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SUMMITT

(54) **GOLF CLUB SHAFT ADAPTER SYSTEM AND GOLF CLUB INCORPORATING THE SAME**

(76) Inventor: **JEFFERY W. SUMMITT**, Utica, OH (US)

Correspondence Address:
CHRISTIE, PARKER & HALE, LLP
PO BOX 7068
PASADENA, CA 91109-7068 (US)

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(52) **U.S. Cl.** **473/307**; 473/309; 473/314

(57) **ABSTRACT**

Golf club adapters and golf clubs incorporating such adapters are provided that allow a golf club shaft to be coupled to a golf club head at different orientations for varying the golf club lie angle and/or face angle. The adapter has a first portion coupleable to the golf club shaft along a first longitudinal axis and a second portion coupleable to the club head along a second longitudinal axis, where the first longitudinal axis is offset from the second longitudinal axis. The adapter may be integral or separate from the golf club shaft.

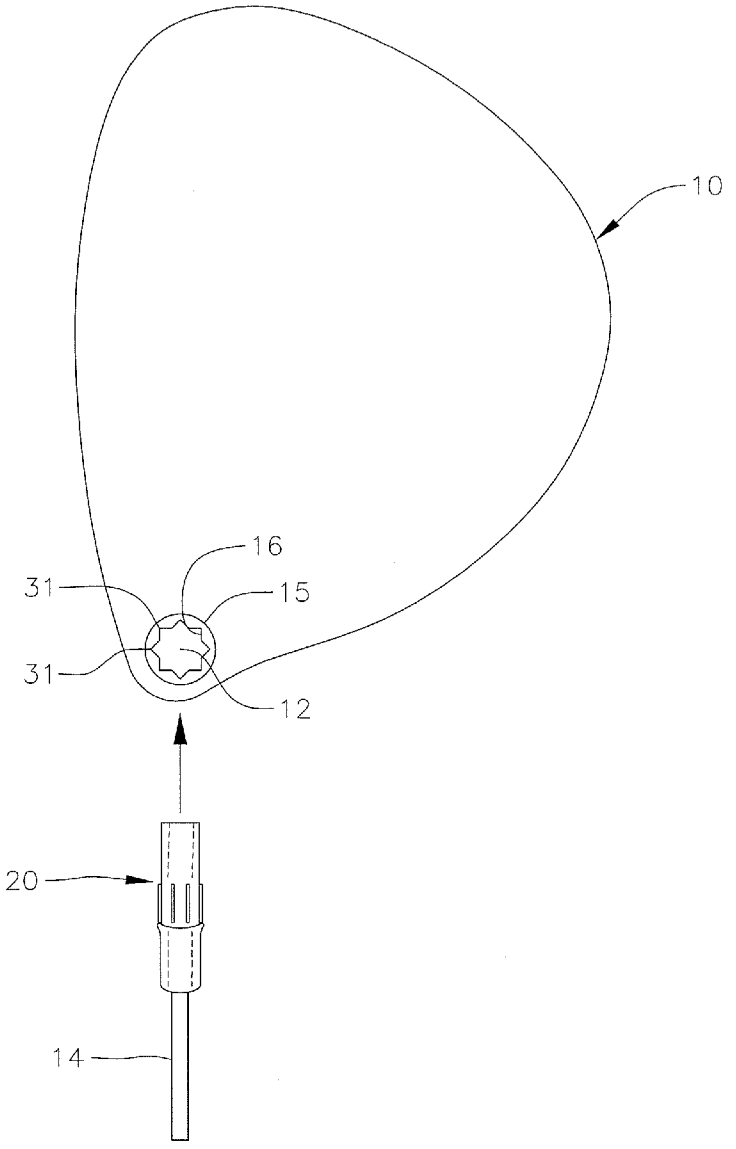


FIG.1

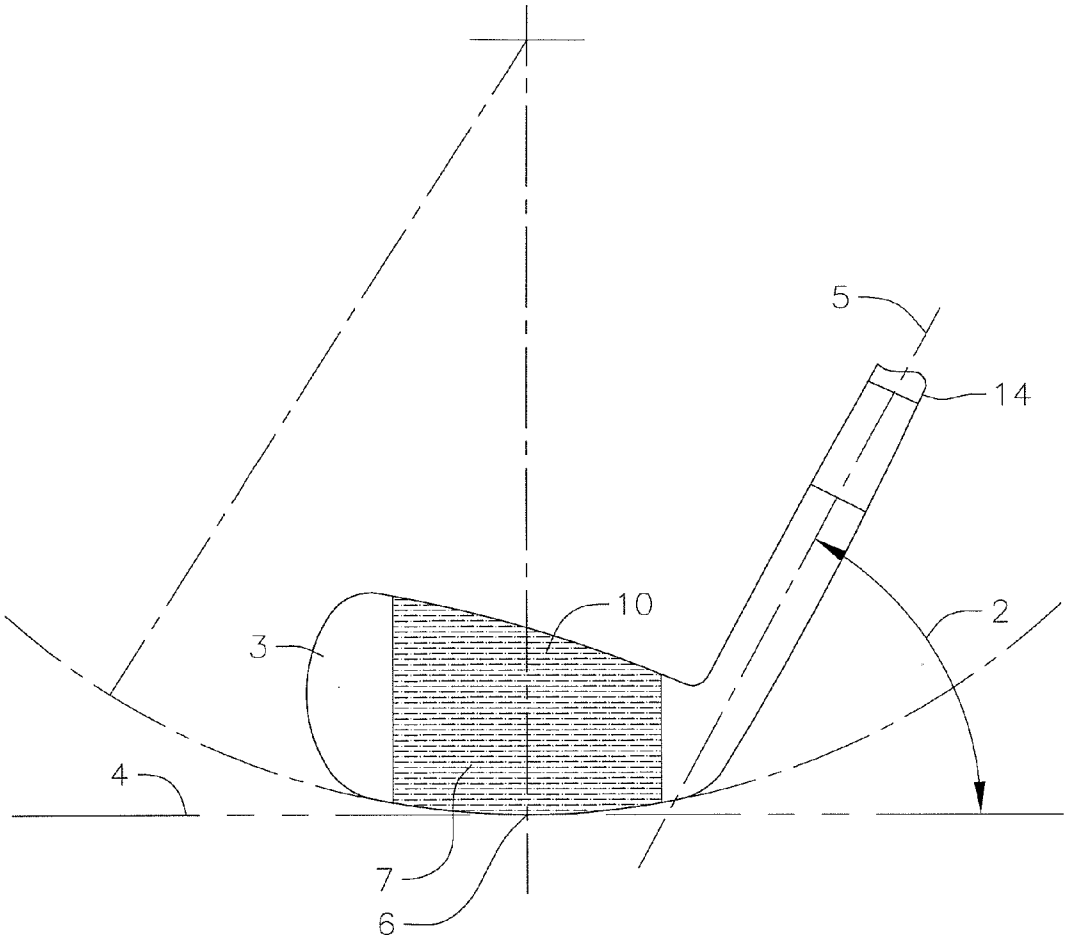


FIG. 2C

