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(54) **Padel racket**

(57) The invention relates to a racket (100, 200) for padel with two opposed striking surfaces, including a first racket half (203) having a first handle portion (205) and a first main portion (211), wherein said first main portion (211) comprises a first striking surface portion (201), a second racket half (204) having a second handle portion (206) and a second main portion, wherein said second main portion (212) comprises a second striking surface portion (202), and at least one core component (500, 611) disposed between said racket halves (203, 204), wherein said core component (500, 611) has two opposed surfaces following at least in parts the shape of the two opposed striking surfaces of the racket and a lateral surface (502, 609), characterized in that, the core component (500, 611) is compressible, and said core component (500, 611) is wrapped up in a fabric component (605), wherein said fabric component (605) comprises fibres and a cured resin and covers at least in parts the lateral surface (609) of the core component (500, 611), and said core component (500, 611) is mounted with a pre-load between the racket halves (203, 204), and said core component (500, 611) is configured to press said fabric component (605) against the inner lateral surfaces (612) of the first and the second racket half (203, 204), and wherein the fabric component (605) bonds the first and second racket half (203, 204) together.

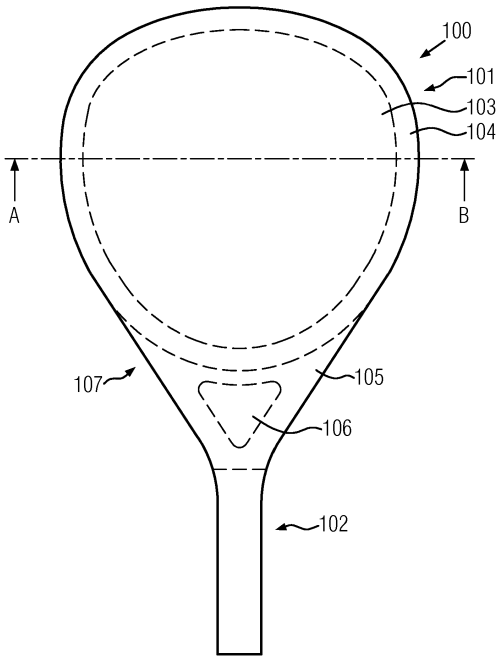

FIG. 1

EP 2 926 872 A1

Description

Field of Invention

[0001] The invention relates to rackets or bats for paddle games and the like, in particular for rackets used in padel tennis sports, a sport also commonly referred to simply as padel or paddle.

Background of Invention

[0002] Current padel rackets, as described for example in ES 2 255 419 A 1, comprise a frame enclosing a striking plane, wherein both surface sides of the striking plane can be used to hit a ball.

[0003] Said frame usually consists of two racket frame parts molded together with the striking plane in a racket mold press, and wherein said frame parts comprise tube elements following the contour of the racket frame, for example a first rigid tube element containing a second flexible inflatable tube element.

[0004] Said tube elements inter alia allow the frame parts to withstand the pressure forces during union of the frame parts in the racket mold press and to achieve a desired stiffness of the produced racket.

[0005] However said tube elements may also lead to an unwanted inhomogeneity in the produced racket, such as for example frame sections of lowered densities, and which may lead to unwanted vibration and handling properties of the racket during impact interactions with the gaming object, e.g. the ball.

[0006] Furthermore the current state-of-the-art production of padel rackets is a rather lengthy and complex process, inter alia requiring for example the step of inflating the flexible tube elements.

Summary of Invention

[0007] The objective technical problem to be solved is then to improve a racket for padel, in particular with respect to its structure, handling properties and production process.

[0008] This said problem is solved by a racket for padel according to claim 1 and padel racket production method according to claim 9. Preferred embodiments are disclosed in the dependent claims.

[0009] A racket for padel according to the invention can comprise two opposed striking surfaces, and can further include a first racket half, which can have a first handle portion and a first main portion, wherein said first main portion can comprise a first striking surface portion, and said racket further can have a second racket half, which can comprise a second handle portion and a second main portion, wherein said second main portion can comprise a second striking surface portion.

[0010] Said padel racket can comprise at least one core component disposed between said racket halves, wherein said core component has two opposed surfaces, that can follow at least in parts the shape of the two opposed striking surfaces of the racket and said core component can have a lateral surface.

[0011] In particular said core component can be compressible, and can be wrapped up in a fabric component, wherein said fabric component can cover at least in parts the lateral surface of the core component. Said fabric component can be heat-curable and for example comprise fibres and a cured resin, wherein the resin and the fibres can be for example cured by heat and/or radiation and/or a chemical polymerisation initiation.

[0012] Said core component can be mounted with a pre-load, i.e. with an initial tension, between the racket halves, and as a consequence of said pre-load, said core component can be configured to press said fabric component against the inner lateral surfaces of the first and the second racket half, and wherein the fabric component can bond the first and second racket half together.

[0013] Advantageously a racket according to the invention does not need to comprise a rigid or flexible and/or inflatable or inflated tubelike element inside the racket, for example close to the perimeter or to enclose a core component.

[0014] In other words the invention can provide a tubeless racket for padel, which can offer superior stability and/or handling properties as compared to for example rackets comprising tube-like elements.

[0015] Furthermore the two racket halves can be symmetric, i.e. of equal shape, but they can also be asymmetric, wherein for example one racket half can comprise protrusions or lateral side walls which can extend partly or fully into the other racket half, when the two racket halves are mounted and joined together.

[0016] As fabric component materials for example carbon fibre, carbon fibre composites or the like may be used, or any other fabric material which in combination with plastic resins can form fiber reinforced polymers with high specific strengths, for example with specific strengths (also referred to as strength-to-weight ratio) greater than 300 kN m / kg.

[0017] A racket according to the invention advantageously provides a simpler and more homogeneous structure, resulting inter alia in better gaming and handling properties of the racket in general, and in particular in reduced unwanted vibration during impact of a ball on the striking surface, and further can lead to an enlarged sweet spot, which for example may be defined as the region of the striking surface where the coefficient of restitution is a maximum, i.e. the region of the striking surface which for a given striking effort results in an optimal racket response and where the gaming object, the ball, absorbs the maximum amount of available kinetic energy.

