

[54] GOLF CLUB ASSEMBLY HAVING INTERCHANGEABLE INNER FLEX MEMBERS

[76] Inventor: **Robert A. Shulkin**, 24122 E. Sprague, Liberty Lake, Wash. 99019

[22] Filed: **July 9, 1973**

[21] Appl. No.: **377,526**

[52] U.S. Cl. **273/194 R, 273/80 B, 273/162 R**

[51] Int. Cl. **A63b 69/36**

[58] Field of Search **273/80 R, 80 B, 80 D, 77 R, 273/77 A, 81.2, 32 R, 162 R, 162 F, 193 R, 194 R, 35 R; 43/18 R**

[56] References Cited

UNITED STATES PATENTS

1,494,530	5/1924	Cook	43/18
1,686,323	10/1928	Von Der Heyde	273/162 F
1,994,069	3/1925	Fletcher	273/80 B
2,801,106	7/1957	Koehler	273/80 B X
2,822,174	2/1958	Brandon	273/77 A

3,180,308	4/1965	Carrol et al.	273/193 R X
3,310,903	3/1967	Binvignat	43/18
3,461,593	8/1969	Martuch et al.	273/80 B X

FOREIGN PATENTS OR APPLICATIONS

25,196	11/1911	Great Britain	43/18 R
690,270	4/1953	Great Britain	273/80 B

Primary Examiner—Richard C. Pinkham

Assistant Examiner—Richard J. Apley

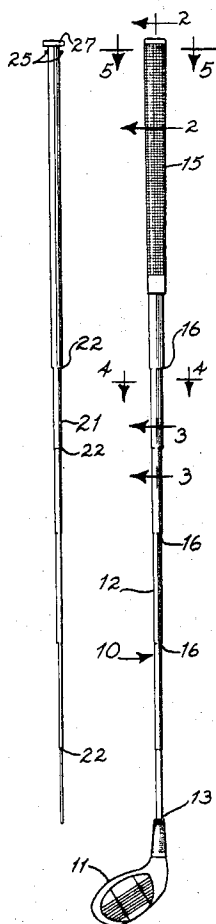
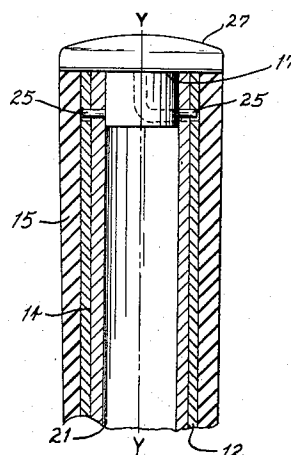
Attorney, Agent, or Firm—Wells, St. John & Roberts

