H. V. HARDMAN.

PLAYING CLUB.

APPLICATION FILED SEPT. 13, 1915.

1,202,383. Patented Oct. 24, 1916.

Fig. 1.

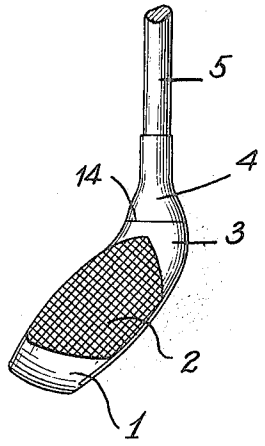


Fig. 2.

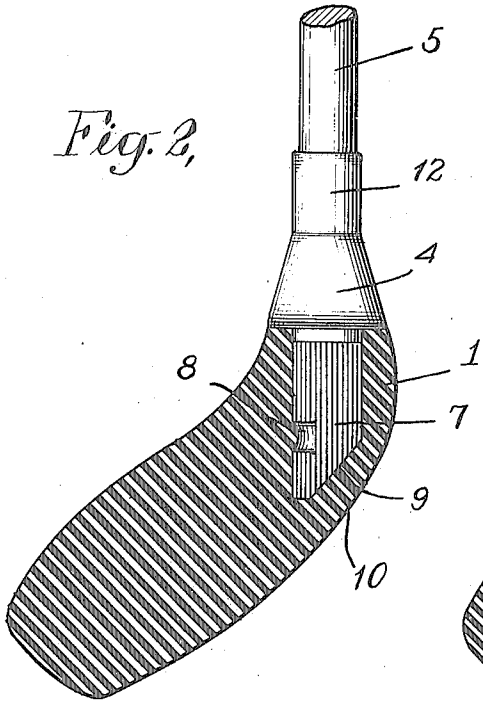
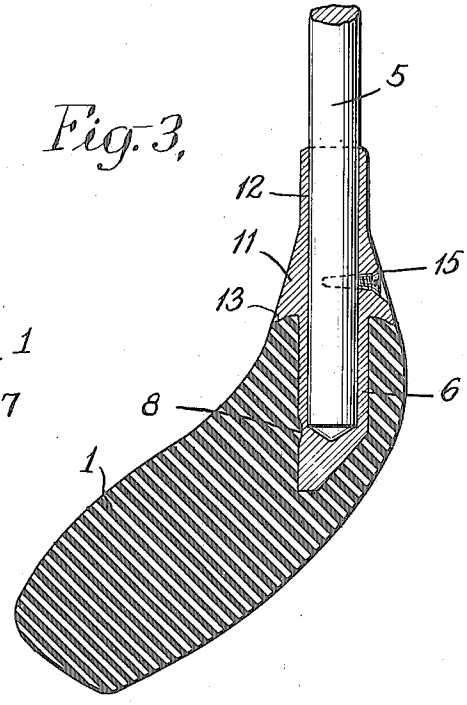


Fig. 3.



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PLAYING-CLUB.

1,202,383. Specification of Letters Patent. Patented Oct. 24, 1916.

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To all whom it may concern:

Be it known that I, HERBERT V. HARDMAN, a citizen of the United States, residing at Belleville, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Playing-Clubs, of which the following is a specification.

My invention relates to playing clubs, especially golf clubs, such as drivers and the like, in which the head of the club is formed of a molded composition.

My invention is particularly directed to improvements in such clubs in which the head comprises a body having a striking face and a neck formed of a single piece of molded hard resilient composition, such as one comprising a phenolic condensation product.

My invention consists in the combination of such a head with a ferrule, in which the end of the shaft is seated, and in improvements in the ferrule itself, the latter being of such a shape and configuration as to prevent cracking or rupture in the adjacent portions of the head and shaft. A portion of the ferrule is embedded in the composition of the head, this portion having a knurled, ribbed, or otherwise roughened surface, and being designed to prevent cracking of the head about the same during the shrinking incident to the manufacture of the head. The ferrule also preferably has a portion seated upon the upper surface of the neck of the head, this portion having a downwardly extending edge, which coacts with the composition of the head, to equalize strains when the club is used in striking a ball. Also, preferably, the ferrule has an upwardly extending neck portion forming a somewhat resilient and extended bearing for the shaft, to largely overcome shearing stresses at the lower end of the shaft when the club is used.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming part of this application and illustrating a preferred embodiment of my invention.

