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(72) Inventors:
• **MINE, Takayuki**
Yoro-gun
Gifu 503-1314 (JP)
• **ITO, Mitsuyasu**
Yoro-gun
Gifu 503-1314 (JP)

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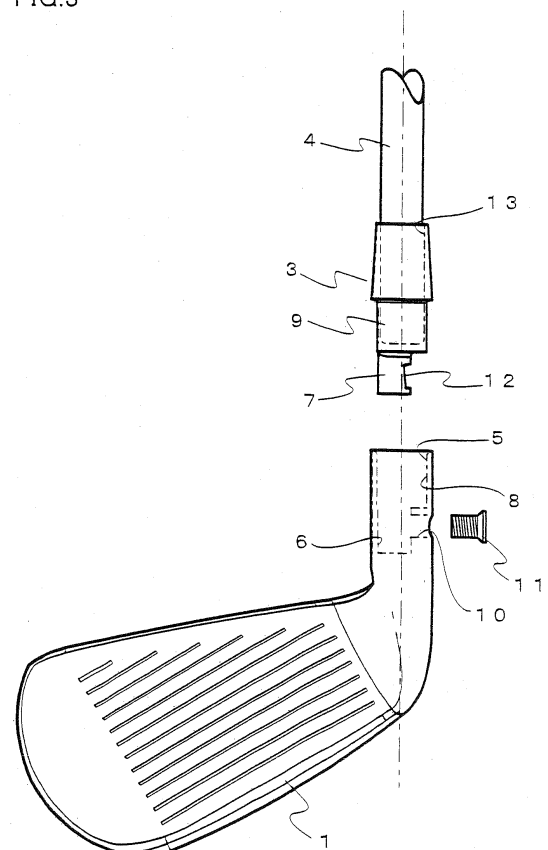
(74) Representative: **Prüfer & Partner GbR**
European Patent Attorneys
Sohnckestrasse 12
81479 München (DE)

(71) Applicant: **Mizuno Corporation**
Osaka-shi, Osaka 541-8538 (JP)

(54) **GOLF CLUB**

(57) A golf club includes: a shaft (4); an adapter (3) having a shaft inserting portion (9) disposed with a shaft inserting hole (13) at one end for fixing the shaft (4) and at the other end a fixing portion (7) which is integrally disposed with the shaft inserting portion (9) with a central axis thereof deviated from a central axis of the shaft inserting portion (9) and is disposed with a concave portion (12) at least at a part of a circumferential wall surface thereof; a club head (1) including a hosel portion (2) disposed with a hosel hole (5) for inserting the adapter (3) and a through hole (10) extending from a hosel outer wall to the hosel hole (5) and located at a position corresponding to the concave portion (12) of the fixing portion (7); and a retaining means (11) passing through the through hole (10) to press the concave portion (12) so as to prevent the shaft (4) from dropping out. Accordingly, it is possible to obtain a golf club where the shaft and the club head can be attached or detached with ease and the club head can be sufficiently fixed around the shaft.

FIG.3



Description**TECHNICAL FIELD**

[0001] The present invention relates to a golf club having a shaft installed in a hosel hole of a hosel portion with an adapter interposed therebetween.

BACKGROUND ART

[0002] To meet abilities and preferences of golfers, it is necessary to combine a shaft and a club head to fit for each golfer. Therefore, conventionally, for example, as proposed in PTL 1 (Japanese Patent Laying-Open No. 2002-153574) and PTL 2 (Japanese Patent Laying-Open No. 2005-270402), there has been publicly known a golf club where the shaft and the club head can be attached to or detached from each other with ease.

CITATION LIST**PATENT LITERATURE****[0003]**

PTL 1: Japanese Patent Laying-Open No. 2002-153574

PTL 2: Japanese Patent Laying-Open No. 2005-270402

SUMMARY OF INVENTION**TECHNICAL PROBLEM**

[0004] According to the configuration of PTL 1, an insert can be rotated so as to adjust a loft angle or the like and the rotation is stopped by pressing a locking member into a plurality of dimples disposed in a side surface of the insert. Thereby, a shear load is repeatedly applied to especially the locking member, which may make insufficient the fixation of the club head about an axis of the shaft.

[0005] According to the configuration of PTL 2, a tip end of the shaft is protruded from the hosel hole toward a sole together with a spacer and thereafter the shaft and the spacer are heated so as to remove the shaft from the club head. Therefore, the club head can be reused, however, the shaft cannot be reused. Moreover, the spacer and a shaft inserting hole are not fixed through adhesion or the like but fixed through frictions among protrusions nearby a crown and an accepting means nearby the sole and the spacer, or frictions between the shaft inserting hole and the spacer. Thereby, there arises a problem that the fixation of the club head about the axis of the shaft is insufficient with respect to an impact load in hitting a ball.

