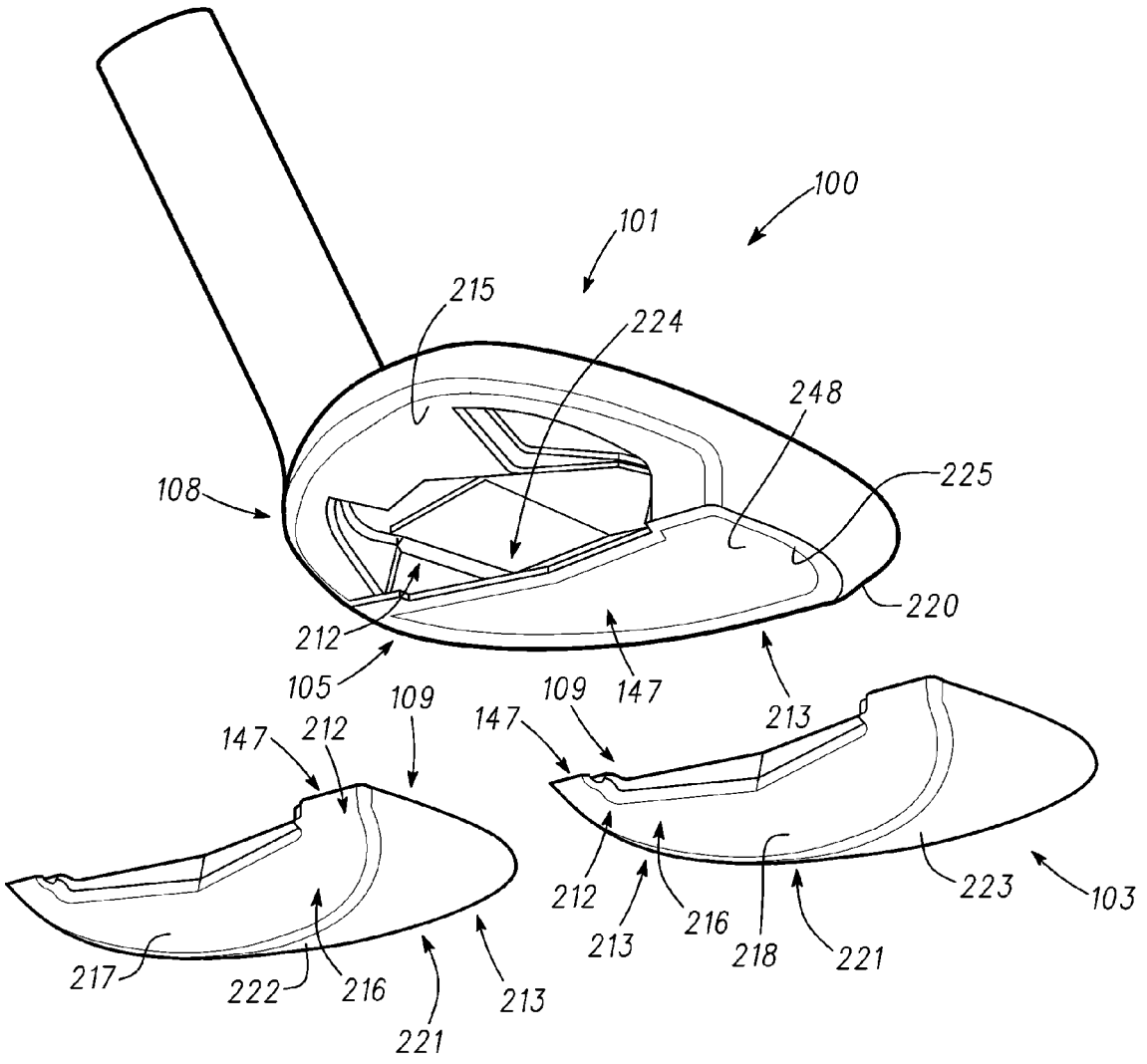
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Fig. 2

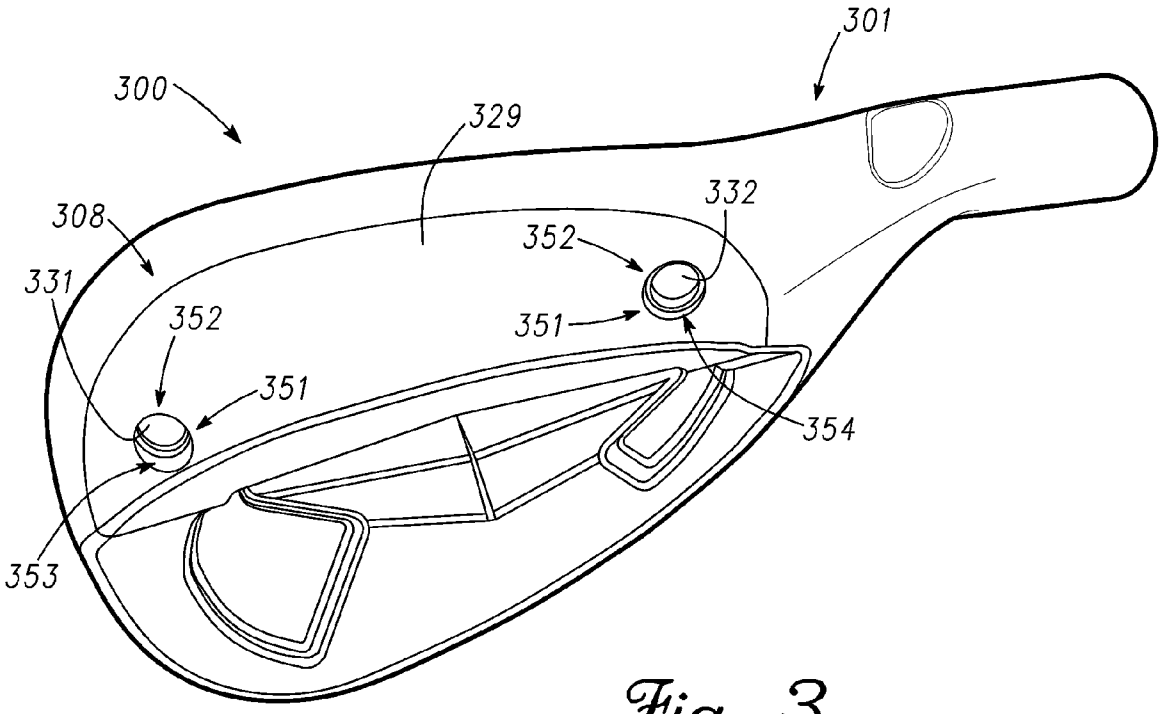

Fig. 3

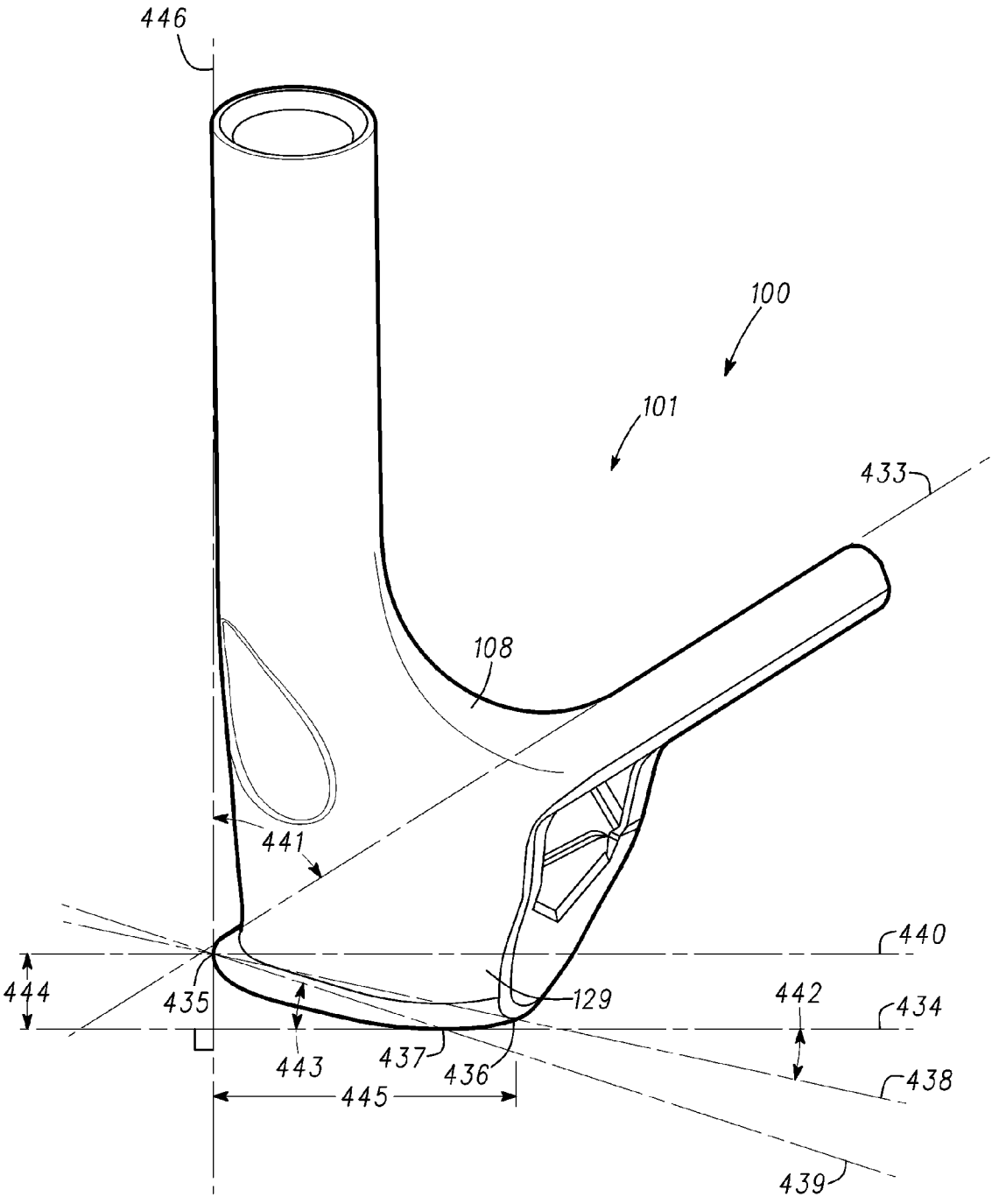
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Fig. 4

