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SHAFT OR ROD FOR GOLF CLUBS OR OTHER SPORTING IMPLEMENTS

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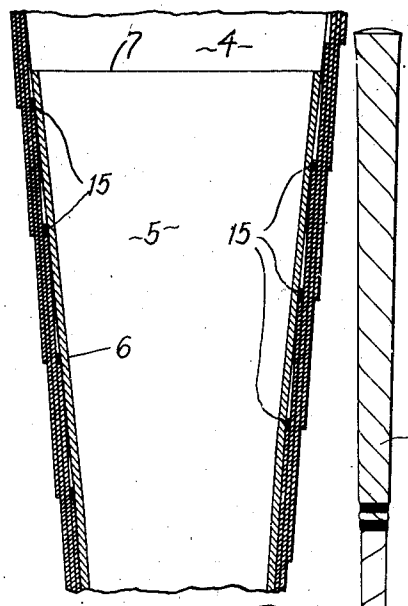


Fig. 5.



Fig. 3.

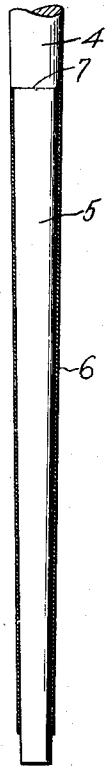


Fig. 2.

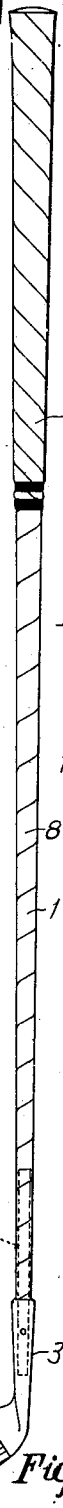


Fig. 1.



Fig. 7.



Fig. 6.



Fig. 9.



Fig. 8.

Fig. 4.

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SHAFT OR ROD FOR GOLF CLUBS OR OTHER SPORTING IMPLEMENTS

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2 Claims. (Cl. 273—80)

This invention relates to improvement in shafts or rods for golf clubs or other sporting implements, such as fishing rods, and comprises improvements in such shafts or rods constructed of a spirally disposed winding of steel or other thin metal ribbon.

Although the invention may be utilized to advantage in the handle, shafts or rod portions of various sporting implements, herein the invention is illustrated and described as embodied in a golf club construction.

Among the objects of the invention are:

To provide an improved golf club construction;

To provide an improved golf club employing a spirally wound shaft having improved means for reinforcing the same at portions thereof adjacent the club head hosel;

To provide an improved method for making spirally wound shaft or rod elements for sporting implements, such for example as golf clubs, or fishing rods.

To provide generally an improved handle shaft or rod element for sporting implements;

To provide an improved sporting implement employing a shaft or rod element of the spirally wound metal ribbon type;

To provide a wound metal ribbon type handle, shaft or rod for sporting implements, such for example as golf clubs, having improved means for distributing bending stresses therein;

To provide a sporting implement employing a handle, shaft or rod of the spirally wound metal ribbon type having improved means to resist fracture and breakage thereof at points of greatest bending.

Other objects will be apparent to those skilled in the art to which my invention appertains.

My invention is fully disclosed in the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is an elevational view of a golf club having a shaft embodying my invention;

Fig. 2 is a fragmentary longitudinal view, partly in section, illustrating a mandrel which I may employ in the process of making the shaft illustrated in Fig. 1;

Fig. 3 is a longitudinal view partly in section of a reinforcing or liner element constituting part of the invention and illustrated in dotted lines in Fig. 1 and in section in Fig. 2;

Fig. 4 is a view illustrating a part of the mandrel of Fig. 2 and illustrating the method of making the shaft of Fig. 1 according to my invention, the view being to enlarged scale and enlarged more transversely than longitudinally, the view being in some respects diagrammatic;

Fig. 5 is a view similar to a part of Fig. 4 illustrating a modification;

Figs. 6 and 7 are, respectively, side elevational and end views of a liner element which I may employ and being a modification of the form shown in Figs. 3 and 4;

Figs. 8 and 9 are, respectively, side elevational and end views of another modification.

The golf club illustrated in Fig. 1 and embodying my invention comprises a tubular shaft 1 having a hand-grip portion 13 on the upper end and a club head 2 on the lower end, the tubular shaft 1 tapering toward the club head 2 and having the small end thereof inserted into the head hosel 3. The tubular shaft 1 is formed from a spirally wound ribbon of metal, preferably steel.

