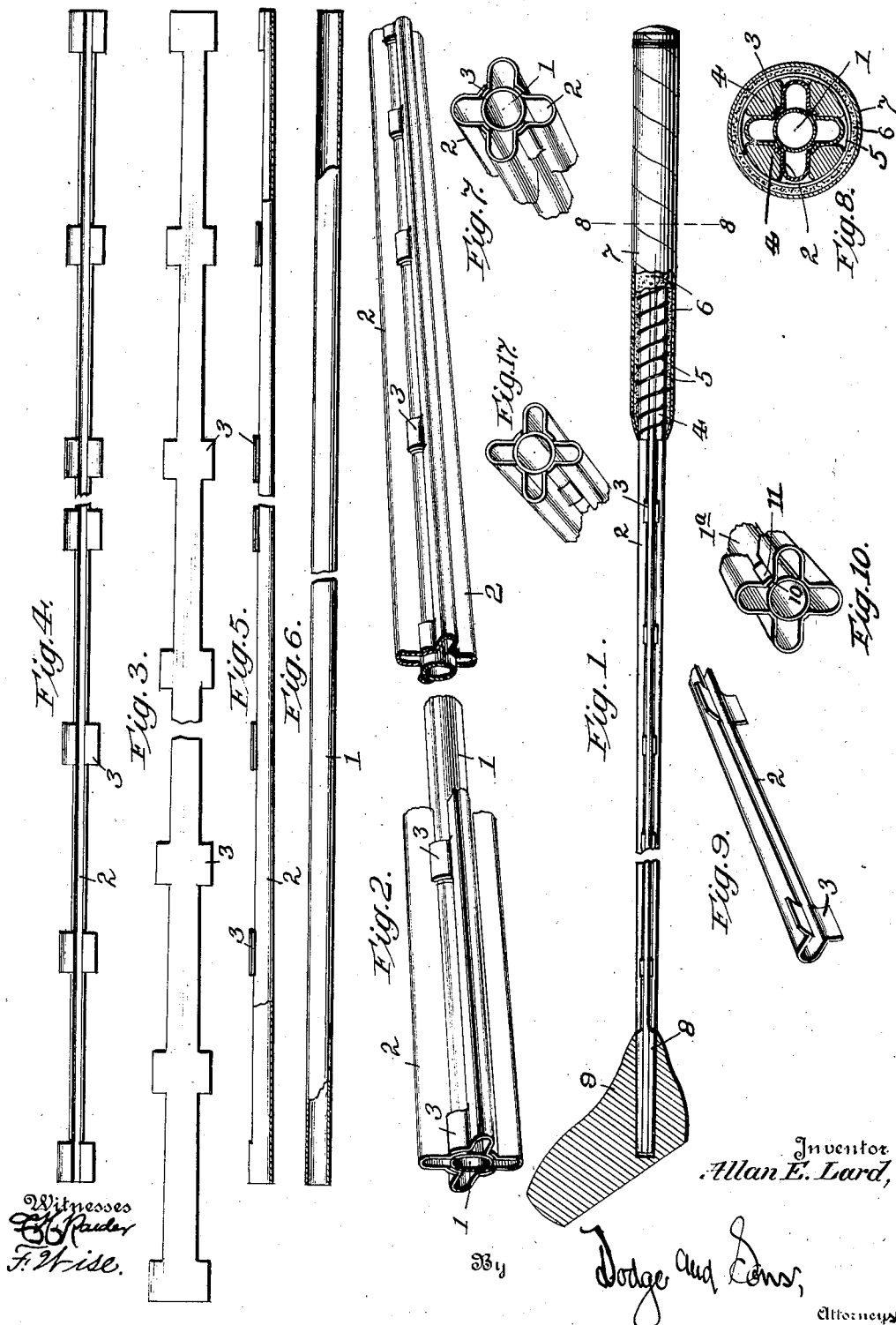


A. E. LARD.
 SHAFT FOR GOLF CLUBS.
 APPLICATION FILED JAN. 23, 1914.

1,125,029.

Patented Jan. 12, 1915.

