

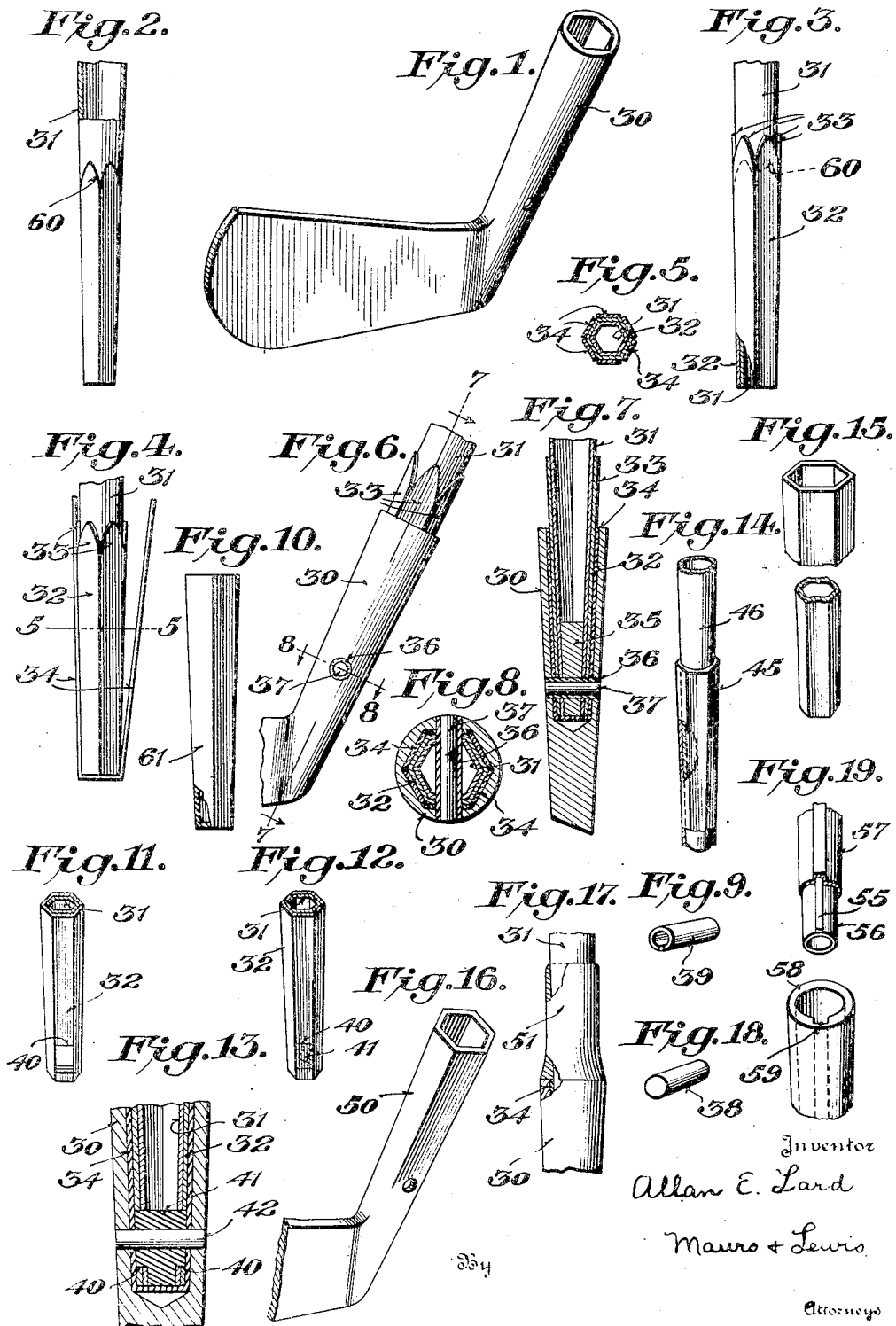
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GOLF CLUB

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UNITED STATES PATENT OFFICE

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GOLF CLUB

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This invention relates to improvements in golf clubs.

Its principal object is to provide a joint between the shaft and hosel of the head that will yield under the twisting stress of impact and snap back when said twisting stress ceases; that is, a joint which has a corresponding rebound after compression. A more specific object is to provide between the shaft and the hosel a joint comprising opposing relatively rotatable surfaces with interposed suitable resilient material, such as rubber, said surfaces being so formed that by said relative movement they are brought closer together at one or more points. A further object is to secure the shaft to the head of the club in a manner permitting relative rotation of the shaft and hosel.

