GOLF CLUB AND GOLF CLUB HEAD STRUCTURES HAVING NANO COATING

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ABSTRACT

Golf club and golf club head structures having a nano coating are presented. In some examples, the golf club heads may be formed of two or more parts. The two or more parts or portions may be formed of different materials or materials having different weights or densities to manipulate the center of gravity of the club head, overall weight of the club head, etc. The two or more parts of the golf club head may be covered with a nano coating to provide the appearance of a uniform, one-piece golf club head. In some examples, all or substantially all of the golf club head may be covered with the nano coating.
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RELATED APPLICATIONS


FIELD OF THE INVENTION

[0002] The present invention relates generally to golf clubs and golf club heads. Particular example aspects of this invention relate to a golf club head having a nano coating covering all or substantially all of the golf club head.

BACKGROUND

[0003] Golf is enjoyed by a wide variety of players—players of different genders and dramatically different ages and/or skill levels. Golf is somewhat unique in the sporting world in that such diverse collections of players can play together in golf events, even in direct competition with one another (e.g., using handicapped scoring, different tee boxes, in team formats, etc.), and still enjoy the golf outing or competition. These factors, together with the increased availability of golf programming on television (e.g., golf tournaments, golf news, golf history, and/or other golf programming) and the rise of well known golf superstars, at least in part, have increased golf’s popularity in recent years, both in the United States and across the world.

[0004] Golfers at all skill levels seek to improve their performance, lower their golf scores, and reach that next performance “level.” Manufacturers of all types of golf equipment have responded to these demands, and in recent years, the industry has witnessed dramatic changes and improvements in golf equipment. For example, a wide range of different golf ball models now are available, with balls designed to complement specific swing speeds and/or other player characteristics or preferences, e.g., with some balls designed to fly farther and/or straighter; some designed to provide higher or flatter trajectories; some designed to provide more spin, control, and/or feel (particularly around the greens); some designed for faster or slower swing speeds; etc. A host of swing and/or teaching aids also are available on the market that promise to help lower one’s golf scores.

[0005] Being the sole instrument that sets a golf ball in motion during play, the golf club also has been the subject of much technological research and advancement in recent years. For example, the market has seen improvements in golf club heads, shafts, and grips in recent years. Additionally, other technological advancements have been made in an effort to better match the various elements of the golf club and characteristics of a golf ball to a particular user’s swing features or characteristics (e.g., club fitting technology, ball launch angle measurement technology, etc.).

[0006] As new materials are used in the manufacture of clubs, lowering the center of gravity is often a priority during golf club design. In addition, players have come to expect a certain profile and/or appearance associated with certain golf clubs. The use of different materials in different parts or portions of the clubs would be advantageous in manipulating the overall weight of the golf club head, as well as the center of gravity of the golf club head. However, these different materials may result in an irregular appearance for the golf club head. Accordingly, a golf club having a low center of gravity while maintaining a traditional appearance would be advantageous to golfers at all levels of play.

SUMMARY OF THE INVENTION

[0007] The following presents a simplified summary in order to provide a basic understanding of some aspects of the invention. The summary is not an extensive overview of the invention. It is neither intended to identify key or critical elements of the invention nor to delineate the scope of the invention. The following summary merely presents some concepts of the invention in a simplified form as a prelude to the description below.

[0008] Aspects of this invention relate to golf club and golf club head structures having a two-part or multi-part golf club head. Portions of the golf club head may be formed of materials different from other portions of the golf club head in order to manipulate the overall weight of the golf club head, the center of gravity of the golf club head, etc. In some examples, the golf club head may include two portions, a lower portion formed of a heavy or dense material and an upper portion formed of a lighter weight or less dense material than the lower portion. The golf club head (e.g., the upper portion and the lower portion) may then be covered with a nano coating to provide the appearance of a one-piece golf club head or a golf club head formed of a single material. In some examples, the nano coating may cover all or substantially all of the golf club head. In some arrangements, the nano coating may be an outer coating that provides a uniform, one piece appearance for the golf club head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention is illustrated by way of example and not limited in the accompanying figures, in which like reference numerals indicate similar elements throughout, and in which:

[0010] FIG. 1 is an example golf club having a multi-part golf club head according to at least some examples of this invention.

[0011] FIG. 2A is an exploded view of an example two-part golf club head according to at least some examples of this invention.

[0012] FIG. 2B is an exploded view of an example multi-part golf club head according to at least some examples of this invention.

[0013] FIG. 3 is the two-part golf club head of FIG. 2A shown with the two portions connected according to at least some examples of this invention.

[0014] FIG. 4A is a cross section of the example golf club head of FIG. 3 taken along line 4-4 in FIG. 3 according to at least some aspects of this invention.

[0015] FIG. 4B is a cross section of the example golf club head of FIG. 3 according to at least some aspects of this invention.

[0016] FIG. 5 is a front view of the golf club head of FIG. 3 having a nano coating according to at least some aspects of this invention.

[0017] FIG. 6 is a rear view of a golf club head having a nano coating and an additional weighted member according to at least some aspects of this invention.

[0018] FIG. 7 is a cross sectional view of a golf club head having a nano coating according to at least some aspects of this invention.
FIG. 8 is a front view of an example golf club head having a nano coating according to at least some aspects of this invention.

FIGS. 9A and 9B illustrate one example wood-type golf club head having a nano coating according to at least some aspects of this invention.

FIG. 10 is an example hybrid-type golf club head having a nano coating according to at least some aspects of this invention.

FIG. 11 illustrates another example of a wood-type golf club head having a nano coating according to at least some aspects of this invention.

FIG. 12A is an exploded view of a wood-type golf club head having a cup-shaped portion and a rear portion according to at least some aspects of this invention.

FIG. 12B is a rear perspective view of the golf club head of FIG. 12A showing a seam connecting cup-shaped portion and rear portion according to to at least some aspects of this invention.

FIG. 12C is a rear elevation view of the cup-shaped portion of the golf club head of FIG. 12A having a nano coating according to at least some aspects of this invention.

FIG. 12D is a rear elevation view of the cup-shaped portion of the golf club head of FIG. 11A having a nano coating according to at least some aspects of this invention.

FIG. 12E is a rear perspective view of the golf club head of FIG. 12A having a nano coating according to at least some aspects of this invention.

The reader is advised that the various parts shown in these drawings are not necessarily drawn to scale.

DETAILED DESCRIPTION

The following description and the accompanying figures disclose features of golf clubs and golf club head structures in accordance with examples of the present invention.

