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# GOLF FLAGSTICK SLEEVE


## Abstract

A golf ball retriever sleeve installed on a flagstick to case the retrieval of a golf ball from the hole, as well as provide functionality to the flagstick to make the golf course more secure and the game more enjoyable.



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## Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application claims the benefit of U.S. provisional patent application Ser. No. 63/551,197, filed on Feb. 8, 2024, all of which is incorporated by reference as if completely written herein.

BACKGROUND

[0002] Golf has increased in popularity since its first recorded rulebook was published two hundred and seventy-nine years ago by the Honourable Company of Edinburgh Golfers and titled “Articles and Laws in Playing at Golf.” In fact, in 2022 over 66 million people worldwide played golf at a golf course, with over 25 million people in the United States alone. There are over 38,000 golf courses worldwide and over 16,700 in the United States.

[0003] The pace-of-play is second only to course conditioning when it comes to customer satisfaction, making pace-of-play an important aspect of a golf course's profitability and popularity. The players of golf range from ages as young as 6 years old to over 90 years old. The longer a round of golf takes the more the players suffer from fatigue, further slowing the pace-of-play and possibly causing more shots to be taken and ending with a frustrated and fatigued player bending over and carelessly removing a golf ball from the hole. While these issues may seem like minor inconveniences to non-golfers, such inconveniences impact the player's desire to return the course at future date and may result in golf course losing out on the revenue earned from more tee times, food and beverage, retail sales, instruction, etc.

[0004] In an effort to improve the pace-of-play, in 2020 the United States Golf Association changed the rules of golf in four areas, namely setting a 40 second maximum time taken per shot, establishing a maximum score for a hole, eliminating a penalty associated with hitting a flagstick in a hole, and encouraging “ready golf” where players take shots out of turn to save time. For example Torrey Pines Municipal Golf course in San Diego, which registers 84,000 rounds annually, has improved the pace of play per round by 20-25 minutes in large part by implementing the flagstick rule.

[0005] However, controversy remains regarding potential damage to the green edges around a hole caused by a golfer attempting to remove the ball from the cup without removing the flagstick. Afterall, when the flagstick is left in the hole, the space between the flagstick and the adjacent cup is small and it is often difficult for a golfer to bend over and fit their hand in this tight space without losing their balance and damaging the playing surface round the hole, or injuring the golfer. Additionally, as the ball is removed from this tight space the golfer often rubs a portion of their hand, or the ball, against the edge of the hole causing damage and often an upturned edge around the perimeter, or edge, of the hole. Such damage, if left unrepaired, then impacts the enjoyment of the golfers subjected to playing on the damaged surface. Further, the additional care and precision required to remove a ball from the hole with the flagstick in place may actually lengthen the pace-of-play.

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## Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The features and components of the following figures are illustrated to emphasize the general principles of the present disclosure. Corresponding features and components throughout the figures may be designated by matching reference characters for the sake of consistency and clarity.

[0007] FIG. **1** is a cross-sectional view of a prior art flagstick secured in a cup, along with a partial magnified cross-sectional view;

[0008] FIG. **2** is a cross-sectional view of a flagstick, equipped with an embodiment of a ball retriever sleeve, secured in a cup, along with a partial magnified cross-sectional view;

[0009] FIG. **3** is a partial cross-sectional view of a flagstick, equipped with an embodiment of a ball retriever sleeve, secured in a cup;

[0010] FIG. **4** is a partial cross-sectional view of a mid-section of a flagstick, equipped with an embodiment of a ball retriever sleeve;

[0011] FIG. **5** is a partial cross-sectional view of a flagstick, equipped with an embodiment of a ball

retriever sleeve in a partially raised position, secured in a cup;
[0012] FIG. **6** is a partial cross-sectional view of a flagstick, equipped with an embodiment of a ball retriever sleeve in a raised position, secured in a cup;
[0013] FIG. **7** is a side view of an embodiment of a ball retriever sleeve;
[0014] FIG. **8** is a top plan view of an embodiment of a ball retriever sleeve;
[0015] FIG. **9** is a side view of an embodiment of a ball retriever sleeve; and
[0016] FIG. **10** is a top plan view of an embodiment of a ball retriever sleeve.
[0017] These drawings are provided to assist in the understanding of the exemplary embodiments of the presently disclosed hangar entrapment system, as described in more detail below and should not be construed as unduly limiting the hangar entrapment system. In particular, the relative spacing, positioning, sizing and dimensions of the various elements illustrated in the drawings are not drawn to scale and may have been exaggerated, reduced or otherwise modified for the purpose of improved clarity. Those of ordinary skill in the art will also appreciate that a range of alternative configurations have been omitted simply to improve the clarity and reduce the number of drawings.
DETAILED DESCRIPTION
[0018] For purposes of this description, certain aspects, advantages, and novel features of the embodiments of this disclosure are described herein. The described methods, systems, and apparatus should not be construed as limiting in any way. Instead, the present disclosure is directed toward all novel and non-obvious features and aspects of the various disclosed embodiments, alone and in various combinations and sub-combinations with one another. The disclosed methods, systems, and apparatus are not limited to any specific aspect, feature, or combination thereof, nor do the disclosed methods, systems, and apparatus require that any one or more specific advantages be present, or problems be solved. Features, properties, characteristics, materials, values, ranges, or groups described in conjunction with a particular aspect, embodiment or example of the disclosure are to be understood to be applicable to any other aspect, embodiment or example described herein unless incompatible therewith. All of the features disclosed in this specification (including any accompanying claims, abstract, and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. The disclosure is not restricted to the details of any foregoing embodiments. The disclosure extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract, and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.
[0019] Although the operations of some of the disclosed methods are described in a particular, sequential order for convenient presentation, this manner of description encompasses rearrangement, unless a particular ordering is required by specific language set forth below. For example, operations described sequentially may in some cases be rearranged or performed concurrently. Moreover, for the sake of simplicity, the attached figures may not show the various ways in which the disclosed methods, systems, and apparatus can be used in conjunction with other systems, methods, and apparatus.
[0020] As used herein, the terms “a,” “an,” and “at least one” encompass one or more of the specified element. That is, if two of a particular element are present, one of these elements is also present and thus “an” element is present. The terms “a plurality of” and “plural” mean two or more of the specified element. As used herein, the term “and/or” used between the last two of a list of elements means any one or more of the listed elements. For example, the phrase “A, B, and/or C” means “A,” “B,” “C,” “A and B,” “A and C,” “B and C,” or “A, B, and C.” As used herein, the term “coupled” generally means physically coupled or linked and does not exclude the presence of intermediate elements between the coupled items absent specific contrary language. The inventive features include all novel and non-obvious features disclosed herein both alone and in novel and non-obvious combinations with other elements. As used herein, the phrase “and/or” means “and”,

“or” and both “and” and “or”. As used herein, the singular forms “a,” “an,” and “the” refer to one or more than one, unless the context clearly dictates otherwise. As used herein, the term “includes” means “comprises.” Any use of terminology such as “at least one of A and B” shall be interpreted to mean “at least one of A or B,” and is not meant to exclude having both A and B, unless noted otherwise.

