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54 **A golf club for use in the game of golf.**

57 A golf club for use in the game of golf, comprising a shank (7) provided at one end with a striking member (1) made of laminated wood elevated in specific gravity by compression. According to the invention, the layers (6) of the laminated wood extend substantially parallel to the striking face (4). The striking member (1) may have one or more cavities therein.

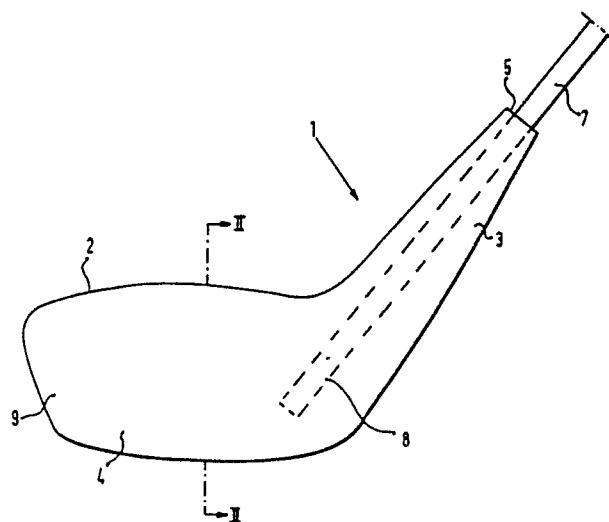


FIG. 1

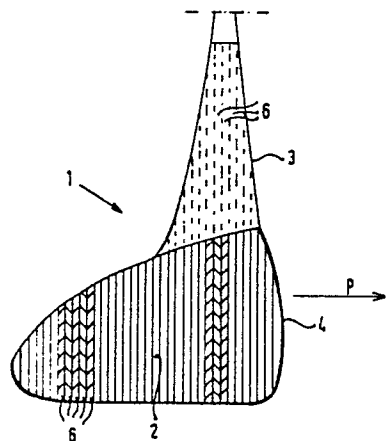


FIG. 2

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A golf club for use in the game of golf.

This invention relates to a golf club for use in the game of golf, comprising a shank provided at one end with a striking member made of laminated wood elevated in specific gravity by compression. The invention further relates to a striking member for a golf club.

The striking member often comprises a head with a striking face and a neck, through which the head is secured to the shank. The neck may be formed integrally with the head, but alternatively can be a separate element, which may be made of a different material. Also, the shank may be directly connected to the head, as is often the case, for example, with a putter.

The invention is applicable to all types of golf clubs, such as driver, brassie, putter, spoon, and all other possible types that may be used in the game of golf.

British patent application 2,026,927 (Travis) discloses an impact delivery member for a golf club, made of laminated wood. In the golf club described in the British application, the shank is formed integrally with the head, the whole being formed of layers of hard wood veneer, pressed together with intervening synthetic resin. In the area of the head, supplemental veneers are inserted to achieve the desired weight and the desired dimensions of the head.

Golf clubs made in the manner described in British patent application 2,026,927 are, for example, the golf clubs marketed by Spalding under the name of Top-Flite. In these known golf clubs, the veneer layers extend transversely to the striking face, that is to say, transversely to the portion of the head which during striking contacts the golf ball. As, during striking, large forces act on the head, and in particular on the striking face, there is the danger that the pressed-together veneer layers, which in fact are struck with the cross-grain end against the golf ball, come apart. To obviate this danger, in known golf club heads the striking face is provided with a plastics face plate.

Another drawback of the prior impact delivery member is that, with the selected orientation of the veneers, an integral neck, if any is provided, cannot be of optimum strength if, as is conventionally the case, the veneer layers are stacked together with the fibre direction alternately rotated through 90°.

It is an object of the present invention to overcome the drawbacks and disadvantages outlined above, and, in general, to provide an effective and durable golf club.

For this purpose, according to the invention, a golf club of the above-described kind is characterized in that the layers of the laminated wood ex-

tend substantially parallel to the striking face.

It is acknowledged that British patent 488,469 discloses an impact delivery member for a golf club, made of compressed wood having a specific gravity of 1 to 1.40. However, this prior golf club head is not made of laminated wood.

Furthermore, British patent application 2,123,701 discloses a golf club head made partially of compressed laminated wood. The wood layers extend approximately vertically and transversely to the striking face, so that, here too, there is the drawback that the head may split. Moreover, this prior head is difficult to make, because it consists of two parts, which must be secured together very firmly.