I. General Description of Example Golf Clubs and Golf Club Heads in Accordance with this Invention

Aspects of this invention relate to golf club and golf club head structures. In some examples, the golf club head may include a first golf club head body portion formed of a first material. The first golf club head body portion may form a lower portion of the golf club head and may include a sole of the golf club head. The golf club head may further include a second golf club head body portion formed of a second material, the second material being a lighter weight material than the first material. In some arrangements, the second golf club head body portion may form an upper portion of the golf club head and may be positioned vertically above and in contact with the first golf club head body portion. The golf club head may further include a connector region. The connector region may include a first portion of a connector connected to the first golf club head body portion, and a second portion of the connector connected to the second golf club head body portion and configured to mate with the first portion of the connector. The golf club head may further include a nano coating covering the golf club head including covering the first golf club head body portion and the second golf club head body portion. In some examples, the nano coating may provide an appearance of a one-piece golf club head or a golf club head formed of a single material.

In some arrangements, the second material may be a different type of material than the first material. Alternatively, the first material and the second material may be the same type of material but the first material and the second material may have different material properties, such as weight, density, etc.

In some examples, the first portion of the connector may include a generally planar upper surface of the first golf club head body portion and the second portion of the connector may include a generally planar lower surface of the second golf club head body portion. In at least some arrangements, the generally planar upper surface may be bonded to the generally planar lower surface. In other examples, the first portion of the connector may include a plurality of protrusions extending upward from a top surface of the first golf club head body portion and the second portion of the connector may include a plurality of recesses formed in a bottom surface of the second golf club head body portion.

In at least some examples, the golf club head may further include a weighted member. In some arrangements, the weighted member may be formed of third material different from first material and second material. The nano coating covering the golf club head may also cover the weighted member.

II. General Description of Example Methods of Manufacturing Golf Clubs and Golf Club Heads in Accordance with this Invention

At least some additional aspects of this invention relate to methods of manufacturing golf clubs and golf club heads. In some examples, the method may include forming a first portion of a golf club head body of a first material. In some aspects, the first portion of the golf club head body may form a lower portion of the golf club head body and may include a first connector region on a top surface of the first portion of the golf club head body. The method may further include forming a second portion of the golf club head body of a second material different from the first material. In some examples, the second portion of the golf club head body may form an upper portion of the golf club head body and may include a second connector region formed in a bottom surface of the second portion and configured to mate with first connector region formed in the top surface of the first portion. At least some example methods may further include connecting the first portion of the golf club head body to the second portion of the golf club head body via first and second connector regions. The method may further include coating the golf club head body, including the first portion and the second portion, with a nano coating. In some arrangements, coating the golf club head body with a nano coating provides an appearance of a golf club head formed of a single material.

In at least some aspects, the first material may have a greater weight than the second material. In still other aspects, the first material may have a greater density than the second material. In at least some examples, the first material and the second material may both be polymers.

In some methods, forming the first portion of the golf club head body and forming the second portion of the golf club head body may include forming the first portion and the second portion in a two-shot molding process. In some example methods, connecting the first portion to the second portion may include bonding the first connector region to the second connector region, for instance, via the two-shot molding process.
[0037] Given the general description of various example aspects of the invention provided above, more detailed descriptions of various specific examples of golf clubs and golf club head structures, as well as methods of manufacturing golf clubs and golf club head structures, according to the invention are provided below.

III. Detailed Description of Example Golf Clubs and Golf Club Heads According to the Invention

[0038] The following discussion and accompanying figures describe various example golf clubs and golf club head structures in accordance with the present invention. When the same reference number appears in more than one drawing, that reference number is used consistently in this specification and the drawings to refer to the same or similar parts throughout.

[0039] Various golf club heads in accordance with aspects described herein may be used with various types of golf clubs. For instance, the nano-coated golf club head may be used with iron-type golf club heads, wedge-type golf club heads, hybrid-type golf club heads, utility-type golf club heads, and the like. Additionally or alternatively, the nano-coated golf club head may be used with wood-type golf clubs and golf club heads, e.g., clubs and club heads typically used for drivers and fairway woods, as well as for “wood-type” utility or hybrid clubs, or the like. Such club head structures may have little or no actual “wood” material and still may be referred to conventionally in the art as “woods” (e.g., “metal woods,” “fairway woods,” etc.).

[0040] Golf club heads may generally include a plurality of different regions, segments, portions, ends, etc. In an example embodiment, a golf club head may generally include a front face, a rear, a toe, a heel, a crown and a sole that may, generally, define an interior of the golf club head. The golf club heads may include a multiple piece construction and structure, e.g., including one or more of a face, a front face (optionally including a ball striking surface that may be integrally formed therein or attached thereto), a top or crown, a bottom or sole, a rear, etc. Of course, if desired, various portions of the club head structure may be integrally formed with one another, as a unitary, one piece construction, without departing from the invention (e.g., the front face and/or rear may be integrally formed with the sole or crown, etc.). Optionally, if desired, the various portions of the club head structure (such as the sole, the crown, the face, the rear, etc.) individually may be formed from multiple pieces of material without departing from this invention (e.g., a multi-piece crown, a multi-piece sole, etc.). Also, as other alternatives, if desired, the entire club head may be made as a single, one piece, unitary construction, or a front face may be attached to a one piece head club head body (optionally, a hollow body, etc.). More specific examples and features of golf club heads and golf club structures according to this invention will be described in detail below in conjunction with the example golf club structures illustrated in FIGS. 1 through 12.

[0041] FIG. 1 generally illustrates an example golf club 100 and/or golf club head 102 in accordance with this invention. In addition to the golf club head 102, the overall golf club structure 100 of this example includes a hosel 104, a shaft 106 received in and/or inserted into and/or through the hosel 104, and a grip or handle 108 attached to the shaft 106. Optionally, if desired, the external hosel 104 may be eliminated and the shaft 106 may be directly inserted into and/or otherwise attached to the head 102 (e.g., through an opening provided in the top of the club head 102, through an internal hosel (e.g., provided within an interior chamber defined by the club head 102), etc.).

[0042] The shaft 106 may be received in, engaged with, and/or attached to the club head 102 in any suitable or desired manner, including in conventional manners known and used in the art, without departing from the invention. As more specific examples, the shaft 106 may be engaged with the club head 102 via the hosel 104 and/or directly to the club head structure 102, e.g., via adhesives, cements, welding, soldering, mechanical connectors (such as threads, retaining elements, or the like), etc.; through a shaft-receiving sleeve or element extending into the club head body 102; etc. The shaft 106 also may be made from any suitable or desired materials, including conventional materials known and used in the art, such as graphite-based materials, composite or other non-metal materials, steel materials (including stainless steel), aluminum materials, other metal alloy materials, polymeric materials, combinations of various materials, and the like. Also, the grip or handle 108 may be attached to, engaged with, and/or extend from the shaft 106 in any suitable or desired manner, including in conventional manners known and used in the art, e.g., using adhesives or cements; via welding, soldering, adhesives, or the like; via mechanical connectors (such as threads, retaining elements, etc.); etc. As another example, if desired, the grip or handle 108 may be integrally formed as a unitary, one-piece construction with the shaft 106. Additionally, any desired grip or handle materials may be used without departing from this invention, including, for example: rubber materials, leather materials, rubber or other materials including cord or other fabric material embedded therein, polymeric materials, and the like.