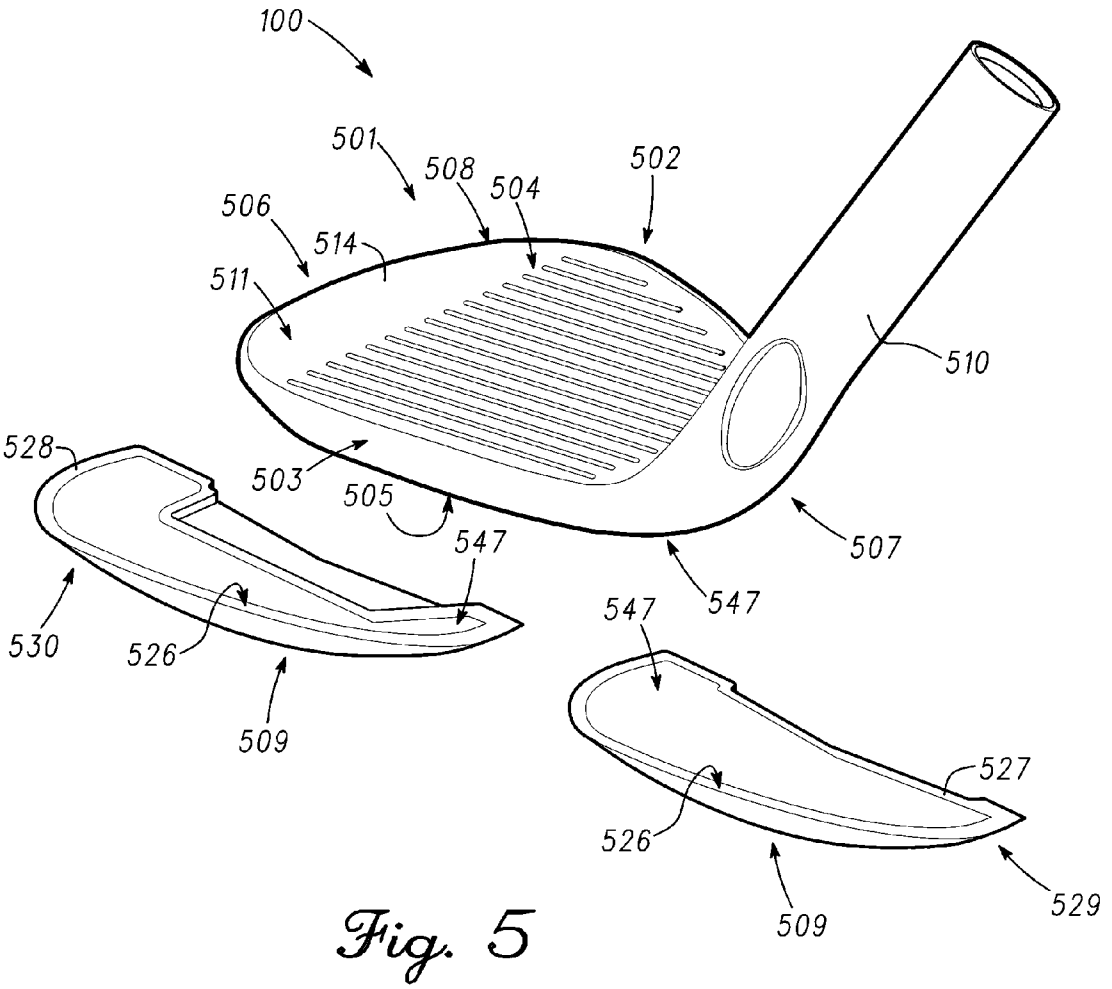
100
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Fig. 5

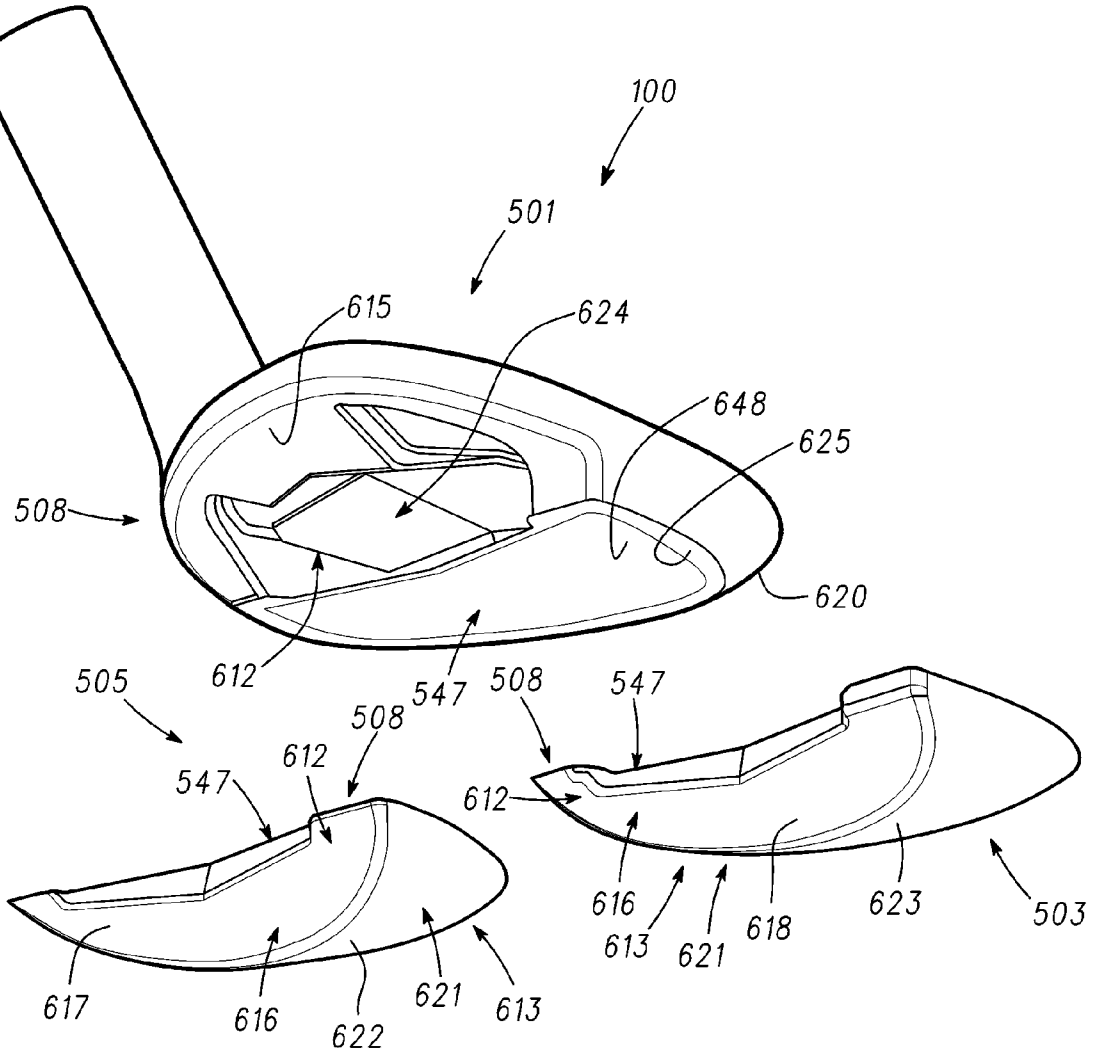
100
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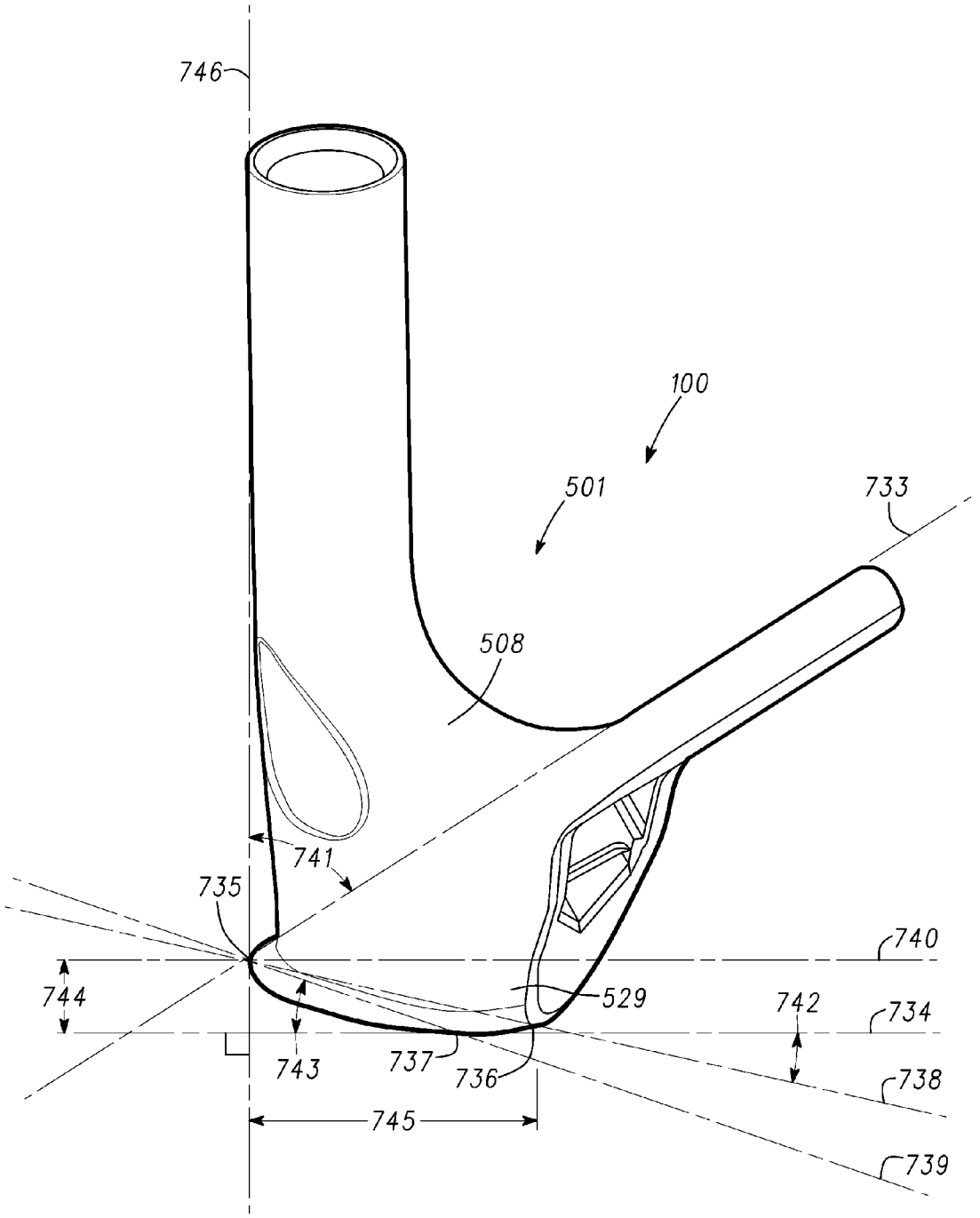
Fig. 6