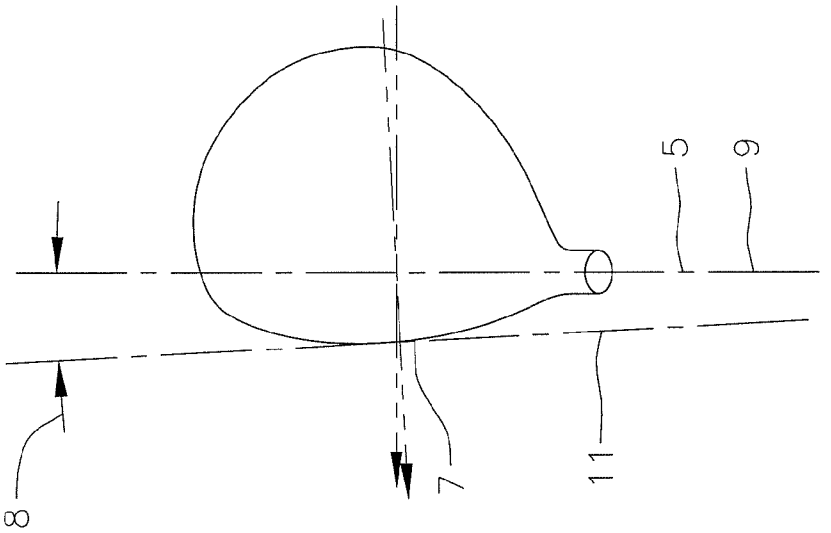


FIG. 2B

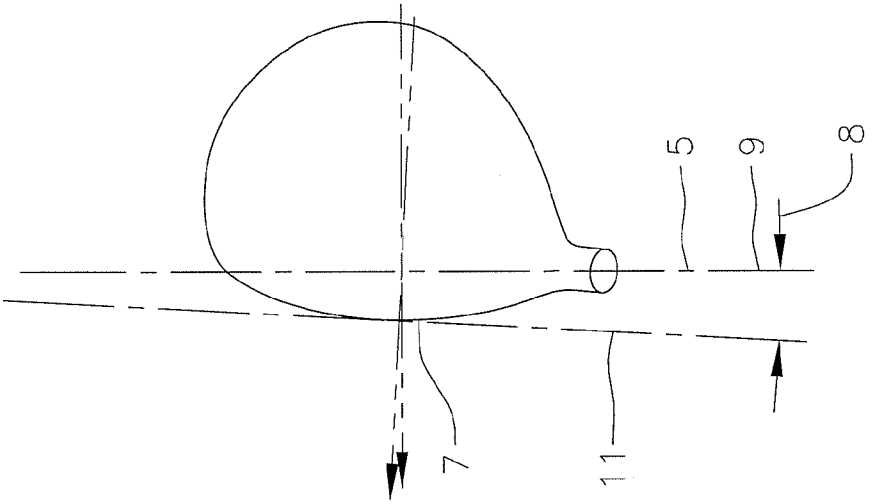


FIG. 2A

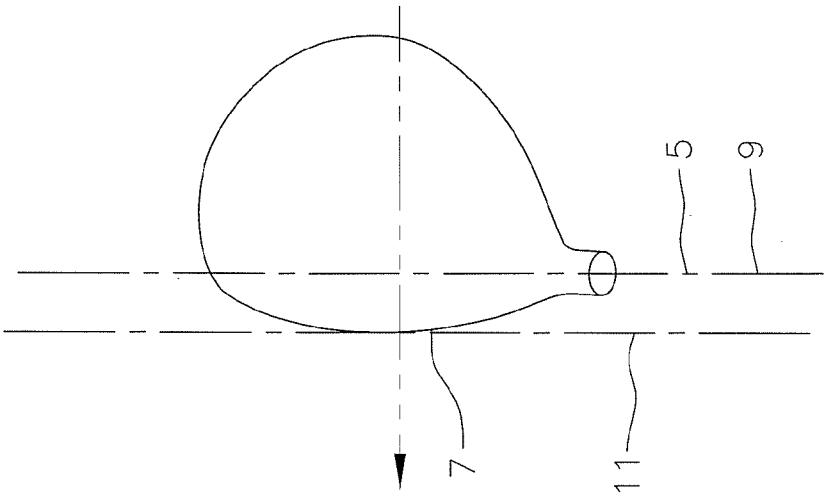


FIG. 3

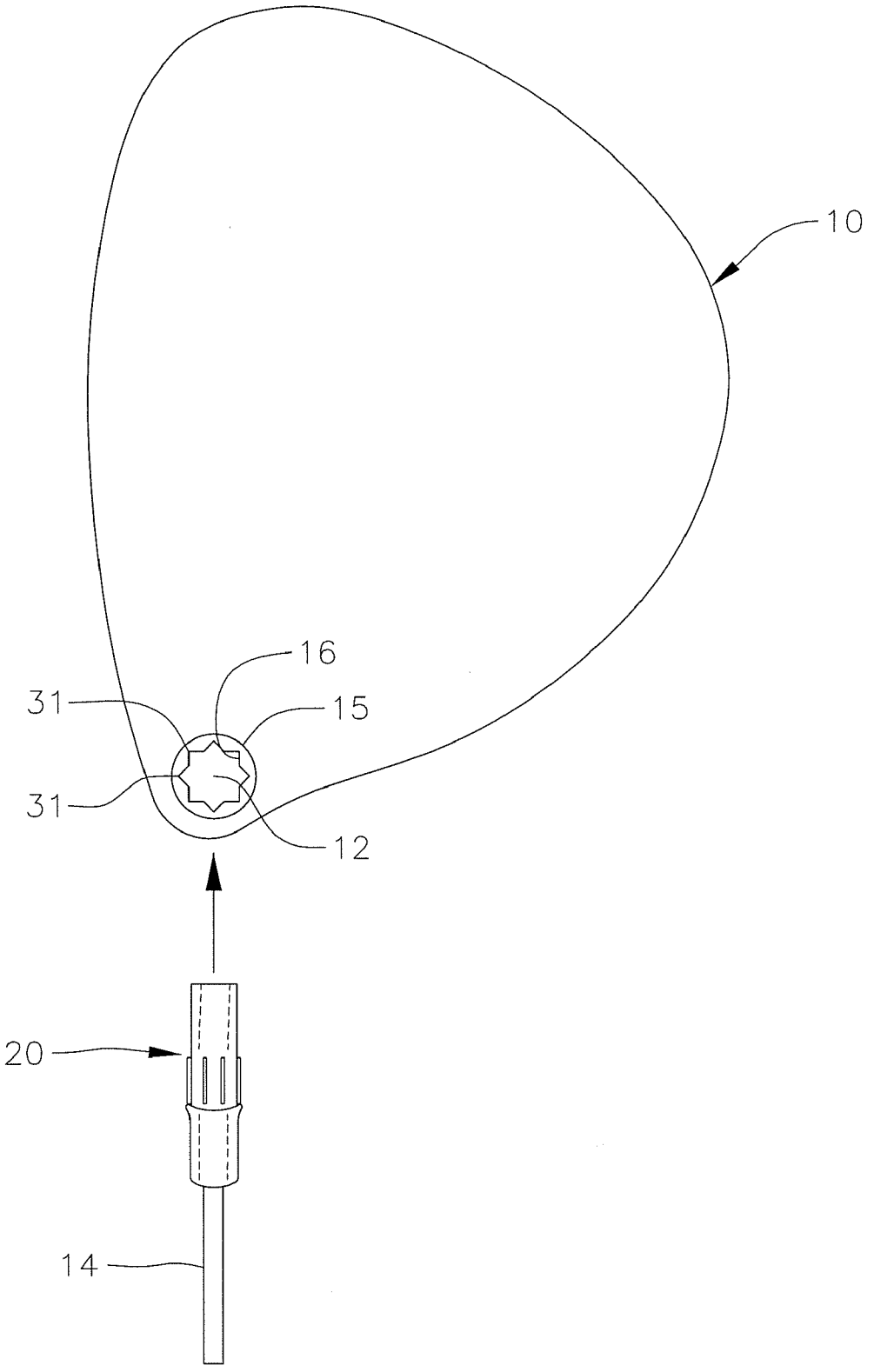


FIG. 4

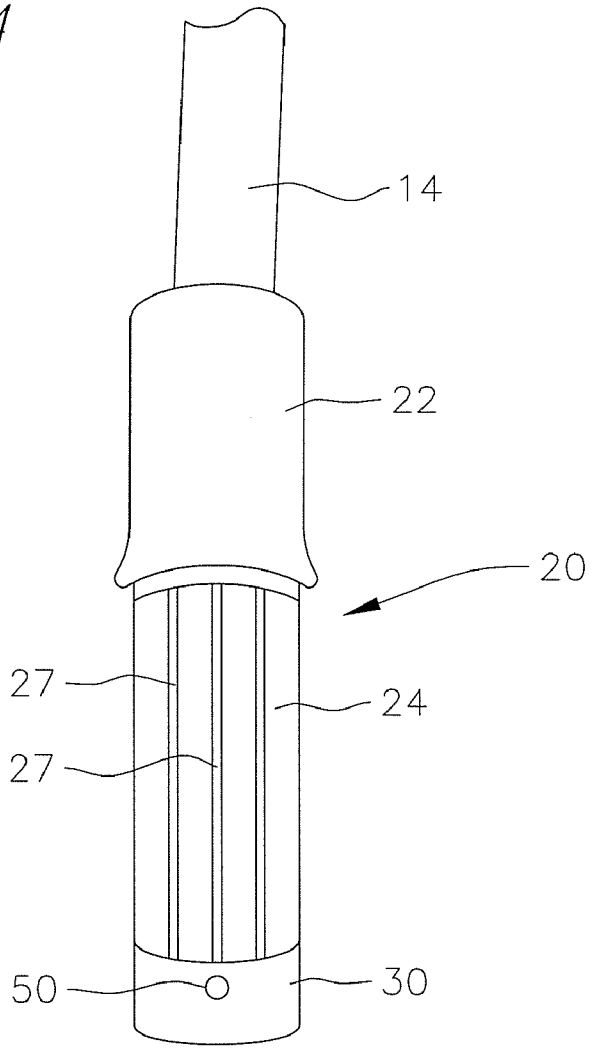


FIG. 6A

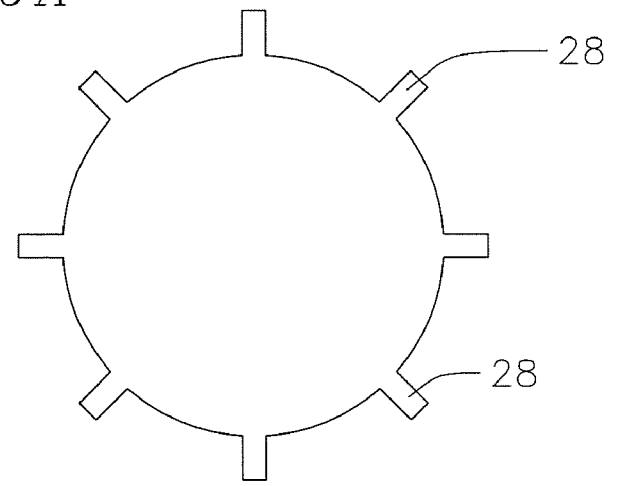


FIG. 5A

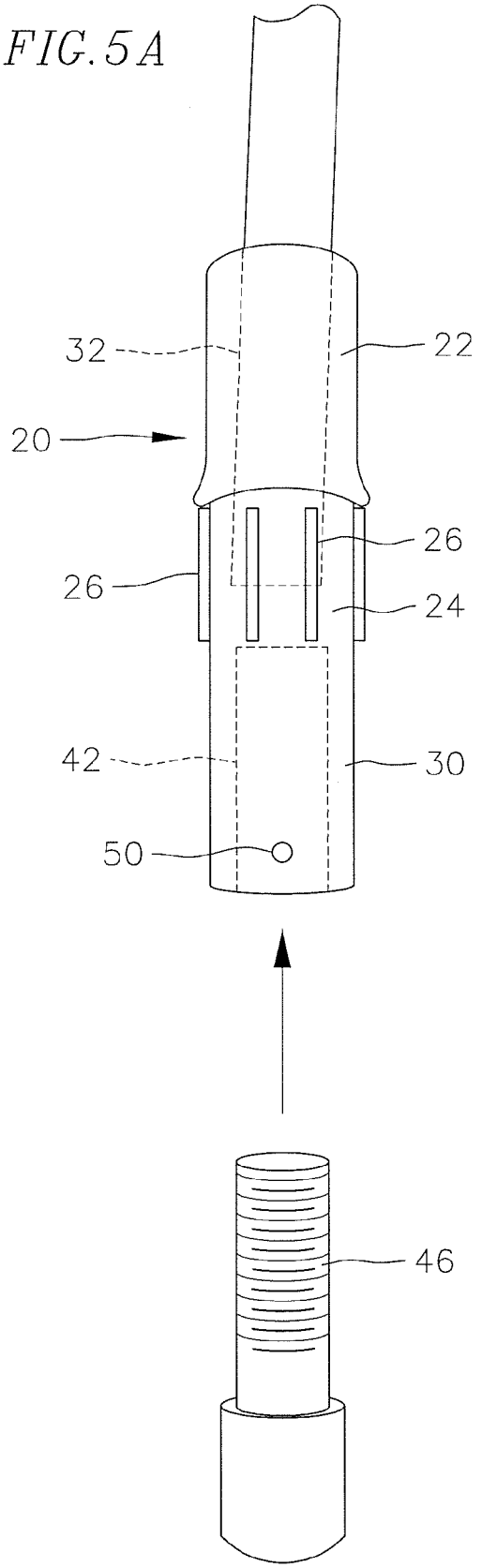


