WEIGHTING FERRULE FOR GOLF CLUB

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ABSTRACT
A weighting ferrule for a golf club is provided. The weighting ferrule has a first section that fits between the shaft and the hosel and a second section that extends up the shaft. The weighting ferrule is made of a strong rigid material, such as titanium, carbon steel, aluminum, stainless steel, or the like. The size of the ferrule may also be adjusted such that the weight of the ferrule adjusts the weight of the club head for a particular design.
WEIGHTING FERRULE FOR GOLF CLUB

[0001] This application claims the benefit of U.S. Provisional Application Ser. No. 61/292,072, filed on Jan. 4, 2010, entitled "Weighting Ferrule for Golf Club," which application is hereby incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure relates generally to golf clubs and, more particularly, to a weighting ferrule for attaching a shaft to a club head.

BACKGROUND

[0003] Golf clubs typically comprise a shaft having a butt end and a tip end. The tip end is connected to a club head. Generally, the club head includes a hosel, which is a cylindrical opening into which the tip of the shaft is inserted. The tip of the shaft is generally attached to the club head by the use of an adhesive.

[0004] As can be appreciated, the joint between the shaft and the hosel can be abrupt where the smaller diameter shaft is inserted into a relatively large diameter hosel. To improve the aesthetics, many clubs include a ferrule that covers the joint between the shaft and the hosel of the club head. The ferrule is a hollow, cylindrical element that fits over the shaft and rests on the upper surface of the hosel. The use of the ferrule provides a smooth transition from the shaft to the club head, thereby improving the aesthetics of the club, particularly when a golfer is preparing for shot.

[0005] During a golf swing, the club head may reach speeds well over 100 mph and may exert a considerable amount of stress on the joint between the club head and the shaft. This stress may allow the club head to twist relative to the shaft, inhibiting the ability of the golfer to fully load the shaft. As a result, the amount of power and control exerted upon the ball at impact may be reduced.

SUMMARY

[0006] In accordance with one aspect of an embodiment, a weighting ferrule for a golf club is provided. The weighting ferrule has a first section that fits between the shaft and the hosel and a second section that extends up the shaft. The weighting ferrule is made of a strong rigid material, such as titanium, carbon steel, aluminum, stainless steel, or the like. The size of the ferrule may also be adjusted such that the weight of the ferrule adjusts the weight of the club head for a particular design.

[0007] Other embodiments are also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] For a more complete understanding of the embodiments, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

[0009] FIG. 1 illustrates a portion of a golf club in accordance with an embodiment;

[0010] FIG. 2a-2c illustrates a cross-sectional view of a weighting ferrule in accordance with an embodiment;

[0011] FIGS. 3a-3c illustrate a weighting ferrule in accordance with an embodiment;

[0012] FIGS. 4a-4c illustrate a weighting ferrule in accordance with another embodiment;

[0013] FIGS. 5a-5c illustrate a weighting ferrule in accordance with yet another embodiment;

[0014] FIGS. 6a-6c illustrate a weighting ferrule in accordance with yet another embodiment;

[0015] FIGS. 7a-7c illustrate a weighting ferrule in accordance with yet another embodiment;

[0016] FIGS. 8a-8c illustrate a weighting ferrule in accordance with yet another embodiment.

DETAILED DESCRIPTION

[0017] The making and using of the embodiments of the disclosure are discussed in detail below. It should be appreciated, however, that the embodiments provide many applicable inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed are merely illustrative of specific ways to make and use the embodiments, and do not limit the scope of the disclosure.

[0018] Embodiments described herein relate to the use of a weighting ferrule made of strong, rigid materials such as aluminum, titanium, carbon steel, stainless steel, or the like. Embodiments described herein further provide specific dimensions, shapes, and weights. It should be noted, however, that these materials, shapes, dimensions, and weights are provided for purposes of illustration only and that other embodiments may use different materials, shapes, dimensions, and weights as desired for a particular golf club and/or golfer.