2 SHEETS-SHEET 1.

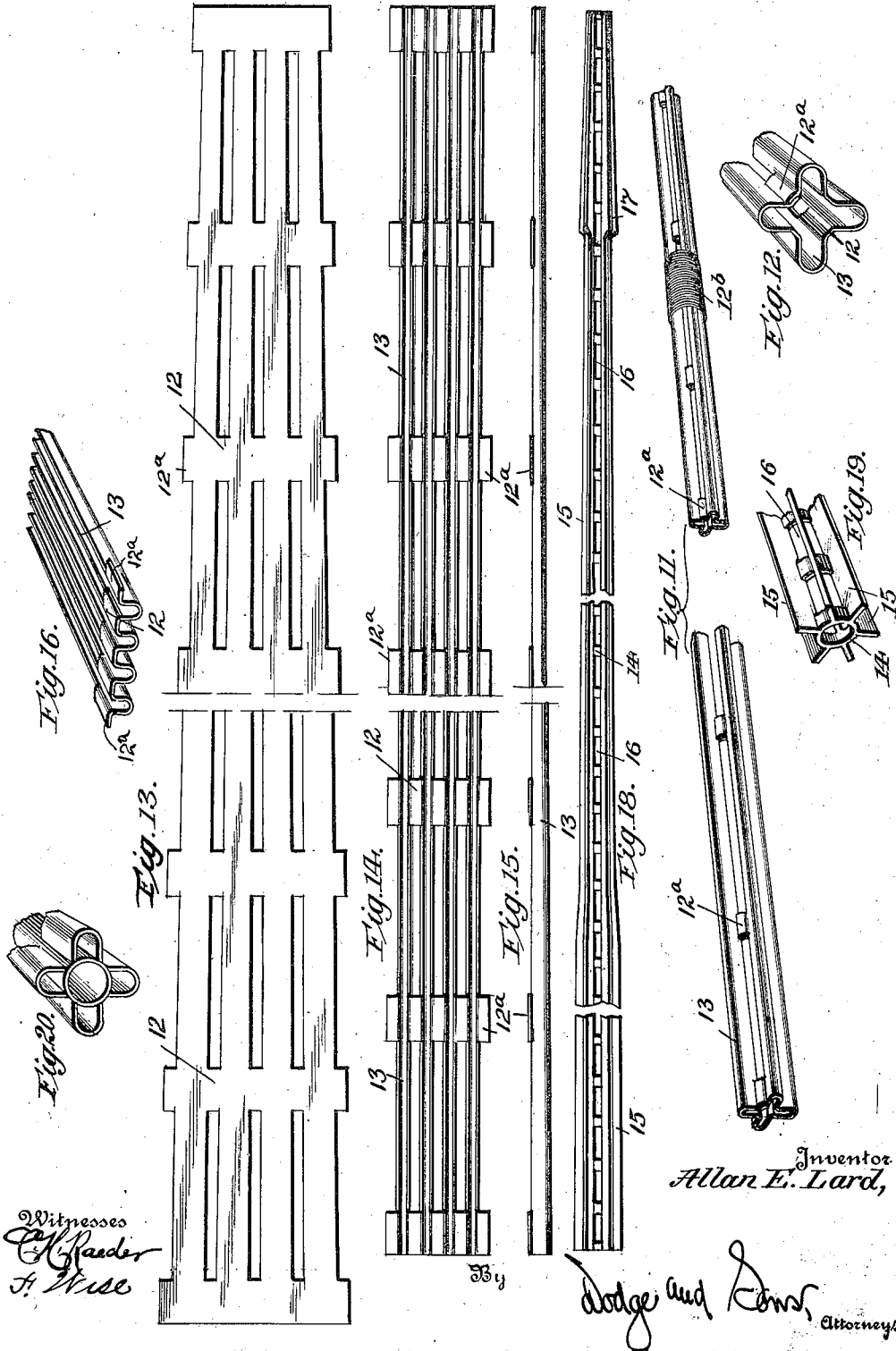


A. E. LARD.
 SHAFT FOR GOLF CLUBS.
 APPLICATION FILED JAN. 23, 1914.

1,125,029.

Patented Jan. 12, 1915.

2 SHEETS-SHEET 2.



UNITED STATES PATENT OFFICE.

ALLAN E. LARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

SHAFT FOR GOLF-CLUBS.