[0018] Also the optimized structure of a racket according to the invention allows for a more efficient production method of the same.

[0019] The aforementioned core component of the racket can be made of solid material or foam, for example polymeric foam and/or elastomeric foam, or comprises

at least two material layers or has honey-comb structure, or can be a combination of said material structures.

[0020] For example the core component material can preferentially be of low density, for example in the range of 20 to 55 kg/m^3, and may preferentially comprise an polymeric foam and/or elastomeric foam, and for example comprise ethylene vinyl acetate (also known as EVA) and/or polyurethane (PU), but also other low density polymer materials, respectively other low density elastomeric foams, in particular thermoplastic elastomer materials may be used to construct the core component.

[0021] When heated to a maximum racket mold temperature, the core component material preferably may have little or no significant extension of its volume.

[0022] The core component can have an average uncompressed thickness, i.e. the average thickness before the core is compressed, between 35 to 45 mm, preferentially of 38 $\pm$ 3 mm, or 40 $\pm$ 3 mm, or 42 $\pm$ 3 mm.

[0023] The core component may be divided into two separate individual parts, a handle core part and a main core part, wherein the main core part can comprises two opposing striking surface portions.

[0024] The handle core part and the main core part can have an equal average uncompressed thickness or they can have a different average uncompressed thickness lying in the range specified above. Also the handle core part and the main core part can be made of the same core component material or they can be made of different core component materials, chosen for example from the core component materials listed above. For example said core parts can be made of low density elastomeric foam, with for example densities in the range of 20 to 55 kg/m^3.

[0025] For example the handle core part can preferentially be made of PU foam and the main core part of EVA or vice versa or each be made of a mixture of PU and EVA or each be made of a mixture of other of low density elastomeric foams, with densities chosen from the range specified above.

[0026] Said handle core part can be wrapped up entirely in a fabric component, wherein said fabric component is for example made of any of the above mentioned fabric component materials, or it can only be partially wrapped up in said fabric component.

[0027] The handle core part and the main core part can be wrapped up using the same fabric component material or said core parts can be wrapped up partially or entirely with different fabric component materials.

[0028] The use of different fabric component materials may inter alia enable to customize the racket handling properties according a desired handling property, depending for example of the skill or preferences of a player.

[0029] The racket halves can be realized as unibodies, which advantageously can also provide better handling and stability properties.

[0030] Alternatively however the main portion and the handle portion of a racket half may also be realized as separated parts, bonded together with bonding means, such adhesives, resins and/or bolts and or screws or the like.

[0031] The main portion of a racket half has a substantially U-shaped or pan-shaped profile, with the striking surface portion extending substantially flat between an edge portion, for example an peripheric edge portion, of said main portion of a racket half.

[0032] The edge portion may be part of the striking surface portion or said edge portion may fully or partially delimit the striking surface portion.

[0033] For completeness we note that said edge portion, respectively peripheric edge portion, can extend fully or partially around the striking surface portion.

[0034] For example said peripheric edge portion can forms sidewalls, which can delimit the striking surface portion of said main portion of a racket half.

[0035] The elevation or height of said sidewalls above the striking surface portion can be equal along the peripheric edge portion or said sidewall elevation can vary continuously or discretely along the peripheric edge portion.

[0036] For example the sidewalls may continuously reduce their height to zero or close to zero towards a transition portion between the main portion and the handle portion of the racket.

[0037] The peripheric edge portion may have lateral side surfaces, which can be flat or curved, for example having a convex or concave curvature.

[0038] The final racket may also comprise bores or holes or openings extending through the racket, for example trough the main portions and through the opposed striking surfaces, allowing air to pass through said bores, opening or holes, in order to optimize the weight and/or air resistance properties of the racket.

[0039] According to the invention a racket with some or all of the features describes as above can be produced by a method, which can comprise all, some or parts of the following steps.

- The inner surface of a first racket half and a second racket half can be coated with a heat curable resin.
- The core component can be wrapped partially or fully in a fabric component, which can cover at least the lateral surface of the core component.
- The fabric wrapped core component can be inserted into the first racket half under compression of said core component, such that the core component can be pre-loaded, i.e. can comprise an initial tension, and can press the fabric component against the inner lateral surface of the first racket half
- The two racket halves containing the wrapped core component can be mounted together, such that the wrapped core component can press against the inner lateral surfaces of the first and the second racket half.

- The racket halves containing the wrapped core component can be bonded together by bonding means, which can include heating the two racket halves containing the wrapped core component inside a racket mold or racket mold press.

[0040] Preferred maximum heat temperatures can lie in the range of 20 to 90 ° C, preferably around 65 ± 5 ° C and preferred ranges of time the racket halves / the racket spends in the racket mold can lie between 15 to 45 min.

Short Description of Figures

[0041] The following figures serve as exemplary embodiments of the invention.

Fig. 1: Racket
Fig. 2: Side view of a racket
Fig. 3: Racket half
Fig. 4a: Handle core part
Fig. 4b: Alternative handle core part
Fig. 5: Main core part wrapped in a fabric component
Fig. 6: Interior structure of a racket
Fig. 7a: Profile of main portions of a racket
Fig. 7b: Alternative handle core part
Fig. 7c: Alternative handle core part

Detailed Description of Figures

[0042] **Fig. 1** shows a schematic top view of an exemplary racket 100 according to the invention made of two, preferentially symmetric, racket halves, wherein only a first racket half 107 is visible. Said first racket half 107 can have a first handle portion 102 and a first main portion 101, wherein said first main portion can comprise a first striking surface portion 103.

[0043] The same holds for the not visible second racket half, which can have a second handle portion and a second main portion, wherein said second main portion can comprise a second striking surface portion.

[0044] The handle portion can comprise a transition portion that is in connection with the main portion. Shown here for example is the transition portion 105 of handle portion 102, which can connect the handle portion 102 to main portion 101.

