United States Patent

Leslie

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[54] STRIKING IMPLEMENT AND HEAD ASSEMBLY THEREFOR

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[52] **U.S. Cl.** .....**273/80.2,** 145/61 R, 287/126, 306/33

[51] **Int. Cl.**.....**A63b 53/02,** A01b 1/22, B25g 3/10

[58] **Field of Search** .....273/80, 80 B, 80.2–80.8, 273/167 R; 145/61, 29, 29 B; 306/32, 33; 287/114, 119, 126

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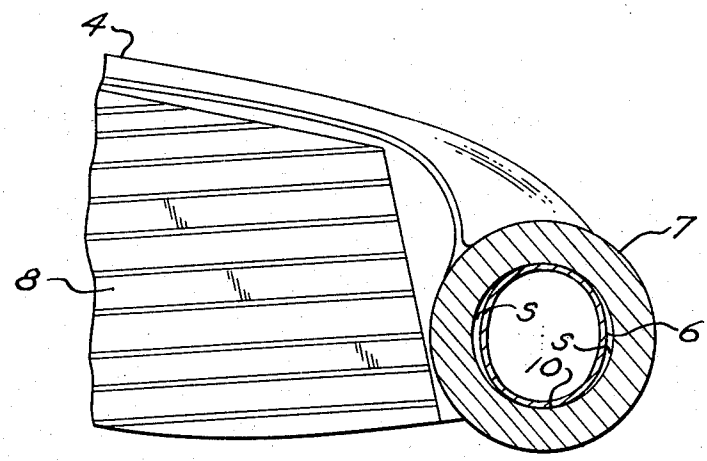
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[57] **ABSTRACT**

A shaft or handle has a shank portion of oblong cross section force fitted into a cylindrical socket in the head of a striking implement, there being spaces at the sides of the oblong shank between the shank and the socket wall containing epoxy bonding compound or other adhesive.