[0021] Directions and other relative references (e.g., inner, outer, upper, lower, etc.) may be used to facilitate discussion of the drawings and principles herein, but are not intended to be limiting. For example, certain terms may be used such as “inside,” “outside,”, “top,” “down,” “interior,” “exterior,” and the like. Such terms are used, where applicable, to provide some clarity of description when dealing with relative relationships, particularly with respect to the illustrated embodiments. Such terms are not, however, intended to imply absolute relationships, positions, and/or orientations. For example, with respect to an object, an “upper” part can become a “lower” part simply by turning the object over. Nevertheless, it is still the same part and the object remains the same. As used herein, “and/or” means “and” or “or,” as well as “and” and “or.”

[0022] As seen in FIG. **1**, a typical setup on a green of a golf course includes a hole having a cup (**200**) for the releasable mounting of a flagstick (**100**) having an upper end (**110**) and a lower end (**120**). The lower end (**120**) generally includes a flagstick ferrule (**170**) and the upper end (**110**) generally includes a flag (F). A flagstick height (**160**) is the shortest distance from the upper end (**110**) to the lower end (**120**), and the flagstick height (**160**) is six to nine feet. The flagstick ferrule (**170**) may have a ferrule stop (**175**) to limit the travel of the ferrule (**170**).

[0023] The hole receives a cup (**200**), which has a cup diameter (**210**), a cup height (**220**), and a ferrule mount (**230**) having a ferrule mount aperture (**240**) configured to receive a portion of the flagstick ferrule (**170**), seen in FIG. **3**. The flagstick (**100**) may be solid or hollow, and if hollow has a flagstick wall thickness (**140**). Regardless, the flagstick (**100**) has an external flagstick diameter (**150**), which may be constant or vary. The flagstick diameter (**150**) is no greater than 0.75″ from a point 3″ above the putting surface to a point 3″ below the putting surface, referred to as a size limited region. In one embodiment the flagstick diameter (**150**) is 0.375″-0.75″ in the size limited region, and in a further embodiment 0.375″-0.5″, and 0.5″ in still another embodiment. The flagstick diameter (**150**) between the upper end (**110**) and the size limited region often varies from the flagstick diameter (**150**) in the size limited region up to 2″ in diameter. In one embodiment the flagstick diameter (**150**) is a first diameter of 0.375″-0.75″ in the size limited region in increases to a second diameter, at a location between the upper end (**110**) and the size limited region, that is at least 25% greater than the first diameter, and at least 50%, 75%, or 100% greater in further embodiments. In another embodiment a maximum diameter, located outside the size limited region, is no more than 300% of the first diameter, and in further embodiments no more than 275%, 250%, 225%, or 200% of the first diameter.

[0024] A top edge of the cup (**200**) is recessed from the adjacent surface of the putting green a distance of at least 1″, the cup height is 2.5″-6″, and the cup diameter (**210**) is 3.75″-4.25″ since the actual diameter of the hole at the playing surface must be 4.25″. In the illustrated embodiment at least a portion of the ferrule stop (**175**) is sized to engage the ferrule mount (**230**) and not enter the ferrule mount aperture (**240**) and thereby limit the travel of the ferrule (**170**).

[0025] FIG. **2** illustrates a ball retriever sleeve (**300**) installed on a flagstick (**100**) to case the retrieval of a golf ball from the hole. The ball retriever sleeve (**300**) has a retriever sleeve height (**305**), seen in FIG. **7**, measure along a longitudinal axis of the flagstick (**100**) from a sleeve top end (**310**) to a sleeve lower end (**320**). As seen in FIG. **7**, the sleeve top end (**310**) has a grip (**311**) having a grip top end (**312**), a grip lower end (**313**), a grip width (**314**), a grip height (**315**), and in some embodiments a grip aperture (**317**) having a grip aperture width (**318**). The sleeve lower end (**320**) has a ball trough (**321**) having a trough upper end (**322**), a trough lower end (**323**), a trough width (**324**), a trough height (**325**), a trough rim (**326**), and in some embodiments a trough aperture (**327**) having a trough aperture width (**328**), which is a trough aperture diameter then the trough

aperture (**327**) is round. A sleeve body (**330**) extends between the grip (**311**) and the ball trough (**321**). The sleeve body (**330**) has a sleeve body upper end (**332**), a sleeve body lower end (**333**), a sleeve body inner width (**334**), which is a sleeve body inner diameter when the sleeve body is round in shape, and a sleeve body outer width (**335**), which is a sleeve body outer diameter when the sleeve body is round in shape, a sleeve body height (**336**), and a sleeve body wall thickness (**337**). As seen in FIG. **4**, the sleeve body (**330**) has a sleeve outer surface to flagstick outer surface distance (**338**), which in one embodiment is less than α″ throughout at least β % of the retriever sleeve height (**305**). In one embodiment α is 0.25″, and is 0.125″, 0.0625″, or zero in further embodiments. In another embodiment β is 25%, and is 50%, 60%, 70%, 80%, 90%, or 100% in further embodiments. The retriever sleeve height (**305**) is at least 16″ in one embodiment, and at least 20″, 24″, 28″, 32″, or 36″ in additional embodiments. In another embodiment the retriever sleeve height (**305**) is no more than 60″, and no more than 56″, 52″, or 48″ in additional embodiments.