[0019] FIG. 1 illustrates a portion of a golf club 100 in accordance with an embodiment. Golf club 100 comprises a club head 102, a shaft 104, and a weighting ferrule 106. The club head 102 shown represents a driver or a wood for illustrative purposes only, and it should be appreciated that other embodiments may utilize other types of club heads, including, for example, irons, fairway woods, utility clubs, hybrids, and/or the like. The shaft 104 has a generally tubular shape tapered from a larger butt end (not shown) to a narrower tip end 108. The tip end 108 of the shaft 104 is sized and configured to insert into a hosel 110 of the club head 102. The shaft 104 may be affixed to the club head using an epoxy or other type of adhesive.

[0020] The weighting ferrule 106 is hollow having an opening with a diameter designed to accommodate the shaft 104. In an embodiment, the opening in the weighting ferrule 106 allows the shaft 104 to pass completely through the weighting ferrule 106 and into the hosel 110 of the club head 102. In other embodiments, however, the opening in the weighting ferrule 106 is such that the shaft 104 does not pass completely through the weighting ferrule 106.

[0021] Referring now to FIGS. 2a and 2b, there is shown a cross-sectional view of shaft 104, weighting ferrule 106, and the hosel 110 of the club head 102 before and after installation, respectively, in accordance with an embodiment. Reference should also be made to FIG. 2c which illustrates an enlarged view of a cross-section of the weighting ferrule to better illustrate the structure in accordance with an embodiment.

[0022] The weighting ferrule 106 includes a collar section 220 having an indent 221 that is designed to fit within an indentation 222 formed in the hosel 110 of the club head 102 around the opening into which the tip end 108 of the shaft 104 is to be inserted. When installed, the collar section 220 is positioned between the shaft 104 and the hosel 110 of the club head 102.
[0023] Adjoining the collar section 220 is an extension section 224. The size of the extension section 224 may be adjusted to alter the weight characteristics of the weighting ferrule 106. For example, if the size of the extension section 224 is increased, then the weighting ferrule 106 will have a greater weight, and similarly, if the size of the extension section 224 is decreased, then the weighting ferrule 106 will have less weight.

[0024] A tapered section 226 of the weighting ferrule 106 provides a transition from the hosel 110 of the golf club 102 to the shaft 104, providing a more aesthetically pleasing appearance. The amount of tapering may be adjusted as desired.

[0025] FIGS. 3a-8c illustrate various views of various embodiments of the weighting ferrule 106, wherein the “a” figures are cross-sectional views, the “b” figures are end views, and the “c” figures are perspective views.

[0026] Referring first to FIGS. 3a-3c, there is shown an embodiment in which the weighting ferrule 106 has an overall length of about 0.500 inches, including an extension section 224 having a length of about 0.125 inches and a tapered section 226 having a length of about 0.290 inches. The tapered section 226 tapers about 7.9°. The collar section 220 has a length of about 0.085 inches and an indentation of about 0.040 inches. In this embodiment, the weighting ferrule has an interior diameter of about 0.335 inches.

[0027] FIGS. 4a-4c illustrate various views of the weighting ferrule 106 in accordance with another embodiment. The embodiment of FIGS. 4a-4c is similar to the embodiment of FIGS. 3a-3c, except the embodiment illustrated in FIGS. 4a-4c has been modified to accommodate a shaft having a larger diameter of about 0.360 inches. In this embodiment, the length of the extension section 224 is about 0.155 inches and the length of the tapered section 226 is about 0.230 inches. The collar section 220 has a length of about 0.115 inches and an indentation of about 0.040 inches. The taper portion has a taper of about 7.9°.

[0028] FIGS. 5a-5c illustrate various views of the weighting ferrule 106 in accordance with yet another embodiment. As shown, this embodiment is longer, and heavier, than the embodiments discussed above with reference to FIGS. 3a-3c and 4a-4c. The embodiment illustrated in FIGS. 5a-5c has been designed for shafts having a tip end diameter of about 0.335 inches. The overall length is about 0.750 inches, wherein the tapered section 226 has a length of about 0.415 inches, an extension section 224 of about 0.250 inches, and a collar section 220 of about 0.085 inches. In this embodiment, the tapered section 226 has a taper of about 5.5°, and the collar section 220 has an indentation of about 0.040 inches.