9 Claims, 13 Drawing Figures



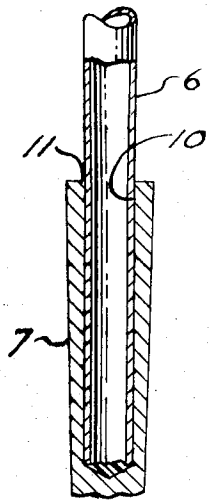


Fig. 8

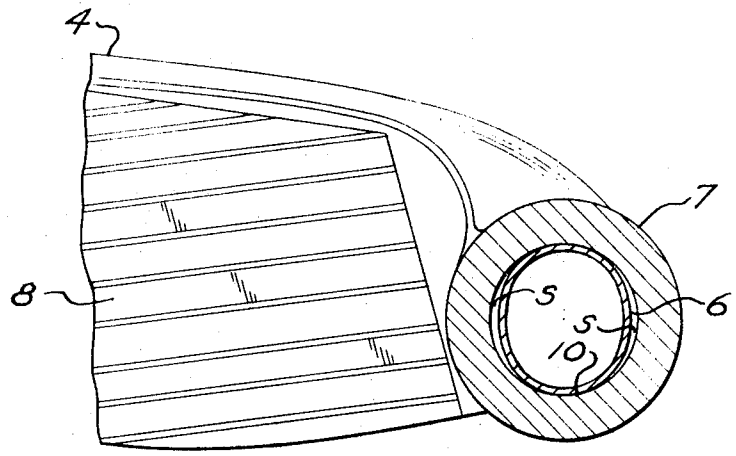


Fig. 9

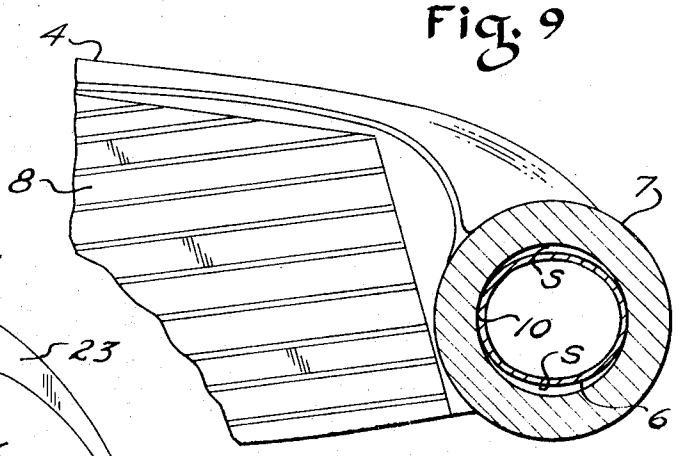


Fig. 10

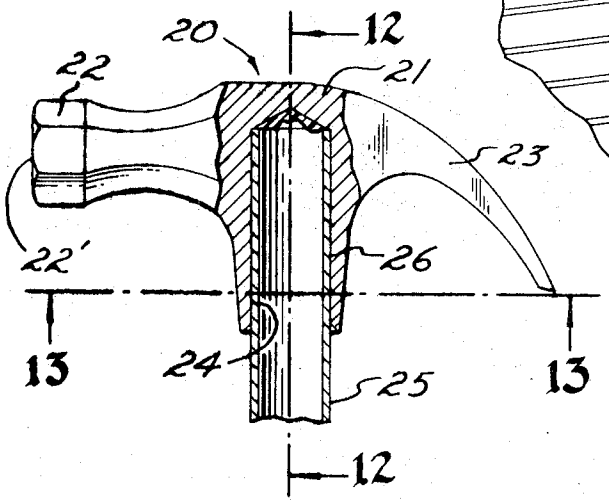


Fig. 11

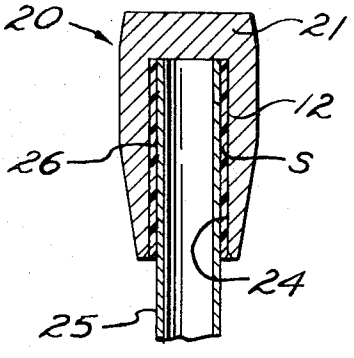


Fig. 12

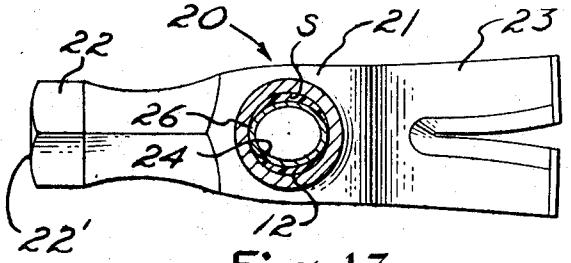


Fig. 13

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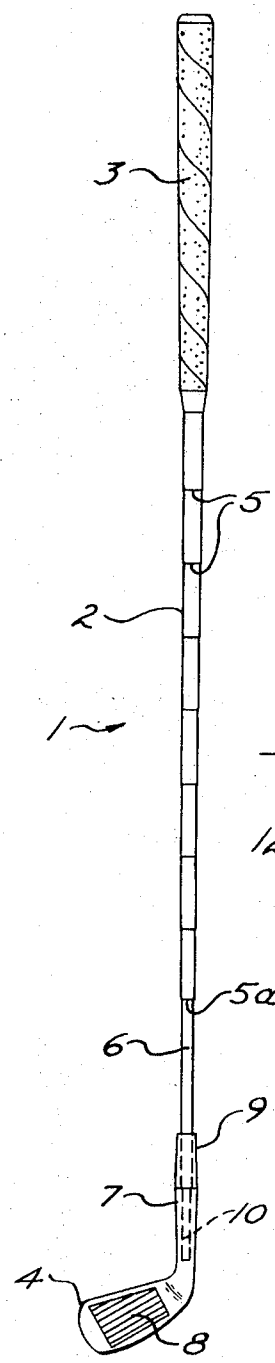