FIG. 5B

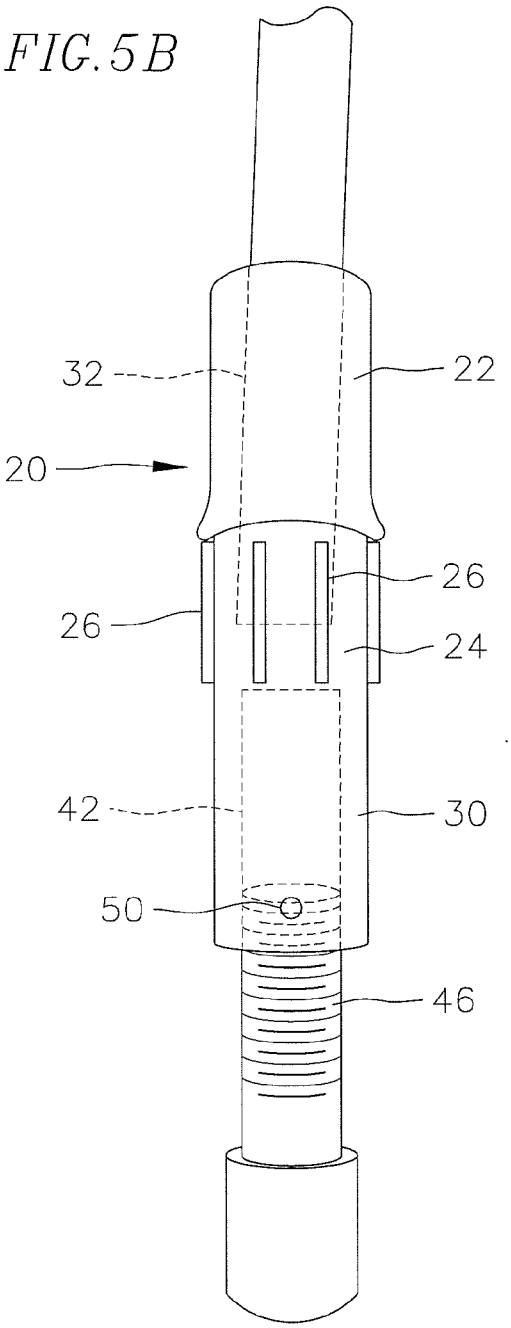


FIG.6D

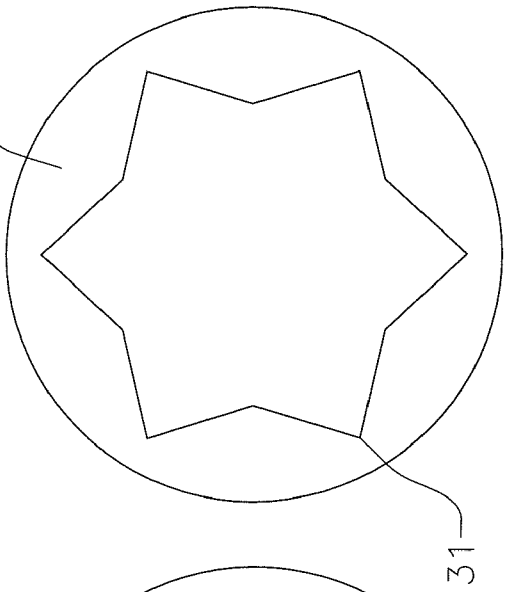


FIG.6C

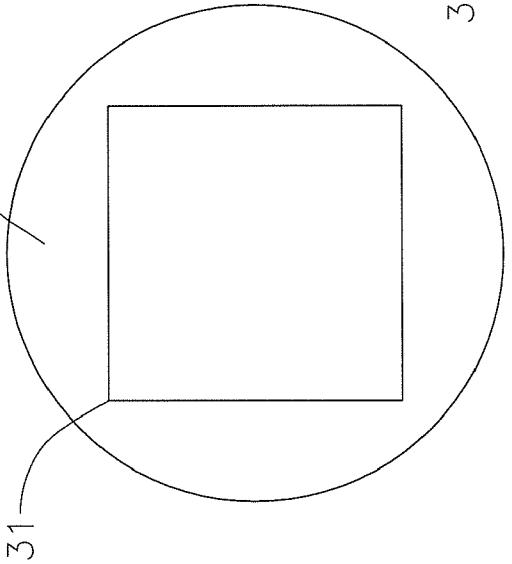


FIG.6B

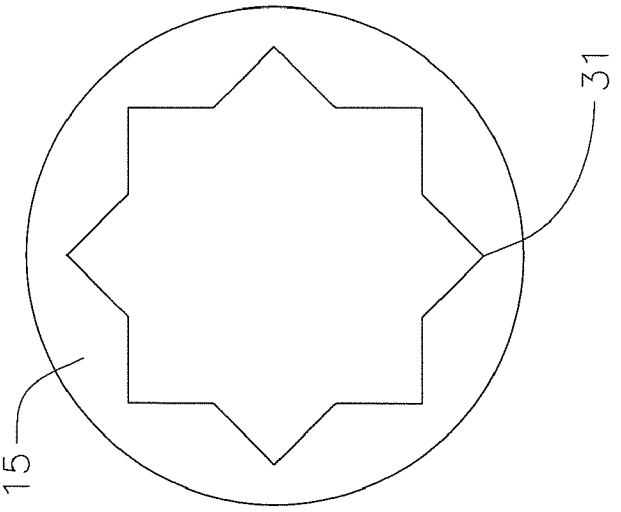


FIG. 7

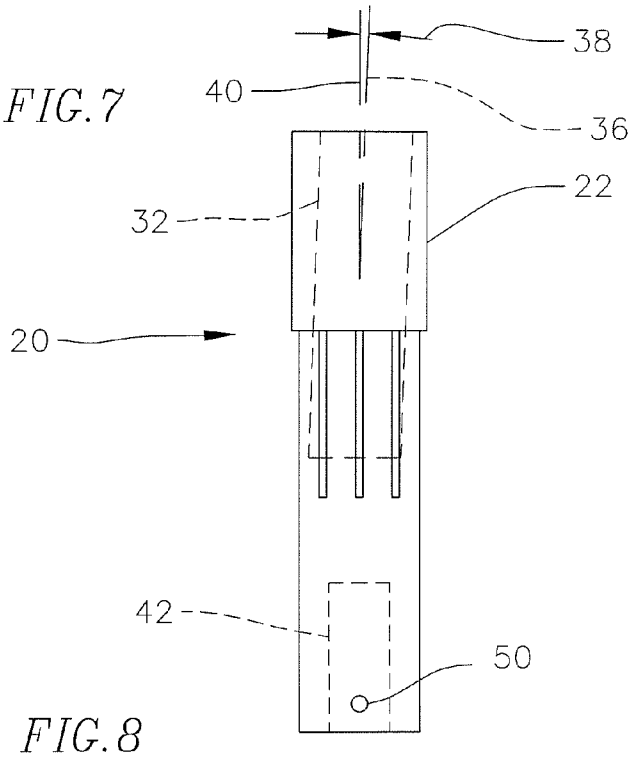


FIG. 8

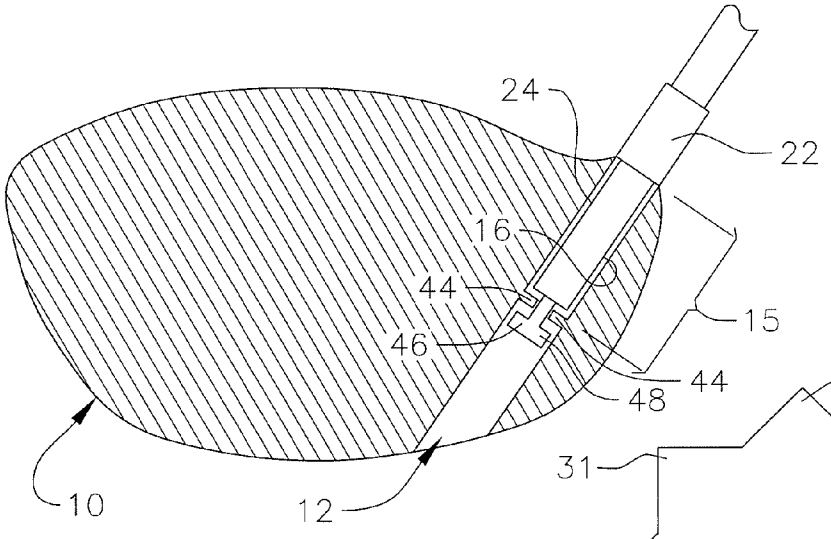
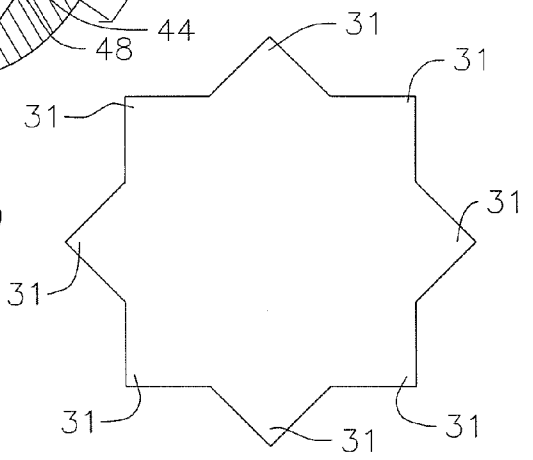


