

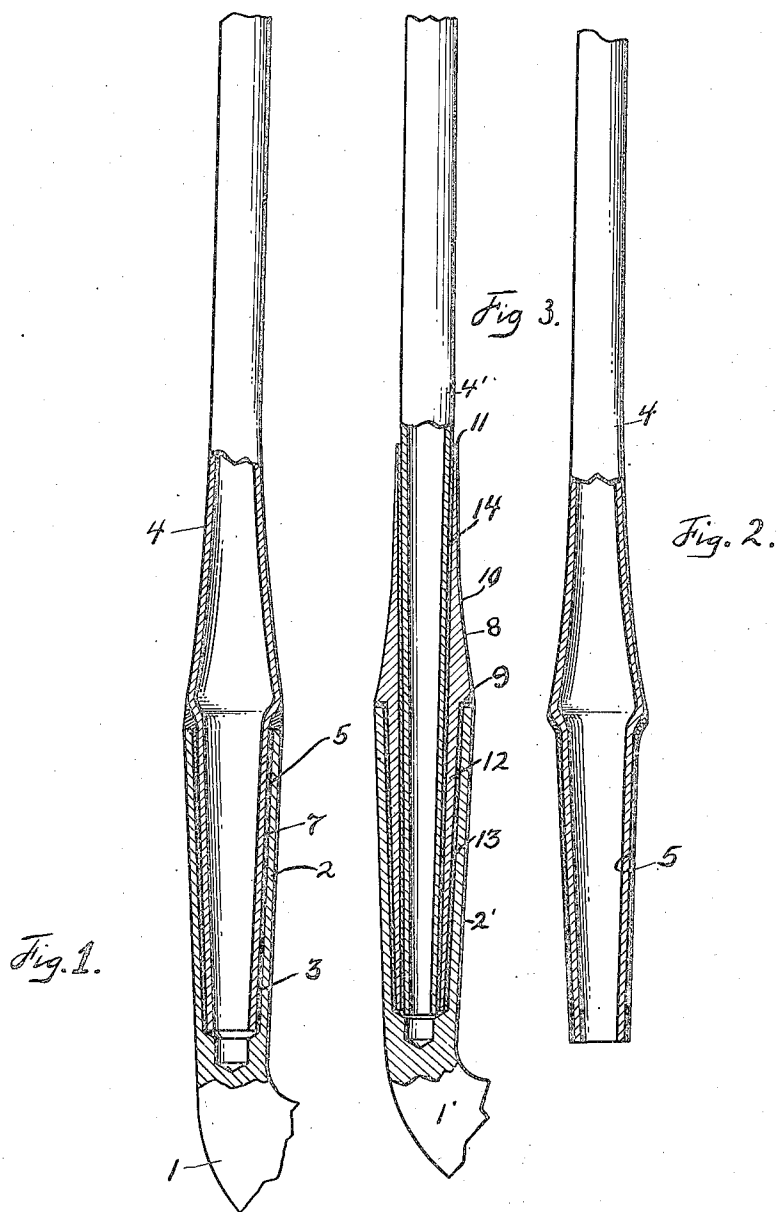
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GOLF CLUB

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GOLF CLUB

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This invention relates to golf clubs and particularly to those having a metal hosel which, in iron headed clubs, is integrally joined with the remainder of the head and in the socket of which the metal end of a shaft, particularly a thin walled tubular metal shaft, is secured.