[0043] The club head 102 itself also may be constructed in any suitable or desired manner and/or from any suitable or desired materials without departing from this invention, including from conventional materials and/or in conventional manners known and used in the art. For example, in the example structure 102 shown in FIG. 1, the club head 102 includes a first portion 102a that may include a ball striking face (optionally including a ball striking face plate integrally formed with the face member 102c) or attached to the club head such that the face plate and a frame member together constitute the overall first portion 102a. The club head 102 may also include a second portion 102b or upper portion 102b arranged on top of (i.e., vertically above when the club is in a ball-address position) the first portion 102a. The second portion 102c or upper portion 102c and the first portion 102a may be formed from known methods of manufacture, such as casting, forging, molding, etc., and the portions 102a, 102c may then be joined, as will be discussed more fully below. In some examples, the first portion 102a and the second portion 102b may be formed together, such as using a two-shot molding process. In some other examples, the first portion 102a and the second portion 102b may be formed using different manufacturing processes and/or different materials, as will be discussed more fully below. The club head may also include a crown or top 102d and a sole or bottom 102d. The crown 102c and sole 102d may be integrally formed with one or more of first portion 102a and second portion 102b, or may be separately formed and joined to the remaining club head members.

[0044] A wide variety of overall club head constructions are possible without departing from this invention. For example, if desired, some or all of the various individual parts...
of the club head 102 described above may be made from multiple pieces that are connected together (e.g., by welding, adhesives, or other fusing techniques; by mechanical connectors; etc.). The various parts (e.g., first or lower portion, second or upper portion, etc.) may be made from any desired materials and combinations of different materials, including materials that are conventionally known and used in the art, such as metal materials, including lightweight metal materials, and the like. More specific examples of suitable lightweight metal materials include steel, titanium and titanium alloys, aluminum and aluminum alloys, magnesium and magnesium alloys, etc. Additionally or alternatively, the various parts of the club head may be formed of one or more polymer materials, composite materials, etc. Suitable materials for use in each part of the golf club head will be discussed more fully below. As mentioned above, the first portion 102a and the second portion 102b of the golf club head may be formed of different materials and may be joined together, or may be formed together using different material, as will be discussed herein.

[0045] The various individual parts that make up a club head structure 102, if made from multiple pieces, may be engaged with one another and/or held together in any suitable or desired manner, including in conventional manners known and used in the art. For example, the various parts of the club head structure 102, such as the first portion 102a, the second portion 102b, etc., may be joined and/or fixed together (directly or indirectly through intermediate members) by adhesives, cements, welding, soldering, or other bonding or finishing techniques; by mechanical connectors (such as threads, screws, nuts, bolts, or other connectors); and the like. If desired, the mating edges of various parts of the club head structure 102 may include one or more raised ribs, tabs, ledges, protrusions, tongues or other engagement elements that fit into or onto corresponding grooves, slots, surfaces, ledges, openings, recesses, receivers, or other structures provided in or on the facing side edge to which it is joined. Cements, adhesives, mechanical connectors, finishing material, or the like may be used in combination with the raised rib/groove/ledge/edge or other connecting structures described above to further help secure the various parts of the club head structure 102 together.

[0046] In some examples, a nano coating may cover the golf club head (including the first portion 102a and the second portion 102b) and may aid in connecting the first portion 102a to the second portion 102b. Nano coatings have been described as “liquid solids” composed of extremely small particles. The nano coatings may be extremely flexible, resistant to corrosion, abrasion or scratching, and may require substantially less time to cure than conventional coatings. For instance, some types of nano coatings may be cured in 10 seconds or less, as opposed to 30 minutes or more for various conventional coatings. The nano coating may be applied to the golf club head using known methods of application, such as painting, spraying, etc.

[0047] Particularly suited are fine-grained high-strength pure metals or alloys containing one of Al, Cu, Co, Ni, Fe, Mo, Pt, Ti, W, Zn, and Zr; alloys containing at least two elements selected from Al, Cu, Ca, Ni, Fe, Mo, Pt, Ti, W and Zr, pure metals or alloys of Al, Cu, Co, Ni, Fe, Mo, Pt, W and Zr, further containing at least one element selected from Ag, Au, B, C, Cr, Mo, Mn, P, S, Si, Pb, Pd, Rh, Ru, Sn, V and Zr; and optionally containing particulate additions such as metal powders, metal alloy powders and metal oxide powders of Ag, Al, Co, Cu, In, Mg, Mo, Ni, Si, Sn, Pt, Ti, V, W, Zn; nitrides of Al, B and Si; C (graphite, carbon fibers, carbon nanotubes or diamond); carbides of B, Cr, Bi, Si, W; ceramics, glasses and polymer materials such as polyytetrafluoroethylene (PTFE), polyvinylchloride (PVC), acrylonitrile-butadiene-styrene (ABS), polyethylene (PE), polypropylene (PP).

[0048] In particular, suitable nano coatings may include those having Ni, Fe, Zn, and Co particles. The nano coating may further comprise a mixture of these particles.

[0049] The thickness of the applied coating may be any suitable thickness to achieve the desired look and properties of the coating. Suitable thicknesses range from 50 to 180 microns, for example 120 to 130 microns. Further, the thickness could vary at different portions of the club head.

[0050] Nano coatings per se are known. Integrare Technologies, Inc., for example, provides suitable nano coatings for various substrates. Suitable nano coatings, properties thereof, and methods of making nano coatings may be found in several Integrare patents, for example, U.S. Pat. Nos. 7,367,578 and 7,910,224, and published applications, for example US 20110143159. Such patents and applications are hereby incorporated by reference in their entirety.

[0051] As mentioned above, the nano coating may be an outer coating that may provide a uniform, one piece appearance for the golf club head. In some arrangements, the nano coating may provide the appearance of a golf club head made entirely of metal or another single material.

[0052] The nano coating covering all or substantially all of the golf club head may affect the feel of the club during use. For instance, the nano coating may provide a softer feel or a harder feel during a golf swing based on the type of nano coating used (e.g., the type of particles within the nano coating). Thus, golf club designers may select a type of nano coating based on the desired feel or performance characteristics of the golf club head. Further, the center of gravity, moment of inertia, flex point, swingweight, and the like may be manipulated through the use of nano coating via selection of the materials of the nano coating as well as strategic positioning of the coating.