[0026] In one embodiment the grip (**311**) is integrally formed with the sleeve body (**330**), while in other embodiments the grip (**311**) is attached to the sleeve body (**330**). In one embodiment the shape of the grip (**311**) is circular, when viewed in a top plan view as seen in FIG. **8**, in which case the grip width (**314**) is a grip diameter. In one embodiment the grip width (**314**) is no more than 10 times the sleeve body outer width (**335**), and no more than 8 times or 6 times in additional embodiments. In another embodiment the grip width (**314**) is at least 2 times the sleeve body outer width (**335**), and at least 2.5 times or 3 times in additional embodiments. In another embodiment the grip width (**314**) is no more than 10 times the flagstick diameter (**150**) is the size limited region, and no more than 8 times or 6 times in additional embodiments. In a further embodiment the grip width (**314**) is at least 3 times the flagstick diameter (**150**) is the size limited region, and at least 3.5 times or 4 times in additional embodiments. In one embodiment the grip height (**315**) is at least 20% of the grip width (**314**), and at least 25%, 30%, or 35% in further embodiments. In another embodiment the grip height (**315**) is at least 70% of the sleeve body outer width (**335**), and at least 80%, 90%, or 100% in further embodiments. In an additional embodiment the grip height (**315**) is no more than 300% of the sleeve body outer width (**335**), and no more than 275%, 250%, 225%, 200%, 175%, or 150% in further embodiments.

[0027] In one embodiment a side of the grip (**311**), when viewed in a vertical cross-section as in FIG. **4**, has a constant curvature and forms a portion of a semi-circle with a sidewall radius of curvature that mimics the curvature and size of a golf ball; and in one embodiment the sidewall radius of curvature is 0.672″-1.008″, and in another embodiment the sidewall radius of curvature is 0.756″-0.924″. In another embodiment the side of the grip (**311**), when viewed in a vertical cross-section as in FIG. **4**, has a constant curvature and forms a semi-circle to establish a grip height (**315**) of at least 0.375″, and at least 0.5″, 0.75″, 1.0″, 1.25″, or 1.5″ in further embodiments. In yet another embodiment the grip height (**315**) is no more than 2″, and no more than 1.85″ or 1.68″ in further embodiments. In one embodiment the grip width (**314**) is no more than 2″. In another embodiment the grip width (**314**) is at least 1″. In another embodiment the grip width (**314**) is no more than 95% of the trough width (**324**), and no more than 90%, 85%, 80%, or 75% in further embodiments. In one embodiment the grip width (**314**) is at least 30% of the trough width (**324**), and at least 35%, 40%, 45%, or 50% in further embodiments. The grip height (**315**) is at least 125% of the trough height (**325**) in one embodiment, and at least 150%, 175%, 200%, or 225% in further embodiments. The grip height (**315**) is no more than 500% of the trough height (**325**) in another embodiment, and no more than 475%, 450%, 425%, 400%, or 375% in further embodiments.

[0028] In one embodiment at least one of the sleeve body (**330**), the grip (**311**), or the ball trough (**321**) are formed of elastic material to provide radially expandable embodiments; while in another embodiment at least two of the sleeve body (**330**), the grip (**311**), or the ball trough (**321**) are formed of elastic material; and in still a further embodiment the sleeve body (**330**), the grip (**311**), and the ball trough (**321**) are formed of elastic material. In one such embodiment the sleeve body

(**330**) has a relaxed sleeve body inner width (**334**) and a relaxed sleeve body outer width (**335**); and likewise has a radially expanded sleeve body inner width (**334**) and a radially expanded sleeve body outer width (**335**).

[0029] In one embodiment the term radially expandable means that the sleeve body (**330**), the grip (**311**), or the ball trough (**321**), or any combination of them, may be slid over a stationary test flagstick as defined herein when one end is subjected to a predetermined tensile force, of 8 lbf, applied to the portion of the ball retriever sleeve (**300**) that is being analyzed. The test flagstick has a first region having a first test flagstick diameter that extends for a first test flagstick diameter length of 36″, with the first test flagstick diameter equal to the relaxed sleeve body inner width (**334**). The test flagstick uniformly transitions to a second test flagstick diameter over a first transition length of 24″, and then back to the first test flagstick diameter over a second transition length of 24″, where the second test flagstick diameter is γ % greater than the relaxed sleeve body inner width (**334**). A test collet is attached to the portion of the ball retriever sleeve (**300**) being analyzed so that the predetermined tensile force is uniformly distributed, and the portion of the ball retriever sleeve (**300**) being analyzed is placed on the first region of the test flagstisk so the test flagstick passes through the portion of the ball retriever sleeve (**300**) being analyzed. The predetermined tensile force is then applied to draw the portion of the ball retriever sleeve (**300**) being analyzed from the first region, through the first transition length and radially expanding over the second test flagstick diameter, and through the second transition length. In one embodiment γ is 50%, and in further embodiments is 60, 70, 80, 90, or 100. In one embodiment δ is 50, and in further embodiments is 40, 30, 20, or 10.

[0030] In one embodiment only the sleeve body (**330**) is elastic, and the trough aperture (**327**) and the grip aperture (**317**) are sized so that they may be slid over the second test flagstick diameter without needing to expand; specifically the trough aperture width (**328**) and/or the grip aperture width (**318**). Alternatively, the ball trough (**321**) and/or the grip (**311**) may be separately attachable to the sleeve body (**330**) after it is slid over the flagstick (**100**). However, in a further embodiment the sleeve body (**330**) and the grip (**311**) are integrally formed of elastic material and both are radially expandable as defined herein. While in a further embodiment the sleeve body (**330**), the grip (**311**), and the ball trough (**321**) are integrally formed of elastic material and each is radially expandable as defined herein.

[0031] In such radially expandable embodiments the sleeve body (**330**), the elastic material has sufficient longitudinal strength to support the mass of the ball retriever sleeve (**300**) so that it can stand vertically, as seen in FIGS. **5-7**, without sliding down the flagstick (**100**), and is not so elastic that the retriever sleeve height (**305**) does not increase by more than ¼″ when a force is applied to the grip (**311**) to retrieve a golf ball having a maximum mass of 45.9 grams, thereby moving the ball trough (**321**) from the position of FIG. **2** to the position of FIG. **6**. In still another embodiment the retriever sleeve height (**305**) does not increase by more than ¼″ when a force is applied to the grip (**311**) to retrieve the mass of two golf balls, in other words with the ball trough contains an additional mass of 91.8 grams. In yet a further embodiment the retriever sleeve height (**305**) does not increase by more than ⅛″ when a force is applied to the grip (**311**) to retrieve the mass of two golf balls, in other words with the ball trough contains an additional mass of 91.8 grams. Such elastic materials may include natural polymers, synthetic polymers, biotic materials, natural plant and wood materials, and bast fiber materials, including, but not limited to, linen, jute, flax, hemp, bamboo. coir, ramie, sisal, cotton, flax, kapok, kenaf, and abaca, and variations or combinations thereof. In one radially expandable embodiment the sleeve body (**330**) is sized to conform to the flagstick (**100**) throughout the sleeve body height (**336**). In another embodiment the sleeve body (**330**) is formed of a material impregnated with, or having a layer of, lubricant and/or mildew preventing agent, thereby casing the sliding nature and/or reducing the likelihood of discoloration or streaking on the flagstick (**100**).