746
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745
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Fig. 7

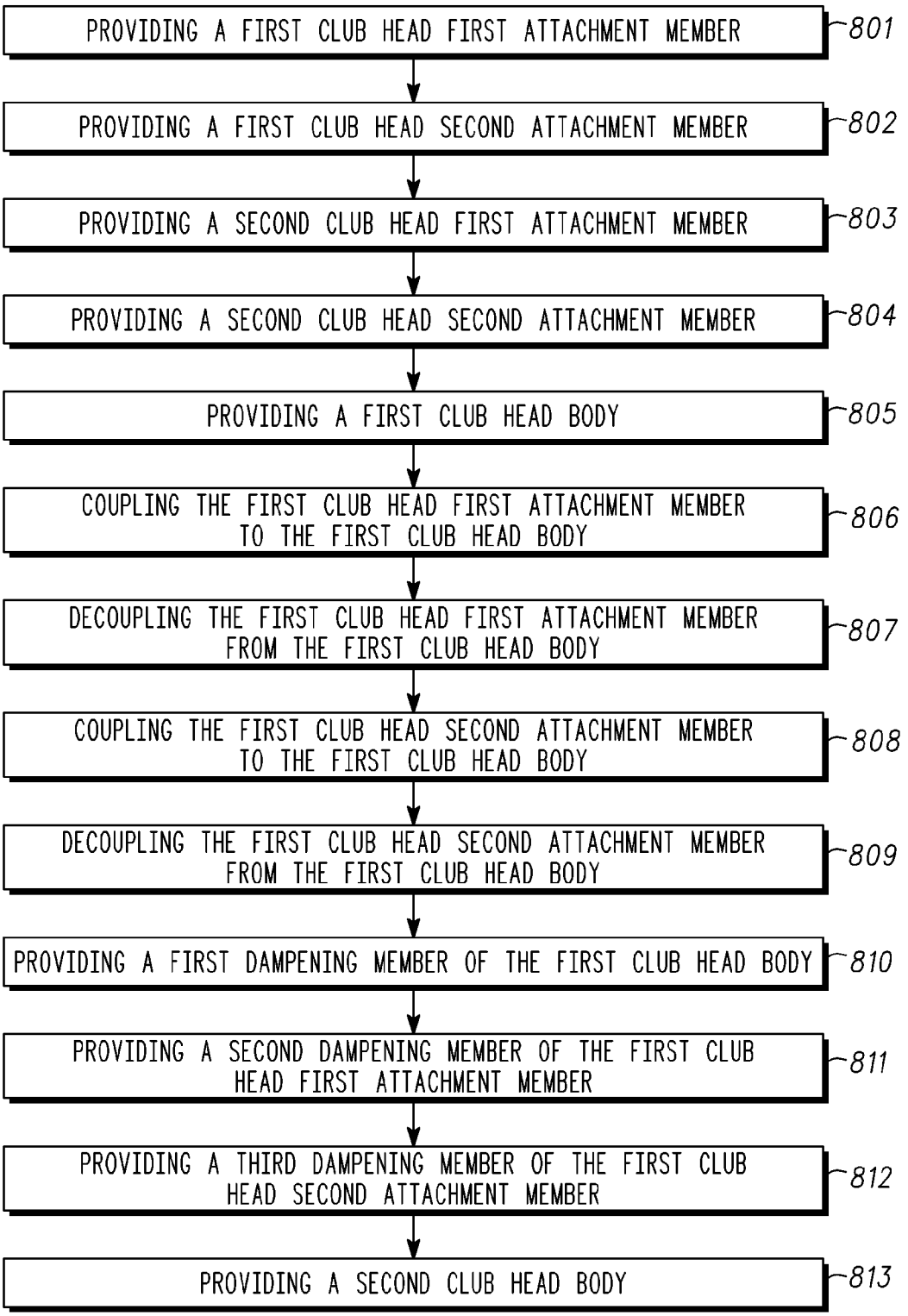
PROVIDING A FIRST CLUB HEAD FIRST ATTACHMENT MEMBER
801
PROVIDING A FIRST CLUB HEAD SECOND ATTACHMENT MEMBER
802
PROVIDING A SECOND CLUB HEAD FIRST ATTACHMENT MEMBER
803
PROVIDING A SECOND CLUB HEAD SECOND ATTACHMENT MEMBER
804
PROVIDING A FIRST CLUB HEAD BODY
805
COUPLING THE FIRST CLUB HEAD FIRST ATTACHMENT MEMBER TO THE FIRST CLUB HEAD BODY
806
DECOUPLING THE FIRST CLUB HEAD FIRST ATTACHMENT MEMBER FROM THE FIRST CLUB HEAD BODY
807
COUPLING THE FIRST CLUB HEAD SECOND ATTACHMENT MEMBER TO THE FIRST CLUB HEAD BODY
808
DECOUPLING THE FIRST CLUB HEAD SECOND ATTACHMENT MEMBER FROM THE FIRST CLUB HEAD BODY
809
PROVIDING A FIRST DAMPENING MEMBER OF THE FIRST CLUB HEAD BODY
810
PROVIDING A SECOND DAMPENING MEMBER OF THE FIRST CLUB HEAD FIRST ATTACHMENT MEMBER
811
PROVIDING A THIRD DAMPENING MEMBER OF THE FIRST CLUB HEAD SECOND ATTACHMENT MEMBER
812
PROVIDING A SECOND CLUB HEAD BODY
813

Fig. 8 800

VARIABLE BOUNCE HEIGHT CLUB HEADS AND RELATED METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/780,217, filed Mar. 13, 2013. U.S. Provisional Application No. 61/780,217 is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure relates generally to sports equipment, and relates more particularly to club heads and related methods.

