Description

This invention relates generally to increasing the size of metallic, hollow golf club heads (woods), without increasing head weight. More particularly, it concerns the distribution of ball impact waves from the head front wall in such manner as to resist deflection of that front wall and to absorb such shock waves on top and rear walls spaced apart from a metallic sole plate welded to the head.

US-A-4,214,754 discloses a golf driver head made of an enclosed metal body cast so that spaced-apart rib-like members extend internally and bridge the thin face of the driver with the top side. They may be L-shaped or diagonally shaped, for example.

Large, very thin-walled metal golf club heads present the problems of cracking and buckling of metal walls, and excessive front wall deflection, during ball impact. There is need to alter the manner in which shock waves are distributed within metal wood walls as by providing a mechanism which guides, interrupts, spreads, or otherwise alters the shock waves which emanate from the face at impact, but while maintaining optimum wall thicknesses.

It is a major object of the invention to provide structure overcoming the above problems and disadvantages.

The present invention is characterised by a second group of dendrites integral with said top wall and which are spaced apart in said transverse direction, and which extend generally rearwardly to merge rearwardly and downwardly with said curved rear wall.

The dendrites are such as to transfer, spread, dampen and distribute impact produced shock so as to reduce shock wave concentration otherwise imposed on the junction between the front wall and top wall. Shock waves are produced by high speed impact of the club head with the golf ball which leaves the head only a few milliseconds after impact.

Preferably a hosel structure is provided that extends downwardly into the head interior and forming a shaft receiving opening. This strengthens the connection of the front wall to the top and heel walls, and reduces hosel weight so that such weight can be utilized to form the dendrites, as referred to. This enables the provision of a larger overall volume head as compared with a head of the same weight, but lacking the dendritic structure as referred to. As will be seen the use of such structure enables thinning of the hollow head top, toe, back, and heel walls.

At least one additional dendrite may be provided extending from the hosel structure generally rearwardly and transversely, adjacent the underside of the top wall and integral therewith.

Preferably

said second set of narrow, metallic, load distributing dendrites extend generally rearwardly adjacent the underside of the top wall and integral therewith, the second set of dendrites also including a transversely extending central dendrite intersecting the generally rearwardly extending dendrites of the second set;

the dendrites of the second set located further from the front wall than the first set of dendrites;

the rearwardly extending dendrites of the second set spaced apart in the transverse direction, the vertical dimensions of the second set dendrites also being less than about 0.152 cms (0.060 inches), generally.

The central dendrite preferably may be larger in cross-section than those emanating from it. Also, the dendrites of the invention may typically have smooth contours, with generally convex tops and concave sides, along their lengths which conform to the hosel top wall shape, which may be arched. If five of the forward dendrites are provided, then accordingly, four of the rearward dendrites may fan towards the rear wall; and if four of the forward dendrites are provided, then five rearward dendrites may be employed, as will be seen. Thus, the number of forward and rearward dendrites may be about the same, and distributed between the toe and heel. Various numbers of dendrites may be employed.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:-

Fig. 1 is a plan view looking upwardly into a hollow metal wood head;

Fig. 2 is an elevation looking toward the front face of the Fig. 1 head;

Fig. 3 is a fragmentary section taken on lines 3-3 of Fig. 1;

Fig. 4 is an enlarged fragmentary section taken on lines 4-4 of Fig. 1;

Figs. 4a and 4b are fragmentary sections taken on lines 4a-4a and 4b-4b of Fig. 1, respectively;

Fig. 5 is a view like Fig. 1 showing a modified head construction;

Fig. 6 is an elevation looking toward the front face of the Fig. 5 head;

Fig. 7 is a fragmentary section taken on lines 7-7 of Fig. 5; and

Fig. 8 is an enlarged section taken on lines 8-8 of Fig. 5.