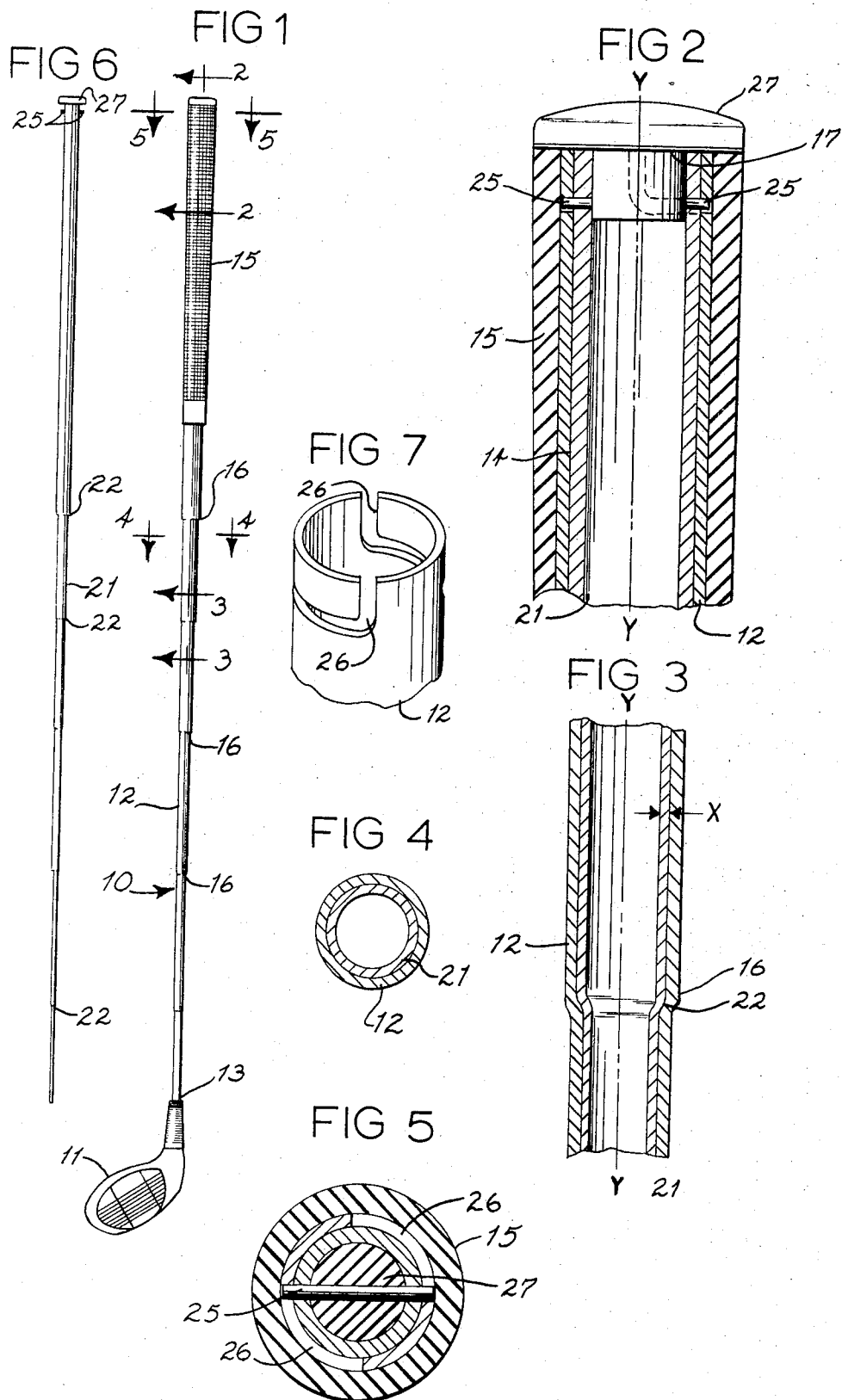
[57]

ABSTRACT

An adjustable shaft for golf clubs comprises a hollow elongated shaft fixed to a club head. The shaft is open at one end to receive an elongated flex member. The flex member is characterized by a predetermined degree of flexibility along its length to impart a specific reflex to the shaft along its length. Adjustability of flex along the club shaft enables the golfer to determine the degree of shaft flexibility to suit his specific requirements.

2 Claims, 18 Drawing Figures





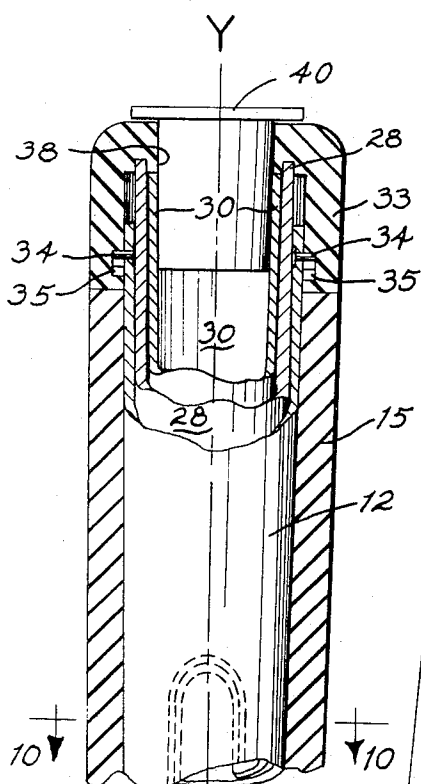
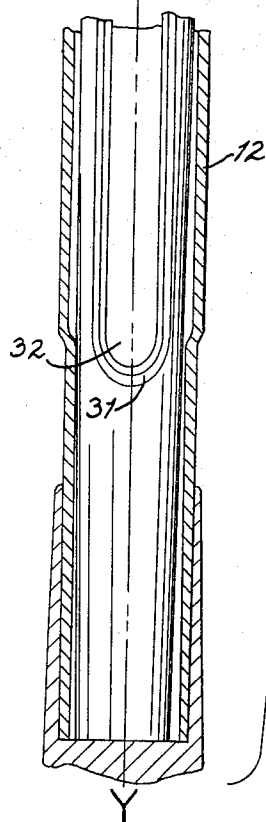