The invention will be described in more detail hereinafter with reference to the accompanying diagrammatic drawings of some embodiments, given by way of example. In said drawings,

Fig. 1 is a side-elevational view, showing the striking end of a golf club according to the invention;

Fig. 2 is a cross-sectional view, taken on the line II-II of Fig. 1;

Figs. 3-5 show a variant of the golf club illustrated in Figs. 1 and 2;

Figs. 6-8 show another variant of a golf club as illustrated as Figs. 1 and 2; and

Figs. 9-11 show still another variant of the golf club of Figs 1 and 2.

Fig. 1 diagrammatically shows a side-elevational view of the striking end of a golf club, which includes a striking member 1. The striking member has a head 2 and a neck 3. Neck 3 has an end face 5, which is contiguous with a shank 7 of the golf club. As shown in dash lines, the shank is sunk into the neck. The head further has a striking face 4, which serves to hit the ball with. The striking member is made of densified laminated wood material, such as that commercially available under the name of Lignostone.

For the manufacture of such a type of densified laminated wood material, wood veneer layers, such as beech wood veneers are provided on opposite sides with a layer of synthetic resin material, whereafter the layers are pressed together while being exposed to elevated pressure and temperature. This operation is continued until the desired density, i.e., the desired specific gravity, is reached.

Owing to the compression at high temperature, the synthetic resin material permeates the wood layers. Preferably, care is taken that the wood is not impregnated with synthetic resin throughout, but a core layer of non-impregnated wood remains.

In the densified laminated-wood material, the non-impregnated core layers together ensure that the resiliency of wood as a natural product is sufficiently maintained.

According to the invention, the head is made from the laminated wood material in such a manner that the wood layers extend substantially parallel to the striking face. As the layers are generally flat, and the striking face not, it could also be said that the layers extend substantially transversely to the striking direction.

All this is shown in cross-section in Fig. 2. The wood layers are designated by 6 in Fig. 2, and the normal direction of striking is indicated by an arrow P. It will be seen that the striking surface is somewhat convex, while the wood layers are substantially flat, so that in this case, strictly speaking, the layers are not parallel to the striking face. Nevertheless, the wood layers will hereinafter be referred to as being parallel to the striking face. As used herein, and in the accompanying claims, this includes a somewhat different situation, as shown in Fig. 2.

In Fig. 2, the striking member 1 is shown approximately in a position in which the ball, not shown, is hit by the striking face 4. The arrangement of the wood layers relatively to the striking face 4, as shown, could be called a vertical arrangement. Such an arrangement results in an excellent hardness and resilience of the head. This has been confirmed experimentally. These experiments included shooting 3000 golf balls from a ball gun against the striking face of a professionally finished and lacquered striking member according to the present invention, made of beech wood veneer and densified until a specific gravity of 1.38 was reached. The result was that 30% of the golf balls had become damaged, whereas the head, and even the lacquer coat were not damaged at all, i.e. they did not exhibit any dents, cracks, etc. Also, an improvement in resilience was found: statistically, a golfer drove a golf ball 15% farther with the striking member according to this invention than with a known striking member of laminated-wood material in which the layers are directed horizontally at the moment when the ball is hit.

Furthermore, the striking member according to the invention is suitable for use under all weather conditions (tested at temperatures of from -30°C to +80°C).

Owing to the vertical disposition of the layers of the densified laminated-wood material, the relevant wood layers 6 can extend from the head into the neck 3 of the striking member, which considerably improves the strength and hence durability of the striking member.

The vertical arrangement of the layers offers the additional advantage that cavities may be pro-

vided in the head without adversely affecting the strength of the head.

In the past, cavities have been provided in golf club heads for these to be filled with heavier material. This is in principle unnecessary when densified wood material is used. Nevertheless, it may be useful to provide one or more cavities in a golf club head to lower the centre of gravity of the head, which renders it possible to drive a golf ball through a greater distance. Also, by means of one or more cavities in the head, the balance of a golf club can be influenced, so that it makes less difference whether the ball is hit with the heel 8 or the toe 9 of the head.

Figs. 3-11 show some further embodiments of golf club heads according to the present invention, provided with cavities. It is noted that, in these figures, the wood layers are not shown in any detail, but that these extend similarly to those shown in the head illustrated in Fig. 2.

Figs. 3-5 diagrammatically show in side elevational view, front-elevational view, and top plan view, respectively, a golf club head 20 according to this invention, provided with a cavity 21. In this example, cavity 21 is a blind bore, made from the top, which is closed with an accurately fitting wooden plug 32. Plug 32 can be made of normal wood, and, in the example shown, leaves a portion of the cavity clear. The result of all this is that the centre of gravity of the head has been displaced in the direction of the sole 23 of the head. This is also the case, but to a lesser extent, if the plug should fully fill the cavity, so long as the plug is made of lighter material than the head proper. Thus, for example, the plug could be made of a synthetic plastics material or, if formed as a relatively thin cover plate, of metal.

