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GOLF SHAFT

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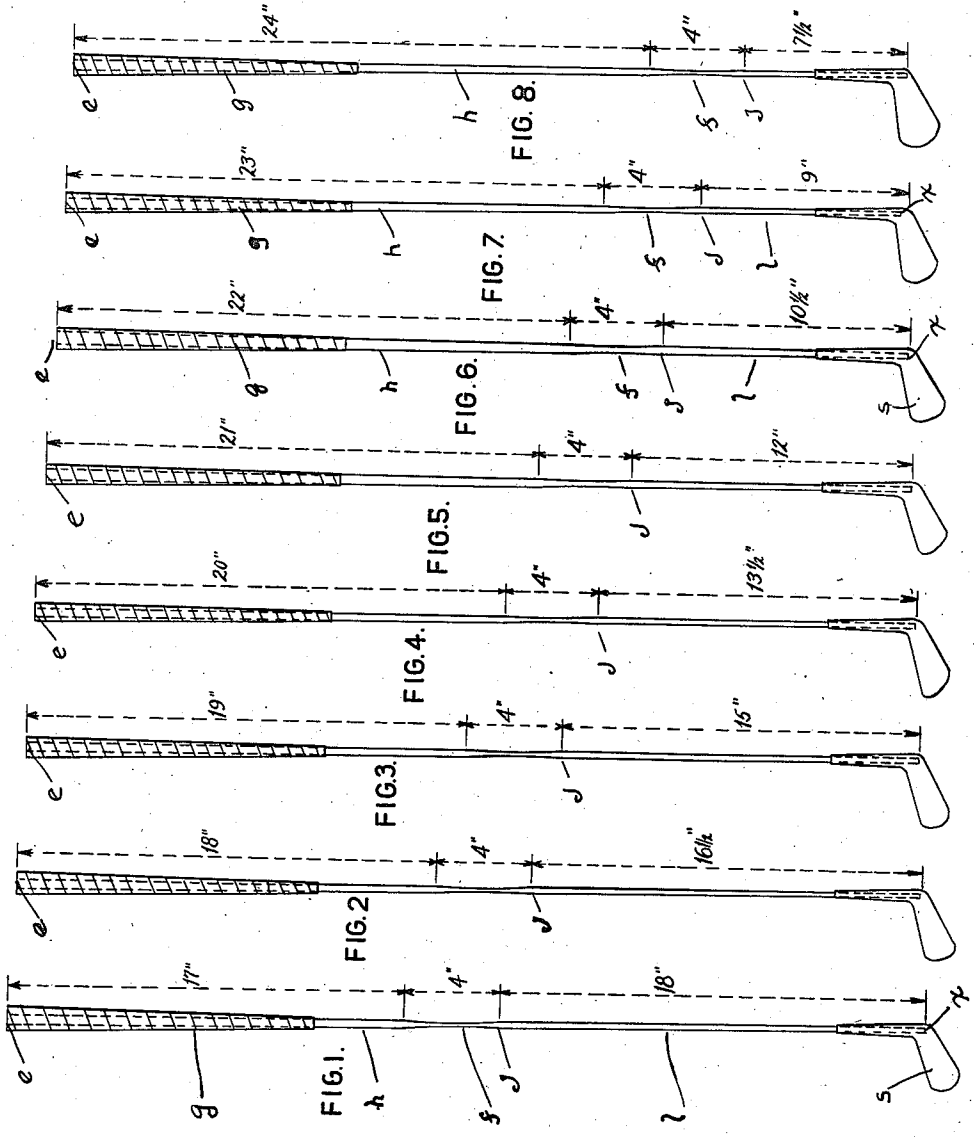

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GOLF SHAFT

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This invention relates to certain improvements relating to shafts of the general type disclosed in my previously filed application filed June 6, 1933, Serial Numbers Mechanical Patent No. 674,530—Design Patent Nos. D-48,294, D-48,295, D-48,296.