SOLUTION TO PROBLEM

[0006] To solve the aforementioned problems, a golf club of the present invention includes: a shaft; an adapter having a shaft inserting portion disposed with a shaft inserting hole at one end for fixing said shaft and at the other end a fixing portion which is integrally disposed with said shaft inserting portion with a central axis thereof deviated from a central axis of said shaft inserting portion and is disposed with a concave portion at least at a part of a circumferential wall surface thereof; a club head including a hosel portion disposed with a hosel hole for inserting said adapter and a through hole extending from a hosel outer wall to the hosel hole and located at a position corresponding to said concave portion of said fixing portion; and a retaining means passing through said through hole to press said concave portion so as to prevent the shaft from dropping out.

ADVANTAGEOUS EFFECTS OF INVENTION

[0007] According to the golf club of the present invention, the fixing portion disposed integrally with the shaft inserting portion of the adapter along an axis different from the shaft inserting portion is inserted into a lower portion of the hosel hole to inhibit the rotation of the club head about the shaft. In addition, since the concave portion disposed at the wall surface of the fixing portion is pressed by the retaining means passing through the through hole, it is impossible for the shaft to drop out from the hosel hole. Since the impact load in hitting a ball applied is smaller in the dropping-out direction than in the rotation direction about the shaft, it is possible to make the retaining means small. Moreover, since the shaft and the adapter can be installed in another club head while still being fixed together, it is possible to reuse both the club head and the shaft.

[0008] Thereby, it is possible for a golfer to hit a ball with a golf club installed with an arbitrary shaft and an arbitrary club head to verify the performance of the golf club; if it is not satisfactory to the golfer, it is possible to replace the club head and/or the shaft with the other ones to hit a ball, thus, it is possible to improve an accuracy of custom fitting.

BRIEF DESCRIPTION OF DRAWINGS**[0009]**

Fig. 1 is a schematic explanation view of a golf club head according to the present invention.

Fig. 2 is a schematic explanation view of an adapter. Fig. 3 is a schematic explanation view of a hosel portion.

Fig. 4 is an example of the adapter according to the present invention.

Fig. 5 is an example of the hosel portion of the present invention.

Fig. 6 is a top view of a retaining means according to a modification of an embodiment.

Fig. 7 is a side view of a retaining means according to a modification of an embodiment.

DESCRIPTION OF EMBODIMENTS

[0010] An embodiment of the present invention will be described with reference to Fig. 1 through Fig. 7.

[0011] A golf club according to the present embodiment is provided with a shaft having a tubular body formed by laminating a prepreg of a fiber reinforced resin or a tubular body made of metal, or a tubular body formed by composing the aforementioned ones. A tip end of the shaft is installed with a club head, and the other end thereof is installed with a grip having natural rubber or synthetic rubber served as a main material.

[0012] The club head may be of an iron type or a wood type, and is formed by casting or by forging a metal material such as an iron alloy like a stainless steel, a titanium, or a titanium alloy. The club head may be constituted from a single material or may be constituted by joining a plurality of materials, and is configured to have a hosel hole disposed in a hosel portion for accepting an adapter.

[0013] In a wood club head, for example, which has a hollow portion enclosed by an outer shell and is disposed with an inner hosel such as a metal pipe or the like, a hole fitting with a shape of the adapter is formed by welding a metal block or the like to a lower end of the inner hosel or by performing a hole punching process on the pipe body. In addition, the hosel is further formed with a through hole leading from an outer wall of the hosel to a lower portion of the hosel hole.

[0014] The adapter may be formed from a metal material such as a stainless steel, a titanium alloy, an aluminum alloy or the like, or from an engineering plastic, a fiber reinforced resin or the like; however, it is preferable to use a metal material superior in fatigue characteristics. It is preferable that a shaft inserting portion and a fixing portion are integrally molded; however, it is also acceptable to dispose a protrusion at an end portion of the shaft inserting portion which is not opened and a hole corresponding to the protrusion in the fixing portion which is separate from the shaft inserting portion so as to join the shaft inserting portion and the fixing portion integrally. Moreover, at least one concave portion is disposed at an outer wall of the fixing portion to prevent the shaft from dropping out from the hosel hole.

[0015] Fig. 1 is a schematic explanation view of a golf club head 1 of the present invention, and Fig. 2 is a schematic explanation view of an adapter 3 to be installed in a hosel portion 2 of club head 1.

[0016] As illustrated in Fig. 3, in the golf club of the present invention, adapter 3 integrally fixed at a tip end of a shaft 4 is inserted into a hosel hole 5. A lower portion 6 of hosel hole 5 fits with a fixing portion 7 of adapter 3, and an upper portion 8 of hosel hole 5 fits with a shaft inserting portion 9 of adapter 3. In the state where adapter

3 is inserted into hosel hole 5, central axes of shaft 4 and adapter 3 match with central axes of shaft inserting portion 9 and hosel hole 5. The central axis of lower portion 6 of hosel hole 5 also matches with the central axis of fixing portion 7 of adapter 3; however, the central axes of shaft inserting portion 9 and fixing portion 7 are configured not to match with each other.

[0017] After adapter 3 is inserted into hosel hole 5, a retaining means 11 is passed through a through hole 10 extending from a hosel outer wall to lower portion 6 of hosel hole 5 to press a surface of fixing portion 7 where a concave portion 12 is formed. Since retaining means 11 remains in through hole 10 through the intermediary of threads or the like disposed in through hole 10, it is impossible for shaft 4 to drop out from hosel hole 5.