[0045] Furthermore the transition portion can for example have an opening, which can extend through the racket, e.g. through the transition portion of the handle portions of the two racket halves. Shown here for example is a trapezoidal shaped through opening 106 in transit portion 105, but other shapes or no through opening at all are also possible.

[0046] The striking surface portion can extend over the complete area of the main portion of a racket half. In other words the striking surface portion can include the edge portion of main portion.

[0047] The main portion can comprise a generic edge portion or edge portion geometry, for example a peripheric edge portion 104, is shown here for illustrative purposes only. The exact shape and extent of said edge portion can vary, it can be continuous or discrete and/or can vary in its average extent and/or average thickness or height. Some more specific examples will be described below.

[0048] The line from A to B denotes a cut through the profile of the main portions of the racket halves of racket 100. Exemplary profiles along said lines are shown in Figs. 7a, 7b and 7c.

[0049] **Fig. 2** is an exemplary schematic side view of a racket 200 analog or identical to the racket 100 of Fig. 1. Therein two racket halves, a first racket half 203 and a second racket half 204, connected along the plane 215, are visible. Further marked are a first handle portion 205 and a first main portion 211 of first racket half 203, and a second handle portion 206 and a second main portion 212 of second racket half 204.

[0050] The two handle portions 205, 206 can comprise transition portions 209, 210 connecting said handle portions 205, 206 to the corresponding main portions 211, 212. The transition portions 209, 210 can have through openings (not shown) analog to the through opening shown in Fig. 1.

[0051] The main portions can comprise a striking surface portion and an edge portion, i.e. first main portion 211 can comprise first striking surface portion 201 and first edge portion 207, and second main portion 212 can comprise second striking surface portion 201 and second edge portion 208.

[0052] The racket 200 can have an average thickness 213 across its opposing, preferred substantially flat, striking surface portions 201, 202 between 30 to 38 mm, or up to 45 mm. The handle of racket 200 can have an average thickness 214 across its opposing handle portions 205, 206 which is equal or different from the average thickness across the opposing surface portions 201, 202. Said thicknesses 213, 214 may also vary also along and/or over the extent of the racket halves 203, 204.

[0053] **Fig. 3** exemplary shows a view onto the inner surface an exemplary racket half 300 which is analog or identical to the racket halves as previously described. Said racket half 300 can be a unibody. It can be pan-shaped, respectively can a have U-shape profile.

[0054] The racket half 300 can have sidewalls 304 extending along the main portion 302 and the handle portion 301. The sidewalls 304 can have an from the outside visible average height between 38/2 to 50/2 mm, which can also vary between main portion 302 and handle portion 301 and along said portions. The end portion 307 of handle portion 301 may be open (as shown) or can also be delimited by said sidewalls.

[0055] As mentioned before the two racket halves forming a racket can be symmetric, but need not be symmetric. For example the sidewalls 304 of racket half 300 may be configured in such way, as to protrude partly or fully into a (not shown) second racket half, and the sidewalls (not shown) of said second half (not shown) may

enclose partly or fully the sidewalls 304 of racket half 300.

[0056] For completeness the striking surface portion 303 of the main portion 302 as well as an optional edge portion 306 and a possible transition portion 308, the part of the handle portion 301 which connects to the main portion 302, are also marked.

[0057] **Fig. 4a** and **Fig. 4b** exemplary show two possible differently shaped handle cores 401, 402 for cases wherein the core component of the racket is divided into two separate individual parts, namely a handle core part 401, 402 and a main core part.

[0058] Handle core 401 has trapezoidal transition part 403 to connect with a main portion (not shown) of a racket (not shown) and handle core 402 has a Y-shaped transition part 404 to connect with a main portion (not shown) of a racket (not shown).

[0059] Said handle cores 401, 402 may be wrapped up partially or entirely in a fabric component (not shown).

[0060] **Fig. 5** shows an exemplary main core 500, respectively main core part, of a racket according to the invention, wherein said main core 500 has an average uncompressed thickness 501 of 35 to 45 mm (i.e. the average thickness of said main core 500 when it is not compressed) and is wrapped up partially in a fabric component 503, which covers the lateral surface 502 of the main core 500 and partly its two opposed surfaces following at least in parts the shape of the two opposed striking surfaces (not shown) of the racket (not shown), from which only surface 504 is visible in the Figure.

[0061] **Fig. 6** shows part 600 of an exemplary internal structure of a racket according to the invention. Therein two separate core components a handle core 607 and a main core 611 are shown inserted into, respectively lying in a first racket half 601. Said core components can be compressible and can be inserted or mounted into said racket half 601 pre-loaded, i.e. with an initial tension.

[0062] The main core 611 is partially wrapped up in a fabric component 605, which can cover at least parts of the lateral surface 609 and at least parts of its two opposed surfaces following at least in parts the shape of the two opposed striking surfaces (not shown) of the racket, from which only surface 602 is visible here.

[0063] The handle core 607 can be for example completely wrapped in fabric component 606, which can be the same or a different fabric component 605 than used for the main core 602.

[0064] Said fabric components 606, 605 may inter alia also be in parts glued to the corresponding cores 607, 611 by curable resins, for example by heat-curable resins.

[0065] The average height 608 of the uncompressed handle core 607 and the average height 604 of the uncompressed main core 611 can be equal or different, for example height the average height 608 of the uncompressed handle core 607 can be lower that the average height 604 of the uncompressed main core 611. Both of said heights 608 and 604 can equal or exceed the average height 603 of the sidewalls 610 of a racket half, i.e. of racket half 601.

[0066] Said sidewalls 610 of racket half 601 may however vary in height and inclination along the periphery of said racket half 601.

[0067] The with pre-loads in racket half 601 mountable and in fabric components 605, 606 wrapped core components 602, 611 can press said fabric components 605, 606 against the inner surface of in racket half 601, in particular against the sidewalls 610 of racket half 601, respectively the inner lateral surface 612 formed by said sidewalls 610.