Where a tubular metal shaft is used and the metal of the hosel and the metal of the shaft are rigidly secured in metallic contact as by a rivet so that there can be no torsional give, a shock is transmitted to the hands of the player when the ball is struck, which is disagreeable, disconcerting and liable to detract from the excellence of his playing; also while the wall of the hosel socket and that of the shaft therein (which are usually correspondingly tapered) are made to correspond as closely as may be, there is almost never an exact conformity of the two. The hosel, it is true, being of comparatively thick metal may have its socket accurately machined. The tubular thin walled type of metal shaft, however, cannot be so machined, and even where the metal employed in the shaft is thicker if it were accurately machined in the first place, its accuracy is liable to be destroyed in the heat treatment and straightening of the shaft. The result is that when the shaft end is inserted in the hosel socket, it frequently does not bear upon the wall of the socket at all points but bears upon only a portion of such wall. If the shaft end is secured in the hosel under these conditions, as by a rivet, a non-solid joint is formed, and under these circumstances the striking of the club against other objects causes it to give forth a sound indicating looseness of the head on the shaft, and it may even have a feeling of looseness. The "feel" and action of the club with a non-solid joint as referred to is different from what it is with clubs wherein the end of the shaft is solidly joined with the hosel.

It is therefore an object of the invention to provide an improved means for securing the metal shaft end within the metal hosel which shall provide a shock-absorbing connection between the head by which the ball is struck and the hands of the player as before referred to.

A further object of the invention is to provide an improved joint between the metal shaft end and the metal hosel which shall certainly be solid throughout the joint without the possibility of any unfilled spaces, however minute, anywhere existing within the area of the joint.

A further object of the invention is to provide an improved method for joining a metal golf shaft

end to a metal hosel whereby a joint with the advantages as above referred to is realized.

Other and ancillary objects of the invention will appear hereinafter.

According to the present invention the solidity of the joint referred to is attained by interposing in the joint between the shaft wall and the hosel wall a fused metal bath which percolates into all the crevices, however minute, between the opposed hosel and shaft walls, and is then allowed to harden. This fused metal may constitute the sole means of securing the shaft to the hosel or it may be used in conjunction with a rivet or other securing means, the interposed bath of metal serving in either case to render the joint perfectly solid with the advantages as above indicated. It is also true that the fused or molten bath of interposed metal will perform its function of completely solidifying the joint whether or not certain parts of the shaft contact with the walls of the socket. Where such contact exists the fused metal will enter into any existing crevices between the parts and accomplish the desired solidification.

According to the present invention the function of shock-absorption between the head of the club and hands of the player is accomplished by interposing a fused or molten bath of metal between the shaft and the hosel walls, which metal solidifies in the joint and when solid secures the shaft and hosel together and is relatively soft and shock absorbing. In order to realise the "give" or shock absorbing qualities of the interposed softer metal, it is necessary that there shall be no hard metal contact or connection, as for instance a hard metal rivet between the shaft and the hosel which would tend to hold the hosel and shaft in rigid connection and interfere with the effect of the cushioning properties of the interposed soft metal.

The objects of the invention as regards the shock absorption may be realized, although in a joint treated with the fused metal bath a portion or portions of the circumferential wall of the shaft is in contact with the circumferential wall of the hosel socket, because such contact would not prevent cushioning of the torsional shock otherwise transmitted to the hands of the player when the ball is struck. It is a fact, however, that the full advantages of the invention and the most perfect shock absorbing and solidifying of the joint is secured when there is a film or layer of soft metal at all points of the joint between the shaft and the hosel with no hard

metal contact connection between the shaft and the hosel.

In some cases it is desirable to interpose an adapter between the hosel and the shaft, and in such cases the invention may be realized by employing the fused metal as the connecting means at either or both of the joints between the shaft and adapter and the adapter and the hosel. It will be apparent that the desired shock absorption will take place if but one of these joints has the fused metal as its sole connecting means. It will probably prove desirable, however, to have both of the joints so connected.

In the accompanying drawing which illustrates the invention—

Fig. 1 is a view of a golf club which embodies the invention, the view being partly broken away and partly in longitudinal axial section, the section showing the improved joint between the head and shaft;

Fig. 2 is a view of the shaft, partly broken away and partly in longitudinal axial section, separated from the head of the golf club; and

Fig. 3 is a view, partly broken away and partly in longitudinal axial section, of a modified construction of golf club.