DETAILED DESCRIPTION

In the drawings, the golf club 10 comprises a head in the form of a thin metallic body 11 typically cast, and having a metallic sole plate 12. These

elements may consist of steel, stainless steel, or other material, and formed by processes other than investment casting. The hollow body includes a front wall or face plate 13 having a front surface 13a adapted to strike a golf ball, as well as top wall 14, rear wall 15, and toe and heel walls 16 and 17. A hosel 118 extends downwardly into the hollow interior 19 of the heel portion of the head, and is adapted to receive a shaft 120. Thus, the weight of the hosel is concentrated more directly behind, or close to, the rear side 13b of front wall 13, near the heel, to contribute to the ball striking mass of the front wall. Also, the hosel cylindrical wall 118a reinforces the junction of the front wall, bottom wall and heel wall 17, at locus 17a. See also hosel webbing or filleting at 118b, and hosel bore 118c receiving shaft 120. Shaft lower end 120a is shown flush with the bottom surface 118d of the hosel.

In accordance with an important aspect of the invention, a first group or set of narrow, metallic, dendrites is provided to extend from the front wall 13 generally rearwardly adjacent the underside 14a of the top or upper wall 14, and integral therewith. See, in the example, dendrites 18-22 spaced apart in a transverse direction indicated by arrows 20, the dendrites having forward ends 18a-22a merging into the front wall at its junctions with the top wall. Note the possible widening of the dendrites as they merge with front wall 13. This serves the purpose of distributing impact produced shock waves from the front wall to the top wall, together with junction 23, especially when a ball is hit high on the front wall or face. This in turn serves to prevent cracking and buckling of the thin metal wall 14. Note that the dendrites are spaced apart, i.e. branch at intervals of about 1.27 to 1.905 cms (1/2 to 3/4 inch); and that the rearward ends of the dendrites at 18b-22b are transversely spaced apart. The vertical dimension "d" of the dendrites lies within the range 0.127 to 0.178 cms (0.050 to 0.070 inch), and the dendrites are generally convex at 25 toward the interior of the head, along their lengths, and have concave opposite sides at 26 and 27, (see Fig. 4). In this regard, the thickness of the front wall is typically substantially greater than the thickness of the other walls, to strengthen it and prevent cracking under high impact loads. Typical wall approximate thicknesses are: front wall 0.305 cms (0.120 inches), sole plate 0.127 cms (0.050 inches), and top wall 0.762 cms (0.030 inches). These dimensions are less than standard thicknesses, allowing for a larger head and a larger moment of inertia for a given total weight. This in turn allows a greater "forgiveness effect" as regards off-center ball strikes.

Also shown is at least one additional dendrite, as at 30, extending from the hosel wall or structure generally rearwardly and transversely, adjacent the upwardly arching underside 14a of the top wall, and integral therewith. It is sized, in cross section, the same as dendrites 18-22, all of such dendrites having about the same cross sectional dimensions. Dendrite 30 distributes impact force or shock waves from the hosel rearwardly and transversely, along its length, and to the upper wall 14. Thus, shock waves are well distributed in their transfer to upper wall 14, as by the dendrites, to minimize risk of head cracking and buckling, especially along the angled junction 23.

Further, the conformation of the dendrites (see Fig. 4a) along their lengths, to head interior wall shape, contributes to shock wave distribution across the upper wall 14. Note that wall 14 may be upwardly crowned, i.e. upwardly shallowly convex.

Another aspect of the invention includes the provision of a second set or group of narrow, metallic, dendrites extending generally rearwardly adjacent the underside of the top wall and integral therewith, the second set also including a transversely extending dendrite intersecting the generally rearwardly extending dendrites of the second set. The dendrites of the second set are located further from the head front wall than said first set of dendrites, the rearwardly extending dendrites of the second set being spaced apart, or branching, in transverse direction, the vertical dimensions of the second set dendrites also being between 0.127 and 0.254 cms (0.050 and 0.100 inches). See for example the four dendrites 38-41 that have fan configuration, radiating rearwardly from different points along the single dendrite 42 spaced rearwardly from dendrites 18-21. Dendrites 38-41 extend generally rearward to merge with the generally curved rear wall 15 of the head, to direct or transfer such rearward loading to that wall as the dendrites pick up loading from top wall 14. Dendrites 38-42 have generally the same configuration and dimensions as dendrites 18-22 and 30. Accordingly, they serve the same shock wave transfer distributing functions to minimize cracking and buckling of the thinned top wall at its junction at 46 with the rear wall. Note also that dendrites 38-42 conform to top wall shape along their lengths. See Fig. 4b. In addition, the rearward ends of the dendrites 38-41 turn downwardly adjacent the inner side of wall 15 and then downwardly and forwardly, as seen at 39a in Fig. 4b, for example.