The aforesaid and other objects and advantages realized will be more readily understood by reference to the accompanying drawing illustrating several embodiments of the invention, and wherein—

Fig. 1 is a perspective view of a club head of metal of the "midiron" type;

Fig. 2 is a view in elevation (with a part thereof in longitudinal section) of a portion of the small end of a tapered tubular metallic shaft suitable for a golf club;

Fig. 3 is a view in elevation of the portion of a shaft illustrated in Fig. 2 with a metallic sleeve fitting about the end thereof;

Fig. 4 illustrates the manner of applying strips of rubber to constitute a covering about the end of the shaft which is shown in Fig. 3;

Fig. 5 is a transverse sectional view on line 5—5 of Fig. 4;

Fig. 6 shows the metal head of Fig. 1 with the shaft and associated parts of Fig. 4 secured in place in the neck or hosel of said head;

Fig. 7 is a longitudinal sectional view on the line 7—7 of Fig. 6;

Fig. 8 is an enlarged transverse sectional view on the line 8—8 of Fig. 6;

Fig. 9 is a detail view showing a modified form of pin for fastening the head on the shaft;

Fig. 10 illustrates a rubber sleeve or cap

suitable for use instead of the rubber strips of Figs. 4 to 8;

Figs. 11, 12 and 13 illustrate another construction for securing the shaft end in the hosel or neck of the metal head, Figs. 11 and 12 being views (similar to Fig. 3) of a portion of the small end of a shaft and Fig. 13 being a longitudinal sectional view (similar to Fig. 7) showing said shaft end in place in the socket of the metal head;

Fig. 14 is a perspective view showing a portion of the small end of a tubular tapered cylindrical shaft fitting into a metallic sleeve the wall of which is cylindrical on its interior surface but hexagonal on its exterior surface;

Fig. 15 illustrates a tubular metallic golf shaft of hexagonal contour both interiorly and exteriorly throughout its entire length;

Fig. 16 is a perspective view of a club head the hosel or neck of which is of hexagonal contour both interiorly and exteriorly;

Fig. 17 is a detail view partly in section illustrating the use of a finishing sleeve around the shaft adjacent the end of the neck of the head of the club;

Fig. 18 is a detail view of another form of cross-pin; and

Fig. 19 illustrates in perspective another embodiment of the invention, with the end of the shaft above, and below it the hosel or neck of the head.

The metal head shown in Fig. 1 is of the type known as a midiron. The opening or socket in the neck or hosel portion of said head is of hexagonal cross-section for a distance of approximately two inches from the outer extremity of said neck. The neck tapers in the usual manner as shown and the external surface of its wall is cylindrical.

Fig. 2 shows a portion of a tubular tapering steel shaft having an exterior surface of hexagonal contour for a distance of about two and one-half inches at the small end of the shaft, said hexagonal contour gradually merging as shown at 60 into a cylindrical surface of the remainder of the shaft.

The end of the shaft shown in Fig. 2 is preferably fitted, by a driving fit or pinning at extreme lower end, into a steel reinforcing sleeve 32 of hexagonal contour both interiorly

and exteriorly. The sleeve may be brazed or spot-welded to the shaft. About one-half inch of the upper end of sleeve 32 is formed into tapered or pointed tongues 33 which project beyond the neck of the club head, as shown in Fig. 6, and distribute along the shaft the localized flexure stress incident to the abrupt ending of the neck.

As shown in Fig. 4, a rubber strip 34, approximately three sixty-fourths of an inch thick and about six inches long, is applied around the end of the shaft and laid upwardly along the same against oppositely located flat surfaces or sides of the hexagonal exterior surface of the sleeve 33. Two other like rubber strips are applied in similar manner, as shown in Fig. 5, against the other flat surfaces of sleeve 33, the ends of the strips extending beyond the extremity of the sleeve as shown in Fig. 4. Each strip may be put in place by placing the end of the shaft midway of the length of the strip and then folding the ends of the strip upwardly along the shaft. The strips are stretched across the end of the shaft and as each strip is positioned a spring clip is applied over its upper ends to anchor the same temporarily.

When the rubber strips have been thus applied to the six flat faces or surfaces of the sleeve 32 on the end of the shaft, the shaft end thus covered is forced into the socket of the neck 30 (Fig. 1) and the upper ends of the rubber strips neatly trimmed off flush with the extremity of said neck—all as clearly shown in Figs. 6 and 7. The tolerance between the exterior hexagonal surface of the shaft, or rather of the sleeve 32 thereon, and the hexagonal interior surface of the wall of the neck 30 which surrounds the socket, is such that when the rubber strips, which register approximately with the dimensions of the flat faces which constitute said hexagonal surfaces, are assembled as described above, the shaft end will make a close, tight fit in the socket.