Fig. 1

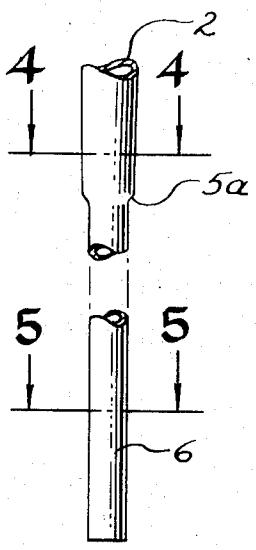


Fig. 2

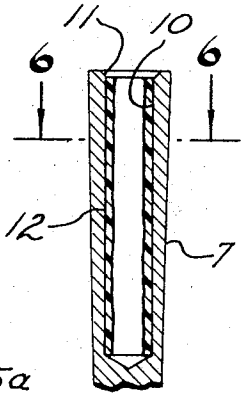


Fig. 3

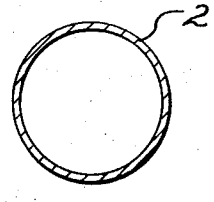


Fig. 4

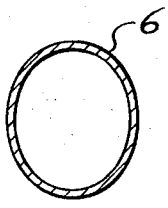


Fig. 5

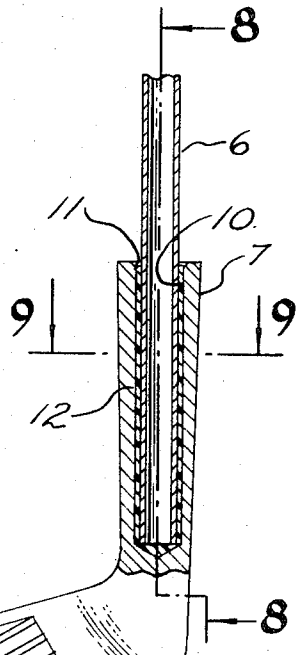


Fig. 7

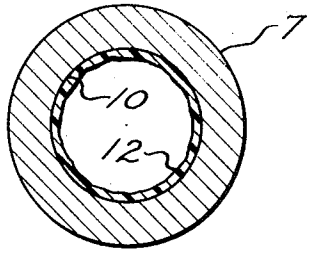


Fig. 6

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STRIKING IMPLEMENT AND HEAD ASSEMBLY THEREFOR

This invention relates to striking implements of various kinds and particularly to means for securing a shaft or handle to the striking head of the implement.

It is well-known to those familiar with the present art to provide the head of a striking implement such as a golf club or hammer with a shaft or handle. The head of the implement is commonly provided with a cylindrical or slightly tapered socket into which a cylindrical end or shank portion of a shaft or handle is force fitted. The shank portion may be provided with a slight taper, and additional securing means in the form of a bonding compound disposed within the socket is frequently used. Such construction provides an implement of great strength having a substantially rigid shaft of handle which resists flexing or bending to the same degree in any direction transverse to the axis thereof.

The present inventor has discovered that a substantially improved striking implement structure subject to more varied uses is achieved by providing a shank portion of a shaft or handle with an oblong cross-sectional shape and providing the socket in the head of the implement with a substantially cylindrical shape. The longer diameter of the shank slightly exceeds the diameter of the socket to effect a force fit, and the smaller diameter of said shank is slightly less than the diameter of the socket whereby space between the shank and socket is provided on either side of the shank. A suitable bonding compound such as an epoxide is disposed in the spaces between the shank and the socket wall whereby the shaft or handle is not only force fitted into the implement head but is also chemically bonded thereto.

Providing the shank portion of the shaft or handle with an oblong cross section has the effect of making said shank more rigid and resistant to bending in the transverse direction of the longer diameter of the shank while affording the shank greater flexibility in the transverse direction of its shorter diameter. Thus, by orienting the shank in the implement head with the longer diameter perpendicular to the striking surface and parallel with the striking motion or direction, maximum strength and stiffness is provided to resist the blow. On the other hand, by orienting the shorter diameter perpendicular to the plane of the striking surface and parallel with the striking direction, a maximum flexibility is achieved.

In a striking implement such as a golf club, the angle of the longer diameter of the shank with respect to the club face can be varied to provide the desired degree of stiffness or flexibility. In a striking tool such as a hammer, the longer diameter would preferably always be oriented perpendicular to the plane of the striking face to provide maximum strength and stiffness in the direction in which the blow is struck.

It is, therefore, the general object of this invention to provide an improved means for securing a tubular shaft or handle to the head of the striking implement.

It is a further object of this invention to provide a striking implement wherein the degree of stiffness or flexibility of the shaft or handle, in the direction of striking motion, can be varied.

Still another object of the invention is to provide an improved handle-to-head assembly comprising both a drive fit and a chemical bond.

Yet another object of the invention is to provide a striking implement having a head provided with a substantially cylindrical socket and a shaft or handle shank of oblong cross-sectional shape whereby spaces for bonding compound are provided on opposite sides of the shank when the same is inserted into the socket.

Other objects of the invention and the invention itself will be readily understood from the following description of two embodiments of the invention and the accompanying drawings, in which said drawings:

FIG. 1 is a side view of a golf club of the type known as an "iron" showing a first embodiment of the invention;

FIG. 2 is an enlarged detail of the lower portion or shank of the golf club shaft, a portion thereof being broken out;

FIG. 3 is a longitudinal section through the hosel of the head of the iron drawn to the scale of FIG. 2;

FIG. 4 is a further enlarged transverse section taken along the line 4—4 of FIG. 2;

FIG. 5 is a transverse section taken along the line 5—5 of FIG. 2 drawn to the scale of FIG. 4;

FIG. 6 is a transverse section taken along the line 6—6 of FIG. 3 drawn to the scale of FIG. 4;

FIG. 7 is an enlarged detail drawn to the scale of FIG. 3 showing the head of the iron in partial section with the shank of the shaft secured thereto;

FIG. 8 is a longitudinal section through the hosel taken along the line 8—8 of FIG. 7;

FIG. 9 is an enlarged transverse section drawn to the scale of FIGS. 4–6 taken along the line 9—9 of FIG. 7 showing the elliptical shank disposed with its longer diameter perpendicular to the striking face of the head;

FIG. 10 is a view similar to FIG. 9 showing the longer diameter of the shank disposed parallel with the striking face;

FIG. 11 is a side view of the head and upper handle portion of a hammer shown partially in elevation and partially in section and illustrating another embodiment of the invention;

FIG. 12 is a longitudinal section through the hammer taken along the line 12—12 of FIG. 11; and

FIG. 13 is a transverse section taken along the line 13—13 of FIG. 11.