In Fig. 5, the head itself is the same as in Figs. 1-4, and the same identifying members are used. Forward dendrites 48-51 correspond to dendrites 18-22, but their transverse spacing "s" is greater, being about 1.905 to 2.54 cms (3/4 inch to 1 inch). See spacings s_1 and s_2. Dendrites 48-51 have the same cross-sectional dimensions, and a generally convex-concave surface configuration, as do dendrites 18-22. Dendrite 53 corresponds to dendrite 30, in Fig. 1. All dendrites may for example have

maximum height dimensions (below the top wall) of about .060 inches.

The five rearward dendrites 68-72 extend or fan rearwardly from a transverse dendrite 73, that corresponds to dendrite 42 in Fig. 1, and they intersect the rearward wall 15 of the head, at intersections along the junction line 76.

Dendrites 48-51 transfer loading from the front wall 13 to the top wall 14; and dendrites 68-72 transfer shock waves from the top wall to the rear wall 15. Dendrite 73 assists this function. Dendrite 53 transfers shock waves from the hosel to the top wall 14.

The number and position of dendrites may vary according to the various head sizes and shapes.

Finally the fact that the dendrites enable head wall thinning allows use of heavier density metallic compositions in the head walls, without reducing the head size below the sizes of standard hollow metal heads made of steel. For example, compositions such as berillium copper, tungsten, surgical steel alloys, and cobalt alloys can be used. In the past such heavier metal compositions could not be used without reducing head size.

Claims

1. A metal wood golf club head having an elongated, forwardly facing front wall (13) to strike a golf ball, and a hollow body (11) rearwardly of the front wall (13) that includes a curved rear wall (15) rearwardly of the front wall (13) elongated in a first transverse direction toward a connection to a club shaft (20), the body (11) having a thin, metallic top wall (14) merging with upper transverse extent of the front wall (13), and including

   a) a first group of narrow, metallic, shock wave distributing dendrites (18-22) extending from said front wall (13) generally rearwardly adjacent the underside of the body top wall (14) and integral therewith, and which are spaced apart in said transverse direction, by amounts greater than their widths, the maximum height dimensions of the dendrites (18-22) below the underside of the top wall (14) being between 0.127 cms and 0.254 cms (0.050 inches and 0.100 inches) and the dendrites (18-22) being generally downwardly convex in cross-section,

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   b) a second group of dendrites (38-41) integral with said top wall (14) and which are spaced apart in said transverse direction, and which extend generally rearwardly to merge rearwardly and downwardly with said curved rear wall (15).

2. A golf club head as claimed in claim 1 wherein said connection is defined by hosel structure (118) extending downwardly within the body hollow, and forming a shaft receiving opening.

3. A golf club head as claimed in claim 2 including at least one additional reinforcement dendrite (30) extending from said hosel structure (118) generally rearwardly and transversely, adjacent the underside of the top wall (14) and integral therewith.

4. A golf club head as claimed in any preceding claim, wherein the dendrites, body and front wall (13) all comprise part of a single metallic casting.

5. A golf club head as claimed in any preceding claim, wherein the front wall (13) has thickness substantially greater than the thickness of the top wall (14), and said dendrites of the first group (18-22) merge with the inner side of said front wall (13).

6. A golf club head as claimed in claim 1 in which

   c) said second group of narrow, metallic, shock wave distributing dendrites (38-41) extend generally rearwardly adjacent the underside of the top wall (14) and integral therewith, said second group of dendrites (38-41) also including a transversely extending dendrite (42) intersecting said generally rearwardly extending dendrites of said second group (38-41);

   d) the dendrites of said second group (38-41) are located further from said front wall (13) than said first group of dendrites (18-22); and

   e) the rearwardly extending dendrites of said second group (38-41) are spaced apart in said transverse direction, the maximum height dimensions of said second group of dendrites (38-41) being between 0.127 and 0.254 cms (0.050 and 0.100 inches.

7. A golf club head as claimed in claim 6 wherein the head has a sole plate (12), a rear wall (15) and side walls (16,17) extending between the top wall (14) and sole plate (12), the first group of dendrites (18-22) being spaced from said side walls (16,17) and rear wall (15).