[0029] FIGS. 6a-6c illustrate various views of the weighting ferrule 106 in accordance with yet another embodiment. The embodiment of FIGS. 6a-6c is similar to the embodiment of FIGS. 5a-5c, except the embodiment illustrated in FIGS. 6a-6c has been modified to accommodate a shaft having a larger diameter of about 0.360 inches. In this embodiment, the length of the extension section 224 is about 0.220 inches and the length of the tapered section 226 is about 0.415 inches. The collar section 220 has a length of about 0.115 inches and an indentation of about 0.040 inches. The taper portion has a taper of about 5.5°.

[0030] FIGS. 7a-7c illustrate various views of the weighting ferrule 106 in accordance with yet another embodiment. As shown, this embodiment is longer, and heavier, than the embodiments discussed above with reference to FIGS. 3a-3c, 4a-4c, 5a-5c, and 6a-6c. The embodiment illustrated in FIGS. 7a-7c has been designed for shafts having a tip end diameter of about 0.335 inches. The overall length is about 1.000 inches, wherein the tapered section 226 has a length of about 0.415 inches, an extension section 224 of about 0.500 inches, and a collar section 220 of about 0.085 inches. In this embodiment, the tapered section 226 has a taper of about 5.5° and the collar section 220 has an indentation of about 0.040 inches.

[0031] FIGS. 8a-8c illustrate various views of the weighting ferrule 106 in accordance with yet another embodiment. The embodiment of FIGS. 8a-8c is similar to the embodiment of FIGS. 7a-7c, except the embodiment illustrated in FIGS. 8a-8c has been modified to accommodate a shaft having a larger diameter of about 0.360 inches. In this embodiment, the length of the extension section 224 is about 0.500 inches and the length of the tapered section 226 is about 0.415 inches. The collar section 220 has a length of about 0.085 inches and an indentation of about 0.040 inches. The taper portion has a taper of about 5.5°.

[0032] The embodiments discussed above are provided for illustrative purposes only and that other embodiments may utilize different sizes and shapes. It should also be appreciated that the weighting ferrules may be formed of metallic material or compound that provides sufficient weighting and rigidity characteristics, such as stainless steel, titanium, aluminum, and carbon steel. The following table illustrates weights that may be used for various lengths of the weighting ferrule in accordance with some embodiments. One of ordinary skill in the art will realize that other materials, weights, and lengths may be used.

<table>
<thead>
<tr>
<th>Type</th>
<th>0.5 inch</th>
<th>0.75 inch</th>
<th>1.0 inch</th>
</tr>
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<tbody>
<tr>
<td>Stainless Steel</td>
<td>4 grams</td>
<td>7 grams</td>
<td>9 grams</td>
</tr>
<tr>
<td>Titanium</td>
<td>2 grams</td>
<td>4 grams</td>
<td>5 grams</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2 grams</td>
<td>3 grams</td>
<td>4 grams</td>
</tr>
<tr>
<td>Carbon Steel</td>
<td>5 grams</td>
<td>8 grams</td>
<td>10 grams</td>
</tr>
</tbody>
</table>

[0033] As opposed to the more traditional ferrules used with golf clubs in which the ferrules are made of a lightweight material, such as plastics, to avoid adding additional weight, weighting ferrules such as those disclosed herein are designed to add weight and rigidity to the joint between the club head and the shaft. It has been found that weighting ferrules such as the embodiments disclosed herein may provide a significant performance advantage. While the exact cause of this increase is not exactly understood, it is believed that the rigidity in combination with the extra weight allows a more efficient loading of the shaft during the golf swing.

[0034] As such, the weighting ferrules may be designed to particularly suit a player’s specific swing. In general, the smaller embodiments discussed above with reference to FIGS. 3a-3a and 4a-4c have been designed for slower swing speeds, such as swing speeds between 60-80 mph. Embodiments illustrated above with reference to FIGS. 5a-5c and 6a-6c have been designed for faster swing speeds of about 80-115 mph and may serve as a general-purpose weighting ferrule. The embodiments illustrated above with reference to FIGS. 7a-7c and 8a-8c have been designed for high swing speeds of over 115 mph.