BACKGROUND

[0003] The bounce angle of a golf club can impact the flight distance and/or accuracy of the golf ball, but the bounce height (i.e., the rise in the bounce angle) can have an even greater impact on the flight distance and/or accuracy of the golf ball. Specifically, the bounce angle and/or bounce height can determine how easily a golf club head can penetrate the ground under the golf ball during a golf club swing. However, ground conditions are subject to change such that the ground may be harder or softer at certain times due to weather, grooming, etc. Accordingly, a club head with a particular bounce angle and/or bounce height configuration may be better in certain circumstances than in other circumstances.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] To facilitate further description of the embodiments, the following drawings are provided in which:

[0005] FIG. **1** illustrates a top, front, heel side view of a first club head body of a first club head next to two or more first club head attachment members of the first club head, according to an embodiment;

[0006] FIG. **2** illustrates a bottom, rear, toe side view of the first club head body of FIG. **1** next to the two or more first club head attachment members of FIG. **1**, according to the embodiment of FIG. **1**;

[0007] FIG. **3** shows a bottom side view of a club head body of a club head coupled to an exemplary club head attachment member, according to an embodiment;

[0008] FIG. **4** illustrates a heel side view of the first club head of FIG. **1** when the first club head body is coupled to one of the first club head attachment members of the two or more first club head attachment members, according to the embodiment of FIGS. **1** & **2**;

[0009] FIG. **5** illustrates a top, front, heel side view of a second club head body of a second club head next to two or more second club head attachment members, according to the embodiment of FIGS. **1**, **2**, & **4**;

[0010] FIG. **6** illustrates a bottom, rear, toe side view of the second club head body of FIG. **5** next to two or more second club head attachment member(s), according to the embodiment of FIGS. **1**, **2**, **4**, & **5**;

[0011] FIG. **7** illustrates a heel side view of the second club head of FIG. **5** when the second club head body is coupled to one of the second club head attachment members of the two or more second club head attachment members, according to the embodiment of FIGS. **1**, **2**, & **4-6**; and

[0012] FIG. **8** illustrates a flow chart for an embodiment of a method.

[0013] For simplicity and clarity of illustration, the drawing figures illustrate the general manner of construction, and descriptions and details of well-known features and techniques may be omitted to avoid unnecessarily obscuring the invention. Additionally, elements in the drawing figures are not necessarily drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help improve understanding of embodiments of the present invention. The same reference numerals in different figures denote the same elements.

[0014] The terms "first," "second," "third," "fourth," and the like in the description and in the claims, if any, are used for distinguishing between similar elements and not necessarily for describing a particular sequential or chronological order. It is to be understood that the terms so used are interchangeable under appropriate circumstances such that the embodiments described herein are, for example, capable of operation in sequences other than those illustrated or otherwise described herein. Furthermore, the terms "include," and "have," and any variations thereof, are intended to cover a non-exclusive inclusion, such that a process, method, system, article, device, or apparatus that comprises a list of elements is not necessarily limited to those elements, but may include other elements not expressly listed or inherent to such process, method, system, article, device, or apparatus.

[0015] The terms "left," "right," "front," "back," "top," "bottom," "over," "under," and the like in the description and in the claims, if any, are used for descriptive purposes and not necessarily for describing permanent relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances such that the embodiments of the invention described herein are, for example, capable of operation in other orientations than those illustrated or otherwise described herein.

[0016] The terms "couple," "coupled," "couples," "coupling," and the like should be broadly understood and refer to connecting two or more elements mechanically and/or otherwise. Two or more mechanical elements may be mechanically coupled together, but not be electrically or otherwise coupled together. Coupling may be for any length of time, e.g., permanent or semi-permanent or only for an instant.

[0017] "Mechanical coupling" and the like should be broadly understood and include mechanical coupling of all types.

[0018] The absence of the word "removably," "removable," and the like near the word "coupled," and the like does not mean that the coupling, etc. in question is or is not removable.

DESCRIPTION

[0019] Some embodiments include a golf club head. The golf club head can comprise a club head body configured to be removably coupled at different times with a first attachment member and a second attachment member. When the club head body is coupled with the first attachment member, the golf club head comprises a loft angle, a bounce angle, and a first bounce height. Further, when the club head body is coupled with the second attachment member, the golf club head comprises the loft angle, the bounce angle, and a second bounce height different than the first bounce height.

[0020] Many embodiments include a set of golf club heads. The set of golf club heads can comprise a first club head and a second club head. The first club head can comprise a first club head body configured to be removably coupled at different times with a first attachment member and a second attach-

ment member. Meanwhile, the second club head can comprise a second club head body configured to be removably coupled at different times with a third attachment member and a fourth attachment member. When the first club head body is coupled with the first attachment member, the first club head comprises a first loft angle, a first bounce angle, and a first bounce height; and when the first club head body is coupled with the second attachment member, the first club head comprises the first loft angle, the first bounce angle, and a second bounce height different than the first bounce height. Further, when the second club head body is coupled with the third attachment member, the second club head comprises a second loft angle, a second bounce angle, and a third bounce height; and when the second club head body is coupled with the fourth attachment member, the second club head comprises the second loft angle, the second bounce angle, and a fourth bounce height different than the third bounce height.

[0021] Other embodiments include one or more golf club heads. The golf club head(s) comprise a first club head comprising a first club head body configured to be removably coupled at different times with a first club head first attachment member and a first club head second attachment member. When the first club head body is coupled with the first club head first attachment member, the first club head comprises a first loft angle, a first bounce angle, and a first bounce height. Further, when the first club head body is coupled with the first club head second attachment member, the first club head comprises the first loft angle, the first bounce angle, and a second bounce height different than the first bounce height.

[0022] In these embodiments, the golf club head(s) can also comprise a second club head. The second club head comprises a second club head body configured to be removably coupled at different times with a second club head first attachment member and a second club head second attachment member. When the second club head body is coupled with the second club head first attachment member, the second club head comprises a second loft angle, a second bounce angle, and a third bounce height. Further, when the second club head body is coupled with the second club head second attachment member, the second club head comprises the second loft angle, the second bounce angle, and a fourth bounce height different than the third bounce height.

[0023] In these or other embodiments, at least one of (i) the second loft angle can be greater than the first loft angle, (ii) the second bounce height can be greater than the first bounce height, and the third bounce height can be greater than or approximately equal to the first bounce height, or (iii) the fourth bounce height can be greater than the third bounce height, and the fourth bounce height can be greater than or approximately equal to the second bounce height.

[0024] Further embodiments include multiple attachment members. The multiple attachment members can comprise a first attachment member and a second attachment member, each being configured to be removably coupled at different times with a first club head body of a first golf club head. When the first attachment member is coupled with the first club head body, the first golf club head comprises a first loft angle, a first bounce angle, a first bounce height, and a first sole width. Further, when the second attachment member is coupled with the first club head body, the first golf club head comprises the first loft angle, the first bounce angle, a second bounce height different than the first bounce height, and a second sole width different than the first sole width.

[0025] Some embodiments include a method comprising: providing a first attachment member; and providing a second attachment member. The first attachment member and the second attachment member are each configured to be removably coupled at different times with a club head body of a golf club head. When the first attachment member is coupled with the club head body, the golf club head comprises a loft angle, a bounce angle, a first bounce height, and a first sole width. Further, when the second attachment member is coupled with the club head body, the golf club head comprises the loft angle, the bounce angle, a second bounce height different than the first bounce height, and a second sole width different than the first sole width.

[0026] Other embodiments include a method comprising: providing a first club head first attachment member; and providing a first club head second attachment member. The first club head first attachment member and the first club head second attachment member are each configured to be removably coupled at different times with a first club head body of a first golf club head. When the first club head first attachment member is coupled with the first club head body, the first golf club head comprises a first loft angle, a first bounce angle, a first bounce height, and a first sole width. Further, when the first club head second attachment member is coupled with the first club head body, the first golf club head comprises the first loft angle, the first bounce angle, a second bounce height different than the first bounce height, and a second sole width different than the first sole width.

[0027] In these embodiments, the method can further comprise: providing a second club head first attachment member; and providing a second club head second attachment member. The second club head first attachment member and the second club head second attachment member are each configured to be removably coupled at different times with a second club head body of a second golf club head. When the second club head first attachment member is coupled with the second club head body, the second golf club head comprises a second loft angle, a second bounce angle, a third bounce height, and a third sole width. Further, when the second club head second attachment member is coupled with the second club head body, the second golf club head comprises the second loft angle, the second bounce angle, a fourth bounce height different than the third bounce height, and a fourth sole width different than the third sole width.

[0028] Turning to the drawings, FIG. **1** illustrates a top, front, heel side view of a first club head body **108** of a first club head **101** of one or more club heads **100** next to two or more first club head attachment members **109** of first club head **101**, according to an embodiment. Meanwhile, FIG. **2** illustrates a bottom, rear, toe side view of first club head body **108** of first club head **101** of club head(s) **100** next to first club head attachment members **109**, according to the embodiment of FIG. **1**. Club head(s) **100** is merely exemplary and is not limited to the embodiments presented herein. Club head(s) **100** can be employed in many different embodiments or examples not specifically depicted or described herein.

[0029] Generally, club head(s) **100** can comprise one or more golf club heads. Each of the golf club head(s) can be part of a corresponding golf club. Further, the golf club head(s) can be part or all of a set of golf club heads and/or the golf club(s) can be part or all of a set of golf clubs. Although club head(s) **100** can comprise any suitable type of golf club head, in many examples, club head(s) **100** comprises one or more iron-type golf club heads. Further, the iron-type golf club

head(s) can comprise a muscle-back or cavity-back configuration. The apparatus, methods, and articles of manufactured described herein are not limited in this regard.