[0053] The dimensions and/or other characteristics of a golf club head structure according to examples of this invention may vary significantly without departing from the invention. Various additional characteristics, features, etc. will be discussed more fully below. In addition, the nano coatings described above including types of particles as well as properties of the coating may be applied in all further aspects and examples of this application.

[0054] As discussed above, a golf club head (e.g., club head 102) may be formed of multiple parts. In some examples, the golf club head 202 may be formed of two parts, a first or lower portion 202a and a second or upper portion 202b, as shown in FIG. 2A. FIG. 2A is an exploded view of a two-part golf club head 202. The second portion 202b may be positioned vertically above and in contact with the first portion 202a. In some examples, the second portion 202b may be a portion of the golf club head 202 that generally does not strike or contact a ball during play. For example, during play, a ball is generally struck with a lower portion of the face of the golf club head. Accordingly, the upper portion may, in some instances, not contact the ball during play. The portion that does not contact the ball may, in conventional golf club heads, add unnecessary weight to a golf club head and shift the center of gravity upward.
Although a two-part golf club head 202 is shown in FIG. 2A, more parts may be used to form the golf club head without departing from the invention. For instance, FIG. 2B illustrates one example golf club head 252 having a three-part head. The three-part head 252 includes a lower portion 252a, an upper portion 252b, and a middle portion 252c arranged between the lower portion 252a and the upper portion 252b. Various other arrangements may be used without departing from the invention, and several additional arrangements will be discussed more fully below.

With further reference to FIG. 2A, the first portion 202a may include a first connector region 204. The second portion 202b may include a second connector region 203 configured to mate with the first connector region 204. In some examples, the first connector region 205 may be a generally planar surface along a top surface of the first portion 202a (see e.g., FIG. 7) and the second connector region 203 may be a generally planar surface along a bottom surface of the second portion 202b (see e.g., FIG. 7). This arrangement will be discussed more fully below.

In other examples, the first connector region 205 may include one or more protrusions 204 extending upward from the top surface of the first portion 202a. The number, size, shape, etc. of protrusions may vary. For instance, although the protrusions 204 are shown as being generally square or rectangular, the protrusions may be any desired shape or have any desired cross-section, including circular, triangular, planar, pentagonal, octagonal, and the like. Further, the protrusions may, in some arrangements be between 0.1 and 0.3 inches high (e.g., a top surface of the protrusion may be between 0.1 and 0.3 inches from the top surface of the first portion 202a of the golf club head 200).

The protrusions 204 may be configured to mate with corresponding recesses 206 formed in the connecting region 203 of the second portion 202b. The protrusions and recesses may aid in aligning the first portion 202a with the second portion 202b, and may aid in connecting the two portions 202a, 202b to form the club head 202. Although FIG. 2A shows the first portion 202a having protrusions 204 and the second portion 202b having recesses, an opposite arrangement may also be used in which the first portion 202a is includes a plurality of recesses while the second portion 202b includes a plurality of protrusions configured to mate with the recesses. In some examples, the protrusions 204 and recesses 206 may provide a friction fit between first portion 202a and second portion 202b. In other examples, the second portion 202b may be manufactured (e.g., molded, etc.) around the protrusions, thereby forming the recesses in the second portion 202b and connecting or bonding the second portion 202b to the first portion 202a. These arrangements will be discussed more fully below.

In some examples, the first portion 202a and the second portion 202b may be constructed of different materials having different material properties. For instance, the first portion 202a may be formed of a heavier or denser material than the second portion 202b. This arrangement may aid in shifting weight associated with the club head 202 to a lower portion of the club head 202, thereby shifting the center of gravity of the club head lower in the club head 202. This may aid in providing improved loft, and other performance characteristics. In some examples, the first portion 202a may be formed of a high density polymer material, while the second portion 202b may be formed of a polymer material having a lower density. In another arrangement, the first portion 202a may be formed of a metal material, such as steel, aluminum, etc. while the second portion 202b may be formed of a lighter weight material, such as a polymer. This two-part arrangement may result in a club head having an irregular appearance due to the difference in materials used. Thus, the first portion 202a and the second portion 202b may be visually perceptively different from one another. Accordingly, a nano coating may cover the golf club head or a portion thereof. In some examples, the nano coating may cover all or substantially all of the golf club head (e.g., first portion, second portion, front, rear, sole, crown, etc.). The nano coating arrangement will be discussed more fully below.

FIG. 3 illustrates the example golf club head 202 of FIG. 2A with the first portion 202a joined to the second portion 202b. A seam 208 formed between the first portion 202a and the second portion 202b is visible and denotes where the two connector regions 203, 205 meet to form the golf club head 202. Although the two portions 202a, 202b are shown here connected via protrusions 204 and corresponding recesses, various other methods of joining the portions 202a, 202b of the golf club head 202 may be used. For instance, various adhesives may be used to join the two portions. Additionally or alternatively, the portions may be joined using screws or other fasteners. In still other arrangements, a snap-fit type arrangement may be used in which tabs, lips, etc. may be used to connect the second portion 202b to the first portion 202a. Further, the first portion 202a may be bonded to the second portion 202b during manufacture of the first portion 202a and the second portion 202b.

FIG. 4A is a cross section of the golf club head 202 taken along line 4-4 in FIG. 3. The top of protrusion 204 is shown. The two portions 202a, 202b of the golf club head 202 are shown having different cross-hatching to indicate that each portion is formed of a different material. As mentioned above, the lower portion 202a may be formed of a heavier weight material, such as metal, high density polymer, etc. while the upper portion 202b may be formed of a lighter weight material, such as a lower density polymer, lighter weight metal, etc. FIG. 4B, a cross-section taken from a front view, also indicates different cross-hatching in the first portion 202a than the second portion 202b to indicate a difference in materials used to construct each portion. The difference in cross-hatching may indicate different types of materials (e.g., metal vs. polymer) or may indicate different types of the same material (e.g., high density polymer vs. lower density polymer).

As mentioned above, the use of different materials for the first portion 202a and the second portion 202b may result in irregularities in the appearance of the golf club head 202. An observer could readily see that the golf club head had a multi-piece construction. Accordingly, a nano coating may be used to cover the golf club head 202 in order to provide a uniform appearance (i.e., the appearance of a one piece golf club head or a golf club head formed of a single material, especially a metal material in an exemplary embodiment). Further, the nano coating may also provide additional performance enhancements, as discussed above.