A plug 35, of wood or other suitable material, of hexagonal exterior surface, to conform to the interior surface of the wall of the shaft at its small end, is now inserted from the large end of the shaft and, by the use of an arbor, driven to a driving fit in the position in which it is shown in Fig. 7. A hole is now drilled through the neck 30 of the club head and the parts within the same at a position about one eighth of an inch from the extremity of the shaft. A section of rubber tubing 36, having a wall approximately one thirty-second of an inch thick, is inserted through said hole and a steel cross-pin or rivet 37 is forced through the rubber tubing. The rubber tubing and steel pin together constitute a resilient cross-pin which locks the shaft from withdrawal from the socket of the head. The object of the wooden plug is to provide a wide bearing for the rubber cov-

ered pin or rivet thereby preventing the thin steel wall of the shaft from cutting the rubber under the twisting stress of impact.

Fig. 10 illustrates a rubber sleeve or cap 61 such as may be used in place of the rubber strips 34, said sleeve being closed at its lower end and being molded with both interior and exterior hexagonal wall surfaces conforming to the similar surfaces between which it is eventually to become interposed. The whole rubber assembly may be vulcanized.

The flat rubber strips 34, or the flat sides of the rubber sleeve 61, between the flat portions or faces of the hexagonal surfaces, yield and the wall of the rubber tubing over the rivet also yields under the twisting stress of impact. The yielding of the rubber strips permits the blade to yield and gives a more satisfactory "feel" to the shot and tends to counteract the turning of the wrists at the moment of impact. If the usual unyielding cross-pin or rivet were employed, all the yielding functions of the rubber strips or rubber sleeve would be rendered useless and lost.

Instead of the rubber covered pin or rivet, a resilient pin 38 of solid rubber, such as shown in Fig. 18, may be used; or it may be a resilient split tubular rivet 39 (Fig. 9) formed of high carbon heat-treated sheet steel, having a longitudinal slot extending its full length and approximately three sixty-fourths of an inch wide and which permits the wall to yield under the twisting stress of impact. The tubular split rivet 39 is inserted in the hole therefor with the slot or split at the bottom of said hole. Rubber tubing such as 36 is also slipped over this split rivet 39 to ease off the stress when the edges meet. It is clear that when these edges meet the rivet becomes as unyielding as the usual solid steel rivet. The pin or rivet may be held in position by peening over the edges of the hole through the wall of the neck of the club head; or a band (not shown) may be shrunk around said neck over both ends of said hole.

Figs. 11, 12 and 13 illustrate another construction employing a cross-pin or rivet for locking the club head onto the shaft. A slot 40 about three eighths of an inch long is milled or punched in one of the flat surfaces or faces of the hexagonal contour of the small end of the shaft and its surrounding sleeve, as shown in Fig. 11; and a similar slot is likewise formed in the corresponding wall portion at the opposite side of the shaft. One end of the slot is about one eighth of an inch from the small extremity of the shaft. The end of the shaft having such openings, as shown in Fig. 11, is "dipped" into molten rubber for a distance of about one-half inch. Before dipping, a hexagonal metal cap (not shown) is slipped over the end of the shaft temporarily, thereby preventing the molten rubber from escaping through the slots 40

before it sets. The rubber will be molded hexagonal shape to conform to the interior of the shaft and will project into and fill the openings 40 flush with the outer surface of the metal sleeve 32. The metal cap temporarily used during the molding operation is now removed. Rubber strips 34, Figs. 4, 5, 7 and 8, or a rubber sleeve 61, Fig. 10, are then applied over the end of the shaft shown in Fig. 12, and the same is then forced into the socket of a club head in the manner shown in Fig. 13. A hole is now drilled through the wall of the neck 30 and through the solid molded rubber body 41 at about the middle thereof. A pin or rivet 42 is inserted in said hole to lock the head onto the shaft. The solid rubber body through which said cross-pin passes permits the latter to yield under stress of impact. This arrangement, like the others, also avoids a metal-to-metal contact in respect to the shaft and the hosel of the club, and, like the other modifications, permits of ready replacement of the rubber parts when they become old and lose their vitality.

When applying this invention in conjunction with tubular steel shafts already finished to cylindrical form, a hole is bored axially in a steel member, of hexagonal contour and approximately two inches long, to constitute a tapered sleeve 45 shown in Fig. 14. The small end of the tapered tubular shaft 46, for a distance of about two inches, is driven into the sleeve 45 with a driving fit and preferably pinned at the extreme ends. This sleeve over the end of the shaft is then covered with strips (or a cap) of rubber and then forced into the hexagonal socket in the neck of the club head, where it is fastened in place by a cross-pin or rivet, all in the same manner as hereinbefore described.

Both the internal and external surfaces of the tubular steel shaft may be hexagonal in cross-section as shown in Fig. 15.

The external as well as the internal surface of the wall of the neck of the metal head may be of hexagonal cross-section, as shown at 50 in Fig. 16.