Figs. 6-8 show, in side-elevational view, front-elevational view and top plan view, respectively, a different example of a golf club head 30 provided with a cavity for a golf club according to this invention. In this example, a blind bore 32' has been formed into the head from the sole 31, which bore is closed with a metal plate 33 of a diameter slightly exceeding that of the bore, which plate is countersunk into the sole. In this way, too, the centre of gravity of the head is lowered. Furthermore, the balance of the head can be influenced by varying the place of the bore. In this connection it is noted that the balance can also be influenced by using more than one bore and/or using a cavity of special shape.

Figs. 9-11 diagrammatically show in side-elevational view, front-elevational view and top plan view, respectively, a head 40 for a golf club according to this invention, provided with an approximately triangular cavity 41, made from the sole 42. The triangular cavity has a side surface approxi-

mately parallel to the striking face 4 and is deeper at that location, as shown at 43 in the figures. Furthermore, a metal sole plate 44 has been used which, in this example, covers not only the cavity, but the entire sole of the head.

It is noted that, in view of the foregoing, various modifications will readily occur to those skilled in the art. Thus, in principle, a cavity could also be formed in the head by forming a bore in the side of the head remote from the striking face 4. So long as such a bore is located above the original centre of gravity of the head, this will lower the centre of gravity. The balance can, again, be influenced by varying the place of the bore or other cavity. Furthermore, a cavity of the kind shown in Figs. 3-5 can be used in combination with a metal plate in the sole 23. These and similar modifications are deemed to be within the scope of the present invention.

Claims

1. A golf club for use in the game of golf, comprising a shank provided at one end with a striking member made of laminated wood elevated in specific gravity by compression and having a striking face, characterized in that the layers of the laminated wood extend substantially parallel to the striking face.

2. A golf club as claimed in claim 1, characterized in that the elevated specific gravity ranges from about 0.9 to about 1.40.

3. A golf club as claimed in claim 1 or 2, characterized in that the elevated specific gravity is about 1.38.

4. A golf club as claimed in any of claims 1-3, characterized in that the laminated wood comprises layers of beech wood veneer.

5. A golf club as claimed in any of the preceding claims, characterized by a metal plate at the sole.

6. A golf club as claimed in any of the preceding claims, characterized by at least one closed cavity in the head, spaced from the striking face.

7. A golf club as claimed in claim 6, characterized in that said at least one cavity is a blind bore formed substantially above the original centre of gravity of the striking member.

8. A golf club as claimed in claim 7, characterized by a metal plate at the sole.

9. A golf club as claimed in claim 6, characterized in that said at least one cavity is a cavity formed from the bottom of the striking member, and the axis of which is substantially parallel to the striking face, the cavity being closed at the bottom by a metal plate.

10. A golf club as claimed in claim 9, characterized in that the cavity comprises at least two parts of different depths.