8. A golf club head as claimed in claim 6, wherein the head has a sole plate (12) and side walls (16,17) extending between the top

maximum height dimensions (below the top wall) of about .060 inches.

The five rearward dendrites 68-72 extend or fan rearwardly from a transverse dendrite 73, that corresponds to dendrite 42 in Fig. 1, and they intersect the rearward wall 15 of the head, at intersections along the junction line 76.

Dendrites 48-51 transfer loading from the front wall 13 to the top wall 14; and dendrites 68-72 transfer shock waves from the top wall to the rear wall 15. Dendrite 73 assists this function. Dendrite 53 transfers shock waves from the hosel to the top wall 14.

The number and position of dendrites may vary according to the various head sizes and shapes.

Finally the fact that the dendrites enable head wall thinning allows use of heavier density metallic compositions in the head walls, without reducing the head size below the sizes of standard hollow metal heads made of steel. For example, compositions such as berillium copper, tungsten, surgical steel alloys, and cobalt alloys can be used. In the past such heavier metal compositions could not be used without reducing head size.

Claims

1. A metal wood golf club head having an elongated, forwardly facing front wall (13) to strike a golf ball, and a hollow body (11) rearwardly of the front wall (13) that includes a curved rear wall (15) rearwardly of the front wall (13) elongated in a first transverse direction toward a connection to a club shaft (20), the body (11) having a thin, metallic top wall (14) merging with upper transverse extent of the front wall (13), and including

   a) a first group of narrow, metallic, shock wave distributing dendrites (18-22) extending from said front wall (13) generally rearwardly adjacent the underside of the body top wall (14) and integral therewith, and which are spaced apart in said transverse direction, by amounts greater than their widths, the maximum height dimensions of the dendrites (18-22) below the underside of the top wall (14) being between 0.127 cms and 0.254 cms (0.050 inches and 0.100 inches) and the dendrites (18-22) being generally downwardly convex in cross-section,

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   b) a second group of dendrites (38-41) integral with said top wall (14) and which are spaced apart in said transverse direction, and which extend generally rearwardly to merge rearwardly and downwardly with said curved rear wall (15).

2. A golf club head as claimed in claim 1 wherein said connection is defined by hosel structure (118) extending downwardly within the body hollow, and forming a shaft receiving opening.

3. A golf club head as claimed in claim 2 including at least one additional reinforcement dendrite (30) extending from said hosel structure (118) generally rearwardly and transversely, adjacent the underside of the top wall (14) and integral therewith.

4. A golf club head as claimed in any preceding claim, wherein the dendrites, body and front wall (13) all comprise part of a single metallic casting.

5. A golf club head as claimed in any preceding claim, wherein the front wall (13) has thickness substantially greater than the thickness of the top wall (14), and said dendrites of the first group (18-22) merge with the inner side of said front wall (13).

6. A golf club head as claimed in claim 1 in which

   c) said second group of narrow, metallic, shock wave distributing dendrites (38-41) extend generally rearwardly adjacent the underside of the top wall (14) and integral therewith, said second group of dendrites (38-41) also including a transversely extending dendrite (42) intersecting said generally rearwardly extending dendrites of said second group (38-41);

   d) the dendrites of said second group (38-41) are located further from said front wall (13) than said first group of dendrites (18-22); and

   e) the rearwardly extending dendrites of said second group (38-41) are spaced apart in said transverse direction, the maximum height dimensions of said second group of dendrites (38-41) being between 0.127 and 0.254 cms (0.050 and 0.100 inches.

7. A golf club head as claimed in claim 6 wherein the head has a sole plate (12), a rear wall (15) and side walls (16,17) extending between the top wall (14) and sole plate (12), the first group of dendrites (18-22) being spaced from said side walls (16,17) and rear wall (15).

8. A golf club head as claimed in claim 6, wherein the head has a sole plate (12) and side walls (16,17) extending between the top

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wall (14) and sole plate (12), certain rearwardly extending dendrites of the second group (38-41) extending downwardly amd fprward;u at said rear wall (15).

9. A golf club head as claimed in any preceding claim, wherein said dendrites of the first and/or second group are upwardly arched along their rearwardly extending lengths.

10. A golf club head as claimed in any preceding claim, wherein said dendrites of the first and/or second group have cross-sectional configuration that includes a convex dome and concave opposite sides.

