July 6, 1937. G. J. LEMMON 2,086,275

GOLF SHAFT

Filed March 9, 1932

Fig. 1

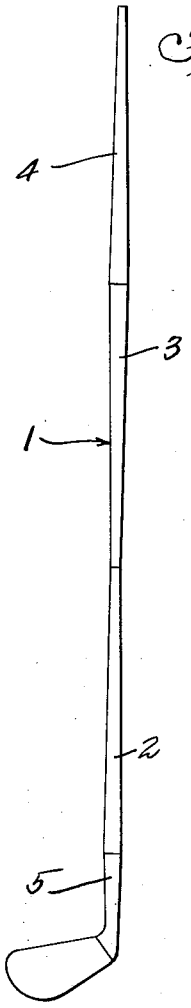


Fig. 3.

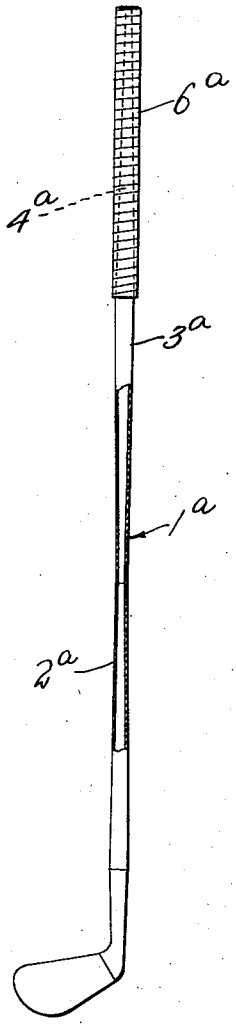
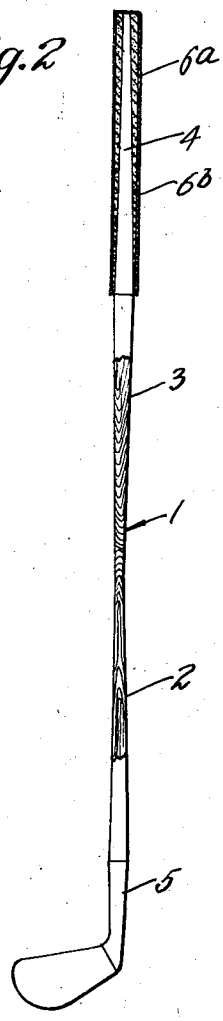


Fig. 2



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Patented July 6, 1937 2,086,275

UNITED STATES PATENT OFFICE

2,086,275

GOLF SHAFT

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Application March 9, 1932, Serial No. 597,725

2 Claims. (Cl. 273—80)

This invention relates to golf clubs, and more particularly to the shafts thereof, irrespective of the material of which the shafts are formed.

In playing the game of golf, the primary objects to be obtained are first, the imparting of the highest speed possible to the head of the golf club at the moment of impact with the ball, and second, to swing the club in such a manner that the club head shortly before or at, and shortly after this impact, is traveling along the line of flight in which the ball is intended to go.

If the shaft is too large and too stiff it tends to jerk the hands out of position at the top of the back swing so that the player is thrown slightly off balance and the descent or downward arc is not that originally intended, causing hooking, slicing, topping and jerking or stopping the hands at the moment of impact of the club head with the ball, all of which tends to, and often does, spoil the stroke or shot entirely.

If, however, the shaft of the club is too small and limber, the player has not the proper control over the direction of the club head so that during the swinging of the club, the club head wobbles in its arc and further, there is an excessive breakage of the shaft due to impact of the club head with the ground, rocks, etc. This breakage occurs in the lower third of the shaft neck near the neck, or hozzle. Shafts which are too limber also break due to crystallization from vibration in the upper third, generally just under the grip of the shaft.

Golf shafts as constructed today are generally of wood or steel. These shafts are larger at the grip end and taper down to their smallest diameter at or very close to the neck or hozzle of the club.