FIG. 9



GOLF CLUB SHAFT ADAPTER SYSTEM AND GOLF CLUB INCORPORATING THE SAME

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of and priority to U.S. Provisional Application No. 61/122,654, filed on Dec. 15, 2008, the contents of which are fully incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] Golf clubs have a shaft that is glued typically with an epoxy into a hosel opening formed on a club head. A shaft grip is positioned over the shaft at the end of the shaft opposite the club head. The lie angle and face angle of the club head during play is affected by the angle of the hosel opening into the club head onto which is attached to the shaft, as well as on the orientation of such angle. Thus, depending on the player or the preference of a player, a club head is chosen having a hosel opening formed at a particular angle and orientation so that after the shaft is attached to the hosel opening, the club head has the lie angle and face angle desired by such player. However, if a different lie angle and face angle is desired, a different club head must be used having a hosel opening which is formed at a different angle or oriented at a different angle. Thus, a golf club maker must have multiple club heads having openings at various angles and orientations for accommodating a shaft so that the golf club maker can make clubs having the appropriate lie angle and face angle for various players. In addition, as a golf player improves, the player may need to purchase new clubs with different lie and face angles. Consequently, a system is desired to allow a single club head to be used which can accommodate a shaft at various angles and angle orientation and which can allow for the changing of the angles and orientations so as to allow a golf club maker to use a single head for making a club with any of multiple lie and face angles. In this regard, a golf club maker would not have to carry multiple heads in order to form clubs having different lie and face angles. Also, a system is desired that would allow a golf player to change the lie and face angle if his club(s) as his/her game improves or changes.

SUMMARY OF THE INVENTION

[0003] In an exemplary embodiment, an adjustable golf club is provided. The club includes a golf club head having a hosel and a shaft having an adapter portion at end coupled to the hosel. The shaft has a longitudinal axis and the adapter portion also has a longitudinal axis, which is not parallel to the longitudinal axis of the shaft. The adapter portion is coupleable with the hosel at a plurality of predetermined orientations for changing at least one of a lie angle and a face angle of the club head. In another exemplary embodiment, the adapter portion is integral with the shaft. In yet a further exemplary embodiment, the adapter portion is separate from the shaft. In yet another exemplary embodiment, the adapter portion is attached to the shaft. In one exemplary embodiment, the adapter portion includes a bore for receiving the shaft, wherein the bore includes a central longitudinal axis extending at an angle relative to the adapter portion longitudinal axis. In another exemplary embodiment, the hosel includes an opening for receiving the adapter portion, wherein the hosel opening includes an inner surface, wherein the adapter portion includes at least a section having an outer surface complementary to the inner surface of the hosel opening. In a further exemplary embodiment, the inner surface prevents the adapter portion outer surface from rotating relative to the inner surface by engaging at least a portion of the inner surface. In yet a further exemplary embodiment, the inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface includes a plurality of faces, and wherein when the adapter portion is received in the hosel opening at a first orientation a first face of the inner surface is aligned with a first face of the outer surface, and wherein when the adapter portion is received in the hosel opening at a second orientation, the first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of the club head. In another exemplary embodiment, the club further includes a fastener for fastening the adapter portion to a lip extending in the hosel opening.

[0004] In another exemplary embodiment, a golf club head shaft adapter system is provided. The system includes a golf club head including a hosel, and a shaft adapter coupleable to a shaft along a first longitudinal axis and to the hosel along a second longitudinal axis, wherein the first longitudinal axis is offset from the second longitudinal axis. In an exemplary embodiment, the adapter includes a bore for receiving the shaft, wherein the first longitudinal axis is a central longitudinal axis of the bore. In yet another exemplary embodiment, the hosel includes an opening for receiving the adapter, wherein the second longitudinal axis is a central longitudinal axis of the hosel opening, wherein the hosel opening includes an inner surface, wherein the adapter includes at least a section having an outer surface complementary to the inner surface of the hosel opening. In a further exemplary embodiment, the inner surface prevents the adapter outer surface from rotating relative to the inner surface by engaging at least a portion of the inner surface. In yet a further exemplary embodiment, both the inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface includes a plurality of faces, and wherein when the adapter is received in the hosel opening at a first orientation the first face of the inner surface is aligned with a first face of the outer surface, and wherein when the adapter is received in the hosel opening at a second orientation, the first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of the club head. In another exemplary embodiment, the system further includes a fastener for fastening the adapter to a lip extending in the hosel opening.

[0005] In yet a further exemplary embodiment, an adapter is provided for coupling a golf club shaft to a golf club head. The adapter includes a first portion coupleable to a shaft along a first longitudinal axis and a second portion coupleable to a club head along a second longitudinal axis, where the first longitudinal axis is offset from the second longitudinal axis.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** is a partial end view of a golf club depicting a lie angle.

[0007] FIGS. **2**A, **2**B, and **2**C are top views of a golf club head depicting face angles.

[0008] FIG. **3** is an exploded top view of a golf club incorporating the inventive shaft adapter system.

[0009] FIG. **4** is a plan view of an exemplary embodiment shaft adapter for use with an inventive shaft adapter system.

[0010] FIGS. **5**A and **5**B are plan views of an alternate embodiment shaft adapter with fastener.

[0011] FIGS. **6**A, **6**B, **6**C and **6**D are plan views of hosel openings for accepting exemplary embodiment shaft adapters.

[0012] FIG. **7** is a plan view of another exemplary embodiment shaft adapter for use with the inventive shaft adapter system.

[0013] FIG. **8** is a cutaway view of a club incorporating an exemplary embodiment shaft adapter system of the present invention.

[0014] FIG. **9** is a plan view of an inner surface of an opening formed through the club head for accepting an exemplary embodiment shaft adapter.