In some examples, the nano coating may cover all or substantially all of the golf club head. FIG. 5 is a front view of a golf club head 202 of FIG. 3. The golf club head 202 may be formed of two or more parts formed of materials having different weights or densities, similar to the arrangements of FIGS. 2A-4B. A nano coating 310 extends over all or substantially all of the golf club head. For instance, the nano
coating 310 covers a front, rear, crown, sole, etc. of the golf club head. The nano coating may provide an appearance of a single piece golf club head, such as a traditional forged golf club head, while providing the weight and performance advantages of the two-piece golf club head. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0064] FIG. 6 is a rear view of a golf club head 402 having a nano coating 410. The golf club head 402 may be formed of two or more parts, as discussed above, and may be substantially coated with a nano coating. In some arrangements, the entire golf club head 402 may be covered with the nano coating, which may provide a uniform appearance for the golf club head 402 (e.g., the golf club head 402 may appear to be made of a single material).

[0065] The golf club head 402 in FIG. 6 may further include a weighted member 420 arranged on a rear of the golf club head 402. For instance, the golf club head 402 may have a weighted member 420 positioned in a cavity 430 formed in the rear of the golf club head 402. The weighted member 420 may further aid in shifting the center of gravity of the golf club head 402 lower along the golf club head 402. In some examples, the weighted member may be formed of a material different from one or more of the materials used to form the portions of the golf club head. For example, the weighted member 420 may be formed of a metal alloy or a metal-filled polymer, such as a tungsten-filled polymer. Alternatively, the weighted member 420 may be formed of one of the material used to form the first portion or second portion of the golf club head. In order to maintain the uniform appearance of the golf club head, the weighted member 420 may also be coated with the nano coating 410. Thus, the golf club head 402 looks like a single, integral, metal iron-type golf club. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0066] FIG. 7 is a cross-sectional view of a golf club head 502 similar to the club head shown in FIG. 4B. The golf club head 502 includes a first portion 502a and a second portion 502b positioned vertically above and in contact with the first portion 502a. The first portion may include a connector region, as discussed above. The first connector region 505 of FIG. 7 is a generally planar top surface of the first portion 502a and the second connector region is a generally planar bottom surface of the second portion 502b. The first connector region 505 and the second connector region 503 form a seam between the top surface of the first portion 502a and the bottom surface of the upper portion 502b. In some examples, alternate connectors (e.g., protrusions, snap fits, etc.) may be used. The seam, connectors, etc. of the connection regions 503, 505 may be visible on the club head. Accordingly, the golf club head 502 includes a nano coating 510 covering all or substantially all of the golf club head 502. The nano coating 510 adds an additional layer to the club head 502 and generally surrounds the golf club head 502. It is understood that the nano coated layer is not necessarily drawn to scale but is shown in an exaggerated thickness for illustrative purposes.

[0067] In some examples, the golf club head 502 (or other golf club heads discussed herein) may be formed using one or more methods of manufacturing. For instance, in one arrangement, the two portions 502a, 502b may be formed in a two-shot molding process, such as a two-shot injection molding process. In this arrangement, the first portion 502a may be formed of a first material, such as a high density polymer material, some metal materials, etc. The second portion 502b may be formed of a second material having less density or being a lighter weight material than the first material of the first portion 502a. Such suitable materials may include light weight or low density polymers. This two-shot molding process may bond the first portion 502a to the second portion 502b. This bond may maintain the position of the second portion 502b relative to the first portion 502a without additional connectors. Alternatively, additional connectors, such as those discussed above, may be used. All or substantially all of the golf club head 502 may then be coated with the nano coating to provide a uniform, one-piece appearance for the golf club head 502.

[0068] In some other arrangements, the second portion 502b may be formed after the first portion 502a. For instance, the first portion 502a may be formed using any known methods of forming a golf club head or portion thereof, such as forging, casting, molding, etc. As discussed above, the first portion 502a may be formed of a first material, such as high density polymer materials, various metal materials, etc. The second portion 502b may be molded (e.g., injection molded, blow molded, etc.) onto the first portion 502a. The second portion 502b may be formed of a second material different from the first material and may be formed of a lighter weight material, such as a polymer. Once the second portion has been formed, the golf club head 502 may be coated with the nano coating. In some arrangements, the nano coating may aid in maintaining the position of the second portion 502b relative to the first portion 502a.

[0069] In some alternate examples, the second portion 502b may be formed separately from the first portion 502a and may be joined to the first portion 502a using known methods of joining, such as screws or other fasteners, adhesives, snap fits, and the like. For instance, rather than molding the second portion 502b around the first portion 502a or using a two-shot molding process to form the first portion 502a and second portion 502b as discussed above, the second portion 502b may be formed in a separate manufacturing process (e.g., molding, etc.) and then joined to the first portion 502a. The club head 502 may then be coated with the nano coating 510.

[0070] The nano coating 510 provided on golf club head 502 may provide a uniform, one-piece appearance for the golf club head 502. In some examples, a seam may be visible on the golf club head where the first portion 502a meets the second portion 502b. Further, because of the difference in materials used to form the two portions 502a, 502b, the golf club head 502 may have an irregular appearance. Accordingly, covering all or substantially all of the golf club head 502 with the nano coating 510 would provide an appearance of a one-piece golf club head or a golf club head formed of a single material and may mask the seam and different materials used. In some examples, the nano coating may provide an appearance of a conventional forged golf club head. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0071] FIG. 8 illustrates a front view of the golf club head 502 of FIG. 7 with the nano coating 510 visible. The connector regions 503, 505 (e.g., protrusions 504, recessed 506) are shown in broken lines and are not visible through the nano coating 510. Rather, nano coating 510 covers all or substantially all of the golf club head 502 and provides a uniform, one-piece appearance for the two piece golf club head 502. The golf club head 502 further includes grooves 530. In some arrangements, the grooves 530 may be formed in at least a portion of the first portion 502a and/or the second portion 502b.
during manufacture of those portions 502a, 502b. The grooves 530 may then be coated with the nano coating 510 as the rest of the club head 502 is coated. Alternatively, in some examples, the grooves 530 may be formed in the club head after the nano coating 510 has been applied. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0072] As mentioned above, the use of a polymer or light weight metal or other material in an upper portion of a golf club head may reduce the overall weight associated with the golf club head and may also aid in shifting the center of gravity of the golf club head lower. The use of different materials may allow club designers to manipulate various aspects of the club (e.g., center of gravity, moment of inertia, etc.) in order to vary the performance characteristics of the golf club. However, the use of different materials to form the golf club head may result in an irregular appearance for the golf club head. Accordingly, covering all or substantially all of the golf club head with a nano coating may provide a uniform, one piece metal appearance for a two-part or multi-part golf club head.