I have discovered that "high whip" or a point of maximum flex in a golf club should be located nearer the hands than has been the custom in steel shafted golf clubs. This will enable the player to get distance with less effort of swing, as he will more easily feel the weight of the club head and will be more inclined to swing naturally through the ball. A "high whip" golf club is one in which the shaft besides having the usual flex near the head, will in addition, have another region of pronounced flex high up near the hands. The player with this added feature in a golf club will have a shaft with flex similar to the flex of the arm of a baseball pitcher. The added flex in the relatively upper region of the shaft corresponds to the elbow action, and the usual flex near the club head corresponds to the wrist action. As a baseball pitcher acquires speed and accuracy through the elbow and wrist action, so does a golfer acquire distance and accuracy with a "high whip" golf club. With this added "high whip" in a shaft the club head has greater freedom passing through the ball, and the hands and wrists which often go into sudden state of rigidity will not as greatly check the speed of the club head through the ball—as would result with a shaft lacking "high whip." Also, the added flex allows the club head to stay against the ball longer during impact, which adds distance and enables the player to "follow through" easier. The springing forward of the club in passing through the ball is easily felt and the momentum gained by the club head during the first half of the down swing will not be checked to the same degree as with another type of club. The fact that the club head stays against the ball longer means that momentum and direction is imparted to the ball.

The ordinary club which has no "high whip" and is usually rigid (except for the flex near the head) reacts too quickly as the head meets the ball. There is an acute choppy short club head vibration which takes place too far away from the hands, giving difficulty in controlling the head action or even sensing it, unless the golfer is an expert. This short snap at the end of the club does not allow the club head a long enough flex through the ball and for that reason "hook" or "slice" spin is apt to be imparted to the ball. With the "high whip" shaft, the long, high flexing vibration enables the club head to pass through the ball farther and there is less chance for "hook" or "slice" spin being imparted to the ball. Any "hooking" or "slicing" with a "high whip" shaft is less pronounced and the player's chance of being off line is lessened. In adding the "high whip" in a golf club, a double flexing action is present in the swinging of the club. This gives the club head a double kick of longer duration as it passes through the ball wherein the action of the shaft is identical to the action of the human arm throwing a ball, and the added high flex action of the shaft governs the low flex action so that it takes place at the proper time. The sequence of this double flexing action accelerates the club head in the proper ratio in regard to the action of the body and the action of the wrists.

A correct golf swing requires a shifting and pivoting of the body and a rolling and flexing of the wrists so that a double action shaft insures better co-ordination between the body and the wrists during the swing.

I have discovered that because each golf stroke is played differently it is not always best to locate the point of "whip" in each golf club at the same relative distance from the club head. In playing the different strokes in a golf game, it is necessary to stand with the feet closer together in some cases and wider apart in others, the shifting of the body is greater in one stance than in another. Also, the shoulder pivot is more pronounced in the longer strokes. Further the wrists are rolled and flexed back fully in some strokes and to a limited degree in other strokes, thus: for these reasons, it is necessary to have the flexing points vary in the shafts of different clubs.

Hereto a set of woods or a set of irons have had shafts substantially the same in all respects. The shafts in a set of irons extremely limber or stiff do not give the golfer the degree of perfection in each club that is possible to get with a "variegated whipping point" set. With the mid-iron the golfer desires:

a. Distance
b. Low trajectory
c. A fair amount of overspin

With a mashie-niblic the golfer desires:

a. Less distance
b. High trajectory
c. A fair amount of underspin

For these reasons, it is necessary to have the flexing point in a mashie-niblic lower in the shaft

than in a mid-iron. Therefore, the highest point of flex in the mid-iron would be located near the hands, with the highest point of the flex in the mashie-niblic near the club head and would coincide with the lowest point of flex. This would give the mid-iron two points of flex, one near the hands another near the club head; while the mashie-niblick would have two points of flex but both so near the club head as to amount to practically one. I am aware that prior efforts have been to achieve efficiency, by so making golf club shafts, that throughout a major portion of the length, the shaft is made quite "whippy," but these have not achieved any substantial success due to the lack of control by the player in stroking the ball, as the slightest departure from a rhythmically tuned swing, destroys the excellence of the shot.

Very "whippy" shafts, wherein the whippiness extends over a major portion of the length of the shaft, or is repeated in a number of flexible portions repeated at short intervals over a substantial portion of the length of the shaft generally achieve less efficient results, than do shafts which are relatively quite rigid, in the hands of the ordinary golfer.

Golf clubs embodying my present invention are distinguished from such prior clubs, particularly in that a considerable portion of the length of the club shaft which is disposed lowermost, i. e. nearest the club head, and supports the same, is made relatively less responsive per unit of length to bending stresses than is a so-called "flexing portion" which is disposed immediately above said lowermost portion, and mergingly joined to it.