A method of forming tubular shafts for golf clubs and other sport implements is the subject matter of the pending application of Everett G. Livesay, Serial No. 553,356, filed July 27, 1931, now Patent No. 2,008,077, for Improvements in metal shafts for golf clubs or the like, and, in forming the shaft 1 above referred to, I prefer to follow in general that method. According to that method, a mandrel is first made having a taper corresponding to the desired taper of the inner wall surface of the tube and steel ribbon is then wound thereon spirally, the successive convolutions or turns overlapping the preceding convolutions, and the convolutions are then secured to prevent unwinding thereof. At selected points along the length of the shaft, the overlapping convolutions are secured to each other.

In the instant shaft, I provide a mandrel 4 having a portion 5 of reduced diameter at the small end of the mandrel. A sleeve 6 is formed from metal, preferably steel, to fit over the reduced portion 5 of the mandrel, the diameter of the reduced portion 5 and the thickness of the wall of the sleeve 6 being correlated so that when the sleeve is telescoped on the mandrel as shown in Fig. 2 the exterior surface of the mandrel 4 and of the sleeve 6 is continuous and has the desired taper from end to end of the mandrel suitable for winding the ribbon thereon. The sleeve 6 is not secured to the reduced portion 5 of the mandrel but has a sliding fit therewith and is at its inner end abutted against the shoulder 7 provided by the reduced portion to accurately position it.

Any suitable method may be employed to make the sleeve 6. Preferably it is drawn by a swag-

ing process from a piece of cylindrical steel tubing with a drawing mandrel therein corresponding in size and taper with the reduced portion 5 of the mandrel 4.

The mandrel 4 and its sleeve 6 are shown in the enlarged semi-diagrammatic Fig. 4 in which the taper is greatly exaggerated for clearness.

In practice, the sleeve 6 may suitably be from three inches to six inches long, a length of five inches being suitable for ordinary golf clubs; and I find that a suitable wall thickness for the sleeve 6 is .010 inch.

Upon the mandrel thus made, steel ribbon 8 (see Fig. 4) is wound spirally, beginning at the small end of the mandrel, and in the type of winding shown in Fig. 5, each successive convolution overlaps the greater part of the preceding convolution so that the winding is three layers deep after the first two convolutions.

At the small end of the mandrel the ribbon is wound upon the sleeve 6 and continues beyond the sleeve 6 and onto the mandrel proper 4 and thence on the upper larger diameter portions of the mandrel to a sufficient length of winding to provide the shaft 1. After the winding has been completed, the ribbon is secured against unwinding in any suitable manner. The mandrel is then removed from the spiral ribbon winding, the portion 5 of reduced diameter being withdrawn from the sleeve 6, leaving the sleeve in the winding as a liner therefor at the small diameter end of the wound tube.

The small end of the tube, with the liner 6 therein, is then fitted into the hosel 3 and secured therein in any suitable or well known manner. For hosels of the usual length and with a liner 6 five inches long, a portion of the liner will extend outwardly beyond the end of the hosel 3 as shown in dotted line in Fig. 1 and reinforces the shaft at the portion adjacent the hosel. Where the wound tube is of .015 inch thick, the thickness including the liner will be .025 inch thick and thus greatly strengthens the shaft adjacent the hosel in portions where the greatest bending forces occur when the head is subjected to the impact of a golf ball and the stresses in the shaft are distributed over a greater length of the shaft adjacent the hosel, and tendency to fracture thereat is minimized or completely eliminated.

In some cases the friction between the sleeve 6 and the winding 8 thereon may be sufficient to permanently hold the sleeve 6 in position to function as a liner as above described. In some cases, however, it may be desirable to more integrally secure it to the winding. In such cases while the ribbon 8 is being wound on the mandrel, a round wire of soldering material 9 may be wound on the sleeve 6 along with the ribbon, together with suitable soldering flux. After the winding on the mandrel is complete, the application of heat will cause the soldering material 9 or 10 to integrally join the ribbon to the sleeve.