[0068] **Fig. 7a, Fig. 7b,** and **Fig. 7c** show exemplary profiles or cross sections 700, 800 and 900 of a racket according to the invention along the line A to B from **Fig. 1.**

[0069] Therein first main portions 701, 801, 901 and second main portions 702, 802, 902 of two racket halves joined along a plane 705, 805, 905 are shown, which comprise first striking surface portions 703, 803, 903 and their opposing second striking surface portions 704, 804, 904.

[0070] The difference between said exemplary cross sections 700, 800 and 900 of a racket lies in the realization of their edge portions 706, 707, 806, 807, 906, 907.

[0071] In cross sections 700 and 800 the edge portions 706, 707, 806, 807 do not rise above their corresponding striking surface portions 703, 704, 803, 804. However while edge portions 706, 707 can form a straight lateral border 708, the edge portions 806, 807 can form a curved convex lateral border 808.

[0072] In cross section 900 the edge portions 906, 907 of the main portions 901, 902 can form additional lateral sidewalls 909, 910 that rise above and delimit the striking surface portions 903, 904. The lateral border 908 formed by the edge portions 906, 907 can be substantially straight (as shown) or can also have a convex or concave curvature.

[0073] In addition the cross sections 700, 800 and 900 also show the core components or main cores 709, 809 and 911, that fill out partially or completely the volume between racket halves, respectively main portions 701, 702, 801, 802, 901, 902.

[0074] Obviously said cross sections 700, 800 and 900 are only examples and other cross sections, including asymmetric cross sections with respect to planes 705, 805, and 905 are possible.

[0075] For completeness we note that all features described in the Figures and description above can be combined, for example as previously noted a racket according to the invention can also have through openings (not shown) that extend for example across the main portions 701, 702, 801, 802, 901, 902 of a racket, respectively racket half.

[0076] The reference signs in Figs. 1, 2, 3, 4a, 4b, 5, 6, 7a, 7b, and 7c are denotes as follows.

100 Racket for padel
101 First main portion
102 First handle portion

103 First striking surface portion
104 Peripheric edge portion or (generic) edge portion
105 Transition portion
106 Opening
107 Racket half
A, B Reference points for cut through the profile of the main portions of the racket halves
200 Racket for padel
201 First striking surface portion
202 Second striking surface portion
203 First racket half
204 Second racket half
205 First handle portion
206 Second handle portion
207 First edge portion
208 Second edge portion
209 First transition portion
210 Second transition portion
211 First main portion
212 Second main portion
213 Average thickness of racket across opposing striking surface portions
214 Average thickness of racket across opposing handle portions
215 Connection plane connecting first and second racket half
300 Racket half
301 Handle portion
302 Main portion
303 Striking surface
304 Sidewalls
305 Average height of sidewalls
306 Edge portion
307 End portion
308 Transition portion
401 Handle core
402 Handle core
403 Transition part
404 Transition part
500 Main core
501 Average thickness uncompressed of main core
502 Lateral surface of main core
503 Fabric component
504 Striking surface
600 Part of an exemplary internal structure of a racket
601 First racket half
602 Striking surface
603 Average height of sidewalls
604 Average height of uncompressed main core
605 Fabric component for main core
606 Fabric component for handle core
607 Handle core
608 Average height of uncompressed handle core
609 Lateral surface
610 Sidewalls
611 Main core
612 Inner lateral surface
700 Profile or cross section of a racket
701 First main portion
702 Second main portion
703 First striking surface
704 Second striking surface
705 Plane along which two racket halves are joined
706 First edge portion
707 Second edge portion
708 Lateral border
709 Core component or main core
800 Profile or cross section of a racket
801 First main portion
802 Second main portion
803 First striking surface
804 Second striking surface
805 Plane along which two racket halves are joined
806 First edge portion
807 Second edge portion
808 Lateral border
809 Core component or main core
900 Profile or cross section of a racket
901 First main portion
902 Second main portion
903 First striking surface
904 Second striking surface
905 Plane along which two racket halves are joined
906 First edge portion
907 Second edge portion
908 Lateral border
909 First additional lateral sidewall
910 Second additional lateral sidewall
911 Core component or main core

Claims

1. Racket (100, 200) for padel with two opposed striking surfaces, including a first racket half (203) having a first handle portion (205) and a first main portion (211), wherein said first main portion (211) comprises a first striking surface portion (201), a second racket half (204) having a second handle portion (206) and a second main portion, wherein said second main portion (212) comprises a second striking surface portion (202), and at least one core component (500, 611) disposed between said racket halves (203, 204), wherein said core component (500, 611) has two opposed surfaces following at least in parts the shape of the two opposed striking surfaces of the racket and a lateral surface (502, 609),
characterised in that,
the core component (500, 611) is compressible, and said core component (500, 611) is wrapped up in a fabric component (605), wherein said fabric component (605) comprises fibres and a cured resin and covers at least in parts the lateral surface (609) of the core component (500, 611), and said core component (500, 611) is mounted with a pre-load be-

tween the racket halves (203, 204), and said core component (500, 611) is configured to press said fabric component (605) against the inner lateral surfaces (612) of the first and the second racket half (203, 204), and wherein the fabric component (605) bonds the first and second racket half (203, 204) together.

2. Racket (100, 200) according to claim 1, wherein the core component (500, 611) is made of solid material or foam or comprises at least two material layers or has honey-comb structure, or can be made of a combination of aforementioned material structures.

3. Racket (100, 200) according to any of the preceding claims, wherein the core component is divided into two separate individual parts, a handle core part (607) and a main core part (611), wherein the main core part (611), comprises two opposing striking surface portions.

4. Racket (100, 200) according to claim 3, wherein the handle core part (607) is wrapped up entirely in a fabric component (605), which comprises fibres and a cured resin.