[0032] In another embodiment the sleeve body (**330**) has multiple layers, with at least one layer

being radially expandable and at least one external layer composed of rigid material, which in some embodiments may incorporate a curved electronic display and/or a flat electronic display. For example, in one embodiment any of the disclosed embodiments may have a segmented external layer forming a rigid external covering composed of individual sections that abut one another when the sleeve body (**330**) has the relaxed sleeve body inner width (**334**) and are separated by a gap when the sleeve body (**330**) is at a radially expanded sleeve body inner width (**334**). For instance, in one embodiment the segmented external layer is formed to two sections, each forming 180 degrees of the perimeter of the sleeve body (**330**) and extending longitudinally throughout a segment length of at least six inches of the retriever sleeve height (**305**), thus there would be a first ball retriever sleeve slot (**307**), as seen in FIGS. **9** and **10**, and a second ball retriever sleeve slot (**307**), not shown, but in this example located on the opposite side of the sleeve body (**330**). This two-section embodiment is described for simplicity, however additional multi-section embodiments may include 3-24 individual sections, thereby providing a rigid outer layer. In a further embodiment the previously described segment length is at least 25% of the retriever sleeve height (**305**), and at least 40%, 55%, 70%, 85%, or 100% in further embodiments. A further embodiment does not have a continuous elastic layer under the rigid sections but rather has individual elastic segments between, and joining, adjacent rigid sections. Yet another embodiment consists of the disclosed rigid sections that are joined by elastic segments at least at the sleeve top end (**310**) and the sleeve lower end (**320**). In another embodiment the rigid sections are not over an elastic layer nor joined by elastic segments, but are held via external bands of elastic material at various locations along the retriever sleeve height (**305**). One such embodiment includes an upper external elastic band located in the top half of the retriever sleeve height (**305**) and a lower external elastic band located in the lower half of the retriever sleeve height (**305**). In a further embodiment the upper external elastic band is located adjacent the sleeve top end (**310**) and the lower external elastic band is located adjacent the sleeve lower end (**320**). In still another embodiment a rigid grip (**311**) is then attached over, and covering, the upper external elastic band, and thus only rigid materials are exposed to potential impact of an incoming golf ball.

[0033] In one embodiment at least one of the sleeve body (**330**), the grip (**311**), or the ball trough (**321**) are formed of rigid non-elastic material, the rigid material embodiments; while in another embodiment at least two of the sleeve body (**330**), the grip (**311**), or the ball trough (**321**) are formed of rigid non-elastic material; and in still a further embodiment the sleeve body (**330**), the grip (**311**), and the ball trough (**321**) are formed of rigid non-elastic material. Such rigid non-elastic materials may include steel alloys, titanium alloys, aluminum alloys, magnesium alloys, natural polymers, synthetic polymers, including composite fiberglass and carbon fiber composites, which may include long-fiber reinforcement material, short-fiber, aka chopped fibers, as well as pre-preg multilayer material layup constructions, biotic materials, natural plant and wood materials, and bast fiber materials, including, but not limited to, linen, jute, flax, hemp, bamboo, coir, ramie, sisal, cotton, flax, kapok, kenaf, and abacá, as well as the disclosed electronic display, and variations or combinations thereof, and also apply to the previously disclosed rigid sections.

[0034] Such rigid material embodiments may mount to the flagstick (**100**) in a number of ways. For example, in one embodiment, seen in FIGS. **9** and **10**, the ball retriever sleeve (**300**) may include a ball retriever sleeve slot (**307**) having a ball retriever sleeve slot width (**308**), which in the illustrated embodiment is longitudinal throughout the retriever sleeve height (**305**), but may be in a spiral path in another embodiment. In this embodiment the ball retriever sleeve slot (**307**) allows minor deflection of ball retriever sleeve (**300**) so that it may deflect, thereby increasing the retriever slot width (**308**), to pass over any variations in the flagstick diameter (**150**). Thus, it is rigid in the fact that it would not be capable of deflecting to pass over a portion of a flagstick (**100**) having a flagstick diameter (**150**) greater than the sleeve body inner width (**334**) but for the ability of the retriever slot width (**308**) to increase from a first retriever slot width (**308**) to a second retriever slot width (**308**), where in one embodiment the second retriever slot width (**308**) is at least 5% greater

than the first retriever slot width (**308**), and at least 10%, 15%, or 20% in additional embodiments. The ball retriever sleeve slot (**307**) allows rigid embodiments to achieve any of the disclosed relationships of the sleeve body inner width (**334**) discussed with respect to elastic embodiments. In one embodiment the first retriever slot width (**308**) is at least 0.5 mm, and in further embodiments is at least 1 mm, 2 mm, or 3 mm. In another embodiment the first retriever slot width (**308**) is no more than 5 mm, and no more than, 4.5 mm, 4 mm, or 3.5 mm in further embodiments.

[0035] In another rigid materials embodiment the previously described and illustrated ball retriever sleeve slot (**307**) is replaced by a hinge. Thus the ball retriever sleeve (**300**) may have at least two sections joined by a hinge so that the sections may be opened about the hinge for entry of a flagstick (**100**), and then closed and secured to one another to entrap the flagstick (**100**). In another rigid materials embodiment the previously described and illustrated ball retriever sleeve slot (**307**) is replaced by an interlocking joint. Thus the ball retriever sleeve (**300**) may have at least two sections joined by an interlocking joint so that the sections may be closed and secured to one another to entrap the flagstick (**100**).