11. A golf club as claimed in claim 9, characterized in that the metal cover forms a sole plate.

12. A golf club as claimed in any of the preceding claims, characterized by at least two cavities.

13. A striking member for a golf club as claimed in any of the preceding claims.

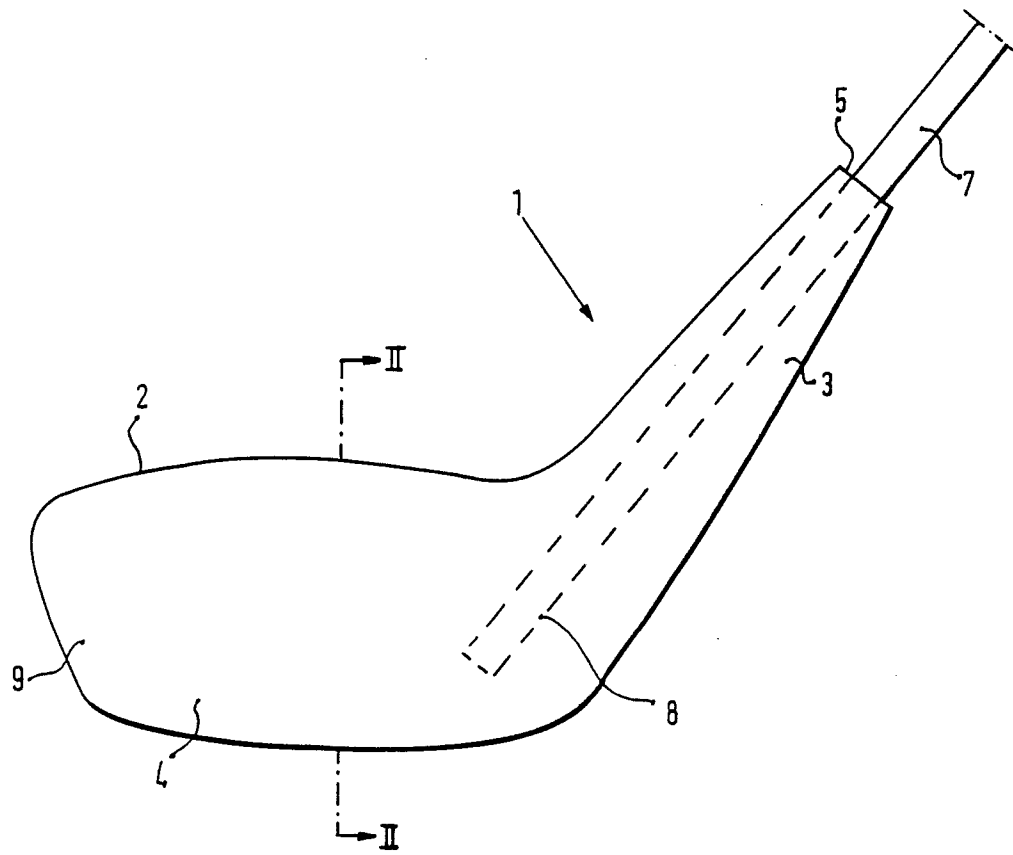


FIG. 1

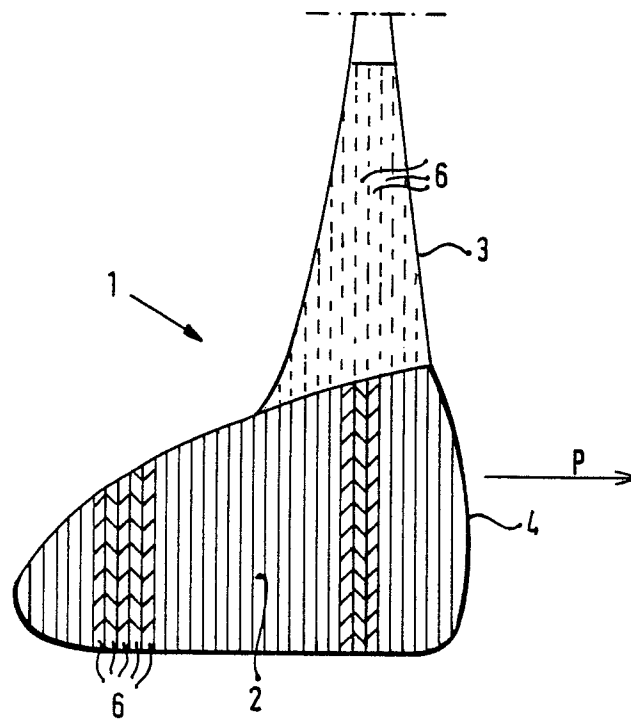