[0030] Referring to FIG. **1**, club head(s) **100** comprises first club head **101**. As discussed in further detail herein, club head(s) **100** can also comprise one or more additional club heads (e.g., a second club head **501** (FIGS. **5-7**)). When club head(s) **100** comprise the additional club heads, each of club head(s) **100** (and the corresponding constituent elements thereof) can be similar to each other.

[0031] First club head **101** comprises a top end **102**, a bottom end **103**, a front end **104**, a rear end **105**, a toe end **106**, and a heel end **107**. Further, first club head **101** can comprise a first club head body **108** and/or two or more first club head attachment members **109** (e.g., a first club head first attachment member **129**, a first club head second attachment member **130**, etc.). In some examples, first club head attachment members **109** can comprise any suitable number of first club head attachment members (e.g., three first club head attachment members, four first club head attachment members, five first club head attachment members, six first club head attachment members, etc.). In some embodiments, club head **100** can comprise hosel **110**, which in other embodiments can be omitted. Although, in some embodiments, each of first club head attachment members **109** can be implemented as multiple elements, for ease and clarity of illustration, each of first club head attachment members **109** is discussed as being a single element.

[0032] Meanwhile, first club head **101** can comprise a front surface **111**, a rear surface **212** (FIG. **2**), a sole surface **213** (FIG. **2**), and/or a custom tuning port (CTP) **224** (FIG. **2**). Further, first club head body **108** can comprise a first club head body interface **225** (FIG. **2**), and each of first club head attachment members **109** can comprise a corresponding one of first club head attachment member interfaces **126** (e.g., a first club head first attachment member interface **127**, a first club head second attachment member interface **128**, etc.). As applicable, (a) front surface **111** can comprise (i) a body front surface **114** and/or (ii) one of first club head attachment member front surfaces (not shown); (b) rear surface **212** (FIG. **2**) can comprise (i) a body rear surface **215** (FIG. **2**) and/or (ii) one of first club head attachment member rear surfaces **216** (e.g., a first club head first attachment member rear surface **217** (FIG. **2**), a first club head second attachment member rear surface **218** (FIG. **2**), etc.); and (c) sole surface **213** (FIG. **2**) can comprise (i) a body sole surface **220** (FIG. **2**) and/or (ii) one of first club head attachment member sole surface(s) **221** (e.g., a first club head first attachment member sole surface **222** (FIG. **2**), a first club head second attachment member sole surface **223** (FIG. **2**), etc.). However, in some embodiments, the first club attachment member front surfaces, body rear surface **215** (FIG. **2**), and/or body sole surface **220** (FIG. **2**) can be omitted.

[0033] For example, part of front surface **111** (e.g., body front surface **114**) can be part of first club head body **108**, and part of front surface **111** (e.g., an applicable one of the first club head attachment member front surfaces) can be part of an applicable one of first club head attachment members **109**. Nonetheless, in other examples, body front surface **114** can comprise front surface **111**, and the first club head attachment member front surfaces can be omitted. In these examples, body front surface **114** can form all of front surface **111**.

[0034] Further, part of rear surface **212** (e.g., body rear surface **215** (FIG. **2**)) can be part of first club head body **108**, and part of rear surface **212** (e.g., an applicable one of first club head attachment member rear surfaces **216** (FIG. **2**)) can be part of an applicable one of first club head attachment members **109**. Nonetheless, in other examples, the applicable one of first club head attachment member rear surfaces **216** (FIG. **2**) can comprise rear surface **212** (FIG. **2**), and body rear surface **215** (FIG. **2**) can be omitted. In these examples, the applicable one of first club head attachment member rear surfaces **216** (FIG. **2**) can form all of rear surface **212** (FIG. **2**).

[0035] Further still, part of sole surface **213** (e.g., body sole surface **220** (FIG. **2**)) can be part of first club head body **108**, and part of sole surface **213** (e.g., an applicable one of first club head attachment member sole surfaces **221** (FIG. **2**)) can be part of an applicable one of first club head attachment members **109**. Nonetheless, in other examples, the applicable one of first club head attachment member rear surfaces **221** (FIG. **2**) can comprise sole surface **213** (FIG. **2**), and body sole surface **220** (FIG. **2**) can be omitted. In these examples, the applicable one of first club head attachment member rear surfaces **221** (FIG. **2**) can form all of sole surface **213** (FIG. **2**).

[0036] Meanwhile, rear surface **212** (FIG. **2**), body rear surface **215** (FIG. **2**), and/or an applicable one of first club head attachment member rear surfaces **216** (FIG. **2**) can comprise and/or form CTP **224** (FIG. **2**). In other embodiments, CTP **224** (FIG. **2**) can be omitted.

[0037] Top end **102** is opposite bottom end **103**; front end **104** is opposite rear end **105**; and toe end **106** is opposite heel end **107**. Front surface **111** can be located at front end **104**; rear surface **212** (FIG. **2**) can be located at rear end **105** and/or opposite of front surface **111**; and sole surface **213** (FIG. **2**) can be located at bottom end **103**.

[0038] First club head body **108** is configured to be coupled (e.g., removably, seamlessly, and/or at different times) with each of first club head attachment members **109**. For example, first club head body **108** can be coupled with first club head attachment members **109** at first club head body interface **225** (FIG. **2**) and first club head attachment member interfaces **126** (e.g., first club head first attachment member interface **127**, first club head second attachment member interface **128**, etc.).

[0039] First club head body **108** and first club head attachment members **109** can be coupled together by any suitable coupling mechanism(s) (e.g., a fastener, a joint, and/or an adhesive, etc.). An exemplary fastener can comprise a screw, a nut and bolt, etc. An exemplary joint can comprise a mortise and tenon joint, a dovetail joint, etc. Further, where multiple coupling mechanisms are implemented, the coupling mechanisms can be the same or different from each other. The apparatus, methods, and articles of manufactured described herein are not limited in this regard.

[0040] Further, first club head **101** can comprise an alignment aid. The alignment aid can comprise any pair of a body alignment aid and one of two or more attachment member alignment aids. The alignment aid, the body alignment aid, and/or the attachment member alignment aid(s) can be configured to facilitate coupling together first club head body **108** and first club head attachment members **109**. For example, the alignment aid, the body alignment aid, and/or the attachment member alignment aid(s) can operate as a guide for coupling together first club head body **108** and first club head attachment members **109**. In many examples, first club head body **108** can comprise the body alignment aid, and/or each of first club head attachment members **109** can comprise one of the

attachment member alignment aids. In other examples, the alignment aid can be omitted. In some embodiments, one or more of the coupling mechanism(s) implemented to couple together first club head body **108** and first club head attachment members **109** can comprise the alignment aid. That is, one or more of the coupling mechanism(s) can also facilitate coupling together first club head body **108** and first club head attachment members **109**, and/or the alignment aid can also couple together first club head body **108** and first club head attachment members **109**.

[0041] When the alignment aid is implemented, the alignment aid can comprise any suitable mechanism(s) to facilitate coupling together first club head body **108** and first club head attachment members **109**. In some examples, the alignment aid can comprise one or more markings (e.g., arrows, etc.). In these examples, the body alignment aid can comprise a marking, and/or the attachment member alignment aid(s) can each comprise a marking. The markings can be complimentary with each other. In these or other examples, the alignment aid can comprise one or more joints. In these examples, the body alignment aid can comprise one or more first joint features, and/or the attachment member alignment aid(s) can each comprise one or more second joint features complimentary to the first joint features. Each of the first joint features can be the same or different from each other, and each of the second joint features can be the same or different from each other. In other examples, the alignment aid can comprise one or more fasteners and/or fastener receptacles configured to receive the fasteners.

[0042] Turning ahead briefly in the drawings for illustration, FIG. **3** shows a bottom side view of club head body **308** of club head **301** of club head(s) **300** coupled to club head attachment member **329**, according to an embodiment. Club head(s) **300** can be similar or identical to club head(s) **100** (FIG. **1**), and club head **301** can be similar or identical to first club head **101** (FIG. **1**). Further, club head body **308** can be similar or identical to first club head body **108** (FIG. **1**), and/or club head attachment member **329** can be similar or identical to first club head first attachment member **129** (FIG. **1**). Club head body **308** and club head attachment member **329** can be coupled together by first coupling mechanism **331** and by second coupling mechanism **332**. Coupling mechanisms **331** and **332** can comprise screw-type fasteners. Further, club head **301** can comprise alignment aid **351**. The body alignment aid (blocked from view by club head attachment member **329**) of alignment aid **351** and attachment member alignment aid **352** (e.g., first coupling mechanism receptacle **353** corresponding to first coupling mechanism **331**, and/or second coupling mechanism receptacle **354** corresponding to second coupling mechanism **332**) of alignment aid **351** can help align club head body **308** with club head attachment members **329**.