[0036] In one embodiment the sleeve body wall thickness (**337**) is no more than 0.25″, and no more than 0.1875″, 0.125″, or 0.0625″ in additional embodiments. In one embodiment the ball trough (**321**) is integrally formed with the sleeve body (**330**), while in other embodiments the ball trough (**321**) is attached to the sleeve body (**330**). The trough height (**325**) is measured along the longitudinal axis of the flagstick (**100**) from the trough lower end (**323**) to the trough upper end (**322**) and/or the trough rim (**326**). The trough height (**325**) is at least 2 times the sleeve body wall thickness (**337**) in one embodiment, and at least three times or four times in further embodiments. The trough height (**325**) is no more than 100% of the sleeve body outer width (**335**) in an embodiment, and no more than 90%, 80%, 70%, or 60% in additional embodiments. The trough width (**324**) is at least 3.6″ in one embodiment, and at least 3.7″, 3.8″, or 3.9″ in further embodiments. In one embodiment the trough aperture width (**328**) and/or the grip aperture width (**318**) are ±20% of the sleeve body inner width (**334**), and in further embodiments ±15%, ±10%, ±5%, or equal to.

[0037] One skilled in the art will appreciate that the ball retriever sleeve (**300**) has a center of gravity (CG) located a CG distance measured from the sleeve lower end (**320**) in the direction of the retriever sleeve height (**305**), seen in FIG. **7**. In one embodiment the CG distance is 35-65% of the retriever sleeve height (**305**), and 40-60% in another embodiment. In a further embodiment the CG distance is not 50% of the retriever sleeve height (**305**); in fact, in one embodiment the CG distance is at least 52% of the retriever sleeve height (**305**), and at least 54%, 56%, or 58% in further embodiments. In one embodiment the ball retriever sleeve (**300**) has a ball retriever sleeve mass of less than 1500 grams, and in additional embodiments less than 1400 grams, 1300 grams, 1200 grams, 1100 grams, or 1000 grams. In one embodiment at least a portion of the ball retriever sleeve (**300**) has ball retriever sleeve density of less than 3 g/cc, and in further embodiments less than 2.8 g/cc, 2.6 g/cc, 2.4 g/cc, 2.2 g/cc, 2.0 g/cc, or 1.8 g/cc; while in additional embodiments at least 50%, 60%, 70%, 80%, 90%, or 100% of the ball retriever sleeve (**300**) meets any of the disclosed material or density disclosure values. The ball retriever sleeve (**300**) may be an aftermarket product for installation of existing flagsticks on a golf course, or may be manufactured and sold with new flagsticks and/or new cups. Thus, in one embodiment any of the disclosed embodiments include a flagstick (**100**) having any of the flagstick attributes disclosed herein.

[0038] The ball retriever sleeve (**300**) may incorporate at least one sensor to monitor activity of the ball retriever sleeve (**300**), and in some embodiments communicate data to a golf course monitoring system. Thus, in one embodiment the ball retriever sleeve (**300**) includes a battery, which may be a plug-in charging device that is easily connected to a power source when the flagstick (**100**) is removed from the course in the evening, or it may incorporate a solar charging system with a portion of the ball retriever sleeve (**300**) having a solar panel. A solar panel may be incorporated into, or attached to, the sleeve top end (**310**), and/or may be incorporated into, or

attached to, a portion of the sleeve body (**330**), and/or may be incorporated into, or attached to, the sleeve lower end (**320**). Similarly, reflectors may be incorporated into, or attached to, the sleeve top end (**310**), and/or may be incorporated into a portion of the sleeve body (**330**), to easy the use of laser-rangefinders on the course, which are often difficult to activate by small reflectors positioned at the top of a flagstick (**100**). Further, the ball retriever sleeve (**300**) may incorporate at least one illumination device, such as an LED light, or a series of lights, to illuminate the area around a flagstick, or to illuminate the flagstick itself, to facilitate play at dusk and overcast conditions, and/or to transmit information to the golfers, such as flashing red when lightening is in the area and play should cease, and/or when the course is closed. In one embodiment an illumination device is located in the lower side of the sleeve top end (**310**) to illuminate downward around the cup, while in another embodiment an illumination device is located around the perimeter of the sleeve top end (**310**) so that it is visible to the golfers from the fairway as they approach the green, while in yet another embodiment at least one illumination device is located along a portion of the sleeve body (**330**). In another embodiment at least one illumination device is located on, or within, a portion of the sleeve lower end (**320**), and in one embodiment is on, in, or below the ball trough (**321**) and oriented to illuminate vertically. Thus, in one embodiment the illumination device includes the ability to produce light of different colors to convey different messages to golfers, or merely to achieve differing appearances.

[0039] The at least one sensor may include a simple proximity switch, a non-contact proximity sensor, a motion sensor, and/or a pressure sensor incorporated into, or attached to, the sleeve lower end (**320**) and/or the sleeve body (**330**). The sensor identifies when the flagstick (**100**) and/or the ball retriever sleeve (**300**) has been removed from the cup. The ball retriever sleeve (**300**) may also include an electronic assembly having a memory storage device, a display, a processor, an internal clock, a speaker, a communication unit, a GPS sensor, at least one inertial measurement unit (IMU), pressure/barometer sensor, sound sensor, temperature sensor, humidity sensor, light or optical sensor, color sensor, motion sensor, thermal sensor, infrared sensor, and/or camera system, which may include video. In one embodiment the IMU can be a 9-axis sensor including one or more accelerometers, gyroscopes, and magnetometers that measure 3D orientation, 3D velocity, and/or 3D gravitational forces. The battery can be a coin cell battery, a nickel cadmium battery, a lithium-ion battery, a nickel metal hydride battery, or other types of batteries. In one embodiment the battery is a rechargeable battery can be charged through a wired connection, while in other embodiments the rechargeable battery can be charged wirelessly, such as via magnetic inductive charging. The electronic assembly can include a receiving coil connected to the battery, or the receiving coil may be located remotely from the electronic assembly. When aligned with a transmitting coil of an external charging device, the battery can be wirelessly charged through electromagnetic coupling between the receiving coil and the transmitting coil. Any of the disclosed sensors can be enclosed within a housing or located outside the housing and elsewhere on any of the individual aspects of the ball retriever sleeve (**300**). The electronic assembly can be fully sealed so that it is watertight and/or waterproof. The motion sensor may monitor motion of the ball retriever sleeve (**300**), motion of the flagstick (**100**), and/or motion of objects on the green, such as the arrival of golfers. The display may be incorporated into a component of the ball retriever sleeve (**300**), such as the sleeve lower end (**320**), sleeve top end (**310**), and/or through a portion of, or all of, the sleeve body (**330**); and as later disclosed may be a rigid curved electronic display or a flexible non-rigid electronic display.