[0018] Fig. 4 is an example of adapter 3 according to the present invention. Adapter 3 is configured to include shaft inserting portion 9 which has a shaft inserting hole 13 and fixing portion 7 which has an axis Z2 different from an axis Z1 of shaft inserting portion 9 and is disposed integrally with shaft inserting portion 9. A side wall of fixing portion 7 is disposed with concave portion 12 which becomes deeper as it goes closer to shaft inserting portion 9 for preventing the dropping out.

[0019] For the purpose of easily processing hosel hole 5, it is desired to have axis Z1 of shaft inserting portion 9 and axis Z2 of fixing portion 7 disposed in parallel.

[0020] In the present embodiment, shaft inserting portion 9 is formed into a shape of a circular cylinder having a diameter D1 of 10.6 to 11.0 mm and a length L1 of 33 mm; the fixing portion is formed into a shape of a circular cylinder having a diameter D2 of 7.0 to 7.5 mm and a length L2 of 9.0 to 14.0 mm; both circular cylinders are disposed to contact each other at one contact point on the outer circumference; and axis Z1 of shaft inserting portion 9 and axis Z2 of fixing portion 7 are parallel but with a deviation of 1.7 mm. The opposite side of fixing portion 7 to the contact point is disposed with concave portion 12 which becomes deeper as it goes closer to shaft inserting portion 9.

[0021] Fig. 5 is an example of hosel portion 2 in the club head of the present invention. The hosel portion includes hosel hole 5 configured to have upper portion 8 and lower portion 6 to receive the insertion of shaft inserting portion 9 and fixing portion 7 of adapter 3 mentioned above and to fit with shaft inserting portion 9 and fixing portion 7, respectively. Through hole 10 is disposed to extend from lower portion 6 of hosel hole 5 to the hosel outer wall; retaining means 11 passes through the through hole 10 to press concave portion 12 disposed at the side wall of fixing portion 7 of adapter 3 so as to prevent adapter 3 from dropping out from hosel hole 5. Since retaining means 11 is detachable, retaining means 11 can be removed from through hole 10 to detach adapter 3 from hosel hole 5.

[0022] In the present embodiment, upper portion 8 of hosel hole 5 is configured to have a diameter D3 of 11.0 to 11.4 mm and a depth L3 of 10.5 to 15.5 mm so as to

enable the insertion of shaft inserting portion 9 with exception of a taper portion. Lower portion 6 of hosel hole 5 is configured to have a diameter D4 of 7.5 to 8.0 mm and a depth L4 of 9.0 to 14.0 mm so as to enable the insertion of adapter 3 in a detachable state.

[0023] A shaft installing length L1' is configured to be 25.0 to 27.0 mm. A hosel length L5 is configured to be 48.0 to 63.0 mm. Herein, hosel length L5 denotes a distance from an intersection point between a virtual line of the shaft axial line and a heel to an upper end of the hosel.

[0024] In the present embodiment, a part of through hole 10 is disposed with threads and a bolt is used as retaining means 11. A stainless screw is used as the bolt so as to sufficiently bear the repeated shear load. In addition, in order to prevent a damage to concave portion 12 of adapter 3, to improve the durability of the retaining means and to prevent the dropping out, it is acceptable to press concave portion 12 with an elastic body interposed therebetween.

[0025] In addition, when the golf club according to the present invention is applied as a custom fitting golf club, in order to improve the accuracy of the golf club as a fitting tool, it is desired to have the position of center of gravity of club head 1 identical to the position of center of gravity of a club head product corresponding to club head 1. However, in the case where club head 1 and shaft 4 are assembled with adapter 3 interposed therebetween like the golf club according to the present invention, the mass of the heel side increases by the weight of adapter 3 and accordingly the position of center of gravity of club head 1 shifts to the position of the heel in comparison to the club head product. As a result, a deviation arises adversely between the position of center of gravity of the club head product and the position of center of gravity of club head 1.

[0026] In order to solve such a problem, in the present embodiment, by making lighter the weight of adapter 3 via the adoption of a titanium material or an aluminum alloy and reducing the weight of the hosel portion of club head 1, the position of center of gravity of the club head product and the position of center of gravity of club head 1 corresponding to the club head product are made substantially identical. Specifically, the hosel of the club head product corresponding to club head 1 is cut into a pre-defined length, and the hosel length after cutting is used as hosel length L5 of club head 1. Thereafter, hosel length L5 and shaft installing length L1' are adjusted appropriately so as to make the weight of the portion cut off from the hosel portion equal to the weight of adapter 3. Herein, the processing length (mass) of the shaft hole in club head 1 is identical to the processing length in the club head product.

[0027] In the present embodiment mentioned above, hosel length L5 (48.0 to 63.0 mm) and shaft installing length L1' (25.0 to 27.0 mm) each fall in a size range capable of fulfilling the position of center of gravity substantially identical to the position of center of gravity of a club head product having a hosel length of 55.0 mm to

70.0 mm; thereby, in the case of using the golf club according to the present invention as a custom fitting club, it is possible to further improve the fitting accuracy.