A finishing sleeve or thimble 51, Fig. 17, may be used. It is slipped over the small end of the shaft 31, Fig. 2, preferably before the metal sleeve 32 and rubber strips 34 are applied. After the shaft has been inserted in the socket of the head said sleeve 51 is brought to the position shown in Fig. 17, covering the tongues 33 of the metal sleeve which project beyond the neck of the head as shown in Fig. 6. At one end thimble 51 fits flush against the end edge or wall of the neck 30, Fig. 17, and tapers gradually to its other end which is only slightly larger than the shaft. The exterior shape of the thimble is made to conform to the exterior shape of the shaft, cylindrical, or hexagonal, or other shape, as the case may be.

When a stroke is made with a golf club

constructed in the manner described, the twisting stress produced by impact of the club head with the ball causes the hexagonal points of the sleeve on the shaft and the center of the hexagonal flat surfaces of the neck to approach each other and the rubber is compressed. Such compression enables the head to yield and the immediate expansion produces a rebound of the head.

Fig. 19 illustrates another embodiment of the invention in which a rib 55 about two inches in length is brazed or formed on and longitudinally of the small end of a tapered tubular steel shaft 56, or on a sleeve fitting about said end of the shaft. A sleeve 57 of rubber or other suitable resilient material, is molded, or otherwise formed, to fit closely about said shaft end and the rib 55 thereon. The shaft end thus encased by the rubber sleeve is then forced into the socket of the neck or hosel 58 of a club head with the rubber covered rib fitting in a groove 59 in the wall of said neck. The head is then secured to the shaft by a cross-pin, or rivet, in the manner hereinbefore described, or by a screw (not shown) through the neck which indents the rubber but does not touch the metal sleeve of the shaft. When a stroke is made with a golf club constructed in accordance with Fig. 19, it acts upon substantially the same principle as before described.

While the invention has been described and illustrated with particular reference to its application to a golf club having a metal head, it is to be understood that it may be applied also to wooden headed clubs, such as drivers and brassies. Furthermore, the invention is applicable to both metal headed and wooden headed clubs in which the bore or socket for receiving the end of the shaft is either closed at its inner end, as illustrated in the drawing in reference to a metal head, or open at both ends, and the term "socket" as used in the claims embraces both. The invention is not restricted to hexagonal form. Any shape or shapes which compress a yielding material when the club head meets the ball in making a stroke may be employed.

What is claimed is:—

1. In a golf club, a metallic shaft and a hosel provided with compressing faces movable towards each other by relative turning of the shaft and hosel and a resilient material interposed between said faces and acting to permit limited relative turning of the shaft and hosel whereby a yield and rebound take place in the club head under the twisting stress of impact.

2. In a golf club, the combination of a shaft; a head; and a joint between the shaft and the head, said joint comprising opposing surfaces on the shaft and head so formed that they are brought closer together at one or more parts thereof by relative turning of the shaft and head, and resilient material

interposed between said part or parts of said surfaces.

3. In a golf club, the combination of a shaft; a head having a socket to receive the end of the shaft, the interior surface of the wall of said socket and the exterior surface of said shaft end being so formed that relative turning thereof moves said surfaces closer together at one or more parts thereof; and resilient material interposed between said part or parts of said surfaces.

4. In a golf club, the combination of a head having a socket; a shaft fitting at one end into said socket; a cross-pin securing said shaft end in said socket; and a resilient material interposed between said pin and either said socket or said shaft, said material acting to permit limited relative turning of the shaft and head.

5. In a golf club, the combination of a head having a socket; a shaft fitting at one end in said socket; and a resilient cross-pin securing said shaft end in said socket and acting to permit limited relative turning of said shaft and head.

6. In a golf club, the combination of a head having a socket; a shaft fitting at one end in said socket; and a tubular cross-pin longitudinally split or slotted to impart resiliency thereto, said pin securing said shaft end in said socket.

7. In a golf club, the combination of a shaft; a head having a socket to receive the end of the shaft, said end of the shaft having one or more flattened surfaces opposing similar surfaces of the socket and whereby relative turning of the shaft and head moves said surfaces closer together at one or more parts thereof; and resilient material interposed between said part or parts of said surfaces.

8. In a golf club, the combination of a head having a socket of polygonal cross-section; a shaft of similar polygonal cross-section at the end thereof engaging in said socket; and resilient material interposed between said polygonal surfaces of the shaft and socket.

9. In a golf club, the combination of a head having a socket; a shaft fitting at one end in said socket; and a cross-pin having a covering of resilient material for securing said shaft end in said socket.

10. In a golf club, the combination of a shaft; a head having a socket to receive the end of the shaft, the interior surface of the wall of said socket and the exterior surface of said shaft end being so formed that relative turning thereof moves said surfaces closer together at one or more parts thereof; and rubber interposed between said part or parts of said surfaces and vulcanized.

In testimony whereof I have signed this specification.

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