[0040] A processor may be in communication with any of the disclosed sensor or electronic devices to monitor predetermined events such as the usage of the ball retriever sleeve (**300**), movement of the flagstick (**100**), and/or entry of a golf ball into the hole. The processor may include a time delay circuit or monitoring protocol to monitor the pace of play via monitoring and recording when different groups of players have completed certain events on a particular green. For instance, a group of four players may each putt-out and trigger the monitoring of activation of the ball retriever

sleeve (**300**), removal of the flagstick (**100**), and/or a ball entering the cup; however to monitor the pace of play the course managers, and/or a course management and monitoring system, may only care to monitor when separate groups first arrive at a green, or leave a green. Therefore, one embodiment incorporates an adjustable monitoring period whereby after the adjustable monitoring period has passed since the last monitored predetermined event occurred, then the time of the last monitored predetermined even signifies the exit of a first group from the hole. Further, the next subsequent monitored predetermined event, and its time, signifies the arrival of the next group, and therefore the time between groups is known, and may be monitored real-time or saved in the memory for later download and analysis.

[0041] The illumination device may have a stand-alone control system based upon a sensed light level and a predetermined activation level, which may be adjustable, or the illumination device may be controlled by the electronic assembly. The illumination device, speaker, display, and/or camera data may also be used to prevent vandalism and/or keep animals off the putting surface. For example in one embodiment the electronic assembly contains a security mode, which may be established by predetermined hours of a security monitoring period, or the period may be adjustable. During the security mode any of the sensors may be active, most logically a motion sensor to detect movement on the putting surface, and upon an alert of motion from the sensor, a predetermined series of security events may take place. For instance, in one embodiment upon an alert the electronic assembly may activate/control any one, or more, of: the speaker, the illumination device, the camera, the display, and/or the communication system. The electronic assembly may store any images or videos recorded for later viewing, or instruct the communication system to transmit them, or simply transmit a potential vandalism alert indicating that activity has occurred on the putting surface during the security monitoring period.

[0042] The electronic assembly may also include a photo opportunity activation method whereby a group may initiate the method, such as a button, and then has a set period of time before the electronic assembly activates a camera to take a memorable photo and/or video. This attribute allows golfers to collect priceless memories, particularly when on iconic golf courses or holes. The communication system may then transmit the photo or video directly to a golfer's phone, email address, and/or the course management and monitoring system.

[0043] Any of the information and data collected may be transmitted to a course management and monitoring system, or directly to a phone or computer, via the communication unit, which may be one-way communication, or configured for two-way communication. For example, the communication unit may simply send back the arrival and/or departure times of groups, or it may also receive communications from the course management and monitoring system, such as adjustment of the monitoring period, audio files to play via a speaker upon the next activation of the predetermined event, or image and/or video file to play on a display upon the next activation of the predetermined event. For example, an audio file may announce to a group that they are behind the target pace and need to pick-up the pace, that they are on-pace, or that they are ahead of pace; and likewise an image file or video file may also display such information. Further, these audio, image, or video announcements may be resident in the memory and automatically activated simply based upon the stand-alone monitoring of the time period between groups without the need for any communication with a course management and monitoring system. Alternatively, a first group may be able to select predetermined audio, image, or video files to play upon leaving a flagstick, thereby leaving a message for a second group playing behind them. In still a further embodiment the electronic assembly may include a local communication system such that the predetermined files may alternatively be custom files sent by mobile communication devices in the first group, such as a smart phone, and received by the electronic assembly for storage and display. The electronic assembly may further include a limited custom file period such that the file is only resident in memory, and thus only capable of playing, or displaying, for a predetermined limited time period and then are automatically erased from memory.

[0044] Similarly, two-way communication would allow any data gathered from any of the disclosed sensors or electronic devices to be transmitted back to the course management and monitoring system. For instance, data from the GPS sensor may be transmitted back to the course management and monitoring system to accurately reflect the pin positions, such as for record keeping purposes and/or to them communicate and display on an on-cart course map and yardage system so that yardages to the actual flagstick (**100**) location are displayed, in addition to or rather than yardages to the front, middle, and/or back of the green. Further, the two-way communication capability may communicate directly to individual carts rather than, or in addition to, directly to a course management and monitoring system. The transmitted data may further be used to improve the course conditions, such as by triggering the activation of green-side fans when threshold data setpoints are met.

[0045] Any of the components of the ball retriever sleeve (**300**) may be formed of textile material, which in one embodiment comprises synthetic fibers selected from the group consisting of polyester, polyamide, polypropylene or PLA (polylactic acid). In addition, the textile material may further comprise natural fibers, such as cotton or regenerated fibers such as viscose or a mixed spun yarn with multifilament synthetic fibers and natural staple fibers or other mixtures thereof. The textile material may comprise threads or yarns of at least one elastic material, said elastic material comprising at least one of: elastomeric polymers such as natural rubber (i.e. polyisoprene), synthetic rubber, a mix of polyisoprene rubber and styrene butadiene copolymer or a mix of thermoplastic and elastomeric polymers such as polyurethane-polyurea copolymer, and other mixtures thereof. In another embodiment, the elastic threads or yarns comprise a synthetic rubber, and in one embodiment a synthetic elastodiene rubber. Textiles may be defined as any manufacture from fibers, filaments, or yarns having a generally two-dimensional structure (i.e., a length and a width that are substantially greater than a thickness). Such textiles may include non-woven textiles and/or mechanically-manipulated textiles. Non-woven textiles are webs or mats of filaments that are bonded, fused, interlocked, or otherwise joined. As an example, a non-woven textile may be formed by randomly depositing a plurality of polymer filaments upon a surface, such as a moving conveyor. Mechanically-manipulated textiles may be formed by weaving or interlooping (e.g., knitting) a yarn or a plurality of yarns, usually through a mechanical process involving looms or knitting machines. Such woven textiles may include yarns that cross each other at right angles (i.e., warp and weft yarns), and knitted textiles include one or more yarns that form a plurality of intermeshed loops arranged in courses and wales. Such yarns, threads, and textiles may be formed from thermoplastic polymer materials.