DETAILED DESCRIPTION OF THE INVENTION

[0015] In an exemplary embodiment, a shaft adapter system is provided for providing multiple club lie and face angles. The lie angle **2** of a club **3** is the angle **2** between a horizontal surface **4** on which a club is laying and a longitudinal axis **5** of the club shaft **14** when a center portion **6** of a face **7** of the club head **10** is lying on such horizontal surface, as for example shown in FIG. **1**. The face angle **8** is the angle between a plane **9** through the longitudinal axis **5** of the club shaft and a plane **11** tangent a hitting portion of the club face **7**, as for example shown in FIGS. **2**A, **2**B, and **2**C. In an exemplary system, a club head **10** is provided having a hosel opening **12** formed there-through to allow for coupling of a golf club shaft **14**, as for example shown in FIG. **3** and FIGS. **6**B, **6**C and **6**D. In an exemplary embodiment, the opening **12** is formed having a section **15** having an inner surface **16** having a polygonal shape (FIG. **3**). In an exemplary embodiment, the polygonal shape is an octagonal shape. A shaft adapter **20** is provided having a length having a first section **22** which in an exemplary embodiment defines a hosel, a second section **24** extending from the hosel having a polygonal outer surface shape complementary to the polygonal shape of the club head hosel opening inner surface **16**, as for example shown in FIG. **4**. Instead of a polygonal outer surface, the second section **24** may have longitudinal ridges **26** formed on the outer surface of the second section which are spaced apart, as for example shown in FIGS. **5**A and **5**B. Each ridge emulates an angular edge **27** of a polygon. For example, instead of an octagonal outer surface, a cylindrical outer surface with eight evenly spaced apart longitudinal ridges **26** may be used. The polygonal shaped outer surface section or the section with ridges of the shaft adapter is sized so that it can mate with the polygonal shaped inner surface **16** of the hosel opening such that the polygonal outer surface section or surface with ridges of the shaft adapter is prevented from rotating relative to the polygonal shaped opening. A third section **30** may extend from the second section of the shaft adapter as for example shown in FIGS. **4**, **5**A, **5**B and **6**. Instead of the inner surface **16** of the club head hosel opening having a polygonal shape, in another exemplary embodiment, the inner surface may be cylindrical with grooves **28** extending radially and longitudinally to accommodate the ridges **26** or angular edges **27** of the second section **24** of the shaft adapter as for example shown in FIG. **6**A.

[0016] The shaft adapter is placed inside the club head opening **12** such that the angular edges or ridges of the shaft adapter are accommodated by the angular edges **31** or the grooves **28** of the club head opening **12**. Two bores are defined in the shaft adapter. A first bore **32** is formed through the first section defining the hosel onto which is attached to the club shaft. The first bore is formed at an angle relative to a longitudinal axis of the shaft adapter as for example shown in FIG. **7**. In other words, the longitudinal axis **36** of the first bore is at an angle **38** relative to the longitudinal axis **40** of the shaft adapter as for example shown in FIG. **7**. In an exemplary embodiment, the angle **38** is 2°. A second threaded bore **42** is defined in the shaft adapter along the shaft adapter longitudinal axis and extends to an opposite end of the shaft adapter opposite the first bore. A golf club shaft **14** is fitted and attached to the first bore. In an exemplary embodiment, the shaft is adhered to the first bore using an adhesive such as an epoxy. In another exemplary embodiment, the first bore is threaded and the shaft is threaded into the first bore. In yet a further exemplary embodiment, the shaft adapter is integral with the shaft. In other words, the shaft adapter is defined at the end of the shaft such that it only has the first bore.

[0017] In an exemplary embodiment, a lip **44** extends from the inner surface below the section **15** of the club hosel opening **12**, as for example shown in FIG. **8**. The lip narrows the opening **12** such that the shaft adapter can not displace axially past the lip. The shaft adapter with shaft is placed in the hosel opening **12** such that its second section **24** with the polygonal outer surface or ridges mates with the section **15** of the opening having the polygonal inner surface or depressions and the first section **22** of the shaft adapter defines the hosel of the club. A fastener **46** having a head **48** is positioned from the opposite side of the opening **12** and threaded into the threaded second bore **42**, such that the lip is sandwiched between the fastener head and the shaft adapter. In an exemplary embodiment, the fastener head **48** has an outer surface diameter which is greater than an inner surface diameter of the lip **44**. In this regard, as the fastener is threaded into the shaft adapter second bore, it pulls the shaft adapter towards the lip such that when the fastener is tightened onto the adapter, the lip retains the adapter in an axial direction and the fastener and shaft adapter sandwich the lip. Since the first bore which accommodates the shaft is formed at an angle relative to the shaft adapter, rotating the orientation of the shaft adapter relative to the hosel opening **12** formed on the club will change the orientation of the shaft relative to the opening. In this regard, by rotating the adapter relative to the opening formed on the club head, the lie and face angle positions of the club may be changed.

[0018] In an exemplary embodiment, a marker **50** may be provided at an outer surface of the shaft adapter in line with an angular edge **27** or ridge **26**. The marker serves as an indicator. For example, if the marker is positioned along the top angular edge or depression in the club head opening **12**, the club head will have predetermined lie and face angles. By orienting and installing the adapter into the club head opening such that the indicator is positioned along the different angular edges **31** or grooves **28** of the hosel opening, different lie and face angles are provided, as for example indicated in FIG. **9**.

[0019] In an exemplary embodiment, the fastener **46** is threaded onto the shaft adapter such that it tightens against the shaft adapter by being rotated in counter clockwise fashion. In another exemplary embodiment, the fastener may be tight-

ened by being rotated in a clockwise fashion. The fastener may have a hexagonal depression which accepts an allen wrench for tightening. Other types of fasteners may also be used.

[0020] In other exemplary embodiments, the club head opening first section may have multiple grooves other than eight or may have a polygonal shape other than octagonal. For example, the inner surface of the first section of the club head hosel opening as well as the second section outer surface of the shaft adapter may be hexagonal, heptagonal, or decagonal, etc. In addition, the angle **38** between the longitudinal axis of the shaft adapter and the first threaded bore which accepts the shaft may be formed at different angles other than 2°, as for example, 1°, 3°, etc. so that different lie and face angles may be provided by rotating the shaft adapter relative to the club opening. The angle of the first bore relative to the shaft adapter affects the angle of the shaft while the orientation of the shaft adapter relative to the head effects the orientation of the shaft angle relative to the head.