[0028] In addition, even though hosel length L5 and shaft installing length L1' are each beyond the above-mentioned size range, it is possible to approach the position of center of gravity of club head 1 to the position of center of gravity of the club head product; however, it is more preferable to keep shaft installing length L1' within the abovementioned size range from the viewpoint of assuring adhesion strength between adapter 3 and keep shaft 4 and hosel length L5 within the abovementioned size range from the viewpoint of assuring strength of adapter 3 and club head 1.

[0029] An installation method of club head 1 and shaft 4 of the golf club according to the present invention will be described. As illustrated in Fig. 3, the tip end of shaft 4 is fixed in shaft inserting hole 13 of adapter 3 by adhesion or the like. Adapter 3 installed with shaft 4 is inserted into hosel hole 5 and after retaining means 11 is installed through the through hole 10 disposed in the hosel, the golf club according to the present invention can be used as a general golf club to hit balls.

[0030] As mentioned above, according to the golf club of the present invention, it is easy to attach or detach club head 1 and shaft 4 to or from each other, it is possible to reuse both the club head and the shaft, and it is also possible to stop the rotation of club head 1 about the shaft axis through the intermediary of fixing portion 7.

[0031] Furthermore, it is possible for a golfer to hit balls with the golf club composed of any favorite club head and shaft so as to confirm the performance thereof, and if the result is not satisfactory, it is possible to exchange the club head or the shaft for another one to confirm the performance; therefore, it is possible to offer the custom fitting system a high accuracy.

[0032] As illustrated in Fig. 3, at least a part of a bottom surface of concave portion 12 is configured to incline deeper as it goes closer to shaft inserting portion 9. Thereby, as retaining member 11 presses the inclination surface of concave portion 12, it is possible to apply a force to fixing portion 7 in a direction away from shaft inserting portion 9 (the direction from upper portion 8 of hosel hole 5 toward lower portion 6 thereof) while pressing fixing portion 7 against the wall surface of hosel hole 5. Accordingly, it is possible to press adapter 3 into hosel portion 2 while fixing adapter 3 in hosel portion 2 of club head 1. As a result thereof, it is possible to press the surface of adapter 3 positioned around shaft inserting portion 9 against the end surface of hosel portion 2 positioned around an opening portion thereof; thereby, it is possible to effectively inhibit the occurrence of a clearance while effectively inhibiting adapter 3 from being installed obliquely with respect to hosel portion 2.

[0033] As illustrated in Fig. 2(d), in order to partially overlap the outer circumference of shaft inserting portion 9 and the outer circumference of fixing portion 7, fixing portion 7 is disposed at a position eccentric relative to

the central axis of shaft inserting portion 9. As illustrated in Fig. 3, concave portion 12 is disposed at a side wall of fixing portion 7 positioned at a side (inner side: the side to the central axis of shaft inserting portion 9) opposite to the side (outer side: eccentric side) where the outer circumference of shaft inserting portion 9 and the outer circumference of fixing portion 7 contact each other. Herein, by making the central axis of fixing portion 7 eccentric relative to the central axis of shaft inserting portion 9, it is possible to assure a space between concave portion 12 and the hosel outer wall and it is possible to utilize the space to dispose retaining means 11. Moreover, by assuring a great space, it is also possible to make longer the length of through hole 10 and thereby make longer the dimension of retaining means 11. Accordingly, it is possible to increase the length of a joint portion between hosel portion 2 and retaining means 11 so as to prevent the dropping out of adapter 3 with certainty.

[0034] As illustrated in Fig. 5, hosel hole 5 includes upper portion 8 fitting with shaft inserting portion 9 and lower portion 6 fitting with fixing portion 7. Hosel portion 2 is further provided with a wall portion 20 which defines a part of the lower end of upper portion 8 and a part of the upper end of lower portion 6, and is contactable with the tip end of shaft inserting portion 9. Therefore, when installing adapter 3 in hosel portion 2, it is possible to cause a part of the end surface of shaft inserting portion 9 to contact wall portion 20 so as to position adapter 3. Thereafter, by installing retaining means 11 in hosel portion 2, it is possible to apply a force directed downward from shaft inserting portion 9 (direction from upper portion 8 of hosel hole 5 toward lower portion 6 thereof) to wall portion 20 while installing retaining means 11 in hosel portion 2. This can also contribute to the inhibition of adapter 3 from being installed obliquely and the reduction of the clearance between the end portion of the hosel and adapter 3.

[0035] As illustrated in Fig. 3, a fixing member having a thread portion such as a bolt may be adopted as retaining means 11. In this case, by providing the thread portion on both wall portion 20 which defines a part of through hole 10 and a partial surface of hosel portion 2 facing through hole 10, it is possible to screw retaining means 11 into through hole 10. Moreover, by increasing the length of wall portion 20 in a feasible range, it is possible to firmly install retaining means 11 in hosel portion 2. Thereby, it is possible to prevent the dropping out of adapter 3 with certainty.