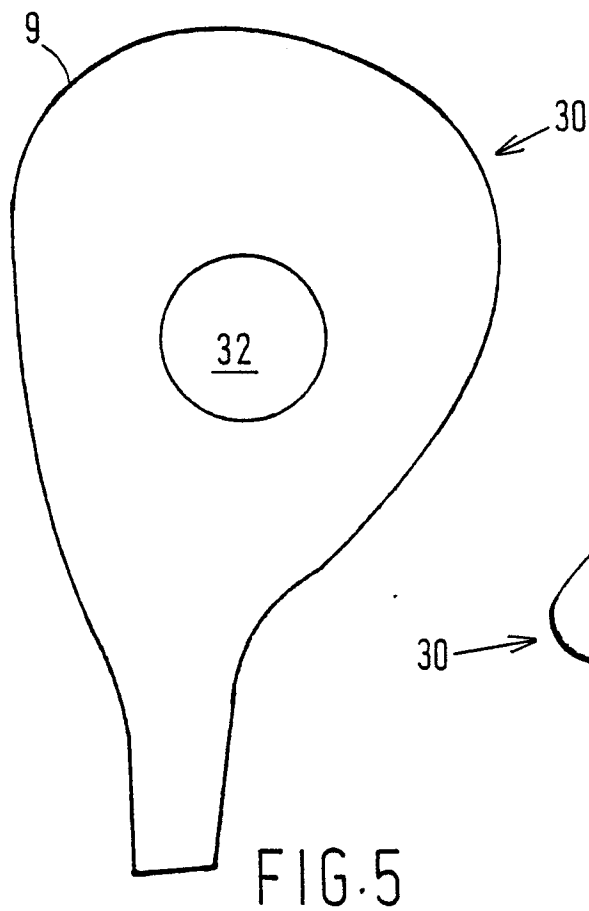
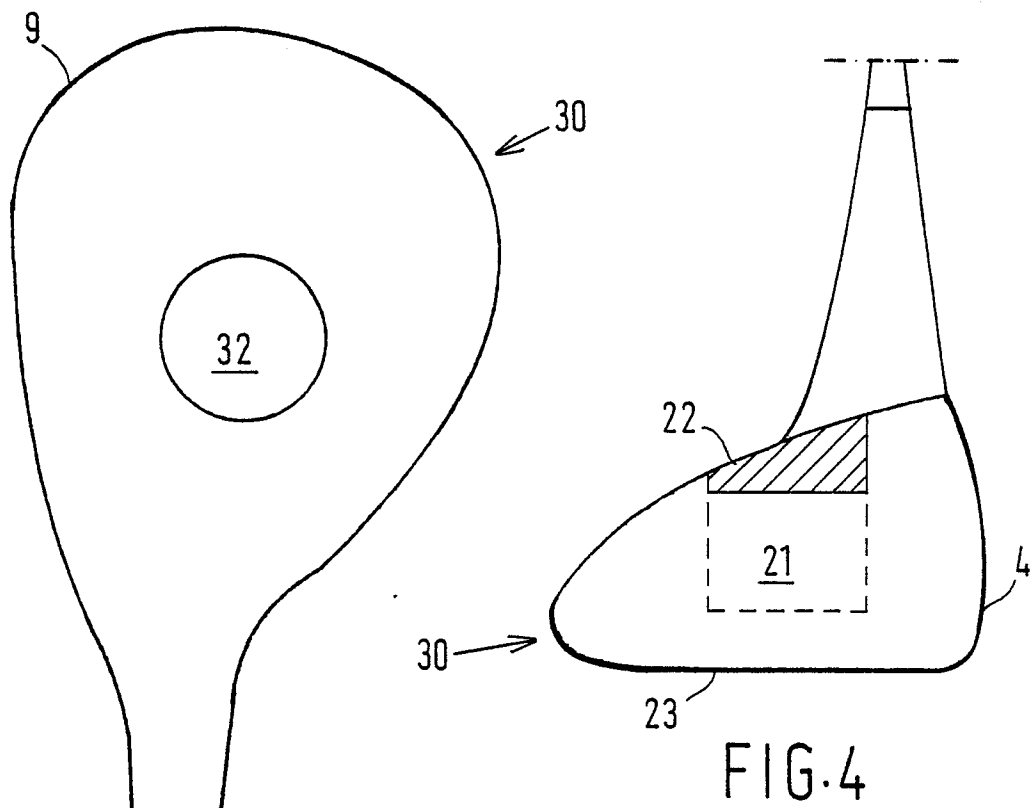
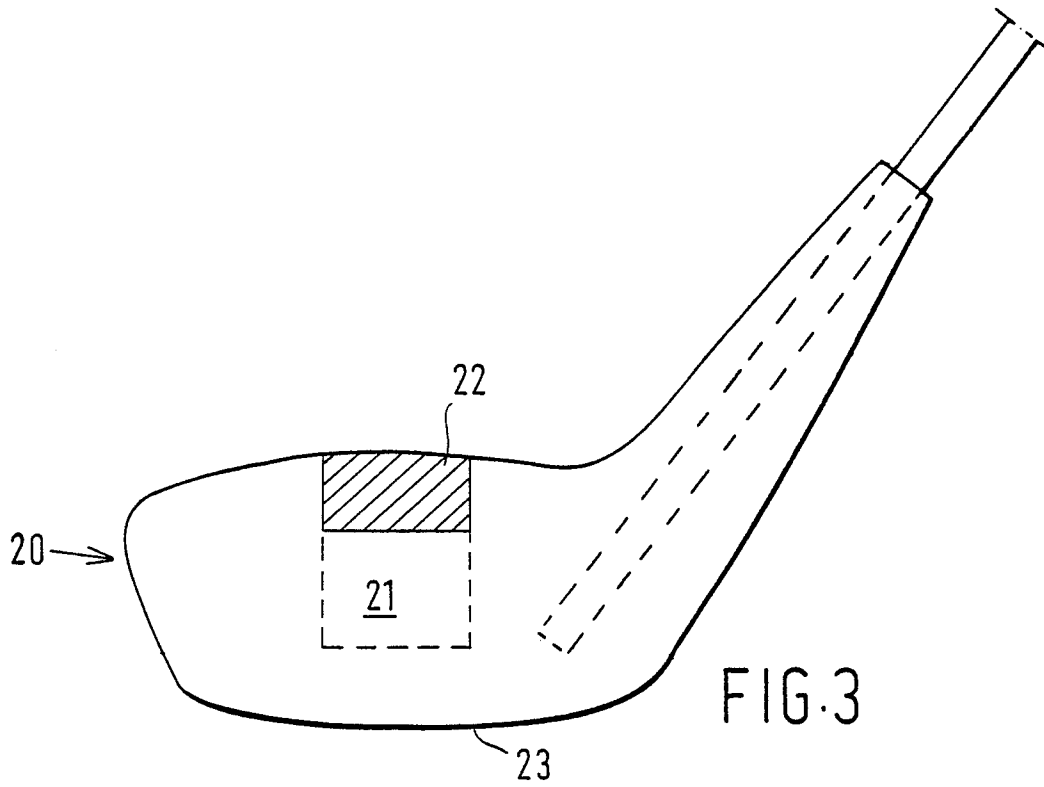
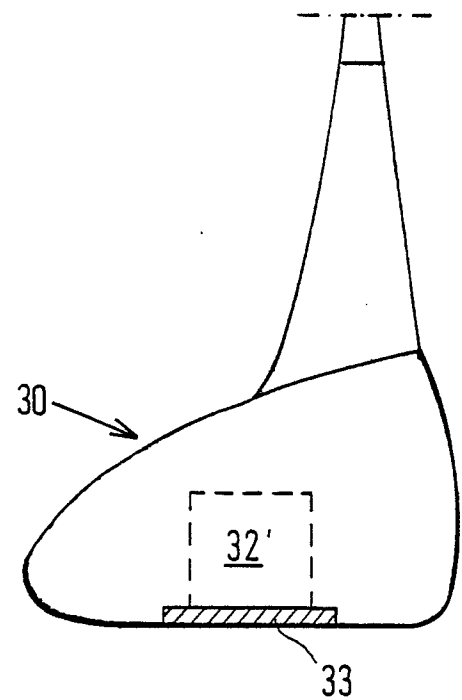
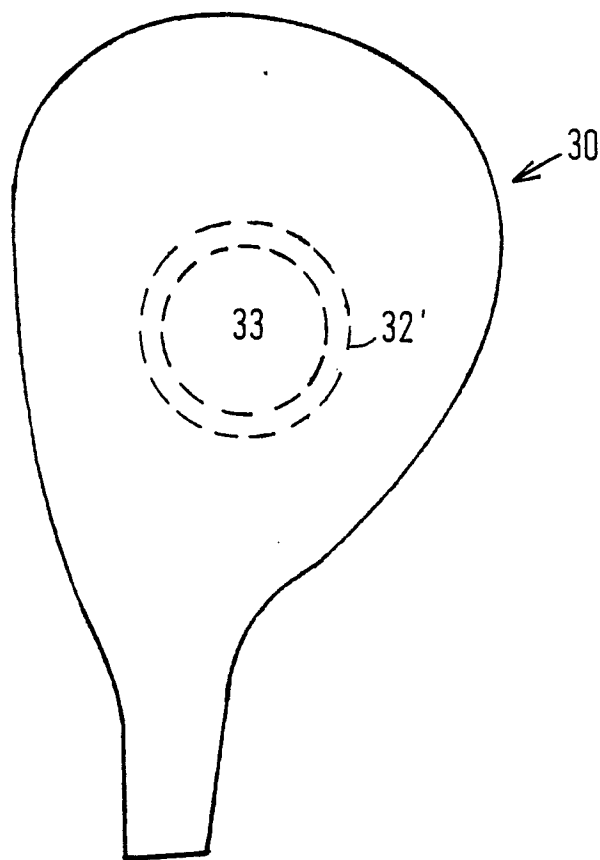