1,125,029.

Specification of Letters Patent.

Patented Jan. 12, 1915.

Application filed January 23, 1914. Serial No. 813,926.

To all whom it may concern:

Be it known that I, ALLAN E. LARD, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Shafts for Golf-Clubs, of which the following is a specification.

My present invention pertains to an improved shaft for golf-clubs, and the main object of the invention is to produce a metallic shaft embodying all the desirable and requisite features of the wooden shaft, and eliminating the objectionable features inherent thereto, namely, breaking, warping, becoming "dead" or "set," and the care and attention necessary during and after exposure to rain.

A golf-club shaft must, as is well understood by those skilled in the use of golf clubs, have proper weight, and also proper balance, and the shaft must have the right "whip" to be effective, the "whip" being a matter of degree, varying with the taste and requirements of different players.

Satisfactory metallic golf-shafts have not, so far as I have been able to ascertain, as yet appeared, and the main difficulty has been the inability to secure the absolutely essential feature of torsion. An ordinary hollow steel golf-shaft has no torsioning qualities under impact, and such torsioning or twisting of the shaft is just as indispensable in a metallic shaft as it is in a wooden one.

The face of the head of a golf-club is offset or out of line with the shaft, and when the impact against the ball occurs the wooden shaft not only flexes backwardly, but also twists or torsions, and it is such torsioning that adds a propelling power which assists in lengthening the drive. Furthermore, this torsioning, cooperating with the turning of the wrists (it being a well-known fact that the wrists must turn in every properly executed golf swing where distance is required), tends to give a long straight ball with a minimum effort. In short, a longer and straighter ball can be obtained with a live shaft that torsions than with one which does not.

Another important feature of the torsioning is that it tends to cushion the blow, the result being a yielding, pleasant sensation

rather than a sudden or jarring one. When the head of the club, traveling at a high rate of speed, impacts against the ball, the tendency is to turn the shaft in the hands, and it will be readily seen that the shaft is less liable to jar when this sudden, twisting effect is cushioned by the torsioning action of the shaft, such action traveling the length of the shaft and being, to a certain extent, more gradually and pliantly conveyed to the gripping hands. It is, therefore, quite apparent, and a well-known fact to those versed in the science of the game, that torsion is indispensable in a wooden golf-shaft, and it naturally follows that it is just as indispensable in a steel golf-shaft.

Several embodiments of the invention are shown in the annexed drawings, wherein:

Figure 1 is a sectional elevation of a golf-club provided with a shaft made in accordance with my invention; Fig. 2 a perspective view of the shaft shown in Fig. 1, the same being broken away to more clearly illustrate the construction thereof; Fig. 3 a plan view of a blank employed to produce one of the longitudinally-extending ribs; Fig. 4 a plan view of one of said ribs after it is formed; Fig. 5 a side elevation thereof; Fig. 6 a sectional elevation of the central tube employed in this construction; Fig. 7 a perspective view, upon a somewhat more enlarged scale than that shown in Fig. 2, looking at the end of the shaft; Fig. 8 a transverse sectional view, taken on the line 8-8 of Fig. 1, showing the manner of securing the grip to the metallic shaft; Fig. 9 a perspective view of a portion of one of the ribs; Fig. 10 a perspective view of a modified arrangement of the ribs as applied to a central tube construction; Fig. 11 a perspective view of a modified form of club, with the central tube omitted; Fig. 12 a similar view on an enlarged scale, looking at one end of the shaft; Fig. 13 a plan view of the blank from which the shaft is produced; Fig. 14 a similar view showing the blank with the ribs produced therein; Fig. 15 a side elevation of such ribbed blank; Fig. 16 a perspective view of a portion of the blank; Fig. 17 a view similar to Fig. 7, showing the ears on the ribs bearing directly upon the central tube instead of being overlapped; Fig. 18 is a side elevation

of a still further modification; Fig. 19 a perspective view of one end of the shaft shown in Fig. 18; and Fig. 20 a detail perspective view of a still further modification.