[0043] Referring now back to FIG. **1**, in some embodiments, first club head **101** can comprise one or more optional dampening members **147**. Dampening member(s) **147** can dampen vibrations between first club head body **108** and first club head attachment members **109**, such as, for example, when first club head body **108** and any one of first club head attachment members **109** are coupled together. In some embodiments, first club head body **108** can comprise dampening member **248** (FIG. **2**), such as, for example, at first club head body interface **125**. In these or other embodiments, first club head attachment members **109** can each comprise a dampening member, such as, for example, at each of first club head attachment member interfaces **126** (e.g., dampening member **149** at first club head attachment member interface **127**, dampening member **150** at first club head attachment member interface **128**. In other embodiments, one or more of dampening member(s) **147** can be separate from first club head body **108** and first club head attachment members **109**. Accordingly, although FIGS. **1** & **2** illustrate dampening member(s) **147** as being part of first club head body **108** and first club head attachment members **109**, in other embodiments, one or more of dampening member(s) **147** (e.g., dampening member **248** (FIG. **2**), dampening member **149**, and/or dampening member **150**) can be separate from first club head body **108** and/or first club head attachment members **109**, as applicable. In still other embodiments, one or more of dampening member(s) **147** (e.g., dampening member **248** (FIG. **2**), dampening member **149**, and/or dampening member **150**) can be omitted. Dampening member(s) **147** can comprise any suitable material(s) (e.g., an elastomeric or elastic material, such as, for example, rubber, etc.) configured to dampen vibrations.

[0044] Front surface **111** can refer to a strike face and/or strike plate of first club head **101**, and can be configured to impact a golf ball (not shown). Front surface **111** can be substantially planar, and/or can comprise one or more scoring lines (e.g., grooves). The scoring line(s) can extend between toe end **106** and heel end **107**. When front surface **111** comprises multiple scoring lines, the scoring lines can be parallel to each other.

[0045] Hosel **110** can be located at or proximate to heel end **107**, and hosel **110** can extend from first club head **101** via a hosel transition portion. Hosel **110** can be configured to receive a shaft (not shown). In a different embodiment, club head **100** can comprise a bore (not shown) configured to receive the shaft. When hosel **110** (or the bore) receives the shaft, first club head **101** and the shaft can substantially provide a golf club, as described above.

[0046] Skipping ahead in the drawings, FIG. **4** illustrates a heel side view of first club head **101** when first club head body **108** is coupled to first club head attachment member **129**, according to the embodiment of FIGS. **1** & **2**.

[0047] First club head **101** comprises loft plane **433** and ground plane **434**. Further, first club head **101** can also comprise leading edge **435**, trailing edge **436**, ground contact **437**, edge line **438**, contact line **439**, and/or height plane **440**. Loft plane **433**, ground plane **434**, edge plane **438**, contact plane **439**, and height plane **440** can refer to reference planes of first club head **101**, and leading edge **435**, trailing edge **436**, and ground contact **437** can refer to reference points of first club head **101**. Meanwhile, first club head **101** further comprises loft angle **441**, effective bounce angle **442**, traditional bounce angle **443**, bounce height **444**, and sole width **445**.

[0048] Loft plane **433** intersects the foremost point or points (e.g., nearest front end **104** (FIGS. **1** & **2**)) of front surface **111** (FIG. **1**). In some examples, the foremost point can be leading edge **435**. Further, loft plane **433** can be approximately parallel with front surface **111** (FIG. **1**) when first club head **101** is positioned both to address a golf ball and in a resting state. When front surface **111** (FIG. **1**) is planar and/or substantially planar, front surface **111** and loft plane **433** can be approximately co-planar. Meanwhile, when front surface **111** (FIG. **1**) is curved (e.g., non-planar), as can frequently be implemented with wood-type club heads, loft plane **433** can refer to a reference plane intersecting an inflection point in the curvature of front surface **111**. Accordingly,

in these embodiments, at least part of front surface **111** (FIG. **1**) can be located behind loft plane **433**.

[0049] Leading edge **435** can refer to a foremost point of sole surface **213** (FIG. **2**) when first club head **101** is positioned both to address a golf ball and in a resting state; trailing edge **436** can refer to a rearmost point of sole surface **213** (FIG. **2**) when first club head **101** is positioned both to address a golf ball and in a resting state; and ground contact **437** can refer to a lowest point of sole surface **213** (FIG. **2**) when first club head **101** is positioned both to address a golf ball and in a resting state.

[0050] Ground plane **434** refers to the plane generally formed by the ground below club head **101** when first club head **101** is positioned to address a golf ball. Ground plane **434** can intersect ground contact **437** when first club head **101** is positioned to address a golf ball. Meanwhile, edge line **438** refers to the line intersecting leading edge **435** and trailing edge **436**; and contact line **439** refers to the line intersecting leading edge **435** and ground contact **437**. Further, height plane **440** refers to a plane approximately parallel to ground plane **434** and intersecting leading edge **435**.

[0051] Bounce height **444** can refer to a distance between ground plane **434** and height plane **440**. Meanwhile, sole width **445** can refer to a distance between leading edge **435** and trailing edge **436**.

[0052] Loft angle **441** can refer to an angle formed between loft plane **433** and normal line **446**, which refers to a reference line orthogonal to ground plane **434** and intersecting leading edge **435** when first club head **101** is positioned to address a golf ball. Effective bounce angle **442** can refer to an angle formed between edge line **438** and ground plane **434**, and traditional bounce angle **443** can refer to an angle formed between contact line **439** and ground plane **434**.

[0053] First club head **101** can be configured such that loft angle **441**, effective bounce angle **442**, and/or traditional bounce angle **443** remain constant for first club head **101** while bounce height **444** and/or sole width **445** can be varied for first club head **101** as first club head body **108** is coupled with different ones of first club head attachment members **109**. As a result, bounce height **444** and/or sole width **445** can be tailored as desired for first club head **101**. That is, first club head **101** can be adjustable so that coupling different ones of first club head attachment members **109** to first club head body **108** can provide differing configurations of bounce height **444** and/or sole width **445**. Further, when effective bounce angle **442** and/or traditional bounce angle **443** are held constant, bounce height **444** can be varied as a function of sole width **445**, and vice versa.

[0054] As a general matter, bounce height (e.g., bounce height **444**) can have more impact on how first club head **101** moves through turf than bounce angle (e.g., effective bounce angle **442** and/or traditional bounce angle **443**). Increasing bounce height (e.g., bounce height **444**) can cause first club head **101** to dig less into the turf while decreasing bounce height can cause first club head **101** to dig more into the turf. Accordingly, for softer ground conditions, it can be desirable to increase bounce height (e.g., bounce height **444**), while for harder ground conditions, it can be desirable to decrease bounce height (e.g., bounce height **444**). Advantageously, as indicated previously, bounce height **444** and/or sole width **445** of first club head **101** can be adjustable, such as, for example, according to the particular ground conditions before the round of golf begins or during the round of golf.

[0055] In some embodiments, loft angle **441** can be greater than or equal to approximately 15 degrees and less than or equal to approximately 65 degrees. In further embodiments, loft angle **441** can be greater than or equal to approximately 47 degrees and less than or equal to approximately 64 degrees, such as, for example, where first club head **101** comprises a wedge-type iron-type golf club head. In more specific examples, loft angle **441** can be one of approximately 56 degrees or approximately 60 degrees. Effective bounce angle **442** and/or traditional bounce angle **443** can be greater than or equal to approximately 0 degrees or less than or equal to approximately 20 degrees.

[0056] In some embodiments, bounce height **444** can be greater than or equal to approximately 0.500 centimeters or less than or equal to approximately 0.635 centimeters. Further, sole width **445** can be greater than or equal to approximately 0.6 centimeters or less than or equal to approximately 3.5 centimeters. The apparatus, methods, and articles of manufacture described herein are not limited in this regard.

[0057] In addition to varying bounce height **444** and/or sole width **445**, first club head attachment members **109** can also vary by shape, density, weight, and/or mass distribution. By varying the density, weight, and/or mass distribution of first club head attachment member **109**, the weight and mass distribution of first club head **101** can also be varied. In turn, a center of gravity of first club head **101** can be selectively varied, as desired, to selectively alter one or more moment of inertia parameters of first club head **101**.

[0058] In these embodiments, first club head attachment members **109** can further comprise two or more first club head attachment members providing the same bounce height **444** and/or sole width **445** of first club head **101**, but having different density, weight, and/or mass distribution configurations so that the location of the center of gravity of first club head **101** can be selectively varied. For example, first club head attachment members **109** can comprise a first set of two or more first club head attachment members (e.g., first club head first attachment member **129**, first club head second attachment member **130**, etc.) varying according to bounce height and/or sole width, and a second set of two or more first club head attachment members corresponding to the first set and having the approximately equal bounce heights and/or sole widths to the first set, but varying according to density, weight, and/or mass distribution configuration.

[0059] In many examples, first club head body **108** can comprise any suitable material(s), such as, for example, any suitable metal (e.g., aluminum, stainless steel, carbon steel, titanium, magnesium, etc.), any suitable non-metal (e.g., carbon fiber composite, polymer, fiber reinforced polymer, etc.), and/or any suitable alloys thereof. Further, first club head attachment members **109** can also comprise any suitable material(s), such as, for example, any suitable metal (e.g., aluminum, stainless steel, carbon steel, titanium, magnesium, lead, tungsten, gold, silver, etc.), any suitable non-metal (e.g., carbon fiber composite, polymer, fiber reinforced polymer, etc.), and/or any suitable alloys thereof. The first club head body **108** and first club head attachment members **109** can comprise the same or different materials. Further, each of first club head attachment members **109** can comprise the same or different materials. These materials can be varied appropriately to affect the density, weight, and/or mass distributions of first club head attachment members **109**.