11. A golf club head as claimed in any preceding claim, wherein there are four or five of said first group dendrites (18-22) that are substantially equally spaced apart across the width of the head between the toe and heel.

12. A golf club head as claimed in any preceding claim, wherein the top wall (14) has thickness of about 0.762 cms (0.030 inches), between said dendrites.

13. A golf club head as claimed in any preceding claim, in which the body wall means is thinned and the head has larger overall volume as compared with a head of the same weight but lacking said dendrites.

14. A golf club head as claimed in any preceding claim, in which the body wall means consists essentially of metal having greater density than steel.

15. A golf club head as claimed in claim 14 wherein the body wall means consists essentially of berillium copper alloy, or tungsten alloy, or cobalt alloy or surgical steel alloy.

16. A golf club head as claimed in any preceding claim wherein said connection is defined by a hosel (118) which is one piece with the body and dendrites.

Patentansprüche

1. Ein metallischer "Holz"-Golfschlägerkopf mit einer langgestreckten nach vorn gerichteten Vorderwand (13) zum Schlagen eines Golfballs und einem rückwärtig von der Vorderwand (13) gelegenen hohlen Körper (11), der eine gebogene Rückwand (15) umfaßt, die rückwärtig von der Vorderwand (13) gelegen ist und sich in einer ersten transversalen Richtung auf eine Verbindungsstelle mit einem Schlägerschaft (20) zu ausdehnt, wobei der Körper (11) eine dünne metallische obere Wand (14) hat, die mit dem oberen transversalen Bereich der Vorderwand (13) zusammenläuft, und umfassend:

a) eine erste Gruppe von schmalen, metallischen, Stoßwellen verteilenden Verzweigungen (Dendriten) (18-22), die sich von der Vorderwand (13) allgemein nach hinten angrenzend an die Unterseite der oberen Wand (14) des Körpers erstrecken und einstückig mit ihr sind, und die in dieser transversalen Richtung um Beträge voneinander beabstandet sind, die größer als ihre Breiten sind, wobei die maximalen Höhenabmessungen der Verzweigungen (18-22) unter der Unterseite der oberen Wand (14) zwischen 0,127 cm und 0,254 cm (0,050 Zoll und 0,100 Zoll) liegen und die Verzweigungen (18-22) allgemein nach unten konvex im Querschnitt sind,

gekennzeichnet durch

b) eine zweite Gruppe von Verzweigungen (Dendriten) (38-41), die einstückig mit der oberen Wand (14) sind und die in der transversalen Richtung voneinander beabstandet sind und die sich allgemein nach hinten erstrecken, um hinten und nach unten mit der gebogenen Rückwand (15) zusammenzulaufen.

2. Ein Golfschlägerkopf nach Anspruch 1, bei dem die besagte Verbindungsstelle durch eine Hoselstruktur (118) definiert ist, die sich innerhalb des Körperhohlraums nach unten erstreckt und eine den Schaft aufnehmende Öffnung bildet.

3. Ein Golfschlägerkopf nach Anspruch 2, der wenigstens eine zusätzliche Verstärkungsverzweigung (Dendrit) (30) enthält, die sich von der Hoselstruktur (118) allgemein nach hinten und transversal, angrenzend an die Unterseite der oberen Wand (14) erstreckt und einstückig mit dieser ist.

4. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Verzweigungen, der Körper und die Vorderwand (13) alle einen Teil eines einzigen metallischen Gußteils umfassen.

5. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Vorderwand (13) eine Dicke aufweist, die wesentlich größer als die Dicke der oberen Wand (14) ist, und die Verzweigungen der ersten Gruppe (18-22) mit der inneren Seite der Vorderwand (13)

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zusammenlaufen.