5. Racket (100, 200) according to any of the preceding claims, wherein the racket halves (203, 204) are unibodies.

6. Racket (100, 200) according to any of the preceding claims, wherein the main portion (301, 701, 801, 901, 702, 802, 902) of a racket half has a substantially U-shaped or pan-shaped profile, with the striking surface portion (703, 803, 903, 704, 804, 904) extending substantially flat between a peripheric edge portion (706, 707, 806, 807, 906, 907) of said main portion of a racket half.

7. Racket (100, 200) according to any of the preceding claims, wherein the main portion of a racket half (901, 902) has a peripheric edge portion (906, 907), wherein said edge portion forms lateral sidewalls (909, 910), which delimit the striking surface portion (903, 904) of said main portion of a racket half.

8. Racket (100, 200) according to any of the preceding claims, wherein the core component has an average uncompressed thickness (501) between 35 to 45 mm and/or wherein the core component material comprises a polymeric foam or elastomeric foam, and for example comprises ethylene vinyl acetate and/or polyurethane foam.

9. Method for producing a racket comprising the steps of:

coating the inner surface of a first racket half and a second racket half with a curable resin,
wrapping a fabric component around a core component, covering at least the lateral surface of the core component,
inserting the fabric wrapped core component into the first racket half under compression of said core component, such that the core component is pre-loaded and presses the fabric component against the inner lateral surface of the first racket half, mounting the two racket halves containing the wrapped core component together, such that the wrapped core component presses against the inner lateral surfaces of the first and the second racket half, and
bonding the racket halves containing the wrapped core component together by bonding means, such as for example by curing the resin by heating the two racket halves containing the wrapped core component inside a racket mold.