[0073] As noted above, the nano coating covering all or substantially all of the golf club head may affect the feel of the club during use. For instance, the nano coating may provide a softer feel or a harder feel during a golf swing based on the type of nano coating used (e.g., the type of particles within the nano coating). Thus, golf club designers may select a type of nano coating based on the desired feel or performance characteristics of the golf club head.

[0074] Although the above description generally describes the use of nano coating in covering two-part iron-type golf clubs heads, the arrangements described herein could be used with various other types of golf club heads, including wedge-type golf club heads, wood-type golf club heads, hybrid-type golf club heads, and the like. FIGS. 9A and 9B illustrate one example wood-type golf club head formed of multiple parts and having a nano coating 610. The golf club 600 includes a golf club head 602, a shaft 606 connected to the golf club head 602 via a hosel 604, and a grip (not shown). The golf club head 602 is formed of multiple parts 602a-602e. For instance, the golf club head 602 includes ball striking surface 602a, frame 602b, crown 602c, sole 602d, rear 602e, toe 602f, and heel 602g. The golf club head 602 may include more or fewer portions without departing from the invention. Further, one or more of the ball striking surface 602a, frame 602b, crown 602c, sole 602d, rear 602e, toe 602f, and/or heel 602g may be integrally formed with one or more other parts. The golf club head 602 portions may be formed of different materials, using different manufacturing processes, etc., similar to the arrangements discussed above. For instance, the ball striking surface 602a and sole 602d may be formed of metal materials or higher density polymer materials, while the crown 602c may be formed of a lighter weight material such as polymer. Alternatively, the rear 602e and crown may be formed of a polymer or other lightweight material while the ball striking surface 602a, frame 602b and sole 602d are formed of metal or higher density polymer materials. The various portions may be connected using methods of connection known and/or described herein. Various other arrangements and combinations of materials may be used without departing from the invention.

[0075] Forming some portions of the golf club head 602 using different materials may reduce the overall weight associated with the golf club head 602 and may aid in shifting the center of gravity lower on the golf club head 602. However, the use of these different materials may result in an irregular appearance for the golf club head. Accordingly, all or substantially all of the golf club head 602 may be covered with a nano coating 610 to provide a uniform, one piece appearance for the golf club head, as discussed above. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0076] FIG. 10 illustrates one example hybrid club 700 having a nano coating 710 covering all or substantially all of the golf club head 702. The hybrid club head 702 may be formed of one or more pieces, one or more materials, etc., similar to the arrangements described above, in order to manipulate the overall weight of the club, center of gravity of the club head, etc. However, these various materials, etc. may result in an irregular appearance for the golf club head 702. Accordingly, the nano coating 710 covers all or substantially all of the golf club head in order to provide a uniform, one piece appearance for the golf club head 702. Types of nano coatings and properties thereof have been earlier discussed and such discussion applies here as well.

[0077] FIG. 11 illustrates another embodiment of a wood-type golf club having a nano coating. FIG. 11 discloses a golf club generally designated with the reference numeral 800. The golf club 800 includes a golf club head 802, a shaft 806 connected to the golf club head 802 via a hosel 804, and a grip (not shown). It is understood that in one exemplary embodiment, the golf club head 802 may be formed of multiple parts. For example, the golf club head 802 may have a cup-faced portion connected to a body portion. The golf club head 802 may also be made of a single member. It is understood that the golf club head 802 may have a ball striking surface 802a, a frame 802b, a crown 802c, a sole 802d, a rear 802e, a toe 802f, and/or a heel 802g, which parts may be integrally formed with one or more other parts. The golf club head 802 portions may be formed of different materials, using different manufacturing processes, etc., similar to the arrangements discussed above. For example, it is understood that the golf club head 802 may be formed of a polymeric material or some other composite type material. The material may be considered moldable. As further shown in FIG. 11, the body portion 802 may include a floor portion 820 on the sole 802d and a plurality of spines 822 extending toward the rear 802e of the club head 802. Recessed portions 824 are defined between the spines 822. It is understood that the golf club head 802 made from such polymeric or composite materials provides a lightweight construction. The various portions of the club head 802 may be connected using methods of connection known and/or described herein. Various other arrangements and combinations of materials may be used without departing from the invention.

[0078] As further shown in FIG. 11, segments of the club head 802 may be covered with a nano coating 810 consistent with descriptions above. In particular, the ball striking surface 802a, the floor portion 820 and the spines 822 may be covered with the nano coating 810. It is understood that the nano coating 810 could be positioned along other segments of the club head 802 as desired. The nano coating 810 is also placed over the hosel 804. In one exemplary embodiment, the nano coating 810 may have a thickness in the range of 2-10 thousands of an inch. In such configuration, the club head 802 appears to be constructed significantly from metal materials, but having a lighter weight construction due to use of the polymeric or composite materials. It is further understood
that the club head 802 could be formed of various shapes that
define surfaces designed to support the nano coating 810
thereon. In these embodiments, the club head 802 is consid-
ered to be made from a lightweight material where a certain
amount of weight is considered to be removed from the club
head including the ball striking surface 802a as desired. The
nano coating 810 provides additional strength and high
impact durability. Types of nano coatings and properties
thereof have been earlier discussed and such discussion
applies here as well.

[0079] FIG. 12A shows an exploded view of a wood-type
golf club 900 having a golf club head 902, the head 902
having a cup-faced portion 904 and rear portion 906. FIG.
12A shows one design but other designs are contemplated.
It is further understood that the cup-faced portion 904 and the
rear portion 906 could be made from the various components
of the exemplary embodiments discussed herein. The cup-
faced portion 904 may be positioned horizontally adjacent
to and in contact with the rear portion 906. The rear portion
906 is generally a portion of the golf club head 902 that does
not strike or contact a ball during play. For example, during play,
a ball is generally struck with the striking face 916 of the
cup-shaped portion 904 of the golf club head 902. A hosel 912
forms part of, or is connected to, cup-shaped portion 904.

[0080] With further reference to FIG. 12A, the cup-faced
portion 904 may include a first connector region 908. The
cup-face portion 904 further defines a hollow interior 914.
The rear portion 906 may include a second connector region
910 configured to mate with the first connector region 908. In
some examples, the first connector region 908 may be a
generally planar surface along a side surface of the cup-faced
portion 904 and the second connector region 910 may be a
generally planar surface along a side surface of rear portion
906. A lip joint may be used to connect cup-faced portion 904
with the rear portion 906.