In the drawings, Figure 1 represents a side elevation of a club head, provided with my invention, Fig. 2 is an enlarged vertical section through the same, the ferrule and shaft being shown in elevation, and Fig. 3 is a similar section with the ferrule also shown in central longitudinal section.

Referring to the drawings, the head 1 is provided with a striking face 2 and a neck portion 3 in and upon which is seated the ferrule 4, which receives the shaft 5. The head is preferably formed of a hard, resilient, infusible, condensation product of phenol and formaldehyde, or other substance containing active methylene groups, such as is described for example in patent to J. W. Aylsworth 1,020,593, March 19, 1912, the condensation product being combined with a suitable inert filler. The ferrule has its lower portion extending into the composition of the head, which composition grips the ferrule tightly when the molding of the head is completed. Whether the composition referred to is used for the manufacture of the head, or some other plastic composition, and whether or not the head comprises a single integral piece, as stated, my invention contemplates in any case the use of a material which shrinks about the ferrule when it cools or hardens. The shrinkage grips the ferrule tightly, and would reduce the diameter of the cylindrical opening through which the ferrule extends, if the ferrule were not present. In shrinking about the ferrule the inward stresses are equally distributed throughout the material surrounding the ferrule, but the inward movement of the material is resisted by the ferrule. Accordingly there is a tendency for the material to move around the ferrule. If the material about the ferrule were considered as a split ring, having abutting ends, the shrinkage, decreasing the peripheral length of the ring, would cause the abutting ends of the ring to separate. The condition is analogous in the manufacture of molded heads, as the latter are commonly made in two-part molds, and the head is weakest in the plane in which the parts of the mold abut, because there is always more or less porosity in the material in this plane because of the joining of the two parts of the mold there. Consequently the tendency of the shrinkage strains is to cause the material to separate peripherally in this plane or seam, and cause cracking in this plane.

My invention aims to overcome this tendency by providing the portion of the ferrule within the head with a roughened or

ribbed surface. This prevents the material about the ferrule from moving around the same as a whole, since the movement or stress around the ferrule of the material between a pair of peripherally-separated ribs or roughnesses is limited by the distance between them. The pull of the material upon a pair of adjacent ribs is proportional to the distance between them, and if they are sufficiently close together, this stress is insufficient to cause cracking at any point. On the contrary, with a smooth ferrule, the tendency for the material to crack at its weak point is measured by the number of units distance around the ferrule, multiplied by the contraction per unit, which is often sufficient to cause the material to separate or crack at the weak point, as stated.

In the drawings, the ferrule is shown as having a downwardly extending cylindrical portion 6 embedded in the head, the surface of this portion 6 being roughened, preferably by providing the same with longitudinal closely spaced ribbing or nurling 7. Portion 6 is preferably provided with a gouged or recessed portion 8 on its periphery, or is otherwise given a transverse shoulder or ridge, which is gripped by the composition of the head, to decrease the possibility of the ferrule being pulled out longitudinally from the finished head. The lower end of the cylindrical portion 6 of the ferrule is also preferably beveled, as shown at 9. This beveled edge 9 is approximately parallel to the bottom face 10 of the head and serves two purposes, in that it permits the lower end of the ferrule being brought lower in the composition of the head than would be possible if the ferrule had a squared end, the beveled edge 9 also acting, in addition to the knurled or roughened surface 7, to prevent any possible turning of the ferrule in the head.