FIG 10

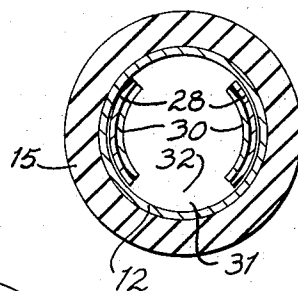


FIG 9

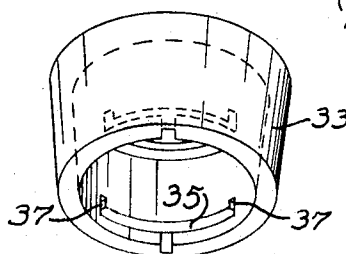


FIG 11

FIG 8

FIG 15

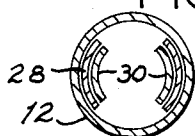


FIG 16

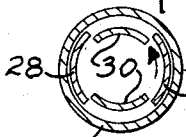


FIG 17

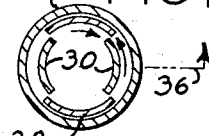


FIG 18

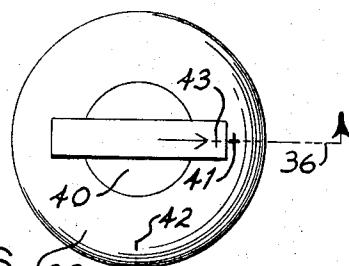


FIG 12

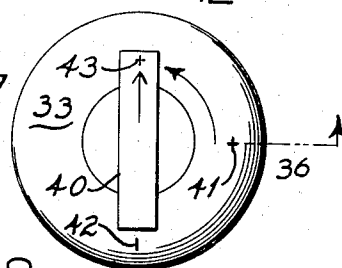


FIG 13

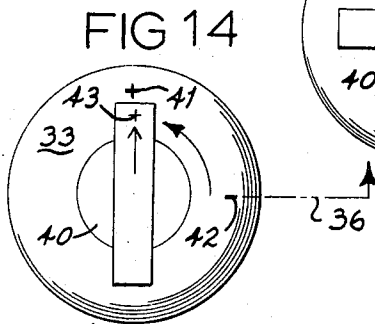
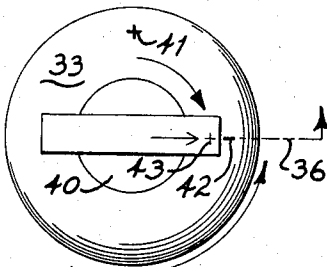


FIG 14



GOLF CLUB ASSEMBLY HAVING INTERCHANGEABLE INNER FLEX MEMBERS

BACKGROUND OF THE INVENTION

This invention relates broadly to the field of golfing equipment and more particularly to an adjustable flexible shaft assembly for golf clubs which allows the golfer to select a proper shaft structure to suit his needs.

It has been found that golfers with fitted clubs tend to hit the ball further and more accurately than do those golfers whose clubs aren't fitted to their golfing style and physical capabilities. It is understandably desirable that a golfer obtain clubs that suit his own personal requirements.

The present method of fitting individuals with golf clubs having a proper amount of flex along the club shaft is simply to supply the golfer with a number of clubs, each having a different degree of flexibility along the length of the shaft. Obviously this method is rather expensive for the golf equipment dealer who must stock a large number of clubs, only to have one specific club purchased. It is also somewhat tiresome for the golfer being fitted to experiment with a large number of individual clubs before selecting the one best suited to himself.

The apparatus of the present invention serves to eliminate the above problems by providing a single golf club that includes a shaft assembly with flex adjusting means for selectively changing the flexibility of the shaft along its length. With the present invention, the golfer need only practice with a single club and the equipment dealer need only purchase one club for fitting purposes. Once the golfer selects a proper shaft flex, he may then specify that particular degree of flex with his order for fitted clubs.