[0046] Any of the components of the ball retriever sleeve (**300**) may be formed of thermoplastic polymer materials including thermoplastic polyurethane, polyamide, polyester, polypropylene, and/or polyolefin. Utilizing thermoplastic polyurethane imparts various advantages. For example, various formulations of thermoplastic polyurethane are elastomeric and stretch over one-hundred percent, while exhibiting relatively high stability or tensile strength. In comparison with some other thermoplastic polymer materials, thermoplastic polyurethane readily forms thermal bonds with other elements. Also, thermoplastic polyurethane may form foam materials and may be recycled to form a variety of products. Utilizing thermoplastic polymer materials allows for thermal bonding processes to join the various components. Any of the components of the ball retriever sleeve (**300**) may be clear, transparent, and/or translucent. Any of the components of the ball retriever sleeve (**300**) may contain a thermal adhesive yarn and/or a non-thermal adhesive yarn, and may be molded by thermal treatment after the knitting. As a result, the shape of the stitches and therefore the shape of the ball retriever sleeve (**300**) is less likely to lose shape. The use nylon or polyester may additionally provide a moisture wicking aspect to the ball retriever sleeve (**300**) to pull moisture away from the flagstick (**100**) and facilitate quick drying, while being structurally resilient, odor repelling, resistant to bacteria, fungi, mold, and/or mildew, or a combination thereof. Fibers of the one or more fibrous layers may have a non-circular cross-section. Fibers of the one or more fibrous

layers may have a cross-section having a plurality of lobes and/or deep grooves. The type and/or orientation of the fibers of the one or more fibrous layers may create a capillary effect to pull the moisture away from the surface of the flagstick (**100**). The ball retriever sleeve (**300**) may include one or more layers having an elastomeric binder to increase resilience of the ball retriever sleeve (**300**) or the one or more layers. At least a portion of the fibers of the ball retriever sleeve (**300**) may be thermoplastic fibers. The fibers of one or more of the layers may include polyethylene terephthalate (PET), polyacrylonitrile (PAN), oxidized polyacrylonitrile (Ox-PAN, OPAN, or PANOX), aramid, olefin, polyamide, imide, polyetherketone (PEK), polyetheretherketone (PEEK), Poly(ethylene succinate), polyether sulfonate (PES), mineral, ceramic, natural, or another polymeric fiber.

[0047] The ball retriever sleeve (**300**) may include one or more fibrous layers, which may include bicomponent fibers. The fibrous layer (or any other layer) may include fibers blended with the inorganic fibers. The fibrous layer may include natural, manufactured, or synthetic fibers. Suitable natural fibers may include cotton, jute, wool, flax, silk, cellulose, glass, and ceramic fibers. The fibrous layer may include eco-fibers, such as bamboo fibers or eucalyptus fibers. Suitable manufactured fibers may include those formed from cellulose or protein. Suitable synthetic fibers may include polyester, polypropylene, polyethylene, Nylon, aramid, imide, acrylate fibers, or combination thereof. The fibrous layer material may comprise polyester fibers, such as polybutylene terephthalate (PBT), polyethylene terephthalate (PET), polytrimethylene terephthalate (PTT), and co-polyester/polyester (CoPET/PET) adhesive bi-component fibers. The fibers may include polyacrylonitrile (PAN), oxidized polyacrylonitrile (Ox-PAN, OPAN, or PANOX), olefin, polyamide, polyetherketone (PEK), polyetheretherketone (PEEK), polyethersulfone (PES), or other polymeric fibers. The fibers may be selected for their melting and/or softening temperatures. The fibers may include mineral or ceramic fibers. The fibers may be or may include elastomeric fibers.

[0048] Exemplary elastomeric materials include elastic bicomponent PET, PBT, PTT, or a combination thereof. In fiber based embodiments the fibers may be formed of any material that is capable of being carded and lapped into a three-dimensional structure. The fibers may be 100% virgin fibers, or may contain fibers regenerated from postconsumer waste (for example, up to about 90% fibers regenerated from postconsumer waste or even up to 100% fibers regenerated from postconsumer waste). The fibers may have or may provide improved moisture absorption or moisture resistance characteristics, or both. The fibers may have particles embedded therein. The particles may act to remove moisture in the vapor stage (e.g., before becoming liquid). The particles may be embedded through an extrusion process. These particles may provide breathability and/or waterproofing properties to the fibrous layer. The particles present in the fibers may increase the surface area of the fiber by 50% or more, about 100% or more, by 200% or more, or by 500% or more as compared with a fiber that is free of embedded particles. The particles may increase the surface area of the fiber by about 1200% or less, about 1000% or less, or about 900% or less. The high surface area of the fiber may provide high adsorption properties. Embedded particles may include, but are not limited to, wood, shells (e.g., fruit and/or nut shells, such as coconut shells or fibers thereon, hazelnut shells), activated carbon, sand (e.g., volcanic sand), or a combination thereof. For example, the fiber may be a PET fiber extruded with active carbon and/or volcanic sand.

[0049] The ball retriever sleeve (**300**) may include one or more wicking layers. The wicking layers may be formed from a nonwoven material, a woven material, a knit material, a meltblown material (e.g., of thermoplastic polyurethane), or the like. These wicking layers may include one or more moisture transport layers, which may serve to transport the moisture. The wicking layers may be formed using any of the fibers and/or binders discussed herein with respect to the fibrous layer. One or more wicking layers may be made from Lycra, polyester, polyethylene terephthalate, or a combination thereof.

[0050] The ball retriever sleeve (**300**) may include a curved electronic display extending around at

least a portion of the circumference of the ball retriever sleeve (**300**), and may possess any of the attributes or relationships disclosed with respect to the ball retriever sleeve (**300**) and/or the attributes of it, including, but not limited to, the size and curvature. The curved electronic display may be a portion of any of the disclosed rigid material embodiments, or the electronic display may be a flexible display that when installed creates the curved electronic display.

[0051] The relationships between the various components are essential to achieve the desired performance and durability. The disclosed relationships account for different stiffnesses and deflections of the components. The disclosure contains a delicate interplay of relationships of the various components, variables within each component as well, as relationships across the components, which impact the performance, durability, and manufacturability of the ball retriever sleeve (**300**). The disclosed relationships are more than mere optimization, maximization, or minimization of a single characteristic or variable, and are often contrary to conventional design thinking, yet have been found to achieve a unique balance of the trade-offs associated with competing criteria such as durability, performance, weight distribution, and case of manufacture. Further, it is important to recognize that all the associated disclosure and relationships apply equally to all embodiments and should not be interpreted as being limited to the particular embodiment being discussed when a relationship is mentioned. The aforementioned balances require trade-offs among the competing characteristics recognizing key points of diminishing returns, as often disclosed with respect to open and closed ranges for particular variables and relationships. Proper functioning of each component, and the overall ball retriever sleeve (**300**), on each and every shot, over thousands of uses, is critical. Therefore, this disclosure contains unique combinations of components and relationships that achieve these goals. While the relationships of the various features and dimensions of a single component play an essential role in achieving the goals, the relationships of features and/or characteristics across multiple components are just as critical, if not more critical, to achieving the goals. Further, the relative length, width, thickness, geometry, and material properties of various components, and their relationships to one another and the other design variables disclosed herein, influence the performance, durability, and case of use and manufacture. Additionally, many embodiments have identified upper and/or lower limits ranges of relationships when extension outside the range the performance may suffer and adversely impact the goals. While some relationships may appear unrelated, durability, reliability, manufacturability, and case of use are all impacted by the relationships.