The wood shafts are faulty due to lack of uniformity in texture of the wood, which results in warping and liability of breakage, while in the steel shafts if the shaft is strong enough to avoid excessive breakage, it results in the jerking of the hands out of position at the top of the swing and further imparts a sting or shock to the hand as the club head comes into contact with the ball or ground.

It is an object of my invention to provide a golf club shaft having a plurality of tapered sections so positioned with respect to the length of the shaft that the vibrations set up in the shaft, from whatever cause, are absorbed or trapped within the shaft so that they do not interfere either with the proper action of the hands or of the proper control of the club head.

Another object of my invention is to provide a golf club shaft which can be so constructed due to its having a plurality of tapered sections arranged along the length of the shaft as to give to the golf club shaft that degree of flexibility desired without weakening the general structure of the shaft.

Another object of my invention is to provide a golf club shaft having a plurality of tapered sections so arranged that in the event that the hands slow up at the moment of impact with the ball, that the action of slowing the club head will not retard or decrease materially the speed of the club head at the moment of impact.

Another object of my invention is to provide a golf club shaft having a multiplicity of tapered sections so arranged that when the club head is traveling in its proper arc and along the proper line of direction, that slight or sudden jerks occurring shortly before the moment of impact of the club head with the ball will not alter the speed or direction and travel of the club head.

Another object of my invention is to provide a golf club shaft having a plurality of tapered sections so arranged that the hands will have maximum control over the club head during the backward portion, at the top, and during the first half of the downward swing of the club head, and a minimum control over the club head shortly before, or at, the moment of impact of the club head with the ball.

Another object of my invention is to provide a golf club shaft having a plurality of tapered sections so arranged that the diameter of said shaft is larger and stronger at the points where breakage is most liable to occur through shock from impact or vibration, and smallest where there is the least strain imposed thereon.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawing.

In the drawing:

Figure 1 is an elevation of the golf club shaft embodying my invention.

Figure 2 is a sectional view of a wood shaft embodying my invention.

Figure 3 is a sectional view of a steel shaft embodying my invention.

In the preferred embodiment of my invention as illustrated in the accompanying drawing, I have illustrated the shaft 1 as having a plurality of tapered sections 2, 3, and 4, each of which

sections is approximately for one-third of the total length of the shaft.

The exact length, degree of taper, and diameter of these sections will, of course, vary throughout the golf club from what is commonly known as a one-iron through the iron-headed clubs, and through the different types of wooden headed clubs used, and will likewise vary as to whether the shaft 1 is constructed of steel or wood, and in accordance with the thickness of the walls of which the hollow tubular steel shafts are made.

The shaft 1 has the three principal sections of taper, 2, 3, and 4, the first of which sections tapers away from the hozzle 5 of the club head toward the grip end of the handle. The central section 3 of the shaft tapers in a direction reverse from the taper of the hozzle section 2. The section 3 thus tapers toward the hozzle of the club head. The third, or grip section 4, of the shaft 1 is tapered away from the hozzle of the club head or toward the upper end of the grip of the club.

The grip 6 of the shaft is built up on the tapering grip section 4 of the shaft so that the club as finally completed has nearly the appearance of an ordinary straight tapered shaft, with the exception of the taper between the hozzle and mid-sections 2 and 3 of the shaft.

The construction of the steel shaft as illustrated in Figure 3 is substantially as that illustrated for the wooden shafts of Figures 1 and 2, with the exception of the thickness of the walls of the tubular shafts will cause a variation in the exact points of beginning and end of the three sections of the shaft, and also the degree of the taper of the sections.

In Figure 3 the same parts are designated by the same numerals as in Figures 1 and 2 with the addition of an exponent "*a*" added thereto.

The golf club shaft of my invention is constructed in accordance with the laws of vibration or harmonics so that the length of the shaft is divided into the three "nodes" 2, 3, and 4 to insure that the vibration set up within the shaft due to the swinging thereof or the impact of the club with either the ball, ground or the like is absorbed within the shaft itself and is not transferred to the grip end of the shaft.