6. Ein Golfschlägerkopf nach Anspruch 1, bei dem

c) die zweite Gruppe aus schmalen, metallischen, Stoßwellen verteilenden Verzweigungen (38-41) sich allgemein nach hinten angrenzend an die Unterseite der oberen Wand (14) erstreckt und einstückig mit dieser ist, die zweite Gruppe der Verzweigungen (38-41)auch eine sich transversal erstreckende Verzweigung (42) umfaßt, die die allgemein sich nach hinten erstreckenden Verzweigungen der zweiten Gruppe (38-41) schneidet;

d) die Verzweigungen der zweiten Gruppe (38-41) weiter entfernt von der Vorderwand (13) als die erste Gruppe der Verzweigungen (18-22) gelegen ist

und

e) die sich nach hinten erstreckenden Verzweigungen der zweiten Gruppe (38-41) in dieser transversalen Richtung voneinander beabstandet sind, wobei die maximalen Höhenabmessungen der zweiten Gruppe von Verzweigungen (38-41) zwischen 0,127 und 0,254 cm (0,050 und 0,100 Zoll) liegen.

7. Ein Golfschlägerkopf nach Anspruch 6, bei dem der Kopf eine Sohlenplatte (12), eine Rückwand (15) und Seitenwände (16,17) hat, die sich zwischen der oberen Wand (14) und der Sohlenplatte (12) erstrecken, die erste Gruppe von Verzweigungen (18-22) von den Seitenwänden (16,17) und der Rückwand (15) beabstandet ist.

8. Ein Golfschlägerkopf nach Anspruch 6, bei dem der Kopf eine Sohlenplatte (12) und Seitenwände (16,17) aufweist, die sich zwischen der oberen Wand (14) und der Sohlenplatte (12) erstrecken, wobei sich bestimmte nach hinten erstreckende Verzweigungen der zweiten Gruppe (38-41) nach unten und vorwärts an der Rückwand (15) erstrecken.

9. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Verzweigungen der ersten und/oder zweiten Gruppe entlang ihrer sich nach hinten erstreckenden Längen nach oben gebogen sind.

10. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Verzweigungen der ersten und/oder zweiten Gruppe eine Querschnittskonfiguration haben, die eine konvexe Wölbung und konkave gegenüberliegende Seiten einschließt.

11. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem es vier oder fünf der besagten der ersten Gruppe von Verzweigungen (18-22) gibt, die im wesentlichen über die Breite des Kopfes zwischen der Spitze und der Ferse gleich beabstandet sind.

12. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die obere Wand (14) eine Dicke von etwa 0,762 cm (0,030 Zoll) zwischen den Verzweigungen aufweist.

13. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Körperwandeinrichtung dünner gemacht worden ist und der Kopf ein größeres Gesamtvolumen im Vergleich zu einem Kopf mit dem gleichen Gewicht, dem jedoch die Verzweigungen fehlen, aufweist.

14. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Körperwandeinrichtungen im wesentlichen aus Metall bestehen, das eine größere Dichte als Stahl aufweist.

15. Ein Golfschlägerkopf nach Anspruch 14, bei dem die Körperwandeinrichtungen im wesentlichen aus Beryllium-Kupfer-Legierung oder Wolfram-Legierung oder Kobalt-Legierung oder Stahl-Legierung für chirurgische Zwecke bestehen.

16. Ein Golfschlägerkopf nach einem der vorhergehenden Ansprüche, bei dem die Verbindungsstelle durch einen Hosel (118) bestimmt ist, der mit dem Körper und den Verzweigungen einstückig ist.

Revendications

1. Tête de club de golf métallique formant bois ayant une paroi avant (13) allongée dirigée vers l'avant pour frapper une balle de golf, et un corps creux (11) situé vers l'arrière de la paroi avant (13) qui comporte une paroi arrière (15) incurvée située vers l'arrière de la paroi avant (13) allongée dans une première direction transversale en direction d'une connexion à un manche (20) de club, le corps (11) ayant une paroi supérieure (14) mince, métallique, fusionnant avec l'étendue transversale supérieure de la paroi avant (13), et comportant:

a) un premier groupe de ramifications (18 à 22) répartissant l'onde de choc, étroites, métalliques, s'étendant depuis ladite paroi avant (13) en direction de manière générale

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de l'arrière en étant adjacentes au côté inférieur de la paroi supérieure (14) du corps et venues de matière avec celle-ci, et qui sont écartées dans ladite direction transversale, de valeurs plus grandes que leurs largeurs, les dimensions maximales en hauteur des ramifications (18 à 22) situées sous le côté inférieur de la paroi inférieure (14) étant comprises entre 0,127 cm et 0,254 cm (0,050 et 0,100 pouce) et les ramifications (18 à 22) étant de manière générale convexes vers le bas en coupe transversale,

caractérisée en ce qu'elle comporte

b) un second groupe de ramifications (38 à 41) venues de matière avec ladite paroi supérieure (14) et qui sont écartées dans ladite direction transversale, et qui s'étendent de manière générale en direction de l'arrière pour fusionner en direction de l'arrière et vers le bas avec ladite paroi arrière incurvée (15).