[0081] In other examples, the first connector region 908
may include one or more protrusions extending outwardly
from the side surface of the cup-faced portion 904. Suitable
protrusions are shown in FIGS. 2A, 2B, and 3. The number,
size, shape, etc. of protrusions may vary. For instance,
although the protrusions in FIGS. 2A, 2B, and 3 are shown as
being generally square or rectangular, the protrusions may be
any desired shape or have any desired cross-section, includ-
ing circular, triangular, hexagonal, pentagonal, octagonal,
and the like. Further, the protrusions may, in some arrange-
ments be between between 0.1 and 0.3 inches high (e.g., a top
surface of the protrusion may be between 0.1 and 0.3 inches
from the side surface of the cup-faced portion 904 of the golf
club head 902.

[0082] The protrusions may be configured to mate with
corresponding recesses formed in the connecting region 910
of the rear portion 906. Such recesses are shown and
described for FIGS. 2A, 2B, and 3 and such discussion is
incorporated herein by reference. An opposite arrangement
may also be used in which the cup-faced portion 904 is
includes a plurality of recesses while the rear portion 906
includes a plurality of protrusions configured to mate with the
recesses. In some examples, the protrusions and recesses may
provide a friction fit between cup-faced portion 904 and rear
portion 906. In other examples, the rear portion 906 may be
manufactured (e.g., molded, etc.) around the protrusions,
thereby forming the recesses in the rear portion 906 and
connecting or bonding the cup-faced portion 904 to the rear
portion 906.

[0083] FIG. 12B shows a rear perspective plan view of golf
club head 902 showing where cup-faced portion 904 is joined
to the rear portion 906. A seam 918 formed between the
cup-faced portion 904 and the rear portion 906 is visible
and denotes where the two connector regions 908, 910 in FIG.
12A meet to form the golf club head 902. In this case, the parts
are joined by a lap joint. Other joints or fastening mechanisms
known to those skilled in the art are also contemplated.

[0084] As discussed above, the two portions 904, 906 may
also be connected via protrusions. In addition, various adhe-
sives may be used to join the two portions. Additionally or
alternatively, the portions may be joined using screws or other
fasteners. In still other arrangements, a snap-fit type arrange-
ment may be used in which tabs, lips, etc. may be used to
connect the rear portion 906 to the cup-faced portion 904.
Further, the cup-faced portion 904 may be bonded to the body
portion 906 during manufacture of the cup-faced portion 904
and the body portion 906.

[0085] FIG. 12C shows a rear elevation view of the cup-
shaped portion 904 and hollow interior 914 of golf club head
902 of FIG. 12A. Nano coating 920 is applied to all, or a
portion of, the outside surface of the cup-shaped portion.

[0086] FIG. 12D shows a rear elevation view of the cup-
shaped portion 904 and hollow interior 914 of golf club head
902 of FIG. 12A. Nano coating 920 is applied to all, or a
portion of, the outside surface of the cup-shaped portion 904
and nano coating 922 is applied to all, or a portion of, the
inside surface of the cup-shaped portion 904. In certain
embodiments, the ball striking face portion of the cup-shaped
portion 904 may have the nano coating applied thereon as
well as at least portions of the inner surface of the ball striking
face portion within the cup-shaped portion.

[0087] FIG. 12E shows the rear perspective view of the golf
club head 902 as depicted in FIG. 12B wherein a nano coating
920 is applied to the outside of golf club head 902. Although
showing coating the entirety of the golf club head, the nano
coating 920 may only be placed in portions thereof as desired.
The nano coating 920 may cover all or substantially all of the
golf club head in order to provide a uniform, one-piece
appearance for the golf club head. The nano coating 920 may
further be strategically placed to provide additional strength
and high impact durability. Types of nano coatings and prop-
erties thereof have been earlier discussed and such discussion
applies here as well.

[0088] Other aspects of the invention include that the cup-
faced member is a closed body—e.g. an additional wall
encloses the cup shape. This closed body is then attached to
the body portion by any suitable means.

[0089] The golf club head 902 may accommodate weight
members capable of being positioned in multiple locations.
For example, weight ports may be included to accept various
weights depending on the desired configuration. Further, in a
multiple piece arrangement, such as a golf club head having a
cup-faced portion and a body portion, the weight ports can be
included in any combination of the multiple piece arrange-
ment.

[0090] In addition to coating the club head, the nano coat-
ing may be applied to all or part of the shaft as well. For
example, the shaft and club head may be formed together
such as being made from polymer, composite materials etc. in
a single, unibody construction. The nano coating may then be
applied to the entire golf club. This provides the ability to
manipulate properties of the entire golf club such as center of gravity, moment of inertia, flex point, swingweight, and the like.

[0091] As discussed, in certain exemplary embodiments, the golf club head may have a first portion and a second portion made from different materials or materials having different densities. For example, in one exemplary embodiment, the first portion may be made from a first material that is a dense material. A second portion may be made from a second material that is less dense than the first material. The first portion and the second portion may be connected or otherwise joined together to form the golf club head. The portions cooperatively define a volume of the golf club head. In one exemplary embodiment, the first portion that is more dense may constitute approximately 40% of the volume of the club head, and the second portion that is less dense may constitute approximately 60% of the volume of the club head. In another exemplary embodiment, the first portion that is more dense may constitute approximately 30% of the volume of the club head, and the second portion that is less dense may constitute approximately 70% of the volume of the club head. In certain embodiments, the first portion may be a metal material and the second portion may be a polymer material although other materials may be used based on density properties.

[0092] The density of portions of the golf club head may be manipulated depending on desired characteristics of the golf club head. For example, the center of the face may be formed of a high density material corresponding to the ball striking area whereas other aspects of the golf club head would be formed of a low density material. The hosel may be made of a low density material to allow higher density material in other areas but keep a balance of total weight of the golf club head. Such strategic placement of various density materials, such as to localize such materials, can allow manipulation of the center of gravity and/or ball speed, as well as other properties. Such manipulations may affect ball speed for example. The nano-coating may be applied to the entire overall surface area of the club head as discussed herein.

IV. CONCLUSION

[0093] The present invention is described above and in the accompanying drawings with reference to a variety of example structures, features, elements, and combinations of structures, features, and elements. The purpose served by the disclosure, however, is to provide examples of the various features and concepts related to the invention, not to limit the scope of the invention. One skilled in the relevant art will recognize that numerous variations and modifications may be made to the embodiments described above without departing from the scope of the present invention, as defined by the appended claims. For example, the various features and concepts described above in conjunction with FIGS. 1 through 12 may be used individually and/or in any combination or subcombination without departing from this invention.

