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GOLF CLUB SHAFT

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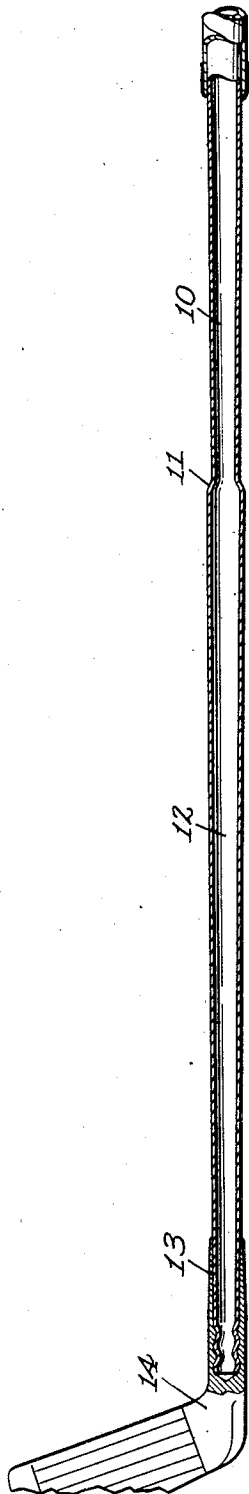


Fig. 1.

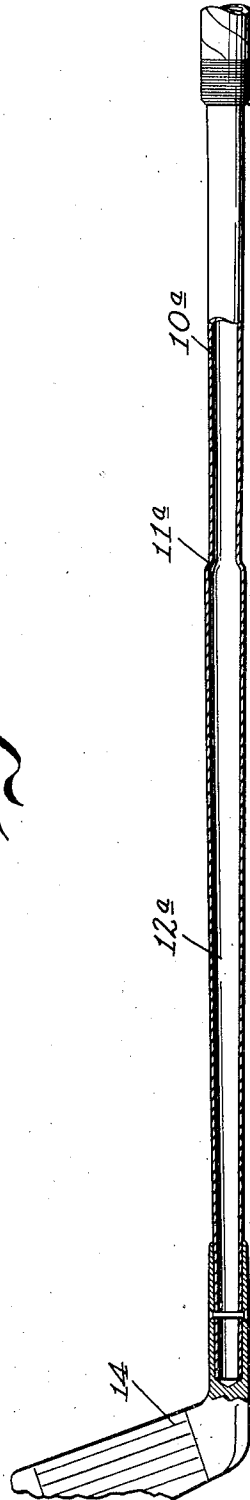


Fig. 2.

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GOLF CLUB SHAFT

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7 Claims. (Cl. 273-30)

In the making of tubular metallic golf club shafts it is desirable to configure the shaft and proportion the taper in such a way as to afford a slight degree of flexibility, and variations in these particulars will produce corresponding variations in the "feel" of the club which is a matter of major importance in the minds of discriminating users of golf clubs.

Various expedients have been adopted to accentuate the flexation of the shaft in the desired region, but such attempts have usually been predicated upon the assumption that it was desirable to progressively decrease the diameter of the shaft, either by continuous taper or by a stepping down arrangement from the handle end of the shaft toward the head end thereof without interruption in the continuity of the flexation.

The shaft of the present invention differs from those above referred to in that the shaft is functionally divided into two portions by a region of abrupt transition which in effect separates the shaft as a whole into two units of flexation, one of which extends from the handle portion of shaft to the medial region, and the other of which from the medial region to the point of attachment to the golf club head, thus to a considerable extent duplicating the same or a similar taper in different portions of the shaft. By dividing the shaft into two units of flexation which may vary in length relative to one another, it is possible to correspondingly vary the action of the shaft with the resultant "feel" so that with the same weight of the metal in the shaft and within the same linear overall dimensions, it is possible to secure marked variations of such character as to meet the individual requirements of discriminating users.

Further objects and details of the invention will appear from a description thereof in conjunction with the accompanying drawing, wherein

Fig. 1 is a view partially in section of a golf club embodying the principles of the present invention, and in which both portions of the shaft are tapered; and

Fig. 2 is a similar view showing the handle portion of the shaft untapered or cylindrical.

The shaft of the present invention is preferably formed of drawn seamless tubing, and as shown in Figs. 1 and 2 the entire shaft length is formed from a single piece of tubing. In Fig. 1 the upper portion 10, which at its upper end carries the handle grip, is gradually and uniformly tapered below the handle grip toward the medial region of the shaft and terminates in an abrupt outwardly protruding shoulder 11 which

is in the nature of a symmetrical bulge in the wall of the shaft and materially enlarges the diameter of the shaft at the crest of the shoulder, at which point the shaft merges into the lower portion 12 which is also gradually and uniformly tapered from the crest of the shoulder to the tip end which enters the socket 13 of the golf club head 14, thus to a considerable degree duplicating the taper of the upper portion in the same direction.