Referring to the drawing, and first to Figs. 1 and 2, the head 1 of the golf club is in the ordinary form of putter, midiron or other metal club usually of steel, having a hollow outwardly tapered metal hosel portion 2 with the inner tapered socket surface 3. The shaft 4 is of seamless tubular steel of thin wall and heat treated to the desired condition of hardness.

The interior wall of the hosel socket and also the walls of the end of the shaft to be inserted are correspondingly tapered and are thoroughly cleaned or polished so that there will be no scale or deleterious foreign substance in the joint. A flux is then applied to the wall of the hosel socket and also to the shaft which is to be entered within the socket. This flux may be any of the well known fluxes used in soldering operations but it should however be free from acid, which would attack the joining or joined materials, to avoid corrosion in the fused joint.

The end of the shaft is then dipped into a molten bath of suitable metal. Although the composition of this metal may vary widely, as will be understood by those skilled in the art, according to different circumstances and results desired to be produced, a satisfactory metal has been found to be an alloy of tin and lead in the proportions of 63% tin and 37% lead. This has the requisite softness when solidified and has a low melting point so that it is not necessary to unduly heat the steel parts in forming the joint. To excessively heat the steel parts entering into the joint would be likely to cause their temper to be deleteriously affected, particularly the tubular shaft.

By thus dipping the shaft its exterior wall is thoroughly and completely coated with the molten alloy or "tinned". The shaft 4 with the coating of alloy 5 is shown in Fig. 2 of the drawing. The wall of the hosel socket to be joined to the shaft may also be coated with the alloy.

The coated end of the shaft is inserted in the socket having its inner wall coated as described and the hosel is then heated up to a point where the alloy between the shaft and socket walls become fused so as to form a fluid bath extending from the shaft wall to the hosel-socket wall. The shaft is then moved about in the hosel to permit the fused alloy to penetrate into every crevice

between the joined walls of the hosel and shaft, and finally the hosel and shaft, held in proper relative position, are plunged into a cooling bath of oil whereupon the alloy becomes solid, the shaft and head are secured together thereby and a joint between the shaft and head is formed as shown in Fig. 1. The cooling of the joint should be effected as soon as possible after the fusing of the alloy in order to avoid possible injury to the temper of the shaft by long continued heat in the joint.

It is to be observed that in the structure illustrated in the drawing, the alloy completely fills all crevices of the joint so that it is homogeneous and the desired solidity is attained, that there is a coating or film of alloy at all points of the joint between the shaft and hosel so that there is no contact between the hosel and shaft, and shock tended to be transmitted through the joint is absorbed and cushioned by the relatively soft metal interposed between the steel hosel and shaft, also that the alloy acts as a solder between the hosel and shaft and is the sole means of securing them together.

Referring to the modified construction shown in Fig. 3, the club therein shown comprises a shaft 4' of seamless steel tube of uniform taper which is adapted to the steel hosel 2' of the head 1' by means of a steel adapter 8, the same being a tubular member having its interior bore tapered so as to receive the end of the shaft as shown. Upon its exterior the adapter 8 has a shoulder 9. The outer edge of this shoulder is substantially flush with the exterior of the hosel so that a smooth joint is made, and from the shoulder 9 the surface tapers in a curve 10 to its upper end 11. Extending from the shoulder 9 in the other direction, the adapter has a portion 12, the exterior surface of which is tapered to correspond to the taper of the interior wall of the hosel 2'. The adapter is secured to the hosel at one joint by means of an interposed layer of fusible alloy 13 surrounding the adapter and forming the sole means of connection between the adapter and the hosel. This alloy may be of the same composition as the alloy of the layer 5 of Figs. 1 and 2, and applied in the same way. The adapter is secured to the steel shaft 4' at the other joint solely by a layer 14 surrounding the shaft and composed of the same alloy applied in a similar manner.

While the invention has been set forth in what are considered its best applications as to both apparatus and method of producing it, the invention of apparatus may be embodied in other structures than those shown and the method may be practiced with details varying from those recited, without departing from the spirit of the invention; the invention is not therefore limited to the apparatus as shown in the drawing nor the precise details of the method as recited.