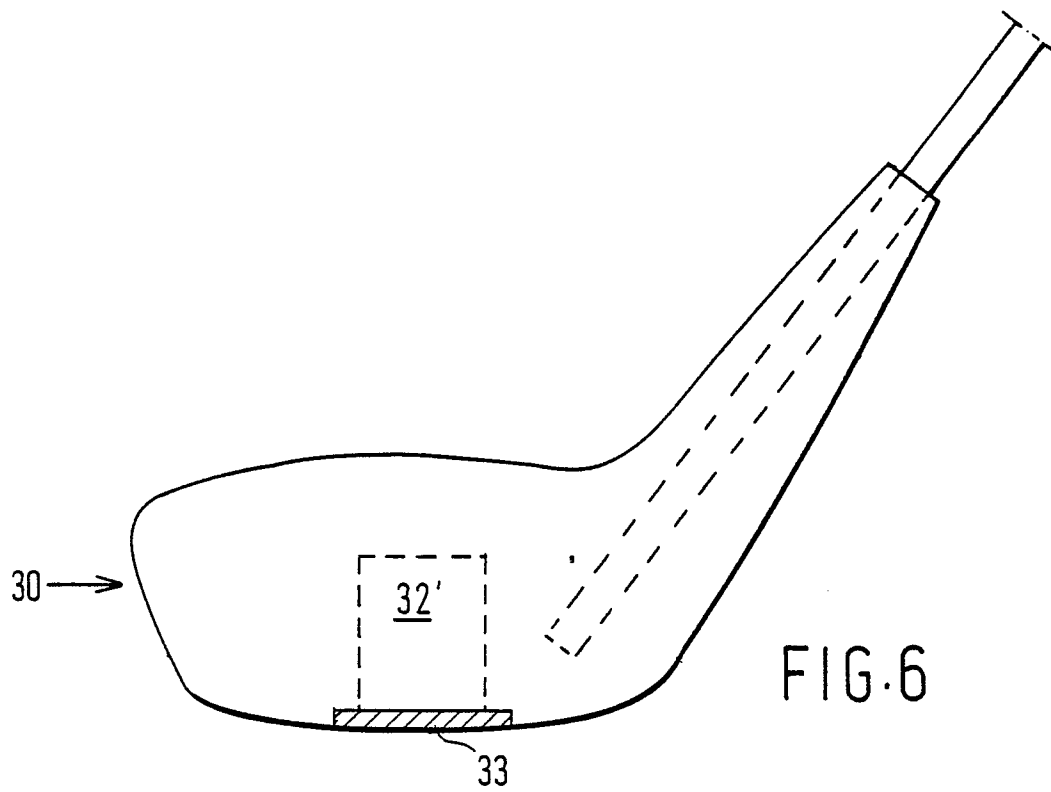
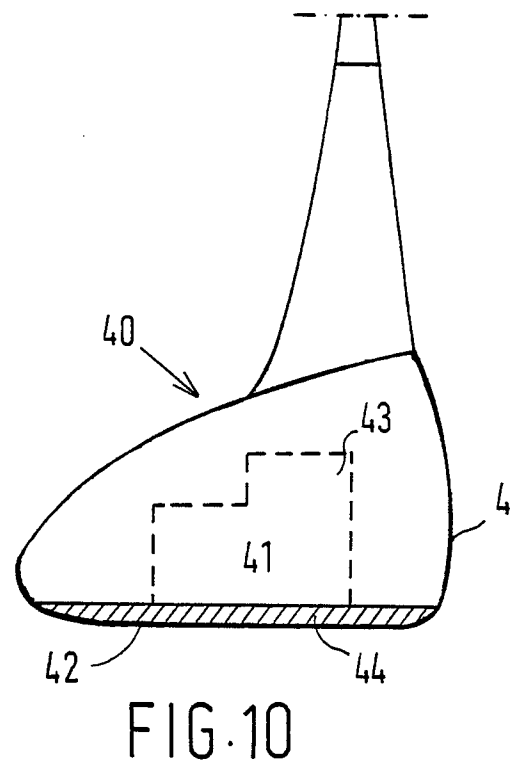
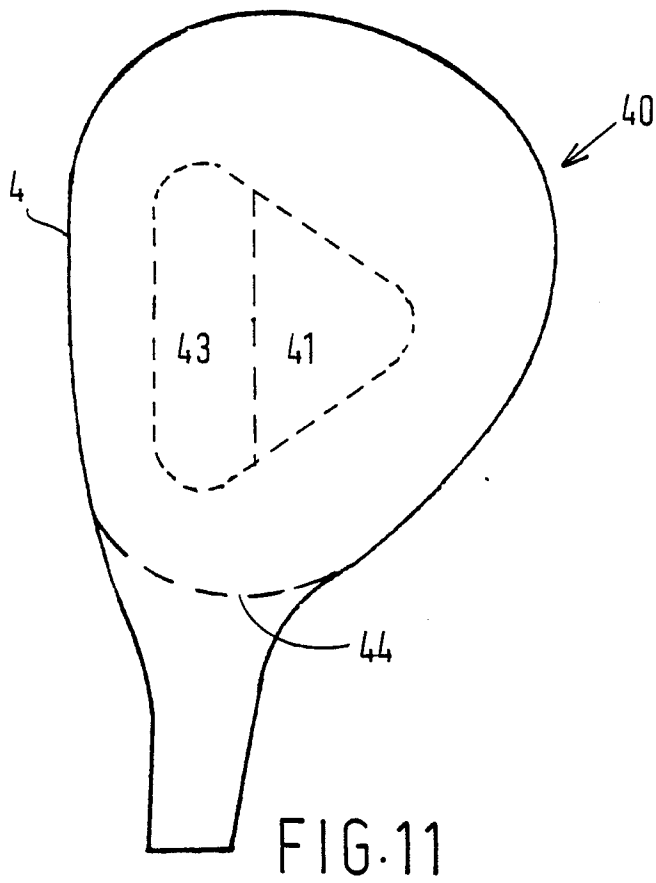
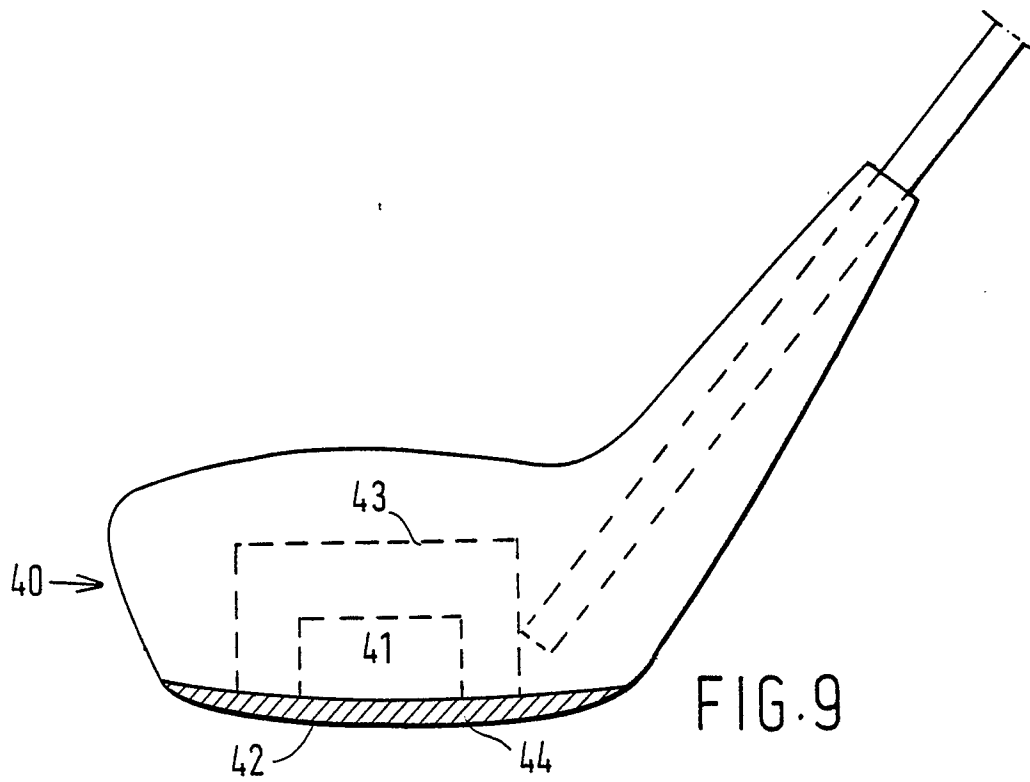