[0060] In other embodiments, first club head **101** can be configured such that loft angle **441** and one or more of effective bounce angle **442**, traditional bounce angle **443**, bounce height **444**, and sole width **445** remain constant for first club head **101** as first club head body **108** is coupled with different ones of first club head attachment members **109**. Meanwhile, in these or other embodiments, one or more of effective bounce angle **442**, traditional bounce angle **443**, bounce height **444**, and sole width **445** can be varied for first club

head **101** as first club head body **108** is coupled with different ones of first club head attachment members **109**.

[0061] Meanwhile, as indicated previously, in many embodiments, club head(s) **100** can also comprise one or more additional club heads, such as, for example, second club head **501** (FIGS. **5**-**7**). FIG. **5** illustrates a top, front, heel side view of second club head body **508** of second club head **501** of club head(s) **100** next to second club head attachment members **509** of second club head **501**, according to the embodiment of FIGS. **1**, **2**, & **4**. Meanwhile, FIG. **6** illustrates a bottom, rear, toe side view of second club head body **508** of second club head **501** of club head(s) **100** next to second club head attachment member(s) **509**, according to the embodiment of FIGS. **1**, **2**, **4**, & **5**. Further, FIG. **7** illustrates a bottom side view of second club head **501** when second club head body **508** is coupled to second club head attachment member **529**, according to the embodiment of FIGS. **1**, **2**, & **4**-**6**.

[0062] In general, second club head **501** can be similar or identical to first club head **101** (FIGS. **1**, **2**, & **4**) and/or club head **301** (FIG. **3**). For example, elements of first club head **101** and/or club head **301** and second club head **501** referenced with reference numbers having the same last two digits can be similar or identical to each other. However, second club head **501** can differ in that the loft angle of second club head **501** can be different than the loft angle of one or more other ones of club head(s) **100** (e.g., first club head **101** (FIGS. **1**, **2**, & **4**)). For example, loft angle **441** (FIG. **4**) can be less than or greater than loft angle **741** (FIG. **7**). Accordingly, club head(s) **100** can each comprise a different loft angle (e.g., loft angle **441**, loft angle **741**, etc.). Meanwhile, in some examples, the bounce angle (e.g., effective bounce angles **442** and **742**, and/or traditional bounce angles **443** and **743**, etc.) can be less than, greater than, or equal from club head to club head within club head(s) **100**. In further examples, the bounce height (e.g., bounce height **444** and bounce height **744**, etc.) and/or sole width (e.g., sole width **445** and sole width **745**, etc.) can be less than, greater than, or equal from club head to club head within club head(s) **100**, but can also be variable depending on the club head attachment members (e.g., first club head attachment members **109**, second club head attachment members **509**, etc.) being used.

[0063] Further, in other embodiments, second club head **501** can be configured such that loft angle **741** and one or more of effective bounce angle **742**, traditional bounce angle **743**, bounce height **744**, and sole width **745** remain constant for second club head **501** as second club head body **508** is coupled with different ones of second club head attachment members **509**. Meanwhile, in these or other embodiments, one or more of effective bounce angle **742**, traditional bounce angle **743**, bounce height **744**, and sole width **745** can be varied for second club head **501** as second club head body **508** is coupled with different ones of second club head attachment members **509**.

[0064] Meanwhile, in some embodiments, the club head bodies (e.g., first club head body **108**, second club head body **508**, etc.) and/or club head attachment members (first club head attachment members **109**, second club head attachment members **509**, etc.) of each club head of club head(s) **100** can be configured to prevent club head attachment members of one club head (e.g., first club head **101**) of club head(s) **100** from being coupled to another club head (e.g., second club head **501**) of club head(s) **100**.

[0065] Advantageously, club head(s) **100** can be implemented to provide the attributes of multiple fixed sole club heads in a single club head. Accordingly, a user of club head(s) **100** need not buy, maintain, and/or carry multiple fixed sole club heads of each loft angle.

[0066] FIG. **8** illustrates a flow chart for an embodiment of method **800**. Method **800** is merely exemplary and is not limited to the embodiments presented herein. Method **800** can be employed in many different embodiments or examples not specifically depicted or described herein. In some embodiments, the activities, the procedures, and/or the processes of method **800** can be performed in the order presented. In other embodiments, the activities, the procedures, and/or the processes of method **800** can be performed in any other suitable order. In still other embodiments, one or more of the activities, the procedures, and/or the processes in method **800** can be combined or skipped.

[0067] Method **800** can comprise activity **801** of providing a first club head first attachment member. The first club head first attachment member can be similar or identical to one of first club head attachment members **109** (e.g., first club head first attachment member **129** (FIGS. **1**, **2**, & **4**)) and/or club head attachment members **309** (FIG. **3**). In some embodiments, performing activity **801** can comprise an activity of providing the first club head first attachment member so that the first club head first attachment member comprises a first weight. In further embodiments, performing activity **801** can comprise an activity of configuring a first bounce height of the first club head first attachment member to be greater than or equal to approximately 0.500 centimeters or less than or equal to approximately 0.635 centimeters; and/or an activity of configuring a first sole width to be greater than or equal to approximately 0.6 centimeters or less than or equal to approximately 3.5 centimeters.

[0068] Method **800** also can comprise activity **802** of providing a first club head second attachment member. The first club head second attachment member can be similar or identical to another one of first club head attachment members **109** (e.g., first club head second attachment member **130** (FIGS. **1**, **2**, & **4**)). In some embodiments, performing activity **802** can comprise an activity of providing the first club head second attachment member so that the first club head second attachment member comprises a second weight different than the first weight.

[0069] In some embodiments, performing activities **801** and **802** can comprise (i) an activity of configuring a first loft angle to be greater than or equal to approximately 47 degrees and less than or equal to approximately 64 degrees; and/or (ii) an activity of configuring a first bounce angle to be greater than or equal to approximately 0 degrees or less than or equal to approximately 20 degrees.

[0070] Method **800** can further comprise activity **803** of providing a second club head first attachment member. The second club head first attachment member can be similar or identical to one of second club head attachment members **509** (e.g., second club head first attachment member **529** (FIGS. **5**-**7**)).

[0071] Method **800** can still further comprise activity **804** of providing a second club head second attachment member. The second club head second attachment member can be similar or identical to another one of second club head attachment members **509** (e.g., second club head second attachment member **530** (FIGS. **5**-**7**)).

[0072] Method **800** can additionally comprise activity **805** of providing a first club head body. The first club head body can be similar or identical to first club head body **108** (FIGS. **1**, **2**, & **4**) and/or club head body **308** (FIG. **3**).

[0073] Method **800** also can comprise activity **806** of coupling the first club head first attachment member to the first club head body. In some embodiments, performing activity **806** can comprise using a first alignment aid to couple the first club head first attachment member to the first club head body.

[0074] Method **800** can further comprise activity **807** of decoupling the first club head first attachment member from the first club head body. In some embodiments, one or both of activities **806** and **807** can be omitted.

[0075] Method **800** can still further comprise activity **808** of coupling the first club head second attachment member to the first club head body. In some embodiments, performing activity **808** can comprise using a first alignment aid to couple the first club head second attachment member to the first club head body.

[0076] Method **800** can additionally comprise activity **809** of decoupling the first club head second attachment member from the first club head body. In some embodiments, one or both of activities **808** and **809** can be omitted.

[0077] Method **800** also can comprise: activity **810** of providing a first dampening member of the first club head body; activity **811** of providing a second dampening member of the first club head first attachment member; and/or activity **812** of providing a third dampening member of the first club head second attachment member. The first dampening member can be similar or identical to dampening member **248** (FIG. **2**), the second dampening member can be similar or identical to dampening member **149** (FIG. **1**), and/or the third dampening member can be similar or identical to dampening member **150** (FIG. **1**). In some embodiments, activities **810**, **811**, and/or **812** can be omitted.

[0078] Method **800** also can comprise activity **813** of providing a second club head body. The second club head body can be similar or identical to second club head body **508** (FIGS. **5-7**).

[0079] Turning to the drawings, FIG. **1** illustrates a top, front, heel side view of a first club head body **108** of a first club head **101** of one or more club heads **100** next to two or more first club head attachment members **109** of first club head **101**

[0080] Although the golf club head(s), attachment members, and related methods herein have been described with reference to specific embodiments, various changes may be made without departing from the spirit or scope of the present disclosure. For example, to one of ordinary skill in the art, it will be readily apparent that activities **801-813** of FIG. **8** may be comprised of many different procedures, processes, and activities and be performed by many different modules, in many different orders, that any element of FIGS. **1-8** may be modified, and that the foregoing discussion of certain of these embodiments does not necessarily represent a complete description of all possible embodiments.

[0081] Further, while the above examples may be described in connection with an iron-type golf club head, the apparatus, methods, and articles of manufacture described herein may be applicable to other types of golf clubs such as a wood-type golf club, a wedge-type golf club, or a putter-type golf club. Alternatively, the apparatus, methods, and articles of manufacture described herein may be applicable other type of sports equipment such as a hockey stick, a tennis racket, a fishing pole, a ski pole, etc.