The ferrule preferably has a portion 11 rising above the upper part of the head or neck in alinement with the portion 6 of the ferrule, portion 11 being comparatively thick and stiff at its lower part, but merging at its upper part into a comparatively thin cylindrical neck portion 12. The portion 11 has a lower edge 13 which extends downwardly around the upper portion of the portion 6 of the ferrule. The outer surface of the neck portion of the head meets the edge portion 13 of the ferrule at the line 14, as shown in Fig. 1, the curvature of the neck and the ferrule being continuous, to present a neat and attractive appearance. The composition of the head flows in molding into the annular pocket formed between the flange 13 of the ferrule and the upper end of the cylindrical portion 6 of the ferrule. By this construction, the stresses produced by striking a ball are distributed between the opposite sides of the neck, for when a blow is struck the reaction of the cylindrical portion 6 against the head on one side is largely counterbalanced by the reaction of the depending flange 13 on the opposite side of the head against the composition located between the same and the adjacent surface of portion 6 of the ferrule. The ferrule is preferably made of a strong resilient metal, such as brass. The neck portion 12 extends for some distance along the shaft and is comparatively thin so as to form a somewhat resilient bearing for the shaft. It is obvious that this arrangement tends to distribute the shearing stress caused by striking a ball, throughout a length of the shaft, and that therefore there is no such likelihood of the shaft breaking at the edge of the ferrule, as would be the case if the ferrule terminated a short distance above the flange 13.

The shaft 5 is forced into the ferrule and extends nearly through the same as shown. It may be secured in place by a suitable securing means, a screw as shown at 15 being preferred. When a screw is used, the latter can be readily removed, and the shaft removed if it is desired to replace the same, which is a difficult matter if a pin is used, extending through the ferrule into the shaft.

It should be noted that the molded composition of which the club head is composed is somewhat resilient in character, the coefficient of elasticity of the phenolic condensation product which is preferably used being substantially the same as that of ivory. The circumferential stresses set up in the material around the ferrule, when the material shrinks in cooling or hardening, are not sufficient to cause cracking of the head in line with any of the ridges or protuberances on the ferrule which extend into the composition, because the pull or stress exerted between a pair of adjacent circumferentially-separated protuberances or ridges is insufficient to overcome the elastic limit of the material.

Having described my invention, what I claim as new therein and desire to secure by Letters Patent of the United States is:

1. In a playing club, the combination of a head having a striking face and formed of a somewhat resilient molded composition having a tendency to shrink in cooling or hardening, and a metal ferrule adapted to receive the end of a shaft, said ferrule having a neck portion and a cylindrical portion in alinement therewith, embedded in said head, said cylindrical portion having protuberances on its surface closely spaced over the same, and extending into the composition of the head, said protuberances being so arranged with relation to each other as to present abutments substantially alined in a circumferential direction to subdivide

and distribute about the ferrule the circumferential shrinkage stresses of the composition contained between said protuberances, and to thereby prevent cracking of the head in a plane parallel to the axis of the ferrule, substantially as set forth.

2. In a playing club, the combination of a head having a striking face, and formed of a molded composition having a tendency to shrink in cooling or hardening, and a ferrule adapted to receive the end of a shaft, said ferrule having a neck portion and a downwardly extending portion in alinement therewith, embedded in said head, said portion having a longitudinally ribbed surface and a lower end beveled to lie approximately parallel to the bottom face of said head and somewhat above the same, substantially as set forth.

3. In a playing club, the combination of a head having a striking face, and formed of a molded composition having a tendency to shrink in cooling or hardening, and a ferrule adapted to receive the end of a shaft, said ferrule having a neck portion and a downwardly extending portion in alinement therewith, embedded in said head, said portion having a longitudinally ribbed surface and a transverse shoulder thereon, substantially as set forth.

4. In a playing club, the combination of a head having a striking face, and formed of a molded composition, having a tendency to shrink in cooling or hardening, and a metal ferrule adapted to receive the end of a shaft, said ferrule having a neck portion and a portion in alinement therewith, embedded in said head, said embedded portion having peripherally-spaced protuberances on its surface extending into the composition of the head, with the composition engaging the surface of the ferrule between said protuberances, and said neck portion constituting an extended bearing tube of thin, resilient metal, substantially as set forth.

5. In a playing club, the combination of a head having a striking face, and formed of a molded composition having a tendency to shrink in cooling or hardening, and a ferrule adapted to receive the end of a shaft, said ferrule having a neck portion and a downwardly extending portion in alinement therewith, embedded in said head, said portion having a longitudinally ribbed surface, substantially as set forth.

This specification signed and witnessed this 30th day of July, 1915.

HERBERT V. HARDMAN.

Witnesses:
HENRY L. DENISON,
J. H. COEYMAN.