FIG. 2









DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X,D	GB-A-2 026 927 (TRAVIS) * Page 1, lines 75-107; page 2, lines 55-71; claim 6; figures 3,7 *	1-3,13	A 63 B 53/04
Y	---	4-6,9,11	
Y	NL-A- 52 383 (DERLA) * Page 1, lines 26-34 *	4	
Y	---		
Y	LU-A- 78 798 (FN INTERNATIONAL) * Page 3, line 32 - page 4, line 23; figures 3,4 *	5,9,11	
A	---	8,10,12	
Y,D	GB-A- 488 469 (WOUDENBERG) * Page 1, lines 32-44; page 1, lines 58-105 *	6	
A	---	7	
A	US-A-4 063 737 (TOM et al.) * Column 5, lines 7-12; figure 5 *	10,12	
A,D	GB-A-2 123 701 (DUNLOP) * Page 1, line 120 - page 2, line 8; page 2, lines 51-53 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	---		A 63 B
A	GB-A- 766 831 (HARDWOOD) * Page 1, lines 51-78; figures 1-6 *	1	
A	---		
A	GB-A- 972 357 (GARTLAND) * Page 1, line 87 - page 2, line 18; figures 3,4 *	1	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31-05-1988	Examiner SCHOENLEBEN J.E.F.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			