[0082] Additional examples of such changes and others have been given in the foregoing description. Other permutations of the different embodiments having one or more of the features of the various figures are likewise contemplated. Accordingly, the specification, claims, and drawings herein are intended to be illustrative of the scope of the disclosure and is not intended to be limiting. It is intended that the scope of this application shall be limited only to the extent required by the appended claims.

[0083] The golf club head(s), attachment members, and related methods discussed herein may be implemented in a variety of embodiments, and the foregoing discussion of certain of these embodiments does not necessarily represent a complete description of all possible embodiments. Rather, the detailed description of the drawings, and the drawings themselves, disclose at least one preferred embodiment, and may disclose alternative embodiments.

[0084] All elements claimed in any particular claim are essential to the embodiment claimed in that particular claim. Consequently, replacement of one or more claimed elements constitutes reconstruction and not repair. Additionally, benefits, other advantages, and solutions to problems have been described with regard to specific embodiments. The benefits, advantages, solutions to problems, and any element or elements that may cause any benefit, advantage, or solution to occur or become more pronounced, however, are not to be construed as critical, required, or essential features or elements of any or all of the claims, unless such benefits, advantages, solutions, or elements are expressly stated in such claim.

[0085] As the rules to golf may change from time to time (e.g., new regulations may be adopted or old rules may be eliminated or modified by golf standard organizations and/or governing bodies such as the United States Golf Association (USGA), the Royal and Ancient Golf Club of St. Andrews (R&A), etc.), golf equipment related to the apparatus, methods, and articles of manufacture described herein may be conforming or non-conforming to the rules of golf at any particular time. Accordingly, golf equipment related to the apparatus, methods, and articles of manufacture described herein may be advertised, offered for sale, and/or sold as conforming or non-conforming golf equipment. The apparatus, methods, and articles of manufacture described herein are not limited in this regard.

[0086] Moreover, embodiments and limitations disclosed herein are not dedicated to the public under the doctrine of dedication if the embodiments and/or limitations: (1) are not expressly claimed in the claims; and (2) are or are potentially equivalents of express elements and/or limitations in the claims under the doctrine of equivalents.

What is claimed is:

1) A golf club head comprising:

a club head body configured to be removably coupled at different times with a first attachment member and a second attachment member;

wherein:

when the club head body is coupled with the first attachment member, the golf club head comprises:

a loft angle;

a bounce angle; and

a first bounce height;

and

when the club head body is coupled with the second attachment member, the golf club head comprises:

the loft angle;

the bounce angle; and

a second bounce height different than the first bounce height.

2) The golf club head of claim **1** wherein:

when the club head body is coupled with the first attachment member, the golf club head comprises:

a first sole width;

and

when the club head body is coupled with the second attachment member, the golf club head comprises:

a second sole width different than the first sole width.

3) The golf club head of claim **2** wherein:
the first sole width is greater than or equal to approximately 0.6 centimeters and less than or equal to approximately 3.5 centimeters.
4) The golf club head of claim **1** wherein:
the golf club head comprises an iron-type golf club head.
5) The golf club head of claim **1** wherein:
the golf club head comprises a club head sole; and
the club head body is configured so that when one of the first attachment member or the second attachment member is coupled to the club head body, the one of the first attachment member or the second attachment member forms at least part of the club head sole.
6) The golf club head of claim **5** wherein:
the club head body is configured so that when the one of the first attachment member or the second attachment member is coupled to club head body, the one of the first attachment member or the second attachment member forms all of the club head sole.
7) The golf club head of claim **1** wherein:
the golf club head comprises an iron-type golf club head; and
the loft angle is greater than or equal to approximately 47 degrees and less than or equal to approximately 64 degrees.
8) The golf club head of claim **7** wherein:
the loft angle is one of approximately 56 degrees or approximately 60 degrees.
9) The golf club head of claim **1** wherein at least one of:
the club head body comprises a first dampening member; or
at least one of: (i) the first attachment member comprises a second dampening member, or (ii) the second attachment member comprises a third dampening member.
10) The golf club head of claim **1** wherein:
the club head body comprises a body alignment aid configured to facilitate coupling the club head body to the first attachment member or the second attachment member.
11) The golf club head of claim **1** wherein:
the bounce angle is greater than or equal to approximately 0 degrees or less than or equal to approximately 20 degrees.
12) The golf club head of claim **1** wherein:
the first bounce height is greater than or equal to approximately 0.500 centimeters or less than or equal to approximately 0.635 centimeters.
13) The golf club head of claim **1** wherein:
the first attachment member comprises a first weight and the second attachment member comprises a second weight different than the first weight.
14) The golf club head of claim **13** wherein:
the club head body is configured to be removably coupled with a third attachment member at different times than the first attachment member and the second attachment member;
wherein:
the third attachment member comprises a third weight approximately equal to the first weight; and
when the club head body is coupled with the third attachment member, the golf club head comprises:
the loft angle;
the bounce angle; and
the first bounce height.

15) A set of golf club heads comprising:
a first club head comprising:
a first club head body configured to be removably coupled at different times with a first attachment member and a second attachment member;
and
a second club head comprising:
a second club head body configured to be removably coupled at different times with a third attachment member and a fourth attachment member;
wherein:
when the first club head body is coupled with the first attachment member, the first club head comprises:
a first loft angle;
a first bounce angle; and
a first bounce height;
when the first club head body is coupled with the second attachment member, the first club head comprises:
the first loft angle;
the first bounce angle; and
a second bounce height different than the first bounce height;
when the second club head body is coupled with the third attachment member, the second club head comprises:
a second loft angle;
a second bounce angle; and
a third bounce height;
and
when the second club head body is coupled with the fourth attachment member, the second club head comprises:
the second loft angle;
the second bounce angle; and
a fourth bounce height different than the third bounce height.
16) The set of golf clubs of claim **15** wherein at least one of:
the second loft angle is greater than the first loft angle;
the second bounce height is greater than the first bounce height, and the third bounce height is greater than or approximately equal to the first bounce height; or
the fourth bounce height is greater than the third bounce height, and the fourth bounce height is greater than or approximately equal to the second bounce height.
17) Multiple attachment members comprising:
a first attachment member and a second attachment member, each being configured to be removably coupled at different times with a first club head body of a first golf club head,
wherein:
when the first attachment member is coupled with the first club head body, the first golf club head comprises:
a first loft angle;
a first bounce angle;
a first bounce height; and
a first sole width;
and
when the second attachment member is coupled with the first club head body, the first golf club head comprises:
the first loft angle;
the first bounce angle;
a second bounce height different than the first bounce height; and
a second sole width different than the first sole width.

18) The multiple attachment members of claim **17** further comprising:

a third attachment member and a fourth attachment member, each being configured to be removably coupled at different times with a second club head body of a second golf club head,

wherein:

when the third attachment member is coupled with the second club head body, the second golf club head comprises:

a second loft angle;

a second bounce angle;

a third bounce height; and

a third sole width;

and

when the fourth attachment member is coupled with the second club head body, the second golf club head comprises:

the second loft angle;

the second bounce angle;

a fourth bounce height different than the third bounce height; and

a fourth sole width different than the third sole width.

19) The multiple attachment members of claim **18** wherein:

the first attachment member and the second attachment member are configured to prevent the first attachment member and the second attachment member from being coupled with the second club head body.

20) A method comprising:

providing a first attachment member; and

providing a second attachment member;

wherein:

the first attachment member and the second attachment member are each configured to be removably coupled at different times with a club head body of a golf club head;

when the first attachment member is coupled with the club head body, the golf club head comprises:

a loft angle;

a bounce angle;

a first bounce height; and

a first sole width;

and

when the second attachment member is coupled with the club head body, the golf club head comprises:

the loft angle;

the bounce angle;

a second bounce height different than the first bounce height; and

a second sole width different than the first sole width.

21) The method of claim **20** further comprising at least one of:

providing the club head body;

coupling the first attachment member to the club head body;

coupling the second attachment member to the club head body;

decoupling the first attachment member from the club head body; or

decoupling the second attachment member from the club head body.

22) The method of claim **20** wherein:

the golf club head comprises a club head sole; and

the club head body is configured so that when one of the first attachment member or the second attachment member is coupled to the club head body, the one of the first attachment member or the second attachment member forms at least part of the club head sole.

23) The method of claim **20** wherein at least one of:

providing the first attachment member and providing the second attachment member each comprises:

configuring the loft angle to be greater than or equal to approximately 47 degrees and less than or equal to approximately 64 degrees;

providing the first attachment member and providing the second attachment member each comprises:

configuring the bounce angle to be greater than or equal to approximately 0 degrees and less than or equal to approximately 20 degrees;

providing the first attachment member comprises:

configuring the first bounce height to be greater than or equal to approximately 0.500 centimeters and less than or equal to approximately 0.635 centimeters;

or

providing the first club head first attachment member comprises:

configuring the first sole width to be greater than or equal to approximately 0.6 centimeters and less than or equal to approximately 3.5 centimeters.

24) The method of claim **20** wherein:

providing the first attachment member comprises providing a dampening member.

25) The method of claim **20** wherein:

providing the first attachment member comprises providing the first attachment member so that the first attachment member comprises a first weight; and

providing the second attachment member comprises providing the second attachment member so that the second attachment member comprises a second weight different than the first weight.

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