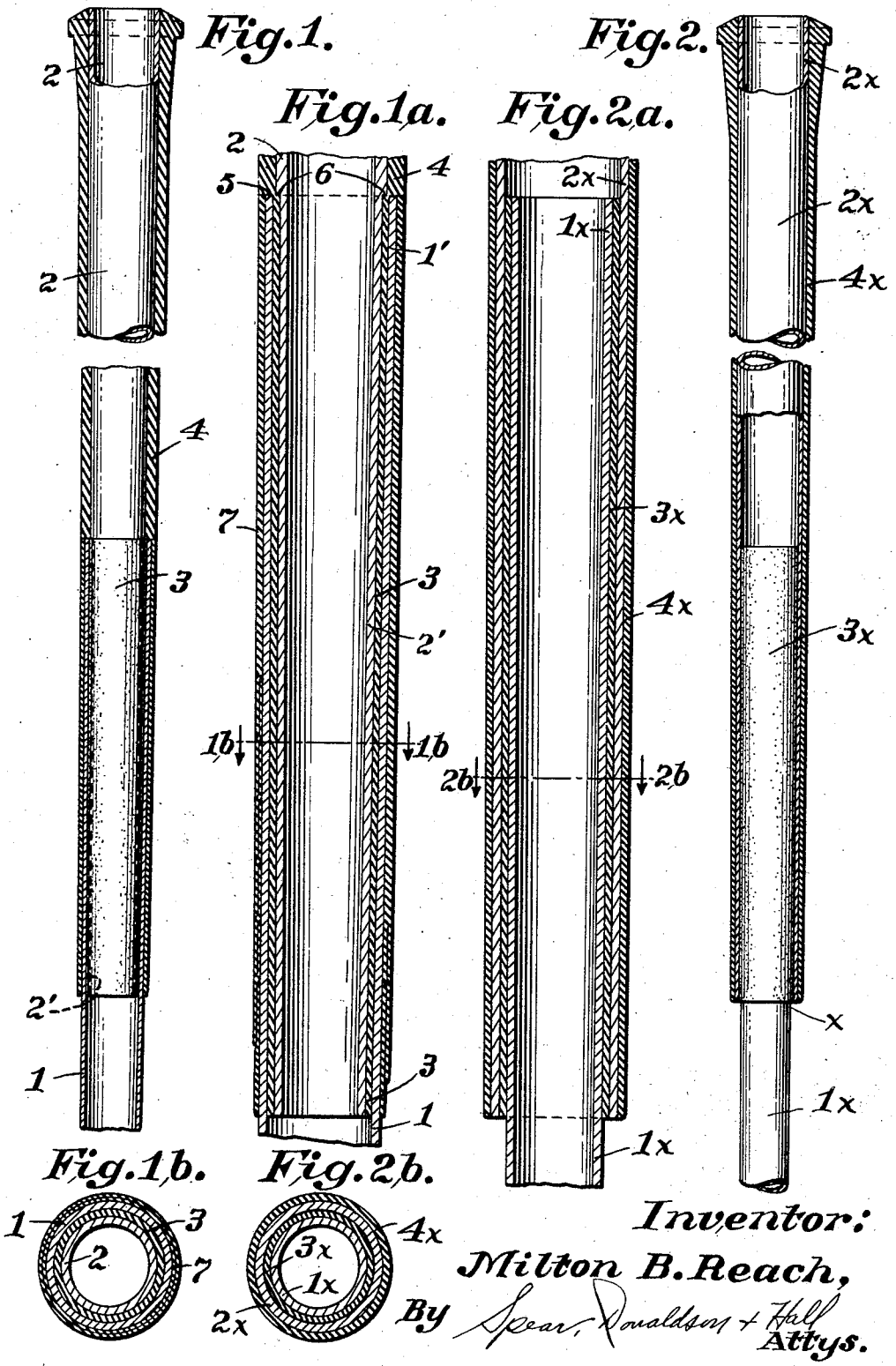
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TWO-PIECE METAL SHAFT FOR GOLF CLUBS

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## TWO-PIECE METAL SHAFT FOR GOLF CLUBS

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This invention relates to improvements in golf clubs of the type having metal shafts and involves the method of making and the article produced.