[0036] Hereinafter, with reference to Figs. 6 and 7, a modification of the present embodiment will be described. In the modification, retaining means 11 includes a main body portion 11a, a protrusion portion 11b and a concave portion 11c. In the example of Fig. 6 and Fig. 7, main body portion 11a has a substantially cylindrical shape; however, it is possible to adopt any shape other than a cylindrical shape if the main body portion includes a cylindrical portion having a thread portion formed on an outer circumferential surface thereof. The outer cir-

cumferential surface of main body portion 11a is formed with threads.

[0037] The tip end of main body portion 11a is disposed with protrusion portion 11b. Any shape of protrusion portion 11b may be selected if it has a pressing face on the end surface (top surface) in the axial direction capable of pressing concave portion 12. In the example of Fig. 6 and Fig. 7, protrusion portion 11b has a substantially cylindrical shape. Protrusion portion 11b protrudes from the tip end of main body portion 11a in the axial direction. Protrusion portion 11b has a smaller radius than main body portion 11a. Protrusion portion 11b functions as a pressing portion to press adapter 3. By disposing protrusion portion 11b, it is possible to reduce the contact area with adapter 3 than the case of pressing adapter 3 by main body portion 11a. Accordingly, it is possible to increase a pressing force per unit area; thereby, it is possible to fix adapter 3 firmly in hosel portion 2 with a small force.

[0038] Concave portion 11c is designed to accept the insertion of a jig such as a hexagonal rod wrench for rotating retaining means 11. An inner wall of concave portion 11c has a shape in correspondence to an outer shape of the jig, for example a hexagonal planar shape. By inserting a part of the jig into concave portion 11c and rotating the jig, it is possible to rotate retaining means 11 together with the jig. Accordingly, it is possible to attach retaining means 11 in hosel portion 2 or detach it therefrom.

[0039] For club head 1 of an iron type, it is favorable to form adapter 3 with a single material such as a titanium or a titanium alloy; for club head 1 of a wood type, it is favorable to form adapter 3 with a composite metal material. For example, adapter 3 may be formed from an aluminum alloy and a member formed from a stainless steel such as SUS 304 may be installed on the outer surface of concave portion 12. This is because in the wood-type case, it is necessary to increase the length of adapter 3, it would be too heavy if a titanium is used, thereby an aluminum alloy is used; moreover, in order to assure the strength of the pressing portion, a stainless steel is used only in the pressing portion. In club head 1 of a wood type, for example, it is acceptable that length L1 of shaft inserting portion 9 of adapter 3 illustrated in Fig. 4 is 40.5 mm and length L2 of fixing portion 7 thereof is 9.5 mm, and the depth of the upper portion (corresponding to L3 in Fig. 5) of the hosel hole is 26 mm and the depth of the lower portion (corresponding to L4 in Fig. 5) thereof is 12 mm.

REFERENCE SIGNS LIST

[0040] 1: club head; 2: hosel portion; 3: adapter; 4: shaft; 5 hosel hole; 6: lower portion; 7: fixing portion; 8: upper portion; 9: shaft inserting portion; 10: through hole; 11: retaining means; 11a: main body portion; 11b: protrusion portion; 11c: concave portion; 12: concave portion; 13: shaft inserting hole; 20: wall portion

Claims**1.** A golf club, comprising:

a shaft (4); 5
 an adapter (3) having a shaft inserting portion (9) disposed with a shaft inserting hole (13) at one end for fixing said shaft (4) and at the other end a fixing portion (7) which is integrally disposed with said shaft inserting portion (9) with a central axis thereof deviated from a central axis of said shaft inserting portion (9) and is disposed with a concave portion (12) at least at a part of a circumferential wall surface thereof; 10
 a club head (1) including a hosel portion (2) disposed with a hosel hole (5) for inserting said adapter (3) and a through hole (10) extending from a hosel outer wall to the hosel hole (5) and located at a position corresponding to said concave portion (12) of said fixing portion (7); and 15
 a retaining means (11) passing through said through hole (10) to press said concave portion (12) so as to prevent the shaft (4) from dropping out. 20

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2. The golf club according to claim 1, wherein a portion of a bottom surface of said concave portion (12) contacted by said retaining means (11) is disposed with an inclination surface which inclines deeper as the inclination surface goes closer to the shaft inserting portion (9). 30**3.** The golf club according to claim 1, wherein said fixing portion (7) is disposed at a position eccentric relative to the central axis of said shaft inserting portion (9), and said concave portion (12) is disposed at a side wall of said fixing portion (7) positioned to the side of the central axis of said shaft inserting portion (9). 35

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4. The golf club according to claim 1, wherein said hosel hole (5) includes an upper portion (8) fitting with said shaft inserting portion (9), and a lower portion (6) fitting with said fixing portion (7), and said hosel portion (2) is further provided with a wall portion (20) which defines a part of a lower end of said upper portion (8) and a part of an upper end of said lower portion (6), and is contactable with a tip end of said shaft inserting portion (9). 45

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5. The golf club according to claim 1, wherein said retaining means (11) is a fixing member having a thread portion.**6.** The golf club according to claim 1, wherein said retaining means (11) includes: 55

a main body portion (11a); and

a protrusion portion (11b) axially protruding from a tip end of the main body portion (11a) in the direction, having a smaller radius than said main body portion (11a), and capable of pressing said concave portion (12).