2. Tête de club de golf selon la revendication 1, dans laquelle ladite connexion est définie par une structure formant tuyau (118) s'étendant vers le bas à l'intérieur du corps creux et formant une ouverture réceptrice de manche.

3. Tête de club de golf selon la revendication 2, comportant au moins une ramification (30) supplémentaire de renforcement s'étendant depuis ladite structure de tuyau (118) de manière générale vers l'arrière et transversalement, en étant adjacente au côté inférieur de la paroi supérieure (14) et venue de matière avec celle-ci.

4. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle, les ramifications, le corps et la paroi avant (13) constituent tous une partie d'un moulage métallique unique.

5. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle la paroi avant (13) a une épaisseur nettement plus grande que l'épaisseur de la paroi supérieure (14), et lesdites ramifications du premier groupe (18 à 22) fusionnent avec le côté intérieur de ladite paroi avant (13).

6. Tête de club de golf selon la revendication 1, dans laquelle

c) ledit second groupe de ramifications (38 à 41) répartissant l'onde de choc, étroites, métalliques, s'étend de manière générale en direction de l'arrière en étant adjacent au côté inférieur de la paroi supérieure (14) et venu de matière avec celle-ci, le second groupe de ramifications comportant aussi une ramification (42) s'étendant transversalement recoupant les ramifications s'étendant de manière générale vers l'arrière du second groupe (38 à 41);

d) les ramifications du second groupe (38 à 41) sont situées plus loin de la paroi avant (13) que le premier groupe de ramifications (18 à 22);

e) les ramifications (38 à 41) du second groupe s'étendant vers l'arrière sont écartées dans la direction transversale, les dimensions maximales en hauteur des ramifications (38 à 41) du second groupe étant comprises entre 0,127 et 0,254 cm (0,050 et 0,100 pouces).

7. Tête de club de golf selon la revendication 6, dans laquelle la tête comporte une plaque de sol (12), une paroi arrière (15) et des parois latérales (15, 17) s'étendant entre la paroi supérieure (14) et la plaque de sol (12), le premier groupe de ramifications (18 à 22) étant écarté desdites parois latérales (16, 17) et de ladite paroi arrière (15).

8. Tête de club de golf selon la revendication 6, dans laquelle la tête comporte une plaque de sol (12) et des parois latérales (16, 17) s'étendant entre la paroi supérieure (14) et la plaque de sol (12), certaines ramifications (38 à 41) s'étendant vers l'arrière du second groupe s'étendant vers le bas et vers l'avant au niveau de ladite paroi arrière (15).

9. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle lesdites ramifications du premier et/ou du second groupe sont en forme d'arche vers le haut le long de leurs longueurs s'étendant vers l'arrière.

10. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle lesdites ramifications du premier et/ou du second groupe ont une configuration en coupe qui comporte un dôme convexe et des côtés opposés concaves.

11. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle il existe quatre ou cinq desdites ramifications du premier groupe (18 à 22) qui sont écartées de manière pratiquement égale à travers la largeur de la tête entre le bout avant et le talon.

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12. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle la paroi supérieure (14) a une épaisseur d'environ 0,762 cm (0,30 pouce) entre lesdites ramifications.

13. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle les moyens formant parois de corps sont amincis et la tête a un volume global plus important par comparaison avec une tête du même poids ne comportant pas lesdites ramifications.

14. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle les moyens formant parois de corps sont constitués essentiellement de métal ayant une densité plus grande que l'acier.

15. Tête de club de golf selon la revendication 14, dans laquelle les moyens formant parois de corps sont constitués essentiellement d'alliage de cuivre au béryllium ou d'alliage de tungstène, ou d'alliage de cobalt ou d'alliage d'acier chirurgical.

16. Tête de club de golf selon l'une quelconque des revendications précédentes, dans laquelle ladite connexion est définie par un tuyau (118) qui est en une seule pièce avec le corps et les ramifications.