Most of the golfers of today learned golf playing with hickory clubs. Their muscles react to a certain movement of the head or shaft at the time of impact. It is desirable to maintain this non-rigid relationship between the portion of the club gripped by the hands and the club head so that the golfer's developed sense of timing need not be changed. It is also desirable for a beginner.

The invention aims to provide a golf club providing a torsional shock absorbing, and cushioning means between the portion of the metal shaft which the golfer grips and the head of the club, by means remote from the hosel of the head and irrespective of the type of connection between the hosel of the head and the metal shaft.

The invention further aims to provide a two-piece metal shaft comprising an upper piece of shafting with its end portion secured by a shock absorbing, resilient, torsional, cushioning, connecting means to the end portion of a lower piece of shafting which is to be connected to the hosel.

Another object is to reduce the weight of the two-piece metal shaft by enabling the use of relatively lighter metal shafting for the upper piece.

A further object is to provide a novel assembly effecting substantial savings in manufacture by salvaging the short lengths of waste metal shafts. A great many short lengths occur in manufacture due to defects in some part of the metal tubing and the present invention makes it possible to salvage the short lengths by the connection of the ends of the upper portion and lower portion of the two-piece metal shaft.

Another object of the invention is the provision of a method of assembly enabling the application of a foundation layer to the upper piece of shafting simultaneously with the permanent application of cushioning material to the end thereof for forming the torsional connection, the foundation receiving and facilitating the application of the leather or other grip wrapping.

A still further object is to provide a metal handle or grip piece of shafting of reduced diameter or taper relative to that of the lower or body piece whereby a foundation layer may be readily applied to the grip piece to receive the usual leather or other grip wrapping, without undue diametrical enlargement of the handle relative to the body piece. This arrangement provides for the ready application of any form of grip covering to the grip piece without undesirable enlargement relative to the lower or body piece.

Another object is to utilize short lengths of tapered shafting of different size by effecting a connection of their ends by permanently affixing the cushioning material to the upper end of the lower piece and pulling said piece through the upper piece to connect the cushion with the overlapping lower end of the upper piece under compression.

Other objects and advantages will appear hereinafter in the further disclosure of the invention which consists in the method and assembly described and particularly pointed out in the claims.

In the drawing,

Figure 1 is a longitudinal partially sectional view of the assembled two-piece metal shaft, the two pieces having their ends connected by an interposed cushion sleeve, the upper piece having the sleeve affixed to its lower end and inserted within the upper end of the lower piece with a drive fit.

Fig. 1*a* is an enlarged view of the connection of Fig. 1.

Fig. 1*b* is a cross section on line 1*b*—1*b* of Fig. 1*a*.

Fig. 2 is a longitudinal partially sectional view of a two-piece metal shaft in which the upper end of the lower piece has the sleeve affixed thereto and is pulled through the upper piece to firmly connect with the overlapping lower end of the upper piece, under pressure.

Fig. 2*a* is an enlarged view of the connection of Fig. 2.

Fig. 2*b* is a cross-section on line 2*b*—2*b* of Fig. 2*a*.

Referring to Figs. 1, 1*a* and 1*b* of the drawing, 1 represents the tapered metal tubing forming the body portion of the two-piece shaft to which the hosel of the head may be secured in any desired or suitable way. The upper piece 2 of the two-piece shaft is of a size such that its lower tapered end 2′ is received within the open upper or larger end 1′ of the tapered lower or body piece 1. A sleeve or layer 3 of rubber or other shock absorbing or cushioning material is vulcanized or otherwise permanently affixed to the small tapered end portion 2*a* of upper piece 2. The upper piece 2 with its affixed sleeve 3 of shock absorbing or cushioning material is inserted within the large end of the tapered tubular metal lower piece 1 with a driving fit under pressure.