SUMMARY OF THE INVENTION

The apparatus of the present invention comprises a golf club shaft assembly formed of an elongated shaft having a first end mountable to a golf club head. The second end of the shaft is spaced longitudinally from the first end and includes a handgrip mounted thereto. Flex adjusting means is provided to be mounted to the shaft. The flex adjusting means provides a selectively variable degree of flexibility along the length of the shaft.

It is a first object of my invention to provide an adjustable shaft assembly for golf clubs that requires the use of only one club to determine individual requirements of golfers for a specific degree of golf club shaft flexibility.

An additional object of my invention is to provide such an adjustable shaft that is inexpensive to manufacture.

A further object of my invention is to provide such an adjustable shaft that may be combined with other adjusting features of a golf club such as club head weight and loft angle.

An additional object of my invention is to provide such an adjustable shaft that may be selectively varied to match any one of several standard degrees of flexibility presently utilized in quality golf clubs.

These and other objects and advantages will become evident upon reading the following disclosure which, taken with the accompanying drawings, describes a preferred and alternate form of my invention.

A BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a golf club utilizing the shaft of the present invention;

FIG. 2 is an elevational sectioned view taken along line 2—2 in FIG. 1;

FIG. 3 is an elevational sectioned view taken along line 3—3 in FIG. 1;

FIG. 4 is a cross sectional view taken along line 4—4 in FIG. 1;

FIG. 5 is a cross sectional view taken along line 5—5 in FIG. 1;

FIG. 6 is an elevational view of a flex member;

FIG. 7 is a fragmentary pictorial view of a section of the golf club shaft;

FIG. 8 is an elevationally sectioned fragmentary view of a golf club shaft embodying the second form of my invention;

FIG. 9 is an isometric view of a portion of the second form of my invention illustrated in FIG. 8;

FIG. 10 is a cross sectional view taken along line 10—10 in FIG. 8;

FIGS. 11—14 are elevational plan views showing various adjustment positions of the flex adjusting means of the second embodiment; and

FIGS. 15—18 are cross sectional views illustrating operational positions of the flex adjusting means.

DETAILED DESCRIPTION OF A PREFERRED AND ALTERNATE EMBODIMENT

A golf club utilizing the adjustable shaft assembly of the preferred and alternate forms of the present invention is illustrated in FIG. 1 and is designated by the reference numeral 10. The golf club 10 includes a head portion 11 affixed to a shaft 12 which extends from a first or lower end 13 to a second or upper end 14 about a longitudinal axis Y—Y. Adjacent the upper end 14 of the shaft 12 is a handgrip 15.

Golf club shafts such as the one illustrated in the drawings often include a series of flex steps 16 which, along with the thickness of the shaft walls, determine the degree of flexibility of the shaft along its length. The flex steps 16 are circular in cross section and extend from the lower shaft end 13 to the lower end of the handgrip 15. They increase in cross-sectional diameter from a smaller diameter adjacent the lower end 13 to a larger diameter adjacent the handgrip 15.

The shaft 12 is hollow along its length to receive one of a series of flex members of the preferred form for determining the degree of flexibility along the length of the shaft 12. One flex member 21 is best illustrated in FIGS. 2, 3, and 6. It includes flex steps 22 (FIGS. 3 and 6) that are complementary to the flex steps 16 extending longitudinally along the shaft 12.

The members 21 are received within a longitudinal cavity formed in the shaft 12 through an opening 17 formed within the upper shaft end 14. The inside of the shaft 12 adjacent opening 17 is provided with twist lock slots 26 (FIG. 7) which are designed to receive complementary lugs 25 extending from the upper end of each flex member 21. Lugs 25 and slots 26 define a fastening means which serves to securely fasten the flex member 21 within the shaft 12. Flex member 21 may be selectively inserted or removed from the shaft 12 by simply disengaging the lugs 25 from the slots 26 by turning a cap 27 fixed to the top of the flex member 21.