By such a construction during the stroking of a golf ball and particularly following the moment of impact with the ball, during the so-called "follow-through" portion of the stroke my improved shaft, having the portion of maximum flexing characteristics disposed relatively high i. e. more substantially spaced from the club head than is the case in prior clubs causes the club head to remain in contact with the ball longer than clubs not having such a flexing portion and during all portions of the stroke a greater measure of control is had by the player over the club head than with the said prior clubs which are very whippy throughout their length especially in the lower portions of their length.

In my improved shaft the junction of said flexing portion with the said lower portion is preferably positioned further from the extreme handle end of the shaft, and therefore nearer the head end thereof, in clubs having relatively short shafts, than in clubs having longer shafts. In all cases, the junction between said lower less flexible shaft portion and the flexing portion is spaced a substantial distance above the club head. Since the longer driving clubs having heads with less lofted striking faces, almost universally have longer shafts than the shorter driving clubs the application of my improved principle of construction necessarily results in the longer driving clubs achieving in use a longer radius of bending response than the shorter clubs, and I find that this principle applied according to the same rule of construction to all clubs of a set, or individual clubs, achieves best playing performance for a club of that length.

It is possible to achieve greater response to flexing in such a "flexing" portion of the length of a golf club shaft in a number of different ways, but I preferably achieve this by reducing the diameter of the shaft in said flexing portion relative to the diameter of the shaft extending between said flexing portion and the club head. However, this same result may be achieved, though I believe in a less perfect manner, by making the walls of such flexing portion thinner, where the shaft is of steel tubular construction, or in any other suitable manner of increasing the bending response within the limits of the shaft elasticity to laterally directed stresses imposed upon the lower end of the shaft when striking a golf ball.

While in the broader aspects of my invention the portion of the length of the shaft which is more responsive to bending stresses per unit of length, than the said lower portion of the shaft which extends therefrom to the club head, may extend upwardly toward the extreme handle end of the shaft to any desired degree, so long as a substantial portion of the handle end of the shaft is reinforced by the hand grip applied to its exterior, I preferably make the flexing portion relatively short, so as to limit, to a greater degree, the resilient hinging, flexing, action which is thus accentuated in a shorter shaft portion. Extending such portion upwardly toward the handle end of the shaft may, however, achieve good results.

Referring now first to Fig. 1 of the drawing wherein I show a club which for example may be a driving iron and which commonly are made with relatively long shafts, such as 39" in length, as herein illustrated, and of course driving irons have heads, such as that shown at *s*, in which the striking face is relatively less lofted than is the case with the heads of any of the other irons, exclusive of course, of the putter. In case of a putter, such a club is not used for striking a ball with any force and therefore the principles of my invention involve very little, if any, advantage in the case of the putter.

In carrying out the principles of my invention to secure best results the length of the club shaft is a predetermining factor in locating the position of the junction between the portion shown at *l*, in Fig. 1, which at its lower end carries the club head *s*, with a more upwardly disposed portion *f*, termed hereinafter a flexing portion. The flexing portion *f*, is joined preferably mergingly at a point *j*, with the portion *l*, and if made as illustrated of a substantially reduced diameter relative to the diameter of the portion *l*, it may be readily found that in the use of a club having such portions *l* and *f* of relatively different diameters, that the portion *f*, will respond to bending stresses to a greater degree per unit of its length than is the case in the portion *l*, which is of relatively larger diameter.

My invention therefore necessarily involves the placement of such a portion *f* above, that is more toward the handle end of the shaft, than the portion *l*, which is less responsive to bending stresses so that in the use of the club as when striking a ball the portion *f*, responding to a greater degree to the bending stress than the lower portion *l*, will effect what I have termed the "high-whip" action, whereby the club head will move relative to said flexing portion, generally arcuately on a radius which is approximately determined by the positioning of the junction *j*, longitudinally of the shaft.

I preferably position the junction *j*, for golf clubs having shafts which are less than 40" in length, in the following manner:

First I determine the over-all length of the shaft which, as shown in Fig. 1, is 39", then I

subtract such length, i. e. 39", from 64", and then the difference i. e. 25" represents a point in the length of the shaft where the junction *j*, may occur as spaced from the upper or extreme handle end of the shaft.