[0021] In use, a club maker would be able to carry a single club head and using a shaft adapter will be able to form a club having a desired lie and face angle for a particular user by rotating, i.e., orienting and positioning the shaft adapter to an appropriate orientation, as for example by lining the indicator with the appropriate club head hosel opening angular edge so as to align the adapter first bore with attached club shaft at a particular angle orientation. In an exemplary embodiment, the club maker may carry a single head having a hosel opening and multiple adapters each having the first bore formed at different angles relative to each shaft adapter longitudinal axis. In this regard, the club maker can make a club head having many different lie and face angles. Moreover, as a player's game progresses, or a player is simply looking for a change in clubs, the shaft adapter can be removed and re-inserted in another orientation to alter the lie and/or face angles of the club. Such re-orientation of the shaft adapter can also provide directional help as one's swing changes. In this regard, the inventive system allows a single club to grow with the owner's game without becoming obsolete like many clubs in the market.

[0022] The adapters may be sold separately and attached to any of the multitude of popular shafts available today creating a nearly limitless number of filling possibilities. For example, with three different lofted heads and eight shafts with adapters which are able to be configured in eight different positions, a club maker can produce **192** unique drivers with very limited inventories.

[0023] Although the present invention has been described and illustrated in respect to an exemplary embodiments, it is to be understood that it is not to be so limited, since changes and modifications may be made therein which are within the full intended scope of the this invention as hereinafter claimed.

What is claimed is:

1. An adjustable golf club comprising:

a golf club head comprising a hosel; and

a shaft having an adapter portion at end coupled to the hosel, said shaft having a longitudinal axis and said adapter portion having a longitudinal axis, wherein said two axes are not parallel, wherein said adapter portion being coupleable with said hosel at a plurality of predetermined orientations for changing at least one of a lie angle and a face angle of said club head.

2. The club as recited claim **1** wherein said adapter portion is integral with said shaft.

3. The club as recited claim **1** wherein said adapter portion is separate from said shaft.

4. The club as recited claim **3** wherein said adapter portion is attached to said shaft.

5. The club as recited claim **3** wherein said adapter portion comprises a bore for receiving said shaft, wherein said bore comprises a central longitudinal axis extending at an angle relative to said adapter portion longitudinal axis.

6. The club as recited in claim **5** wherein said hosel comprises an opening for receiving said adapter portion, wherein said hosel opening comprises an inner surface, wherein said adapter portion comprises at least a section having an outer surface complementary to the inner surface of said hosel opening.

7. The club as recited in claim **6** wherein said inner surface prevents said adapter portion outer surface from rotating relative to said inner surface by engaging at least a portion of said inner surface.

8. The club as recited in claim **7** wherein both said inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface comprises a plurality of faces, and wherein when said adapter portion is received in said hosel opening at a first orientation the first face of the inner surface is aligned with a first face of the outer surface, and wherein when said adapter portion is received in said hosel opening at a second orientation, said first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of said club head.

9. The club as recited in claim **8** further comprising a fastener for fastening said adapter portion to a lip extending in said hosel opening.

10. The club as recited in claim **1** wherein said hosel comprises an opening for receiving said adapter portion, wherein said hosel opening comprises an inner surface, wherein said adapter portion comprises at least a section having an outer surface complementary to the inner surface of said hosel opening.

11. The club as recited in claim **10** wherein said inner surface prevents said adapter portion outer surface from rotating relative to said inner surface by being engaged by at least a portion of said outer surface.

12. The club as recited in claim **11** wherein both said inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface comprises a plurality of faces, and wherein when said adapter portion is received in said hosel opening at a first orientation the first face of the inner surface is aligned with a first face of the outer surface, and wherein when said adapter portion is received in said hosel opening at a second orientation, said first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of said club head.

13. The club as recited in claim **12** further comprising a fastener for fastening said adapter portion to a lip extending in said hosel opening.

14. A golf club head shaft adapter system comprising:

a golf club head comprising a hosel; and

a shaft adapter coupleable to a shaft along a first longitudinal axis and to the hosel along a second longitudinal axis, wherein the first longitudinal axis is offset from the second longitudinal axis.

15. The system as recited claim **14** wherein said adapter comprises a bore for receiving said shaft, wherein said first longitudinal aids is a central longitudinal axis of said bore.

16. The system as recited in claim **14** wherein said hosel comprises an opening for receiving said adapter, wherein said second longitudinal axis is a central longitudinal axis of said hosel opening, wherein said hosel opening comprises an inner surface, wherein said adapter comprises at least a section having an outer surface complementary to the inner surface of said hosel opening.

17. The system as recited in claim **16** wherein said inner surface prevents said adapter outer surface from rotating relative to said inner surface by engaging at least a portion of said inner surface.

18. The system as recited in claim **17** wherein both said inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface comprises a plurality of faces, and wherein when said adapter portion is received in said hosel opening at a first orientation the first face of the inner surface is aligned with a first face of the outer surface, and wherein when said adapter portion is received in said hosel opening at a second orientation, said first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of said club head.

19. The system as recited in claim **18** further comprising a fastener for fastening said adapter to a lip extending in said hosel opening.

20. The system as recited in claim **14** wherein said hosel comprises an opening for receiving said adapter, wherein said hosel opening comprises an inner surface, wherein said adapter comprises at least a section having an outer surface complementary to the inner surface of said hosel opening, and wherein said inner surface prevents said adapter portion outer surface from rotating relative to said inner surface about the adapter central longitudinal axis by being engaged by at least a portion of said outer surface.

21. The system as recited in claim **20** wherein both said inner and outer surfaces are polygonal when viewed in cross-section perpendicular to their corresponding longitudinal axes, whereby each surface comprises a plurality of faces, and wherein when said adapter is received in said hosel opening at a first orientation the first face of the inner surface is aligned with a first face of the outer surface, and wherein when said adapter is received in said hosel opening at a second orientation, said first face of the inner surface is aligned with a second face of the outer surface which is different from the first face of the outer surface for changing at least one of the lie angle and face angle of said club head.

22. The system as recited in claim **12** further comprising a fastener for fastening said adapter portion to a lip extending in said hosel opening.

23. An adapter for coupling a golf club shaft to a golf club head comprising a first portion coupleable to a shaft along a first longitudinal axis and a second portion coupleable to a club head along a second longitudinal axis, wherein the first longitudinal axis is offset from the second longitudinal axis.

* * * * *