The diameter of the upper terminus of the head portion of the shaft is materially greater than the diameter of the lower terminus of the handle portion of the shaft, the shoulder affording a sufficiently abrupt bending or bulging of the metal to functionally separate or segregate the two sections so that they will, to a considerable extent, flex each in conformity with the requirements of its own configuration, which is determined by the ratio in diminution of the diameter throughout the shaft portion. Although, as shown in Fig. 1, each of the shaft portions 10 and 12, respectively, is continuously and uniformly tapered in conformity with a computed ratio, it is not the intention to limit the invention to one which is necessarily tapered throughout each shaft portion, or in which the tapering is necessarily in the same ratio throughout each shaft portion, since variations in the extent of the tapering or in degree may be introduced for the purpose of further refining the action of the shaft if desired. However, the characteristic feature of the present invention resides in the fact that the medial bulge or shoulder shall abruptly increase the diameter of the upper end of the lower shaft portion as compared with the diameter of the lower end of the upper shaft portion, so that the shoulder will afford a division or barrier between the two portions, each of which will be configured and tapered in the same direction as a unit.

In Fig. 2 I have shown a similar arrangement which differs from the preceding only in the fact that the upper or handle portion 10^a of the shaft is of uniform diameter throughout, or, in other words, is cylindrical, but of less diameter than the maximum diameter at the upper end of the lower shaft section 12^a, which begins at the crest of the shoulder 11^a and tapers down at the tip end of the shaft to a lesser diameter than that of the cylindrical upper portion of the shaft.

In the golf club of the present invention, however constructed, two separated regions of maximum flexation will be afforded, one near the lower end and one above the shoulder, so that continuity in action is as it were interrupted in

the medial portion of the shaft which affords a region of increased stiffness as compared with the regions of greater flexibility both above and below the shoulder. By locating the shoulder at the desired point, and by computing the diametric relations along the upper portion of the shaft and along the lower portion of the shaft, and by relating these computations to one another, numerous variations in the action and the resultant "feel" of the shaft may be introduced and the flexibility of the shaft distributed in a distinctive manner and centered in two separated regions.

Although the present invention is not in any sense dependent upon any particular ratio in wall thickness in metal from end to end of the shaft, nevertheless in actual practice it is customary to progressively and gradually increase the wall thickness in the region toward the tip or head end of the shaft, and by methods which permit the weight of the metal to be distributed in conformity with any desired computation, so that by properly combining the ratio of the diameters in the upper and lower portions of the shaft with a desired distribution of the metal, the flexibility, weight and strength of various portions of the shaft may be computed with precision and in such a way as to meet all requirements.

I claim:

1. A tubular metallic golf club shaft of uniform cross sectional shape throughout its length, comprising an upper portion carrying the handle or grip and tapering downwardly to a medial region at which the metal of the shaft wall is abruptly bulged outwardly in symmetrical relation to the axis of the shaft, thereby forming an annular stiffening shoulder; and a lower portion tapering downwardly from a maximum diameter at said shoulder toward its opposite or tip end.

2. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft having contiguous upper and lower portions of circular cross section throughout, and said upper and lower portions being connected by a portion outwardly protruding from the upper portion and providing the upper terminus of the lower portion, said lower portion tapering to a minimum diameter in the tip region.

3. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft having contiguous upper and lower portions of circular cross section throughout, and said upper and lower portions being tapered in the same general direction and

connected by a portion outwardly protruding from the upper portion and providing the upper terminus of the lower portion.

4. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft having contiguous upper and lower portions of circular cross section throughout, and said upper and lower portions being connected in the medial region of the shaft by a portion which outwardly protrudes from the upper portion and merges with the upper terminus of the lower portion, said lower portion tapering to a minimum diameter in the tip region.

5. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft being of circular cross section throughout and consisting of an upper portion and a lower portion, said upper and lower portions being interconnected by a shoulder outwardly protruding from the upper portion and affording the upper terminus for the lower portion, and the lower portion immediately below the shoulder tapering therefrom to a minimum diameter at the tip.

6. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft being of circular cross section throughout and comprising an upper portion and a lower portion, said upper and lower portions being interconnected by a shoulder outwardly protruding from the upper portion and affording the upper terminus for the lower portion, and the lower portion immediately below the shoulder tapering therefrom to a minimum diameter in the tip region, and the minimum diameter of the lower portion being less than the minimum diameter of the upper portion in the region adjacent the shoulder.

7. A tubular metallic golf club shaft having a grip portion at its upper end and a tip at its lower end, said shaft being of circular cross section throughout and comprising an upper portion and a lower portion, both of said portions being tapered in the same general direction, said upper and lower portions being interconnected by a shoulder outwardly protruding from the upper portion and affording the upper terminus for the lower portion, the lower portion being of maximum diameter at the crest of the shoulder and tapering to lesser diameter toward its tip end, and the minimum diameter of the lower portion being less than the minimum diameter of the upper portion in the region adjacent the shoulder.

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