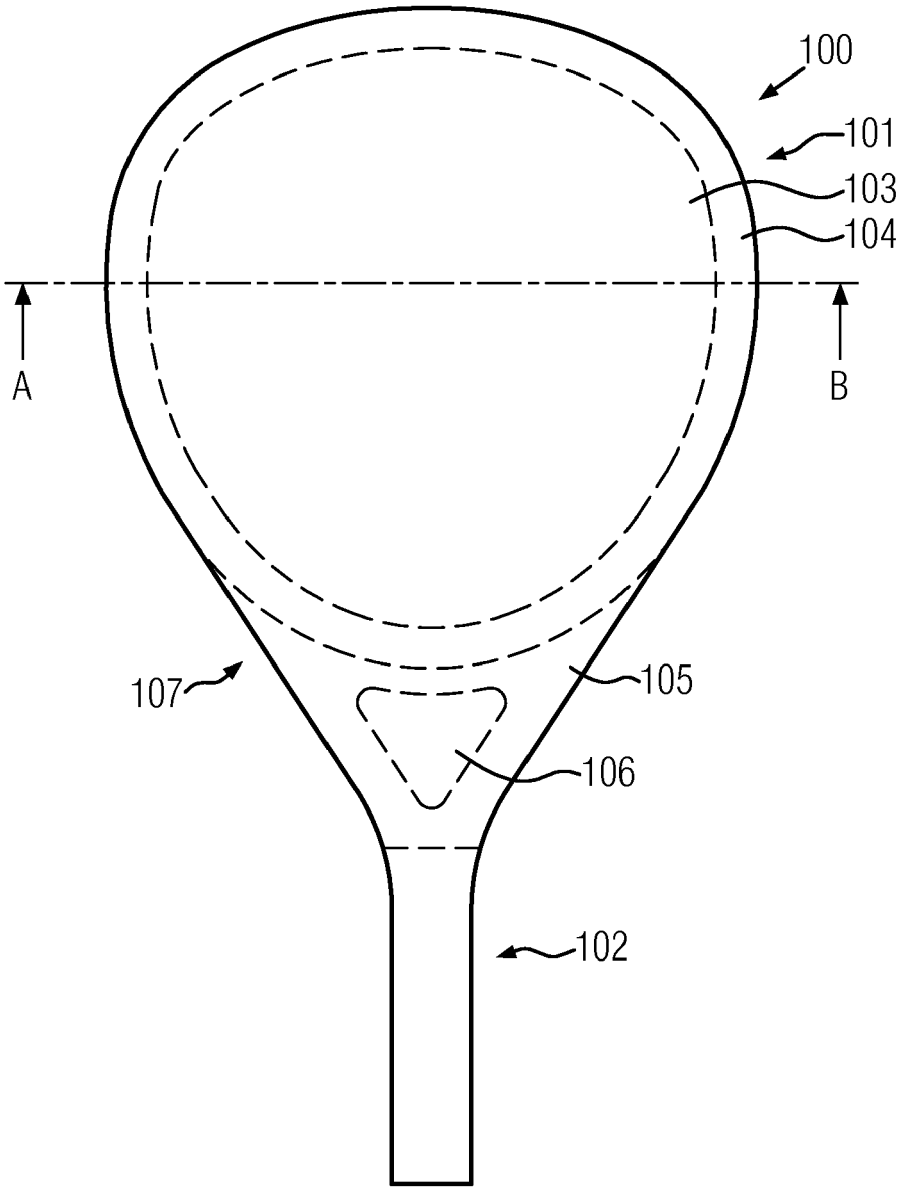

FIG. 1

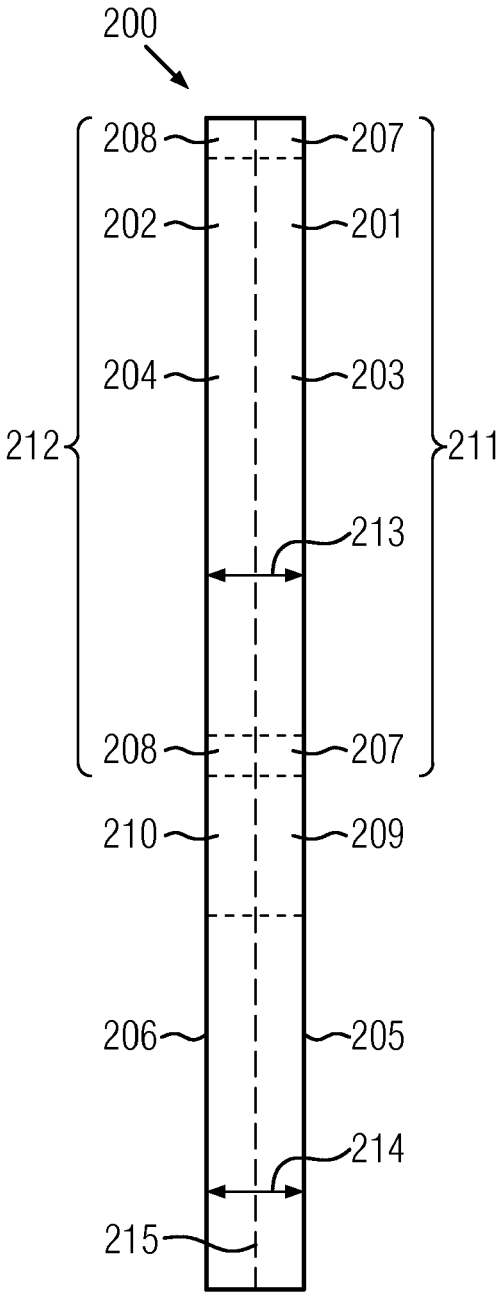
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FIG. 2