Referring to the construction shown in Figs. 1 to 9 inclusive, and which I may here state has been actually produced and tested out, 1 denotes a central tube formed of spring steel, the same being relatively small and light. It is surrounded by a plurality of inverted U-shaped ribs, said members being indicated by 2. These ribs are formed from the blank shown in Fig. 3, and as will be noted upon reference to Figs. 2 and 5, they are of greater depth at the upper or grip end of the shaft than at the lower end; in other words, they taper in depth from the upper to the lower end of the shaft. Each rib is formed with a plurality of laterally-extending ears or lugs 3, which in the completed rib are slightly curved and overlap the lugs or ears upon the adjacent rib when the parts are assembled about the central tube and secured thereto, producing what may be termed an outer slotted tube. These lugs or ears may be welded to the central tube and the ribs have no immovable or solid connection therewith except through such ears, and thus as the outer slotted tube or ribs torsion the central tube torsions also under impact and is prevented from collapsing (which would otherwise occur owing to its lightness and size) by the exteriorly placed and longitudinally extending strengthening ribs. The object of the relatively light central tube is to provide a brace or support for the outer slotted tube or ribs, but its presence will not prevent the shaft from torsioning. The ears or lugs of the various ribs, as will be readily appreciated, may lie side by side along the shaft, as in Fig. 17, or they may abut, or be otherwise arranged. It has been found that a shaft thus produced will have the necessary balance, will fall within the requirements of weight of the ordinary golf-shaft, to wit, from six to six and three-fourths ounces, and will likewise have the necessary whip and will torsion under impact. The outside diameter of the tube of the shaft which I have actually tested is seven-thirty seconds and the thickness of wall .014 of an inch. A tube when made this light will, of course, torsion, but it will not possess sufficient strength to withstand the impact of the blow, and will even bend and collapse at the finish of a practice swing. In fact, when the head of the club is attached, the tube becomes too limber for any golf-club purpose. With the present structure, however, the advantages of the tube are retained and the tube sufficiently strengthened, without doing away with its susceptibility of being torsioned, to prevent collapse of the

tube. Of course, the ribs or outer tube tend to reduce the torsion to a certain degree, and the torsion is affected by the diameter and thickening of both tubes. The number and width of ears also affect the torsion. A shaft with many ears, located close together, (or one ear extending and welded to the entire length of the shaft) will torsion less than if the ears are few and far apart. The ears may be omitted, and the edges of the ribs welded or attached in any other suitable manner to the tube. Such a construction is illustrated in Fig. 20.

To secure the grip upon the club I have laid in the channels or grooves formed between the adjacent ribs strips of wood, designated by 4, which are rounded off upon their outer surfaces so as to be upon a somewhat larger radius than the outer face of the ribs 2, and the wire or other securing device 5 is wound around the same. Over this is placed a strip of listing 6, and any preferred form of grip surface 7. The nesting of the strips 4 between the ribs and the winding of the members 5 and 6 thereabout securely hold the grip in place. The wood being recessed to receive the ears which it overlies, prevents any endwise movement of the grip with reference to the shaft. It will, of course, be understood that any suitable cementitious material may be used in addition, but this in practice has not been found necessary. The lower small end of the shaft is secured in the head of the club in the following manner: The wooden strips 8, being recessed to receive the ears, are laid in the grooves between the ribs and driven with the shaft into the opening in the head of the club, which is designated by 9. Suitable cementitious material should be used at this point.

In Fig. 10 I have shown a slightly modified construction, wherein the tube is designated by 1^a, and the ribs, instead of being made separately, are formed from a single sheet of metal bent to shape and having overlapping ears, as 10 and 11, which are welded to the tube. Said ears, instead of overlapping, may be placed in any other suitable relation to each other, as above indicated in connection with Fig. 17. A shaft made in accordance with either of these constructions may be readily assembled and all the ribs secured in place without difficulty, through the employment of electric spot welding, or any other approved method.

In Figs. 12 to 16 inclusive I have shown a further modification of the invention, wherein the shaft is produced from sheet metal without the use of a central supporting tube. It may be said to comprise a plurality of ribs formed from a single sheet of metal in such manner as to produce a tapered shaft. As will be readily appre-

ciated by those skilled in the art, the blank from which the shaft is formed under this construction may be produced in several ways, as by rolling between forming dies, cutting out the openings between the connecting ears or members (which secure the ribs together) at the time of their formation or thereafter, or producing a blank from which the ribs may be pressed out, as is illustrated in the figures last referred to.