What I claim is:

1. In a golf club, the combination with a head having an iron hosel, of an iron shaft entering within and secured to said hosel, and a film of soft solder contacting and securing iron to iron in a joint between said hosel and shaft and filling in spaces of non-contact of the joined surfaces, said solder being fused in said joint and allowed to solidify.

2. In a golf club, the combination with a head having an iron hosel with a tapered opening, of a tapered iron shaft entering within and secured to said hosel, the taper of said shaft within said opening being substantially the same as the taper of said opening, and a film of soft solder

in a joint between said hosel and shaft, said solder contacting and securing iron to iron and filling in spaces of non-contact of the joined surfaces, said solder being fused in said joint and allowed to solidify.

3. In a golf club, the combination with an iron head having a hosel with a tapered opening, of an iron shaft interfitting with said hosel and secured thereto, said shaft being of substantially uniform taper within said hosel, and said shaft taper being substantially the same as that of said hosel opening, the areas of non-contact of said hosel and shaft being filled with a film of soft solder contacting and securing together said hosel and shaft iron to iron and extending for the greater part of the length of said hosel.

4. In a golf club, the combination with a head having an iron hosel, of an iron shaft entering within and secured to said hosel, and a film of soft solder in a joint between said hosel and shaft contacting and securing together said hosel and shaft iron to iron and filling in spaces of non-contact of the joined surfaces, said solder being fused in said joint and allowed to solidify, said fused material being the sole securing means of the joint.

5. In a golf club, the combination with a head having an iron hosel with a tapered opening, of a tapered iron shaft entering within and secured to said hosel, the taper of said shaft within said opening being substantially the same as the taper of said opening, and a film of soft solder contacting and securing iron to iron in a joint between said hosel and shaft filling in spaces of non-contact of the joined surfaces, said solder being fused in said joint and allowed to solidify, said fused material being the sole securing means of the joint.

6. In a golf club, the combination with a head having an iron hosel, of an iron shaft, an adapter interposed between said shaft and said hosel, there being a joint between said shaft and adapter and between said adapter and said hosel, and films of soft solder in said joints filling in spaces of non-contact of the joined surfaces, said solder being fused in said joints and allowed to solidify.

7. In a golf club, the combination with a head having an iron hosel, of an iron shaft, an adapter

interposed between said hosel and shaft, there being a joint between said shaft and adapter and between said adapter and said hosel and a film of soft solder in at least one of said joints, said solder being fused in said joint and allowed to solidify and forming the sole securing means in its joint.

8. In a golf club, the combination with a head having an iron hosel, of an iron shaft, an adapter interposed between said hosel and shaft, there being a joint between said shaft and adapter and between said adapter and said hosel and films of soft solder in each of said joints, said solder being fused in said joint and allowed to solidify and forming the sole securing means in its joint.

9. In a golf club, the combination with a metal head, of a tempered steel shaft secured to said head and material in a joint between said head and shaft of a lower fusing temperature than that at which the said shaft is tempered, said material being fused in the joint and allowed to solidify.

10. In a golf club, the combination with a metal head, of a tempered steel shaft secured to said head and a thin film of solder in a joint between said head and shaft of a lower fusing temperature than that at which said shaft is tempered, said solder being fused in the joint and allowed to solidify and constituting the sole securing means of its joint.

11. In a golf club, the combination with a head having an iron hosel, of an iron shaft entering within and secured to said hosel and a film of soft solder with an acid free flux, contacting and securing iron to iron, in a joint between said hosel and shaft and filling in spaces of non-contact of the joined surfaces, said solder being fused in said joint and allowed to solidify.

12. In a golf club, the combination with an iron head of a tempered tubular steel shaft secured to said head and a film of soft solder with an acid free flux, contacting and securing iron to iron, in a joint between said shaft and head, said solder being of a fusing temperature lower than the temperature at which the said shaft is tempered, said solder being fused in the joint and allowed to solidify.

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