Referring now to the drawings in all of which like parts are designated by like reference numerals. FIG. 1 shows a striking implement in the form of a golf club 1 of the type known as an "iron". Said golf club as herein illustrated comprises an elongated shaft 2 of tubular, metallic construction having a grip 3 and a metal head 4. As herein illustrated, the shaft 2 decreases in diameter from the handle 3 to the head 4 in a series of steps generally indicated at 5 and well-known in the art. Below the lowermost step 5*a*, the shaft 2 is provided with an elongated shank 6 which, as will hereinafter be described in detail, has a slightly oblong cross section whereas the remainder of said shaft has a substantially circular cross section. The golf club head 4 has an upwardly directed hosel 7 and a striking face 8 which is tilted or angled somewhat with respect to the axis of the shaft in the usual configuration of an iron. The lower end portion of the shank 6 is seated within a socket 10 in the hosel 7 and may be provided with a decorative ferrule 9 above said hosel, said ferrule not being shown in the remainder of the drawings since it forms no part of the present invention.

FIG. 2 shows the lower end portion of the shaft 2 including the lowermost step 5*a* and the elongated shank 6. FIG. 4 shows the cross-sectional shape of the shaft 2 above the step 5, said shape being circular, whereas the sectional showing of FIG. 5 illustrates the cross-sectional shape of the shank 6 showing the same to be elliptical or oblong. FIG. 3 shows the socket 10 of the hosel 7 in detail, said socket being circular in cross section as illustrated in the detail of FIG. 6. Because the socket is circular and the longer dimension of the oblong shank is greater than the diameter of said socket, the shank will contact the socket wall surface along lines diametrically opposite to each other whereby the shank will be centered in the socket with respect to its shorter diameter and the spaces S will be the same on both sides of said shank. This condition also assures that the shank is coaxial with the socket 10. Thus, this particular construction helps to assure alignment of the shank 6 and hosel 7 when the parts are assembled.

As herein illustrated, the socket 10 is preferably cylindrical in shape whereby it has the same cross-sectional dimension throughout the depth thereof. The longer diameter of the oblong shank 6 is slightly greater than the diameter of socket 10 thereby affording a force-fit between said shank and socket when the two are assembled. The upper inner peripheral edge of the socket 10 is preferably provided with an annular inwardly sloping bevel 11 to facilitate entrance of the lower end of the shaft 6 into said socket.

When the shank 6 is driven into the socket 10, the oblong or elliptical shape of said shank affords space or clearance at opposite sides of the shank across the shorter dimension of the

ellipse. These spaces are best seen in FIGS. 9 and 10 where they are indicated by the letter S. The spaces S in the assembled golf club would be filled with a suitable bonding compound such as an epoxy resin, the same having been eliminated in FIGS. 9 and 10 for purposes of clarity.

In assembly of the golf club, the inner surface portions of the socket 10 are preferably wiped or coated with an uncured epoxy bonding compound 12 in a liquid state after which the shank 6 is driven into said socket and the compound is cured. Said epoxy compound is squeezed into the spaces S at the sides of the oblong shank 6 whereby said shank is firmly bonded as well as drive fitted into the hosel 7.

The oblong or elliptical shape of the shank 6 has the effect of stiffening the shaft against axial distortion in the direction of the longer diameter of the ellipse and correspondingly making the shank portion more flexible in the direction of the shorter diameter of said ellipse. Thus, the elliptical shank 6 not only affords the spaces S for the deposit of the epoxy bonding compound but also provides means for increasing the stiffness or strength of the shaft 2 in the area of the shank by inserting said shaft with the longer diameter of the ellipse generally perpendicular to the striking face 8. This is illustrated in FIG. 9 wherein the longer diameter of the ellipse is disposed vertically and the striking face 8 is disposed horizontally.