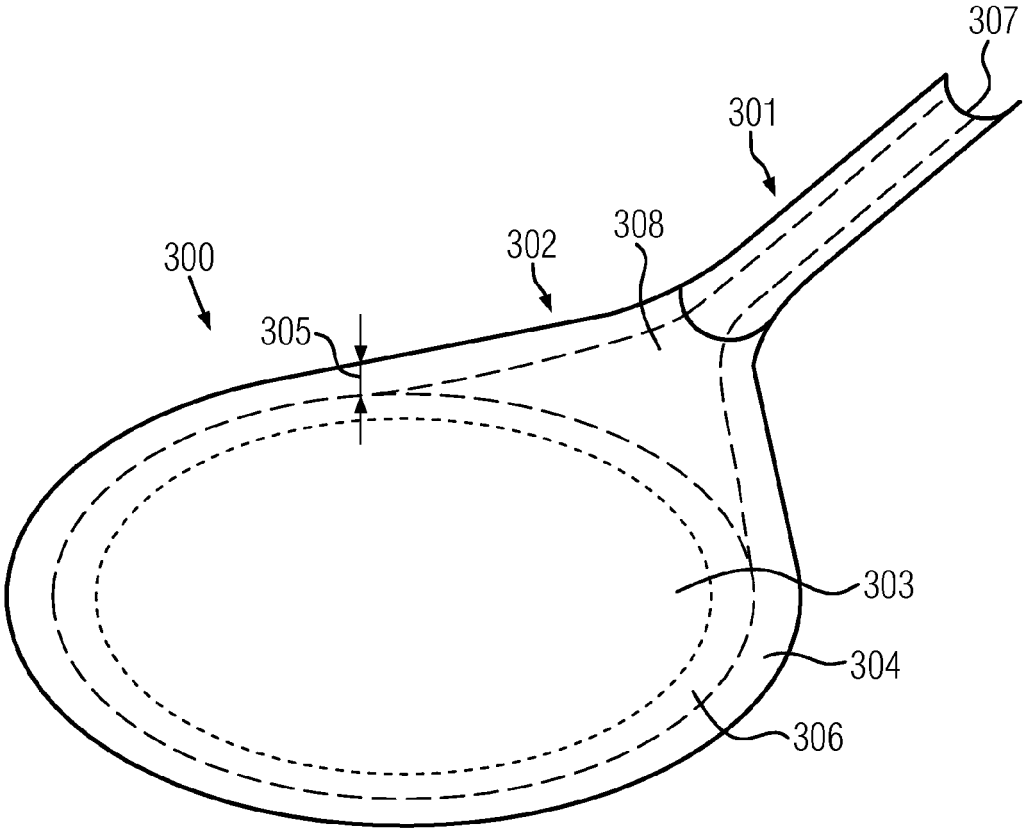

FIG. 3

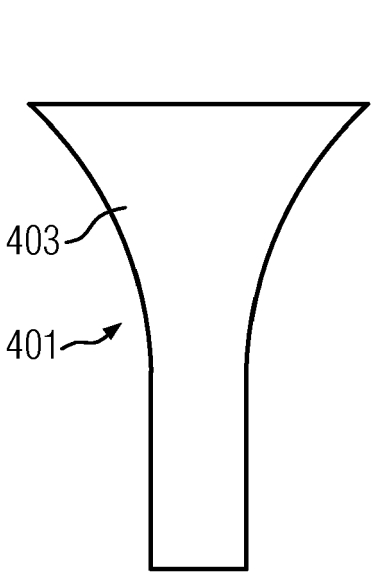

FIG. 4a

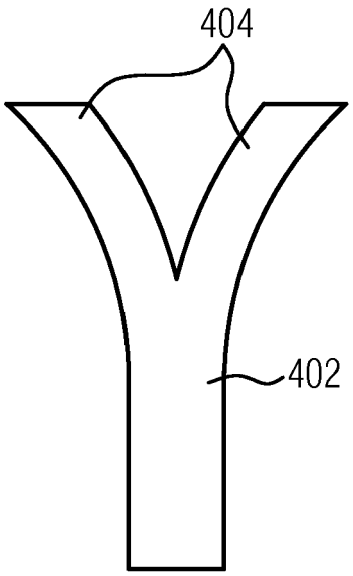

FIG. 4b

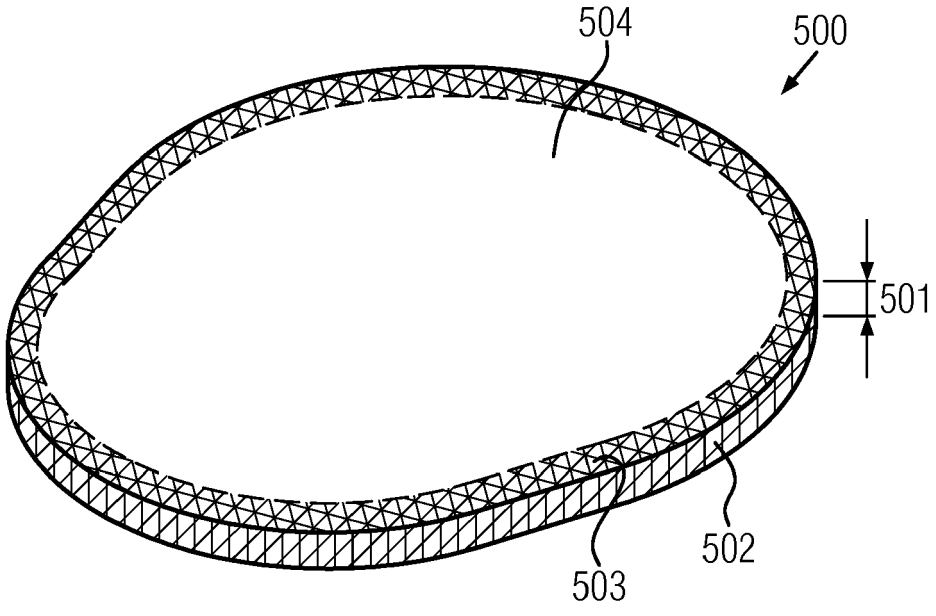

FIG. 5

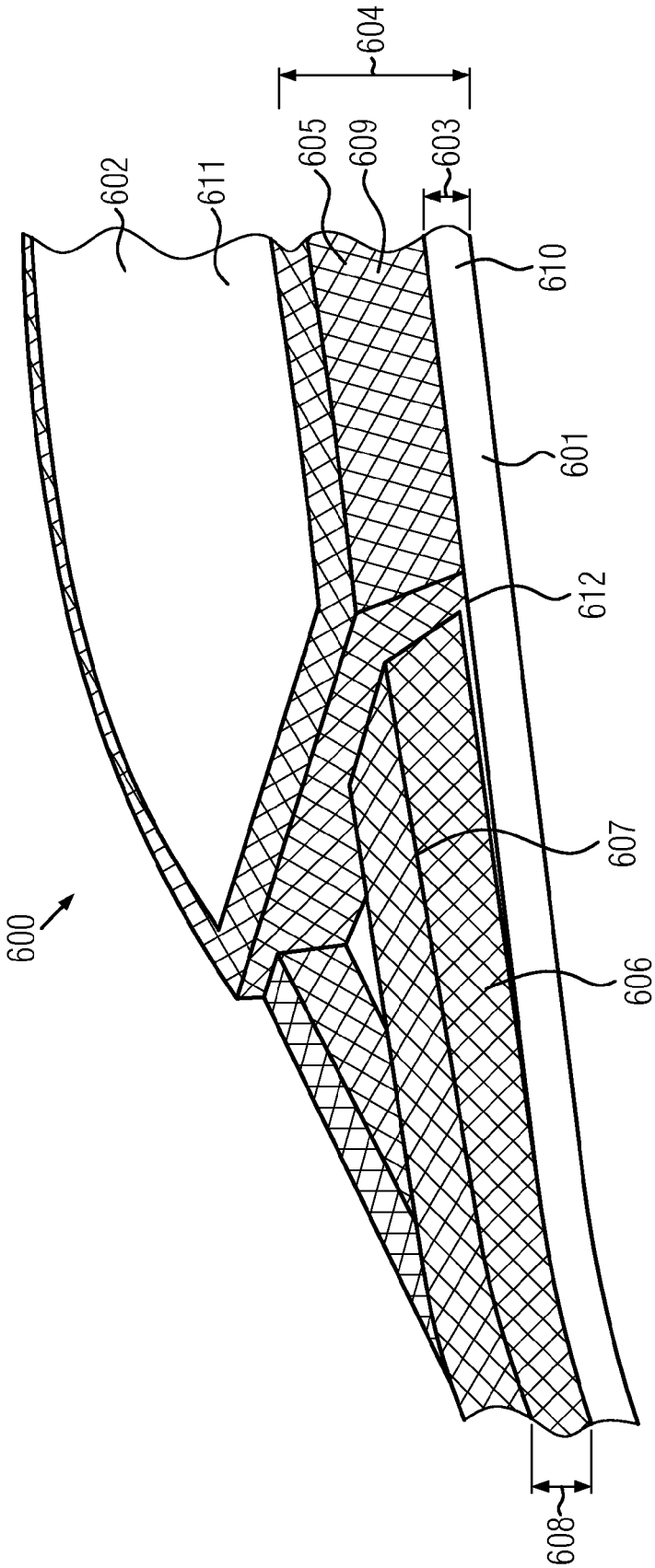

FIG. 6

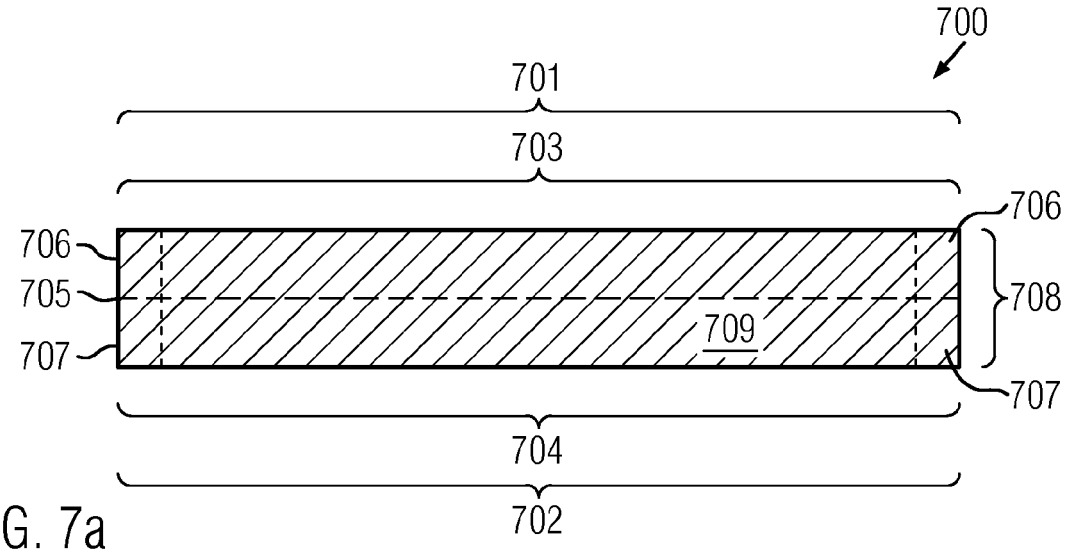

FIG. 7a

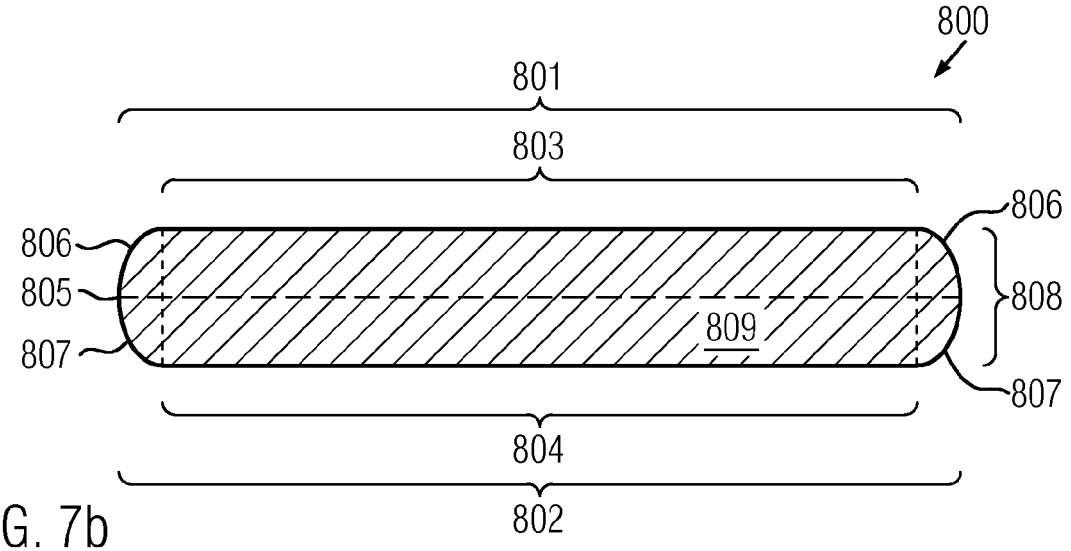

FIG. 7b

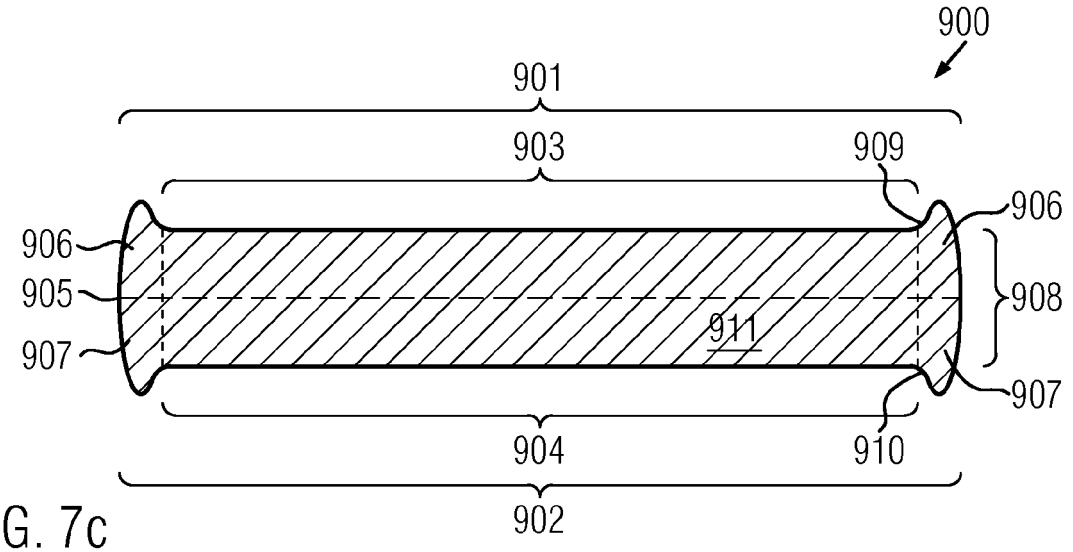

FIG. 7c

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EUROPEAN SEARCH REPORT

Application Number
EP 14 38 2122

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2012/089931 A1 (DECATHLON SA [FR]; LE BOZEC YVAN [FR]; TRIBOULT JOEL MANUEL HENRI [FR]) 5 July 2012 (2012-07-05) * page 6, line 1 - page 11, line 26; figures 1-3 *	1-9	INV. A63B59/18
A	WO 2009/125329 A1 (PRINCE SPORTS INC [US]; GAZZARA ROBERTO [IT]; PINAFFO MAURO [IT]; POZZ) 15 October 2009 (2009-10-15) * page 3, line 15 - page 10, line 19; figures 1-15 *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 September 2014	Jekabsons, Armands

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012089931 A1	05-07-2012	EP 2658619 A1	06-11-2013
		ES 2400286 A2	08-04-2013
		WO 2012089931 A1	05-07-2012
WO 2009125329 A1	15-10-2009	AR 072661 A1	15-09-2010
		CN 101980753 A	23-02-2011
		EP 2265343 A1	29-12-2010
		US 2011201461 A1	18-08-2011
		WO 2009125329 A1	15-10-2009

EPO FORM P0459

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Patent documents cited in the description

- ES 2255419 A1 **[0002]**