In Fig. 13 a blank is shown consisting of a series of longitudinally-extending members connected by cross-bars or ears 12. A blank thus produced will be subjected to the action of suitable dies, whereby longitudinal U-shaped members 13 will be formed, connected as just noted, by the ears or members 12, with outwardly-extending ears 12^a along each side of the blank. These U-shaped members, as will be best seen upon reference to Figs. 11 and 15 are of greater depth at the handle or grip end than at the lower end of the shaft. To produce the shaft, the ribbed blank is brought to the form best shown in Figs. 11 and 12, and the marginal ears are overlapped and welded. With this construction the shaft may be made of a metal slightly heavier than in the constructions before referred to, inasmuch as no central tube is present, and the weight of said tube may be carried into the metal of the shaft. The shaft may be reinforced with any suitable wrapping, as for instance, wire as 12^b, Fig. 11. A shaft constructed in this manner will torsion, and has the whip and spring necessary to a successful golf-club shaft.

The whip under any of the constructions hereinbefore set forth, may be located or accentuated at any desired point in the length of the shaft by variation in the height or size of the ribs. Thus, the whip may be localized down near the head, up near the grip, or in the middle of the shaft.

It is to be understood that in all the constructions herein set forth a greater or less number of ribs may be employed. In practice I have used four, that number keeping the shaft within the required weight, and giving all the desirable features before alluded to.

The shaft may be treated or enameled to prevent rust, and where it is made of high-grade steel and properly tempered, its life is almost limitless.

Under all of the constructions hereinbefore referred to there is present what may be termed a "slotted shaft." Thus, in the constructions shown in Figs. 1 to 9 inclusive, and in the constructions illustrated in Figs. 10 and 17 slots are formed between the ears and between the edges of the ribs and the adjacent face of the central tube. In the form shown in Figs. 11 to 16 inclusive there

is a substantially tubular shaft provided with a series of slots formed therein and defined by the spaces between the ears and the edges of the longitudinally-extending ribs. The amount of torsion is regulated (assuming the weight to be correct) by the length of the slots and the width of the ears,—the shorter the slots and the wider the ears, the less the shaft will torsion, and vice versa.

It is readily conceivable that with a blank formed as shown in Fig. 16, the ribs may be turned in a direction the reverse of those disclosed in Fig. 11, in which instance the ribs would be internal of the shaft with the edges thereof extending outwardly. This, however, is not as desirable a construction as that disclosed in Fig. 11.

In Figs. 18 and 19 there is shown a further modification, in which the tubular member 14 and the ribs 15 are drawn from an ingot or formed from one piece. In this construction the openings 16, designed for the purpose of permitting torsion, are punched or milled.

The tapering of the shaft is produced by grinding away the outer surface of the ribs, and the whip is placed in the desired section by reducing the height of the ribs in that locality where it is desired the whip should appear.

I have produced a shaft of the character described by milling the flanges or ribs from a steel tube having a three-sixteenths inch inside diameter and an outside diameter of one-half inch. These flanges may, however, be drawn instead of milled.

The depth of the ribs or flanges adjacent the grip end of the shaft is slightly over one-eighth of an inch. As will be readily seen upon reference to Fig. 18, the ribs may have a stepped, tapered form adjacent the lower end of the shaft, as indicated at 17, in order to facilitate the securing of the shaft in the head of the club. At the grip end the ribs, as shown may be left of a height sufficient to enable one to readily secure the proper gripping surface thereon. Strips of wood may be embedded between the ribs, as before described. With this construction the club-maker may, by merely grinding away the ribs, produce the whip at any desired point, in much the same manner as it is now obtained by reducing the diameter of a wooden shaft which is commonly effected by scraping the shaft with a piece of glass or the like.

While I have described the invention somewhat at length, and the different ways in which it may be carried out, I do not confine myself to tapering by grinding, milling stamping or any specified methods. If it is found desirable to produce the taper by drawing, I may do so.