FIG. 10 shows the manner in which the shank portion can be made more flexible by disposing the longer diameter of the ellipse generally parallel with the striking face 8, or horizontally as herein illustrated. It will be readily understood that the shank 6 can be disposed at any angle intermediate the angle shown in FIGS. 9 and 10 to achieve any desired intermediate degree of stiffness or flexibility. The partial sectional view of FIG. 7 is taken across the shorter diameter of the ellipse and illustrates the manner in which the epoxy bonding compound 12 preferably fills the spaces S throughout the length of the socket 10. The sectional detail of FIG. 8 is taken across the longer diameter of the ellipse and shows the manner in which the shank is seated tightly against the inner wall surface of the socket 10 in that direction.

FIGS. 11–13 show the present invention as applied to a striking hand tool, such as a hammer, generally indicated at 20. The hammer herein illustrated comprises a metal head 21 having a striking portion 22 projecting in one direction and claws 23 projecting in the opposite direction. The intermediate portion of the head 21 is provided with a downwardly open socket 24 adapted to receive the upper end portion of shank 26 of a tubular metallic handle 25. As shown in FIG. 13, the shank 26 is oblong shaped or elliptical in cross section with the longer dimension of the ellipse being parallel with the long dimension of the head 21 and perpendicular to the plane of the striking surface indicated at 22'. As shown in FIGS. 12 and 13, the spaces S at the sides of the ellipse are filled with the epoxy bonding compound 12. In the case of striking hand tools such as hammers, the longer diameter of the ellipse would preferably always be disposed perpendicular to the plane of the striking face of the tool. However, the added flexibility suggested in connection with the description of FIG. 10 may well be desirable in some tools, such as grass whips, hoes, rakes and the like.

In the following claims, the term "handle" is used in the sense of a part designed especially to be grasped at one end and adapted to carry a head at the other end thereof. The term "oblong" is intended to mean a configuration having a longer diameter in one direction and having a shorter diameter at right angles thereto.

I claim:

1. A striking implement comprising a striking head having a striking surface; said head having means providing a socket of substantially circular cross section adapted to receive the shank end of a handle; a handle having a shank portion disposed in said socket; said shank portion being oblong shaped in cross section having a longer diameter portion and a shorter diameter portion, the longer diameter of said shank being slightly in excess of the diameter of said socket providing a force fit thereof within the socket, the shorter diameter being slightly less than the diameter of said socket providing space between said shorter diameter portions of the shank and the wall of said socket; a bonding compound disposed within said space between said shank and socket wall whereby the oblong shank is chemically bonded to said socket intermediate the force fitted portions.

2. A striking implement as set forth in claim 1: the longer diameter of said shank being disposed at an angle with respect to said striking surface.

3. A striking implement as set forth in claim 1: the longer diameter of said shank being disposed generally perpendicular to said striking surface to afford maximum stiffness in the direction of striking motion.

4. A striking implement as set forth in claim 1: the shorter diameter of said shank being disposed generally perpendicular to said striking surface to afford maximum flexibility in the direction of striking motion.

5. A golf club comprising a golf club head and a shaft of generally circular cross section; said head having a hosel providing a socket of substantially circular cross section; said head having means providing a generally laterally projecting striking face; said shaft having an elongated shank portion which is oblong shaped in cross section to increase the stiffness of said shank in the direction of the larger diameter thereof and increase the flexibility of said shank in the direction of the smaller diameter thereof; said longer diameter being slightly in excess of the diameter of said socket providing a force fit in said socket and said shorter diameter being slightly less than the diameter of said socket whereby opposite sides of said shank are spaced from the wall of said socket; and a bonding compound disposed within the spaces between said shank and socket wall for chemically bonding the oblong shaft to the socket wall intermediate the force fitted portions.

6. A golf club as set forth in claim 5: said longer diameter of said shank being disposed at an angle with respect to said striking surface.

7. A golf club as set forth in claim 5: said longer diameter of said shank being disposed generally perpendicular to said striking surface to afford maximum stiffness in the direction of striking motion.

8. A golf club as set forth in claim 5: said shorter diameter of said shank being disposed generally perpendicular to said striking surface to afford maximum flexibility in the direction of striking motion.

9. A striking implement comprising a head having a striking surface; said head having means providing a socket portion adapted to receive the shank end of a handle; a handle having a shank portion disposed in said socket portion; one of said portions being oblong shaped in cross section and the other said portion being substantially circular in cross section; one diameter of said shank portion being slightly in excess of one diameter of said socket portion to provide a force fit of said shank portion within said socket portion; the diameter of said shank portion perpendicular to said one diameter thereof being less than the diameter of said socket in the same direction whereby opposite sides of said shank portion are spaced from the wall of said socket portion; and a bonding compound disposed within the spaces between said shank portion and the wall of said socket portion.

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