[0035] It is believed that the greater weight added as the swing speeds increase allow the shaft to load quicker to accommodate the faster swings. Additionally, it is believed
the rigid material of the weighting ferrule prevents or reduces torquing or twisting of the club head during the swing and impact, providing greater control to the golfer. Tests performed using a stationary robotic arm calibrated to the aerospace environment standards for various club head speeds and meeting the USGA rules and PGA standards indicated that embodiments using a weighting ferrule such as those disclosed herein may improve the overall performance (e.g., including distance, accuracy, and the like) of a golf club by about 66% setting the RSSR at 85 and about 80% setting the RSSR at 110 over an off-the-shelf manufactured golf club. By adding the weighting ferrule just above the hosel on the golf club head and inserting the shaft through the weighting ferrule and club head, the center of gravity is raised from the club head sole towards the center of the face of the club head, thereby increasing the sweet spot width. The resulting impact factor (as measured using a pressure impact gage at impact) increase is 12% to 14% percent, which may result in a shot distance increase by 6% to 12%, and may result in 5 yards to 20 yards longer shots depending on the shaft flex, shaft length, and the weight of the weighting ferrule. The distance may vary depending on the movement of inertia.

[0036] The weighting ferrule may also reduce torque from 4.2 down to 2.8 allowing less movement of the golf club head during the load and unload of the club shaft. This allows accuracy and shot distribution to be tighter by 45% to 55%.

[0037] On average, test data show that the actual reaction times at various club head speeds improved by 30% to 46% depending on the type of shaft and club head. The actual reaction times were measured by comparing the time the club head takes to travel from the start of the backswing (e.g., 12:00 o’clock position on a swing robot) to the impact position (e.g., the 6:00 o’clock position on a swing robot). The club crush factor at impact (e.g., the amount of force at impact with the ball), using an average OEM club, increased by 38% to 47%, again depending on the flex of the shaft, weight of the weighting ferrule, and the swing speed of the golf club.

[0038] Techniques such as those disclosed herein may be combined with other techniques as well. For example, a weighting ferrule such as those disclosed above may be combined with spinning (e.g., a process in which the shaft is rotated with respect to the club face to align a seam of the shaft with the club face).

[0039] Although the embodiments and their advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the embodiments as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, and composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed, that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the disclosure. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps. In addition, each claim constitutes a separate embodiment, and the combination of various claims and embodiments are within the scope of the disclosure.

What is claimed is:

1. A weighting ferrule for a golf club, the ferrule comprising:
   a collar section;
   an exterior section adjoining the collar section, the collar section having a smaller exterior dimension than the exterior section, the weighting ferrule being formed of a single continuous piece of rigid material.

2. The ferrule of claim 1, wherein the rigid material comprises aluminum.

3. The ferrule of claim 1, wherein the rigid material comprises carbon steel.

4. The ferrule of claim 1, wherein the rigid material comprises stainless steel.

5. The ferrule of claim 1, wherein the rigid material comprises titanium.

6. The ferrule of claim 1, wherein the exterior section has a first section and a second section, the first section having a constant exterior diameter and the second section having a tapered exterior diameter.

7. The ferrule of claim 1, wherein the rigid material comprises a metallic material.

8. A golf club comprising:
   a club head having a hosel, the hosel having a cavity, the cavity having a first portion and a second portion, a diameter of the first portion being larger than a diameter of the second portion;
   a shaft having a butt end and a tip end, the tip end of the shaft being inserted into the cavity of the hosel; and
   a weighting ferrule around the shaft, the ferrule having an upper portion and a lower portion, the lower portion extending into the first portion of the cavity, the upper portion extending along the shaft from the hosel toward the butt end of the shaft, the weighting ferrule being formed of a rigid material.

9. The golf club of claim 8, wherein the rigid material comprises aluminum.

10. The golf club of claim 8, wherein the rigid material comprises carbon steel.

11. The golf club of claim 8, wherein the rigid material comprises stainless steel.

12. The golf club of claim 8, wherein the rigid material comprises titanium.

13. The golf club of claim 8, wherein the rigid material comprises a metallic material.

14. The golf club of claim 8, wherein the upper portion has a first section and a second section, the first section having a constant exterior diameter and the second section having a tapered exterior diameter.

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