What is claimed is:

1. A golf club head, comprising:
   a first golf club head body portion formed of a first material, the first golf club head body portion forming a lower portion of the golf club head and including a sole of the golf club head;
   a second golf club head body portion formed of a second material, the second material being a lighter weight material than the first material, the second golf club head body portion forming an upper portion of the golf club head body and being positioned vertically above and in contact with the first golf club head body portion;
   a connector region including:
   a first portion of a connector connected to the first golf club head body portion, and
   a second portion of the connector connected to the second golf club head body portion and configured to mate with the first portion of the connector; and
   a nano coating covering the golf club head including covering the first golf club head body portion and the second golf club head body portion.

2. The golf club head of claim 1, wherein the second material is a different type of material than the first material.

3. The golf club head of claim 1, the first material and the second material are the same type of material and the first material has a higher density than the second material.

4. The golf club head of claim 1, wherein the first portion of the connector includes a generally planar upper surface of the first golf club head body portion and the second portion of the connector includes a generally planar lower surface of the second golf club head body portion.

5. The golf club head of claim 4, wherein the generally planar upper surface is bonded to the generally planar lower surface.

6. The golf club head of claim 1, wherein the first portion of the connector includes a plurality of protrusions extending upward from a top surface of the first golf club head body portion and the second portion of the connector includes a plurality of recesses formed in a bottom surface of the second golf club head body portion.

7. The golf club head of claim 1, wherein the nano coating covers substantially the entire golf club head.

8. The golf club head of claim 1, further including a weighted member.

9. The golf club head of claim 8, wherein the weighted member is formed of third material different from first material and second material.

10. The golf club head of claim 9, wherein the nano coating covers weighted member.

11. The golf club head of claim 1, wherein the nano coating provides appearance of single piece golf club head.

12. A golf club head, comprising:
   a golf club head body having a first golf club head body portion formed of a first material and a second golf club head body portion formed of a second material different from the first material; and
   a nano coating covering substantially all of the first golf club head body portion and the second golf club head body portion to provide an appearance of a golf club head formed of a single material.

13. The golf club head of claim 12, wherein the nano coating covers substantially all of a front, rear, crown and sole of the golf club head.

14. The golf club head of claim 13, wherein the first golf club head body portion is positioned vertically below the second golf club head body portion.

15. The golf club head of claim 12, wherein the first material is a higher density material than the second material.

16. The golf club head of claim 15, wherein the first material is a polymer and the second material is a polymer.

17. The golf club head of claim 16, wherein the polymer of the first material is different from the polymer of the second material.
18. The golf club head of claim 1, further including a weight member connected to first golf club head body portion and having the nano coating covering the weight member.

19. The golf club head of claim 1, wherein the golf club head is an iron-type golf club head.

20. The golf club head of claim 1, further including a shaft connected to the golf club head to form a golf club.

21. A method of forming a golf club head, comprising:
   forming a first portion of a golf club head body of a first material, the first portion of the golf club head body forming a lower portion of the golf club head body and including a first connector region on a top surface of the first portion of the golf club head body;
   forming a second portion of the golf club head body of a second material different from the first material, the second portion of the golf club head body forming an upper portion of the golf club head body and including a second connector region formed in a bottom surface of the second portion and configured to mate with the first connector region formed in the top surface of the first portion;
   connecting the first portion of the golf club head body to the second portion of the golf club head body via first and second connector regions; and
   coating the golf club head body, including the first portion and the second portion, with a nano coating.

22. The method of claim 21, wherein coating the golf club head body with a nano coating provides an appearance of a golf club head formed of a single material.

23. The method of claim 22, wherein coating the golf club head body with a nano coating provides an appearance of a forged golf club head.

24. The method of claim 21, wherein the first material has a greater weight than the second material.

25. The method of claim 21, wherein the first material has a greater density than the second material.

26. The method of claim 21, wherein the first material and the second material are both polymers.

27. The method of claim 21, wherein forming the first portion of the golf club head body and forming the second portion of the golf club head body includes forming the first portion and the second portion in a two-shot molding process.

28. The method of claim 27, wherein connecting the first portion to the second portion includes bonding the first connector region to the second connector region.

29. The method of claim 28, wherein bonding the first connector region to the second connector region is performed during the two-shot molding process.

30. The method of claim 21, wherein connecting the first portion to the second portion includes positioning second portion vertically above the first portion and positioning the first connector region in contact with the second connector region.

31. The method of claim 21, further including forming a weighted member and connecting the weighted member to the first portion of the golf club head body.

32. The method of claim 31, wherein coating the golf club head body with the nano coating includes coating the weighted member with the nano coating.

33. The method of claim 21, further including connecting the golf club head to a shaft to form a golf club.

34. A method of forming a golf club, comprising:
   forming a golf club head body, forming the golf club head body including:
   forming a first golf club head body portion of a first material; and
   forming a second golf club head body portion of a second material different from the first material, the second golf club head body portion being vertically above and in contact with the first golf club head body portion;
   coating the substantially all of the golf club head body with a nano coating; and
   connecting the coated golf club head body to a shaft.

35. The method of claim 34, wherein the first material and the second material are the same type of material but have different material properties.

36. The method of claim 34, wherein the first material and the second material are different types of material.

37. The method of claim 34, wherein the first material is a polymer and the second material is a polymer and the first material polymer has a higher density than the second material polymer.

38. The method of claim 34, wherein forming the golf club head body includes forming the first golf club head body portion and the second golf club head body portion via a two-shot molding process.

39. The method of claim 34, wherein coating substantially all of the golf club head with the nano coating includes coating a front, a rear, a crown and a sole with the nano coating.

40. A golf club head, comprising:
   a golf club head body having a first golf club head front body portion formed of a first material and a second golf club head rear body portion formed of a second material different from the first material;
   wherein the first golf club head front body portion is positioned adjacent the second golf club head rear body portion; and
   a nano coating covering substantially all of the first golf club head body portion and the second golf club head body portion to provide an appearance of a golf club head formed of a single material.

41. The golf club head of claim 40, wherein the nano coating covers substantially all of a front, rear, crown and sole of the golf club head.

42. The golf club head of claim 40, wherein the polymer of the first material is different from the polymer of the second material.

43. The golf club head of claim 40, further including a weight member connected to first golf club head body portion and having the nano coating covering the weight member.

44. The golf club head of claim 40, wherein the golf club head is a wood-type golf club head.

45. The golf club head of claim 40, wherein the golf club head is an iron-type golf club head.

46. The golf club head of claim 40, further including a shaft connected to the golf club head to form a golf club.

47. The golf club head of claim 40, wherein the first golf club head front body portion forms a cup-faced portion having a hollow interior.

48. The golf club head of claim 40, further including a shaft connected to the golf club head to form a golf club.

49. The golf club head of claim 40, wherein the first golf club head front body portion forms a cup-faced portion having a hollow interior.

50. The golf club head of claim 40, wherein the hollow interior of the first golf club head front body portion is at least partially coated with a nano coating.