This thin wall 3 of rubber vulcanized to the upper piece of the two-piece shaft and forced into the other piece under pressure forms a secure joint highly resistant to separation even when subjected to tests pulling the two-piece shaft apart longitudinally, and inseparable in use, while permitting a certain degree of torque in the shaft.

Preferably, at the time the rubber cushion 3 is formed on the end of the upper piece, a shaped rubber grip foundation layer 4 is moulded or vulcanized to the remaining portion of the upper piece. This foundation layer facilitates the application of the grip covering or wrapping (not shown) which is usually of leather, or the bare rubber layer may be used as the grip.

The upper piece 2 of the two-piece shaft is of reduced diameter or taper relative to that of the body or lower piece 1, and provides for the ready application of any form of substantial grip covering to the upper piece without undue enlargement thereof relative to the lower or body piece, the grip covering abutting and covering the shoulder 5 presented by the large end of the lower piece.

In the preferred form of covering including the foundation layer 4 and the leather or similar grip wrapping, the shaped foundation layer of rubber or other material 4 may abut and completely cover the shoulder 5, prior to the application of the outside wrapping of leather or the like, as indicated in Fig. 1*a*.

The foundation layer is preferably of rubber moulded or vulcanized on the upper shaft piece 2 and is preferably made integral, with the cushion sleeve vulcanized on the end 2′, although it is not of necessity so and I do not desire to limit myself to the integral construction as the cushion sleeve and foundation layer may be applied separately. Also the foundation layer of rubber may be entirely omitted if desired and the grip built up to size in some customary way as by means of an adhesive tape wrapping.

Preferably, and as shown in Figs. 1 and 1*a*, the upper piece of shafting 2 is stepped down or provided with a shoulder at 6 defining the lower end portion 2′ for receiving the cushion sleeve 3. The cushion 3 of rubber or other resilient material is then moulded over the reduced portion 2′, and is of a thickness to extend radially beyond the shoulder 6 to meet, integrally or otherwise, the end of the foundation layer 4 or other grip covering applied to the upper shaft piece 2, the rubber grip layer 4 being stepped down to the cushion sleeve 3. The lower piece of the shafting is then pushed on over the cushion sleeve with a drive fit until its upper end is adjacent the grip sleeve 4.

As shown in Fig. 1*a* the rubber grip 4 may be of a thickness to extend radially beyond the upper end of the lower piece of shafting and the shoulder thus presented by the grip 4 is finished off by a winding 7 of electrician's tape or the like to present a uniform taper.

The winding 7 is shown as extending down for substantially the extent of the cushion sleeve 3, but may be of any extent to provide the uniform taper.

In Figs. 2, 2*a*, and 2*b* is shown another two-piece shaft assembly utilizing short lengths of tapered shafting of different sizes, and thus effecting substantial savings. In this assembly the upper piece of shafting 2*x* is larger than the lower piece 1*x*. The rubber cushion 3*x* is permanently secured to the upper end of the lower piece 1*x*, and the lower piece is pulled through the upper piece 2*x* until the cushion sleeve 3*x* engages the tapered inner walls of the lower end of the upper piece 2*x* with a driving fit under pressure. The grip sleeve or foundation layer 4*x* is moulded to the upper piece 2*x* preferably before connecting the two-piece shaft.

Suitable tape or other covering means (not shown) may be provided on lower shaft piece 1*x* at X to build up the shaft 1*x* at this point to make uniform the taper of the two-piece shaft.

The two piece metal shaft of the present invention by its cushioning connection between the overlapping ends of the pieces forming the shaft enables the salvaging and utilization of short lengths of the tubular shafting of different tapering sizes. In the manufacture of steel shafts a great many such short lengths occurs due to defects in some part of the tubing.