While as stated above any suitable means may be employed to secure convolutions of the spiral ribbon winding together, a preferred practice is to solder the outer overlapping convolution to that immediately thereunder. To this end a solder wire as shown at 14 Fig. 4 may be wound spirally at the lower edge of the outer convolution of the spiral ribbon and heat applied thereto to melt the solder. Any suitable solder flux may be used. When this method is to be employed the ribbon may be previously copper plated. Silver solder wire is preferred because while being strong and resistant to fracture upon flexing of the shaft, the temperature to melt it is below that which would alter the predetermined heat treatment effecting resiliency and toughness of the steel ribbon.

Instead of the round solder wire 9 of Fig. 4, a thin solder ribbon may be employed as shown at 15 in Fig. 5.

The additional strength provided adjacent the hosel by the liner 6 makes it possible to provide shafts for golf clubs of exceedingly light weight as low as four and one-quarter ounces, whereas without it, the shaft if wound in a manner to have equivalent strength, would have to have a wall 25 percent thicker and would weigh between five and six ounces; thus, by the practice of this invention, the advantages of the spirally wound shaft may be enjoyed by players demanding the minimum weight of club shaft.

In order to more gradually distribute the reinforcing effect of the liner 6 at the upper end thereof and to avoid an abrupt change of resilience of the shaft at the upper end of the liner, the liner may be longitudinally slotted as shown in Fig. 6 at the upper end thereof, at 11—11, and for the sake of simplicity and cheapness of manufacture the slots 11 may be sawed and therefore of uniform width; or, the slots may be more in the nature of serrations as shown at 12 in the form of Figs. 8 and 9 where the cost of production is not the controlling factor.

In Fig. 4, the ribbon 8 is wound so that each convolution overlaps the same proportion of the underlying convolution so that after the third convolution, the shaft has a tubular wall three convolutions thick throughout. This type of winding is merely illustrative. The convolutions may overlap underlying convolutions by different relative amounts in different parts of the shaft longitudinally to predetermine the resilience and flexibility of the shaft at different points in its length.

While I prefer to make the sleeve or liner 6 by drawing a tubular blank, it will be understood that it may be made by other methods, for example by bending it out of flat sheet metal and with abutting longitudinally adjacent edges of the metal integrally joined by welding, brazing or the like, or not so joined.

Although I have shown and described modifications of my invention, I contemplate that numerous and extensive departures may be made therefrom without departing from the spirit of my invention and within the scope of the appended claims.

Having thus described my invention, what I claim is:

1. A shaft for golf clubs comprising a metallic ribbon so wound in generally spiral form with successive convolutions in overlapped relation as to form a progressively tapered tube, the convolutions being of such width and the pitch of the winding being of such a degree that each successive convolution overlaps a substantial portion of the width of a preceding convolution, and a reenforcing liner disposed within said tapered tube with its outer wall in engagement with such portions only of successive convolutions overlying said liner which are disposed nearest an edge portion of such convolutions, and means bonding the so engaged portions of said successively engaged convolutions to the liner to prevent relative longitudinal movement of the said portions of said convolutions relative to said liner, other portions of said convolutions longitudinally spaced from the bonded engaged portions being

free of engagement with said liner and adapted to have a slight amount of shock absorbing movement relative to the underlying portion of the liner when said shaft is subjected to abrupt stresses tending to bend the shaft.

2. A golf club comprising a head having a shaft end receiving tubular hosel, a shaft having an end portion adapted to be projected into and secured within said hosel, said shaft comprising a metallic ribbon so wound in generally spiral form with successive convolutions in overlapped relation as to form a progressively tapered tube, the convolutions being of such width and the pitch of the winding being of such a degree that each successive convolution overlaps a substantial portion of the width of a preceding convolution, and a reenforcing liner disposed within said tapered tube with its outer wall in engagement with such portions only of successive convolutions overlaying said liner which are disposed nearest an edge portion of such convolutions, and means bonding the so engaged portions of said successively engaged convolutions to the liner to prevent relative longitudinal movement of the said portions of said convolutions relative to said liner, other portions of said convolutions longitudinally spaced from the bonded engaged portions being free of engagement with said liner and adapted to have a slight amount of shock absorbing movement relative to the underlying portion of the liner when said shaft is subjected to abrupt stresses tending to bend the shaft as a result of striking a golf ball with said head during use of the club in play, said liner extending from within said hosel longitudinally outwardly thereof within said tube for a substantial distance above the end of the hosel.

ROBERT H. COWDERY.