[0052] In the above description, certain terms may be used such as “up,” “down,” “upper,” “lower,” “horizontal,” “vertical,” “left,” “right,” “over,” “under” and the like. These terms are used, where applicable, to provide some clarity of description when dealing with relative relationships. But, these terms are not intended to imply absolute relationships, positions, and/or orientations. For example, with respect to an object, an “upper” surface can become a “lower” surface simply by turning the object over. Nevertheless, it is still the same object. Further, the terms “including,” “comprising,” “having,” and variations thereof mean “including but not limited to” unless expressly specified otherwise. An enumerated listing of items does not imply that any or all of the items are mutually exclusive and/or mutually inclusive, unless expressly specified otherwise. The terms “a,” “an,” and “the” also refer to “one or more” unless expressly specified otherwise. Further, the term “plurality” can be defined as “at least two.” The term “about” in some embodiments, is defined to mean within +/−5% of a given value, however in additional embodiments any disclosure of “about” may be further narrowed and claimed to mean within +/−4% of a given value, within +/−3% of a given value, within +/−2% of a given value, within +/−1% of a given value, or the exact given value. Further, when at least two values of a variable are disclosed, such disclosure is specifically intended to include the range between the two values regardless of whether they are disclosed with respect to separate embodiments or examples, and specifically intended to include the range of at least the smaller of the two values and/or no more than the larger of the two values. Additionally, when at least three values of a variable are disclosed, such disclosure is specifically

intended to include the range between any two of the values regardless of whether they are disclosed with respect to separate embodiments or examples, and specifically intended to include the range of at least the A value and/or no more than the B value, where A may be any of the disclosed values other than the largest disclosed value, and B may be any of the disclosed values other than the smallest disclosed value.

[0053] Additionally, instances in this specification where one element is “coupled” to another element can include direct and indirect coupling. Direct coupling can be defined as one element coupled to and in some contact with another element. Indirect coupling can be defined as coupling between two elements not in direct contact with each other, but having one or more additional elements between the coupled elements. Further, as used herein, securing one element to another element can include direct securing and indirect securing. Additionally, as used herein, “adjacent” does not necessarily denote contact. For example, one element can be adjacent another element without being in contact with that element.

[0054] As used herein, the phrase “at least one of”, when used with a list of items, means different combinations of one or more of the listed items may be used and only one of the items in the list may be needed. The item may be a particular object, thing, or category. In other words, “at least one of” means any combination of items or number of items may be used from the list, but not all of the items in the list may be required. For example, “at least one of item A, item B, and item C” may mean item A; item A and item B; item B; item A, item B, and item C; or item B and item C. In some cases, “at least one of item A, item B, and item C” may mean, for example, without limitation, two of item A, one of item B, and ten of item C; four of item B and seven of item C; or some other suitable combination.

[0055] Unless otherwise indicated, the terms “first,” “second,” etc. are used herein merely as labels, and are not intended to impose ordinal, positional, or hierarchical requirements on the items to which these terms refer. Moreover, reference to, e.g., a “second” item does not require or preclude the existence of, e.g., a “first” or lower-numbered item, and/or, e.g., a “third” or higher-numbered item. As used herein, a system, apparatus, structure, article, element, component, or hardware “configured to” perform a specified function is indeed capable of performing the specified function without any alteration, rather than merely having potential to perform the specified function after further modification. In other words, the system, apparatus, structure, article, element, component, or hardware “configured to” perform a specified function is specifically selected, created, implemented, utilized, programmed, and/or designed for the purpose of performing the specified function. As used herein, “configured to” denotes existing characteristics of a system, apparatus, structure, article, element, component, or hardware which enable the system, apparatus, structure, article, element, component, or hardware to perform the specified function without further modification. For purposes of this disclosure, a system, apparatus, structure, article, element, component, or hardware described as being “configured to” perform a particular function may additionally or alternatively be described as being “adapted to” and/or as being “operative to” perform that function.

[0056] The present subject matter may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. All changes which come within the meaning and range of equivalency of the examples below are to be embraced within their scope. In view of the many possible embodiments to which the principles of the disclosure may be applied, it should be recognized that the illustrated embodiments are only preferred examples and should not be taken as limiting the scope of the disclosure. Various modifications may be made thereto without departing from the broader spirit and scope of the disclosure as set forth. The specification and drawings are, accordingly, to be regarded in an illustrative sense rather than a restrictive sense. Accordingly, the scope of the disclosure is at least as broad as the full scope of the following exemplary claims and their equivalents.

## Claims

**1**. A golf ball retriever sleeve for mounting on a flagstick having a flagstick diameter, comprising: a sleeve top end separated from a sleeve lower end by a retriever sleeve height; a grip located at the sleeve top end and having a grip top end, a grip lower end, a grip width, and a grip height; a ball trough located at the sleeve lower end and having trough upper end, a trough lower end, a trough width, a trough height, and a trough rim; a sleeve body extending between the grip and the ball trough, with the sleeve body having a sleeve body upper end, a sleeve body lower end, a sleeve body inner width, a sleeve body outer width, a sleeve body height of 16″-60″, a sleeve body wall thickness, and a sleeve-outer-surface-to-flagstick-outer-surface distance of less than 0.25″ throughout at least 25% of the retriever sleeve height; wherein: the grip width is 2-10 times the sleeve body outer width, and the grip width is 3-10 times the flagstick diameter; the grip height is at least 20% of the grip width, and the grip height is at least 70% of the sleeve body outer width; at least one of the sleeve body, the grip, and the ball trough are formed of elastic material and is radially expandable; the ball retriever sleeve has a center of gravity located a CG distance measured from the sleeve lower end in a direction of the retriever sleeve height, and the CG distance is 35-65% of the retriever sleeve height; and at least a portion of the ball retriever sleeve has a ball retriever sleeve density of less than 3 g/cc.