A lighter tubing can be used as the grip piece in the upper portion of the two-piece shaft. Such lighter tubing may be made of some light metal alloy material adequate in strength for the grip, while reducing the weight of the club. This gives less weight under the hands and the feel of the club head is afforded by the torsional cushioning rubber connection between the grip piece and the body piece.

I claim:

1. In a golf club, a two piece metal shaft consisting of short lengths of tapered tubular metal shafting arranged end to end with overlapping end portions to jointly form the permanent shaft of required length, comprising a lower piece of said shafting for connection to the club head, and an upper piece of said shafting, a sleeve of rubber or similar shock absorbing material vulcanized to the lapping end portion of one of said pieces, said end of said piece and its vulcanized sleeve being inserted into the end of the other piece with a driving fit, to firmly connect the said ends of said upper and lower pieces of shafting against separation longitudinally and to provide torsional resiliency between said shaft sections.

2. In a golf club according to claim 1, the large end of the lower piece presenting an exterior upwardly facing shoulder, and a covering for said upper piece abutting said shoulder and covering said shoulder.

3. In a golf club according to claim 1, the large end of the lower piece presenting an exterior, upwardly facing shoulder, a covering for said upper piece abutting and covering the upwardly facing edge presented by the large end of the lower piece, and extending outwardly beyond the same to present a downwardly facing shoulder, and a winding of tape or the like on said lower piece adjoining and covering said shoulder and presenting a substantially uniform taper.

4. A golf club according to claim 1 in which the sleeve is affixed to the upper piece of shafting and the receiving end portion of said upper piece of shafting is of reduced external diameter relative to the remainder thereof to present a downardly facing shoulder, said sleeve abutting said shoulder and being of greater diameter to present with said lower piece of shafting an upwardly facing shoulder, covering means for said upper piece covering said upwardly facing shoulder, and adjoining covering means on the upper end of said lower piece for presenting a substantially uniform external taper.

5. A golf club according to claim 1 in which the sleeve receiving end portion of said upper piece of shafting is of reduced external diameter relative to the remainder thereof to present a downwardly facing shoulder, said sleeve abutting said shoulder and being of greater diameter to present with said lower piece of shafting an upwardly facing shoulder, covering means for said upper piece covering said upwardly facing shoulder, and adjoining covering means on the upper end of said lower piece for presenting a substantially uniform external taper, said sleeve is affixed to the upper piece of shafting and the covering means for said upper piece comprising rubber material vulcanized to said upper piece and made integral with each other.

6. In a golf club, a two piece metal shaft consisting of short lengths of tapered tubular metal shafting arranged end to end, to jointly form the permanent shaft to required length comprising a lower piece of said shafting for connection to the club head, and an upper piece of said shafting, a sleeve of rubber or similar shock absorbing material vulcanized to the small end portion of said upper piece, said end of said upper piece and its vulcanized sleeve being inserted into the large end of the lower piece with a driving fit, to firmly connect the said ends of said upper and lower pieces of shafting, against separation longitudinally and to provide torsional resiliency between said shaft sections.

7. In a golf club according to claim 6, said large end of the lower piece presenting a shoulder, and a covering of rubber material vulcanized to said upper piece, said rubber covering abutting and covering said shoulder, said rubber sleeve and rubber covering being moulded in one integral piece.

8. A golf club according to claim 6 in which the sleeve receiving end portion of said upper piece of shafting is of reduced external diameter relative to the remainder thereof to present a downwardly facing shoulder, said sleeve of rubber material abutting said shoulder and being of greater external diameter to extend outwardly beyond the upper piece of shafting, a covering of rubber material vulcanized to said upper piece and moulded in one piece with said sleeve of rubber material, said covering of rubber, covering and extending outwardly beyond the upper edge of said lower piece of shafting, and adjoining covering, means in the upper end of said lower piece for presenting a substantially uniform external taper.

In testimony whereof, I affix my signature.

MILTON B. REACH.