However, I provide an optional range of variation for the positioning of said junction *j*, of 8", in order to take care of the different styles of stroking employed by different players and which differing styles, may be efficiently accommodated by some variation in the position of said junction *j*, relative to the extreme handle end of the shaft which is shown at *e*. I find that for nearly all players this optional range of variation need not exceed 8" and that such range of variation proceeds in the upward direction on the shaft, in other words the junction *j*, may be as previously stated disposed 25" from the end *e*, or as illustrated it may be positioned 21", or at any point distant from the end *e*; any amount ranging from 25" to 17". Fig. 1 illustrates an intermediate positioning within the optional range above described and which is 21" from the extreme handle end.

With the foregoing description of Fig. 1, the other figures will be accordingly readily understood as representing various positioning, within the optional range of variation, of the junction *j*, for shafts of varying lengths. For instance, in Fig. 7 in which is illustrated one of the shorter shafts of an "irons" set, this shaft being 36" in length, the positioning of the junction *j*, may be determined as above stated by subtracting the over-all length of the shaft, i. e. 36", from 64" 64" being a constant employed for determining the positioning of *j*, for all lengths of shaft. The difference between 64" and 36", being 23", this value 28" may represent the distance between the junction *j*, and the extreme handle end *e*, of the shaft. However, in the embodiment illustrated in Fig. 7 the junction *j*, is located 27" from the extreme handle end of the shaft and therefore within the permissible range of 8" possible variation in the position *j*, which permissible variation ranges for the shaft of Fig. 7 from a distance of 28" to a distance of 20" from the extreme handle end of the shaft *e*.

With the above detailed description of two of the figures of the drawing illustrating two different embodiments of my invention and employing two different amounts of permissible optional range of variation, the positioning of the junction *j*, in the case of any club of any length, within a permissible range of variation, will be readily understood.

Briefly describing the other embodiments illustrated, Figs. 2, 3, 4, 5, 6 and 8 illustrate shafts which are respectively 38½", 38", 37½", 37", 36½" and 35½" in total length respectively. The distances for each case of the junction *j*, from the extreme handle ends of the shafts, in these figures of the drawing are illustrated respectively as 22", 23", 24", 25", 26" and 28", respectively. Thus in every case, within the permissible optional range of variation of 8", the junction *j*, is spaced from the extreme handle end of the shaft, a distance represented by the numerical difference between 64" and the over-all length of each of said shafts. As above stated this numerical difference represents the lowermost preferable positioning of the junction *j*, and the optional range of variation amounting to 8" provides other positions for the junction *j*, within a range of 8", extending upwardly of the shaft from said maximum distance *j*, as determined by said numerical difference.

In the drawing:

Figs. 1 through 8, inclusive, illustrate the different "irons" of a set all of which embody the principle of my invention.

The views of Figs. 1 to 8 are all in side elevation, and illustrate a complete set of golf clubs employing shafts which are embodiments of my invention in eight different lengths which may be employed in such a set of golf clubs.

In my aforesaid application I have disclosed an improved type of golf club shaft, wherein the shaft is primarily distinguished from tubular golf club shafts, with which I had been previously familiar, in that the shaft is characterized by the provision of a medial region of its length being made of larger diameter, and, therefore, more responsive to lateral flexing stresses, and the portion of the length of the shaft which is disposed immediately below said medial diametrically reduced region.

In my present application, I provide a more precise positioning for the said region of reduced diameter, whereby said region for shafts of different length is positioned at different distances from the extreme handle end of the shaft to give best results in shafts of any given length.

Although in the preceding description, and from the different figures of drawing relating to shafts of different lengths employed in a set of golf clubs, I have given specifically different dimensions for the lengths of the upper and lower portions of said shafts.

It will be found that each and every of the shafts illustrated and described herein respond in dimensions to the following single formula, which may be consulted for constructing any shaft of any length disclosed herein to wit:

The flexing area "*f*", is located a distance "D" from the uppermost end of the shaft, where $D=(60\pm4)-L$, where D is the distance in inches from the uppermost end of the shaft, and L is the over all length of the shaft in inches.

It is understood that certain deviations may be made in the carrying out of my invention as here illustrated and described within the scope of the appended clauses, without departing from or exceeding the spirit of my invention.

What I claim is:

1. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length diametrically constricted on all diameters, to provide a substantially relatively resilient hinge at such portion, the distance in inches of the lower end of such constricted portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, the over all length of said shaft being less than 40 inches.

2. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length diametrically constricted on all diameters, to provide a substantially resilient hinge at such portion, the distance in inches of the lower end of such portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, said portion of reduced diameter being

intermediately of least diameter and progressively of greater diameter towards its junction with the other portions of the shaft, the over all length of said shaft being less than 40 inches.

3. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft being of tubular construction substantially throughout and having an intermediate portion forming a relatively short portion of its length constricted on all diameters, to provide a substantially resilient hinge at such portion, the distance in inches of the lower end of such constricted portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, the over all length of said shaft being less than 40 inches.

4. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length formed to provide thereat a substantially relatively resilient hinge at such portion, the distance in inches of the lower end of such portion relative to the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, said hinge portion being intermediately of least diameter and progressively of greater diameter until its junction with the other portions of the shaft, said shaft being of tubular steel construction and said hinge portion being the only hinge-like portion in the length of the shaft, the over all length of said shaft being less than 40 inches.

5. A golf club shaft of resilient material having a short portion of its length weakened to increase its response to bending flexure at such portion, the lower end of said portion being spaced from the extreme handle supporting end of the shaft approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the overall length of the shaft in inches, and having a shaft portion which is substantially longer than said weakened short portion extending therefrom towards and carrying said head supporting end portion, the overall length of said shaft being less than 40 inches.

6. A tubular shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length relatively circumferentially constricted to provide a substantially flexible hinge at such portion, the lower end of such portion being spaced from the hand grip and of said shaft approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, the over all length of said shaft being less than 40 inches.

7. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length circumferentially constricted to provide a substantially flexible hinge at such portion, the distance of the lower end of such portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches; said portion of constricted circumference being intermediately of least transverse dimensions and progressively of greater transverse dimension towards its junction with the other portions of the shaft, the over all length of said shaft being less than 40 inches.

8. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite end portions, said shaft being of metallic tubular generally progressively tapered construction, and having an intermediate portion forming a single relatively short portion of its length circumferentially constricted to provide thereat a substantially flexible resilient hinging portion, the distance of the lower end of such portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, said hinge portion being substantially spaced from said head and hand grip supporting shaft ends, the over all length of said shaft being less than 40 inches.

9. A tubular shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite ends, said shaft having an intermediate portion forming a relatively short portion of its length circumferentially constricted to provide a substantially flexible hinge at such portion, the distance of the lower end of such portion from the hand grip end of said shaft being approximately 64 inches, within a range of further permissible variation of minus 8 inches, minus the total length of the shaft in inches, said constricted portion being intermediately more constricted and progressively less constricted towards both of its junctions with the other portions of the shaft, said shaft being of tubular steel construction and said circumferential constriction being the only abrupt constriction in the length of the shaft, the over all length of said shaft being less than 40 inches.

10. A shaft for golf clubs adapted for the placement of a head and a hand grip on its two opposite end portions, said shaft being of metallic tubular construction, and provided with a short portion of its length weakened to increase its flexibility in said portion, said short portion comprising a part of the length of said shaft which is spaced from the extreme handle supporting end of the shaft approximately 60 inches minus the over all length of the shaft within a range of plus or minus four inches, the over all length of said shaft being less than 40 inches.

11. A golf club shaft of tubular resilient metallic material adapted to support a striking head at a lower end, and to support a hand grip at an upper end, said shaft having a lower portion terminating in said head supporting end and extending upwardly therefrom a distance constituting a substantial portion of the length of the shaft, and a flexing portion disposed immediately above said lower portion, said flexing portion being so weakened relative to the lower portion with which it is mergingly joined as to relatively increase its response to bending flexure stresses imposed on the entire shaft during manual operation thereof in striking a ball by force manually communicated from the hand grip supporting end, to the head supporting end, the junction of said lower portion with said flexing portion being approximately spaced from the extreme hand grip end of the shaft a distance determined by subtracting the total length of the shaft in inches from sixty-four inches such total shaft length being less than forty inches, and subtracting any part of a permissible range of dis-

tance variation ranging from 0 to 8 inches from the result of the first mentioned subtraction.

12. A tubular shaft for golf clubs adapted for placement of a hand grip and head on its two opposite end portions, said shaft being generally tapered proceeding toward its head supporting end portion, and having a portion of relatively abruptly constricted circumference to provide a substantially resilient hinge portion, said hinge portion having less resistance to lateral bending than the adjacent shaft portion of greater circumference adjacent thereto, said adjacent portion relatively disposed toward the hand grip portion, and the distance of such hinge portion from the hand grip end of the shaft being 60 inches, minus the total length of the shaft in inches, within a range of further permissible variation of plus or minus 4 inches, said shaft being less than 40 inches in over-all length.

NORMAN P. VICKERY.