The three nodes or sections of the shaft 2, 3, and 4, are constructed so that the shaft has the greatest strength at the points where it receives the greatest strain. For example, the hozzle section or lower node 2 of the shaft is of its greatest diameter and strength at or near the hozzle of the golf club where the greatest strain is imposed upon the shaft. The mid-section, or second node 3, of the shaft is of its greatest diameter at or near the point of its joinder with the grip section, or third node 4, of the shaft, both of which upper sections are at their greatest diameters at the point where the greatest strain is imposed upon the shaft. And the shaft is constructed so that it has a relatively small diameter about midway between the handle and the head, and tapers to a larger diameter in opposite directions from this point. The weaker sections of the shaft, namely, the upper section of the shaft within the grip, and the section of the shaft immediately between the sections 2 and 3 thereof are so positioned that they receive the least strain as the club is utilized. These sections of the shaft, being weak at the points of least strain, permit the giving to the shaft a greater flexibility than was heretofore possible in shafts of straight taper, permitting a more flexible shaft to be constructed without the difficulty of increasing the liability of breakage of the shaft.

The golf club shaft constructed in accordance with my invention, having a multiplicity of tapered sections 2, 3, and 4, are so arranged that when vibration is set up in the head end of the club, that this vibration is absorbed within the shaft as it passes through the sections of reduced diameters so that when the vibration reaches the first node, or lower section, of the shaft, this vibration is transferred through the smaller end of this section, permitting the transfer of the least possible portion thereof to the middle or second section 3 of the club. The vibrations reaching the second section 3 of the shaft are then in reversed order, and this second node acts as an anchor, tending to confine the vibrations within these two sections. The point of connection of this section with the upper or grip section of the shaft being larger than any point from there to the grip end of the shaft, tends to reverse the vibrations and instead of crystallizing at this point, the shaft is able to absorb any vibration remaining without injury to the shaft.

The upper end of the shaft is imbedded within the built-up grip 6, consisting of an outer covering 6*a* and a filler sleeve 6*b*, so that any slight vibration which reaches this section of the shaft is absorbed within the material used in building up the grip to the proper size for the hands. The result is that the shocks or vibrations set up within the club are not felt by the hands.

The golf club constructed with the three principal tapered sections or nodes enables the player to have a more perfect control of the swing of the golf club at all times. There are two principal times at which control of the swing of the golf club are essential requisites to the proper driving or stroke of the golf ball. The first of these is when the club reaches the upper end of the back swing and its direction of travel must be reversed. At this point the player must have control of the club. The other portion of the swing which is of extreme importance is at the moment of impact of the club head with the ball. A shaft constructed in accordance with my invention eliminates the control of the player over the club head at this latter point, so that the failure of the player to properly act at this point of impact because of stopping of the hands, jerking or slowing up the action of his hands, does not have the effect on the club head heretofore had where shafts were merely of a straight taper from their upper to their lower end.

This control of the action of the club head is due to the different tapered sections of the club head and due to the greater flexibility permitted in the construction of the golf club shaft.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. In a golf club, the combination of a head, a shaft secured thereto, a handle secured to the shaft at the opposite end from the head, the shaft being divided into sections of different taper, the upper section being tapered so that its smaller end is within the upper end of the handle, the second section tapered from substantially the end of the handle to a point intermediate the section of the shaft between the handle and the head, and the third section being reversely ta-

pered from the second section so that its largest portion is at the upper end of the head.

2. A golf club having a head, a shaft secured to the head at one end and having a handle at its other end, said shaft having a relatively small diameter about midway between the handle and the head, and reversely tapering to a larger diameter at the head and at the handle, said shaft having a tapered handle section within the handle, with the smaller end of the handle section adjacent the outer end of the handle.

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