It is intended that the flex adjusting means of the preferred form be comprised of a plurality of flex members similar to the member 21 shown in the drawings. Each flex member would then be characterized by a prescribed wall thickness, designated in FIG. 3 by the distance X. By varying the wall thickness X with respect to the thickness of the shaft 12, I am able to selectively adjust the degree of flexibility of the shaft 12 along its length. Since golf club shafts are conventionally available in several standard flex characteristics, I intend to produce the flex members with varying wall thicknesses X so that when combined with the wall thickness of the shaft 12, each member will impart a longitudinal rigidity to the shaft 12 which corresponds to one of the several standard degrees of flexibility. Therefore, once a golfer has determined his specific requirements for a specific degree of shaft flexibility, he may then specify that degree of flexibility in ordering his fitted clubs. It is also possible to construct each insert member of different materials having varying physical properties to produce the desired degree of flex for each flex member.

The second or alternate form of the present invention is illustrated in FIGS. 8-18. In this particular embodiment, the flexibility of the shaft 12 is determined by the angular position of the flex adjusting means relative to the shaft axis Y—Y. The flex adjusting means of the alternate form is comprised of an outer flex member 28 and an inner flex member 30. Both outer member 28 and inner member 30 are received within the shaft 12 for free pivotal movement about the longitudinal shaft axis Y—Y.

Flex members 28 and 30 include longitudinal elongated slots 31, 32 respectively that extend transversely through each member. The slots 31, 32 cause the flex members to have varying degrees of flex along their lengths with respect to the angular positions of the slots relative to the plane of the golf club face which is indicated by a reference plane 36 in FIGS. 11-18. By selectively rotating the flex members within the shaft 12 about the axis Y—Y, the user is able to determine any one of four different flex settings, each setting closely corresponding to a conventional flexibility standard. A fifth setting is made possible simply by removing the flex members from the shaft 12. The shaft 12 alone is intended to have the flex characteristics necessary for the highest standard degree of shaft flexibility currently available.

As shown in FIG. 8, the outer flex member 28 is held within the shaft 12 by cap 33 at the upper end of handgrip 15. The cap 33 facilitates selective angular adjustment of the outer flex member 28 about the axis Y—Y. Angular movement of the outer flex member 28 is limited by a pin and groove assembly operatively connecting the shaft 12 to the cap 33. A diametrically opposed set of pins or lugs 34 protrude radially outward from the shaft 12 to engage complementary grooves 35 (FIG. 9) formed within the cap 33. One groove 35 is illustrated in FIG. 9. It extends annularly about the inside periphery of the cap 33 to include an angle of approximately 90° between upturned ends 37. The upturned ends 37 allow the outer flex member 28 to be locked in a prescribed angular orientation with respect to the club face plane 36. Adjustment of the angular position of the outer flex member 28 is accomplished by lifting upwardly on cap 33 to dislodge the lugs 34 from the upturned ends 37 of grooves 35. The cap 33

may then be pivoted 90° about the axis Y—Y to the upturned ends 37 adjacent the opposite ends of the grooves 35. Angular positions of the outer flex member 28 are illustrated in FIGS. 16 and 17.

The cap 33 includes an upwardly facing opening 38 through which an index knob 40 extends to rotatably mount the inner flex member 30 within the outer flex member 28. The knob 40 may be angularly indexed about the axis Y—Y of the shaft to position the inner flex member 30 between two angular positions relative to the club face plane 36. These positions are illustrated in FIGS. 16 and 17.

The cap 33 and knob 40 are independently operable to allow the inner and outer flex members to be angularly adjusted independently or together.

FIGS. 11-14 show the cap 33 in plan view to illustrate four possible settings of the cap 33 and knob 40 that align the inner and outer flex members angularly with respect to the plane 36 to determine four separate flex settings as shown in FIGS. 15-18 respectively. The cap 33 is provided with indicia in the form of a plus sign 41 and a minus sign 42 which indicate the angular position of the outer flex member 28 when aligned with the plane 36. The setting shown in FIGS. 12 and 13 indicates that the outer flex member 28 is in an angular position within the shaft 12 to cause the greatest degree of longitudinal rigidity along the shaft that may be obtained by combining the flex member 28 and the shaft 12.

The minus sign 42 when aligned with the club face plane 36 indicates the angular position of the outer flex member 28 that is shown in FIGS. 17 and 18. By adjusting the cap to this angular position, the slot 31 is aligned with the club face plane 36, thereby increasing flexibility of the shaft along its length.