In the employment of the terms "slots"

and "slotted shaft" it is to be understood that the same are used in a generic sense, except in the more or less specific claims, and that it is not essential that the slots extend entirely through the wall or body of the shaft. Thus, for instance, in Fig. 20 it may be said that the shaft is provided with longitudinally-extending slots located between the longitudinally-extending ribs, and the same is true of the construction disclosed in Figs. 18 and 19, wherein, in addition to the longitudinally-extending slots formed in the production of the ribs 15, openings 16, in the central tubular body portion are likewise provided to permit the desired amount or degree of torsion. In other words, I may or may not have openings in the central body portion of the shaft, dependent, of course, upon the size and thickness of the central body, as hereinbefore set forth.

Having thus described my invention, what I claim is:

1. As a new article of manufacture, a relatively light, tubular golf-shaft, provided with means to permit torsioning thereof under impact.
2. As a new article of manufacture, a tubular metallic golf-shaft having means to permit torsioning thereof, and likewise with means for preventing collapse of the structure under impact.
3. As a new article of manufacture, a golf shaft having a body tubular and tapering in form and provided with means to permit torsioning thereof.
4. As a new article of manufacture, a tapered, tubular metallic golf shaft, having a fluted exterior and susceptible of torsion under impact.
5. As a new article of manufacture, a metallic golf shaft having a relatively light body susceptible of torsion and provided with ribs.
6. As a new article of manufacture, a metallic golf shaft having a relatively light hollow body susceptible of torsion and provided with ribs.
7. As a new article of manufacture, a metallic golf shaft having a relatively light body, and provided with tapering ribs extending longitudinally thereof.
8. A golf-club, comprising a ribbed steel shaft; a head having a socket forced therein; and a plurality of filler pieces seated in the lower end of the shaft between the ribs and adapted, when the shaft and pieces are driven into the socket, to form a tight union therewith.
9. A golf-club, comprising a ribbed steel shaft; a head having a socket therein; a plurality of filling members seated in the spaces between the ribs at the lower end of the shaft and adapted to form a tight union with the head when said shaft and members

are driven into the socket in the head; a second series of filler members seated in the spaces between the ribs at the upper end of the shaft and secured thereto; and a grip surface secured around said second series of filler members and the outer face of the ribs.

10. In a golf-club, the combination of a ribbed steel shaft; a plurality of flattened filler members seated between said ribs and extending outwardly to a height substantially equal to the height of the ribs; means for securing said filler members in place; and a flexible grip surface secured around the outer face of said filler members and the ribs.

11. As a new article of manufacture, a tubular, metallic golf-shaft provided with openings designed to permit torsioning of the shaft under impact.

12. As a new article of manufacture, a tubular, tempered steel golf-shaft provided with slots extending longitudinally thereof, said shaft being susceptible of torsion.

13. As a new article of manufacture, a golf-shaft formed of a plurality of rib-shaped members connected together at intervals by ears, and extending throughout the length of the shaft.

14. As a new article of manufacture, a golf-shaft formed from a single piece of metal, and having a centrally-disposed tubular member, with a series of ribs extending longitudinally thereof, the tubular member having slots or openings formed therein intermediate said ribs, said openings being designed to permit torsion.

15. As a new article of manufacture, a golf-shaft formed from a single piece of metal and comprising a centrally-disposed tubular member, having a plurality of ribs extending longitudinally thereof, said ribs tapering from the grip portion of the shaft toward the lower end thereof, and the tubular member having a series of slots or openings formed therein, between said ribs.

16. As a new article of manufacture, a golf-shaft comprising a relatively light tubular member having ribs extending longitudinally thereof, and a wrapping wound around said member.

17. As a new article of manufacture, a golf-shaft comprising a tubular member having openings designed to permit torsioning, and a wrapping wound around said member.

18. In a golf club, the combination of a head; and a metallic shaft secured thereto, said shaft being provided with means to permit the same to torsion under impact applied to the head.

19. In a golf club, the combination of a head; and a tubular metallic shaft secured thereto, said shaft being provided with

means to permit the same to torsion under impact applied to the head.

20. In a golf club, the combination of a head; and a tapered, tubular metallic shaft secured thereto, said shaft being provided with means to permit the same to torsion under impact applied to the head.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALLAN E. LARD.

Witnesses:

HORACE A. DODGE,
BENNETT S. JONES.