FIG.1

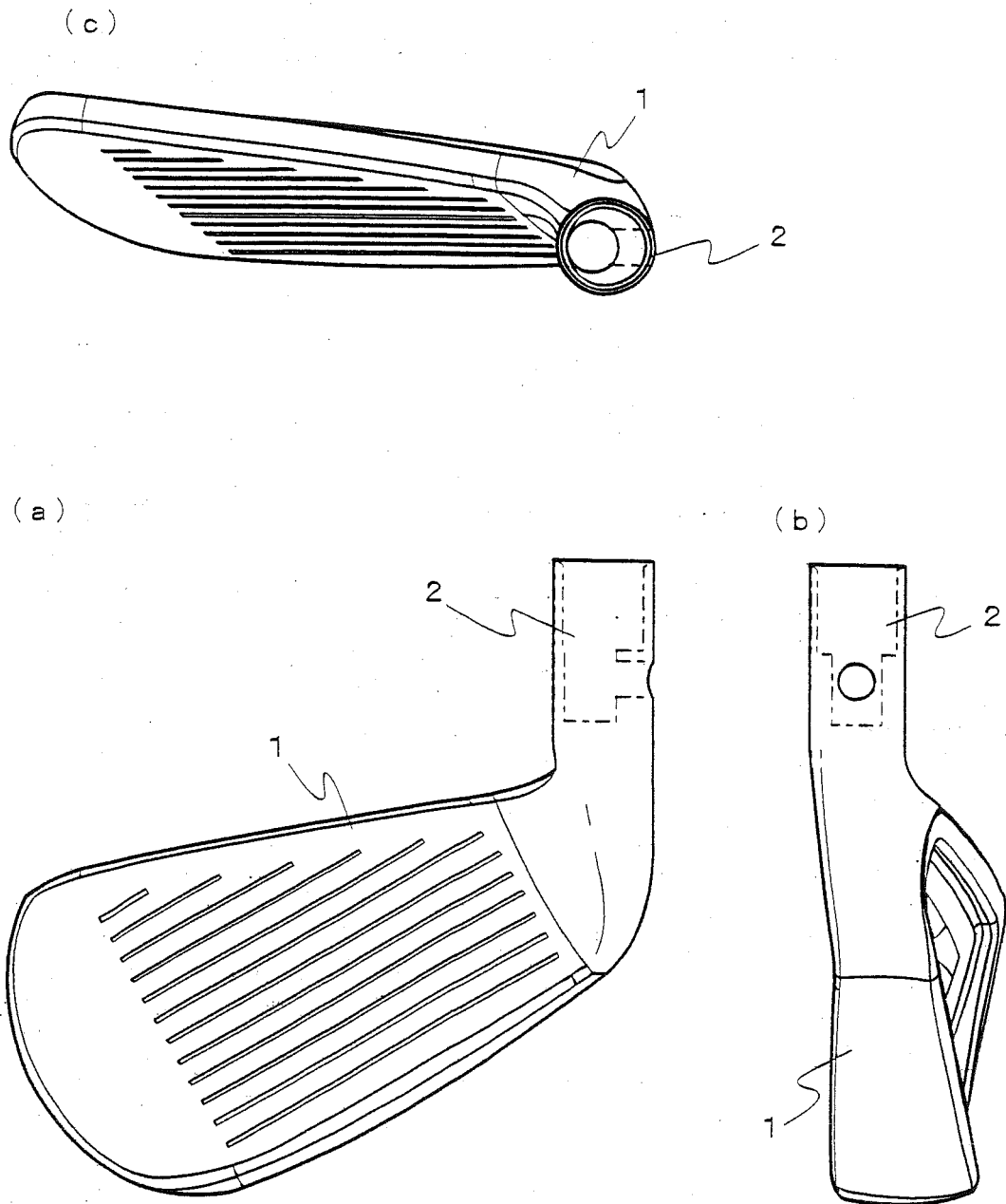


FIG.2

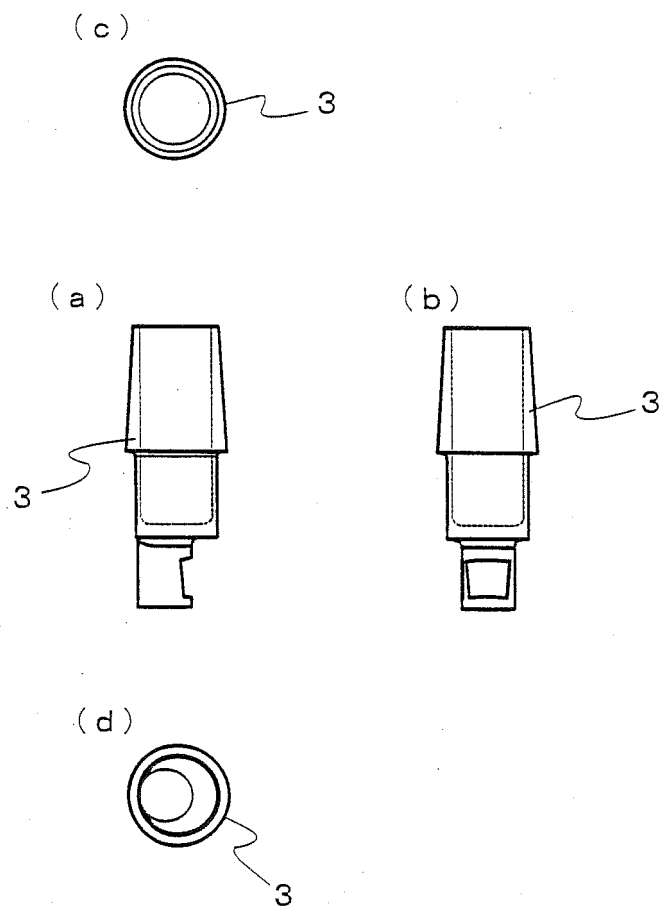


FIG.3

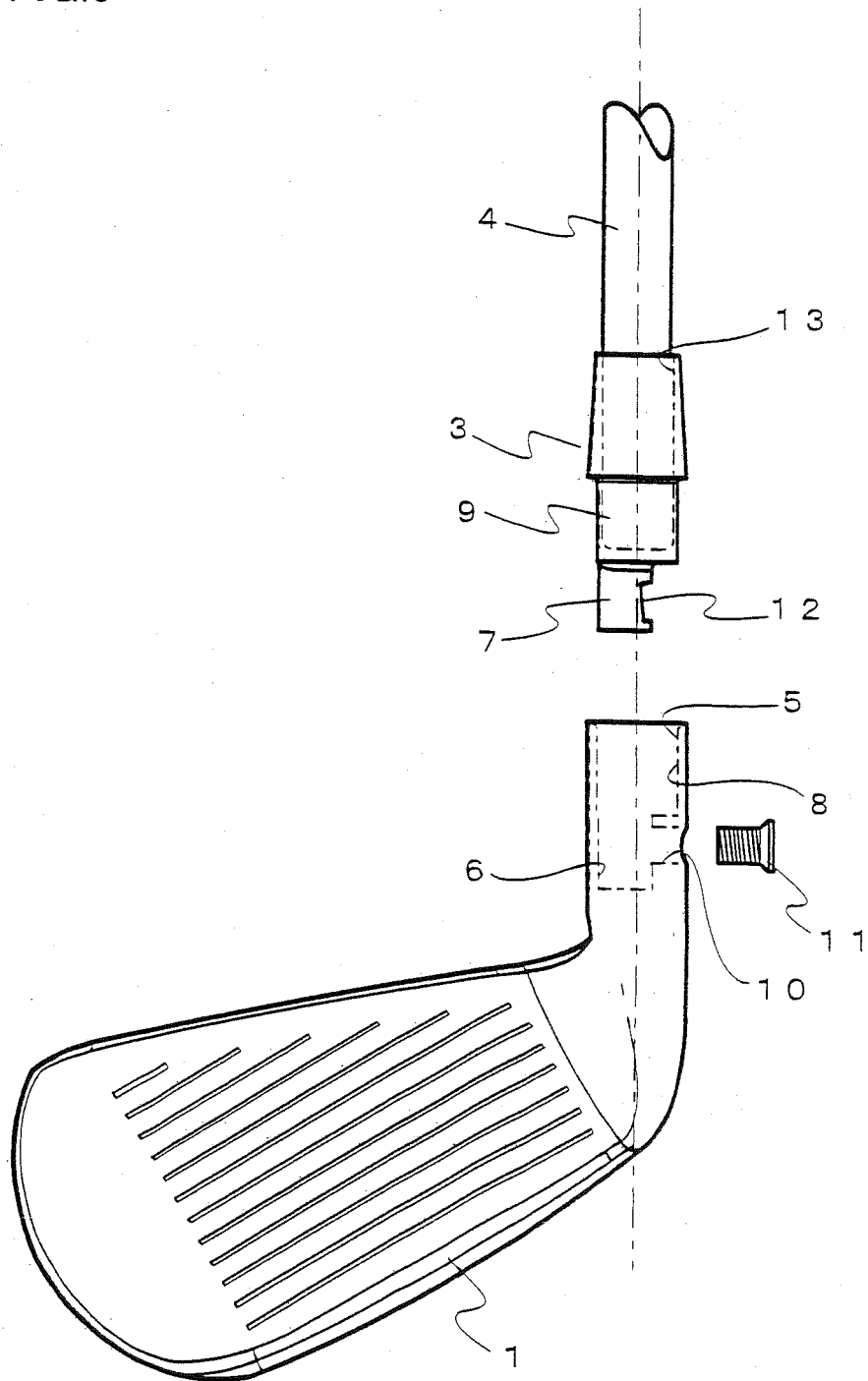


FIG.4

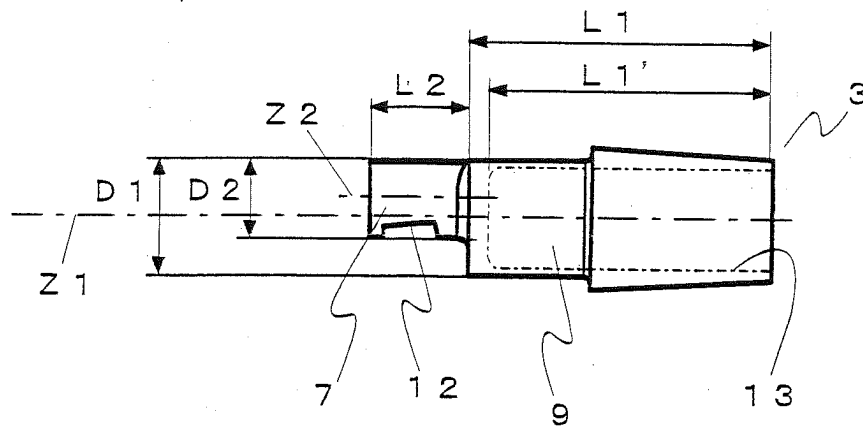


FIG.5

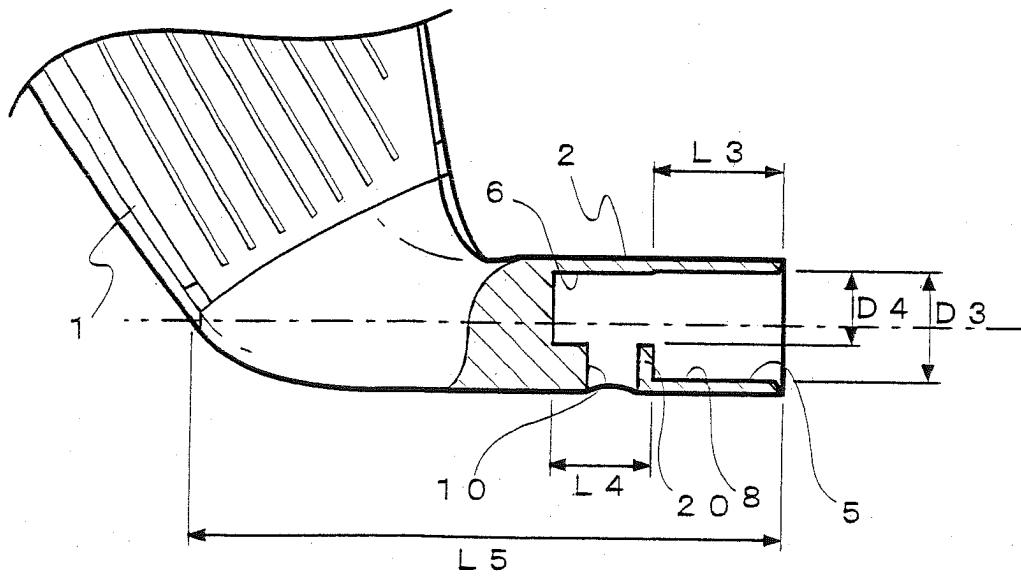


FIG.6

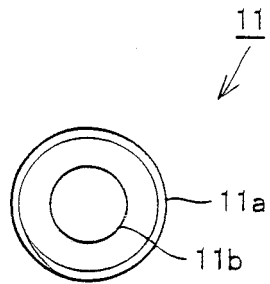
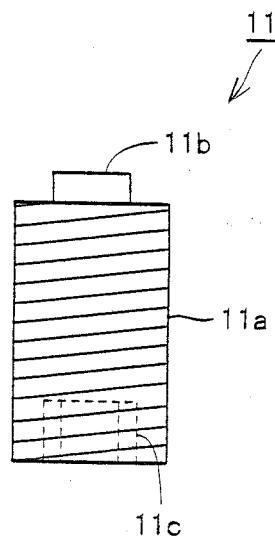


FIG.7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/065102

A. CLASSIFICATION OF SUBJECT MATTER

A63B53/02 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A63B53/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2012
Kokai Jitsuyo Shinan Koho	1971-2012	Toroku Jitsuyo Shinan Koho	1994-2012

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2010-5197 A (Globeride, Inc.), 14 January 2010 (14.01.2010), paragraphs [0023], [0051] to [0069] & US 2010/0035701 A1	1, 3-6 2
Y A	JP 2010-51590 A (Globeride, Inc.), 11 March 2010 (11.03.2010), claim 1; fig. 5 to 10 (Family: none)	1, 4-6 2-3
Y	JP 2010-194258 A (Japan Co., Ltd.), 09 September 2010 (09.09.2010), claims 1 to 2; fig. 1 to 8 (Family: none)	3

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search
26 July, 2012 (26.07.12)Date of mailing of the international search report
07 August, 2012 (07.08.12)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/065102

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2008-284289 A (SRI Sports Ltd.), 27 November 2008 (27.11.2008), claim 1; fig. 2 to 5, 10 to 13 & US 2008/0293510 A1	1-6

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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