The knob 40 is also provided with an indicator in the form of a small plus sign 43. When the knob 40 is adjusted to the position shown in FIG. 11 with the small plus sign 43 aligned with the club face plane 36, the resulting angular position of the inner flex member 30 is as shown in FIGS. 15 and 17. In this position the slot 32 of the inner flex member 30 is aligned substantially perpendicular to the plane 36 so that the inner flex member 30 provides a maximum degree of rigidity to the shaft 12.

By turning the knob 40, to the position shown in FIG. 12, the angular position of the inner flex member 30 is shifted 90° from the position shown in FIGS. 15 and 17 to the position shown in FIGS. 16 and 18. In this position the slot 32 is aligned with the plane 36 to allow a greater degree of flex along the length of shaft 12.

The outer flex member 28 and inner flex member 30 may be adjusted to any of the four positions illustrated to produce any of the 4° of flex common to the standards utilized in conventional golf clubs. The setting that provides the greatest degree of longitudinal rigidity along the shaft 12 is made by angularly adjusting the knob 40 and cap 33 with respect to the plane 36 as shown in FIG. 11 so that the two plus signs 41 and 43 align with plane 36. The corresponding positions of the outer and inner flex members 28, 30 respectively is illustrated in FIG. 15. In this position both the slots 31 and 32 are aligned substantially perpendicular to the club face plane 36, thereby imparting the greatest possible amount of longitudinal rigidity to the outer shaft 12.

FIG. 12 shows a second setting wherein the knob 40 has been pivoted 90° to move the inner flex member 30 to a position wherein the slot 32 is substantially aligned with the plane 36 (FIG. 16). This position produces a different degree of flex along the shaft 12 that corresponds to a slightly more flexible setting than that illustrated in FIG. 11. A slightly more flexible setting is accomplished by turning the knob 40 back to align the plus sign 43 with plane 36 and then turning the cap 33 to align the minus sign 42 with the plane 36 (FIG. 13). The resulting angular positions of the flex members 28 and 30 are illustrated in FIG. 17.

Finally, the flex members 28 and 30 may be aligned to present both slots 31 and 32 in alignment with the plane 36 (FIG. 18) to allow the greatest degree of flexibility along the shaft 12 with the flex members held therein. The corresponding setting of the knob 40 and cap 33 is illustrated in FIG. 14, wherein the minus sign 42 is aligned with the plane 36 and the plus signs 41 and 43 are aligned with one another.

As described above, the fifth flex setting may be obtained by removing the flex members 28 and 30 from the outer shaft 12 to allow the greatest degree of flexibility along the length of the shaft 12.

It is intended that the present invention be utilized with golf club heads 11 having other adjusting features utilized in golf clubs for fitting purposes. Such club heads might include means for adjusting the club head weight as well as the loft or angle of the club face. When used with such a combination, the golfer may be personally fitted for a specific club through the provisions for adjusting the loft angle, club head weight, and the degree of shaft flex, by simply making various ad-

justments to a single golf club.

It may become obvious from the above description and attached drawings that various changes may be made therein without departing from the intended scope of this invention. Therefore, only the following claims are intended to define this invention.

What I claim is:

1. A golf club assembly for enabling a golfer to select the appropriate shaft flexibility in a golf club according to the golfer's style and physical capabilities, comprising:

a test golf club having an axially hollow, elongated, flexible shaft with a club head fixed to a lower end thereof and a hand grip fixed to an upper open end thereof;

a plurality of interchangeable elongated flex members, each having a different predetermined flexibility and an exterior contour complementary to the hollow interior of the flexible shaft for selective insertion into the interior of the flexible shaft through the upper end with the resultant flexibility being a function of the combined flexibility of the shaft and the selected inserted flex member; and releasable fastening means engageable between the shaft and the inserted flex member for releasably securing the inserted flex member in the flexible shaft while the test golf club is being utilized.

2. The golf club shaft set out in claim 1 wherein said fastening means comprises complementary engageable sections on the shaft and flex member positioned on said shaft and flex member to securely engage said flex member within said shaft.

* * * * *

35

40

45

50

55

60

65