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(54) **PADDLE RACKET**

(57) A paddle racket (1) is provided, including: a frame body (10), including a frame wall (11) and a handle (12) connected to the frame wall (11), the frame wall (11) having an inner circumferential surface (111) and defining a receiving space (112); a three-dimensional web core (20), disposed in the receiving space (112) and including an outer circumferential surface (21) facing the inner circumferential surface (111), including channels (22) disposed through the three-dimensional web core (20) in a thickness direction (T) of the three-dimensional web core (20); two striking surface portions (30), disposed on two opposing sides of the three-dimensional web core (20), each striking surface portions (30) including through holes (31), the through holes (31) corresponding to and being in communication with parts of the channels (22); and double-sided adhesive layers (40), connecting the outer circumferential surface (21) of the three-dimensional web core (20) to the inner circumferential surface (111) of the frame wall (11) and connecting the two striking surface portions (30) to the two opposing sides of the three-dimensional web core (20).

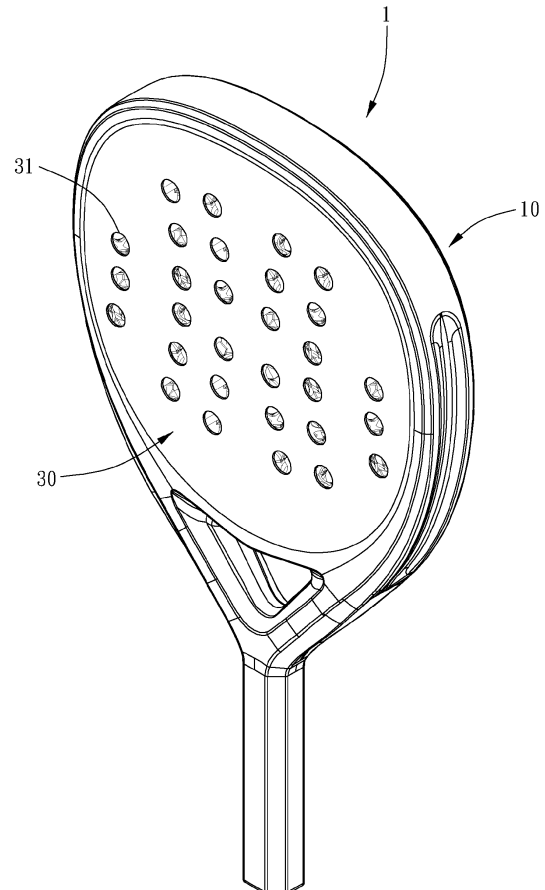


FIG. 1

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a paddle racket.

Description of the Prior Art

[0002] In order to maintain posture and physical health, various sports have become an indispensable part of people's daily life. When performing various sports, it is necessary to use or be equipped with different corresponding sports equipment.

[0003] For example, a variety of ball sports use rackets to play. Examples of such rackets include tennis racket, squash racket, badminton racket, and cricket racket, etc. A racket includes a striking portion and a handle. The striking portion includes a frame body and a striking member (such as a plate, net wire or the like) disposed with the frame body. If the striking member is of considerable thickness and solid structure, it requires a large amount of raw materials (plastic, wood, metal, etc.) for producing the racket, which increases the production cost and causes a heavy weight of the racket unfavorable for play.

[0004] In addition, the striking components of some rackets are connected to the frame body through colloid (fluid such as glue), which causes disadvantages of colloid overflowing, uneven adhesion and time-consuming.

[0005] The present invention is, therefore, arisen to obviate or at least mitigate the above-mentioned disadvantages.

SUMMARY OF THE INVENTION

[0006] The main object of the present invention is to provide a paddle racket which is to manufacture and allows replacement of components according to various requirements, which is extremely convenient and economical.

[0007] To achieve the above and other objects, a paddle racket is provided, including: a frame body, including a frame wall and a handle connected to the frame wall, the frame wall having an inner circumferential surface and defining a receiving space; a three-dimensional web core, disposed in the receiving space and including an outer circumferential surface facing the inner circumferential surface, including a plurality of channels disposed through the three-dimensional web core in a thickness direction of the three-dimensional web core; two striking surface portions, disposed on two opposing sides of the three-dimensional web core, each of the two striking surface portions including a plurality of through holes, the plurality of through holes corresponding to and being in communication with parts of the plurality of channels; and a plurality of double-sided adhesive layers, connecting the outer circumferential surface of the three-dimension-

al web core to the inner circumferential surface of the frame wall and connecting the two striking surface portions to the two opposing sides of the three-dimensional web core.

5 [0008] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment(s) in accordance with the present invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

15 Fig. 1 is a stereogram of a preferable embodiment of the present invention;

Fig. 2 is a breakdown drawing of a preferable embodiment of the present invention;

20 Fig. 3 is a partial cross-sectional view of a preferable embodiment of the present invention;

Fig. 4 is a front side view of a three-dimensional web core according to a preferable embodiment of the present invention;

25 Fig. 5 is a drawing of the three-dimensional web core as viewed in a first view angle according to a preferable embodiment of the present invention;

Fig. 6 is a drawing of the three-dimensional web core as viewed in a second view angle according to a preferable embodiment of the present invention;

30 Fig. 7 is a partial enlarged side view of the three-dimensional web core according to a preferable embodiment of the present invention; and

Fig. 8 is a partial perspective enlargement of the three-dimensional web core of a preferable embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

40 [0010] Please refer to Figs. 1 to 8 for a preferable embodiment of the present invention. A paddle racket 1 of the present invention includes a frame body 10, a three-dimensional web core 20, two striking surface portions 30 and a plurality of double-sided adhesive layers 40.

45 [0011] The frame body 10 includes a frame wall 11 and a handle 12 connected to the frame wall 11, and the frame wall 11 has an inner circumferential surface 111 and defines a receiving space 112. The three-dimensional web core 20 is disposed in the receiving space 112 and includes an outer circumferential surface 21 facing the inner circumferential surface 111, and the three-dimensional web core 20 includes a plurality of channels 22 disposed through the three-dimensional web core 20 in a thickness direction T of the three-dimensional web core 20. The two striking surface portions 30 are disposed on two opposing sides of the three-dimensional web core 20, each of the two striking surface portions 30 includes a plurality of through holes 31, and the plurality of through

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holes 31 correspond to and are in communication with parts of the plurality of channels 22. The plurality of double-sided adhesive layers 40 connect the outer circumferential surface 21 of the three-dimensional web core 20 to the inner circumferential surface 111 of the frame wall 11 and connect the two striking surface portions 30 to the two opposing sides of the three-dimensional web core 20. As such, the three-dimensional web core 20 is replaceable from the frame body 10, and the two striking surface portions 30 are replaceable from the three-dimensional web core 20, which allows replacement of parts according to needs. Therefore, it is convenient, fast and economical.

[0012] It is noted that in order to show the structure of the three-dimensional web core 20 more clearly, in figures, just a part of the three-dimensional web core 20 (surrounded by a dash-dotted line) is taken as an exemplary illustration. In this embodiment, the outer circumferential surface 21 is provided without any hole, and a portion of the three-dimensional web core 20 surrounded by the outer circumferential surface 21 has a structure substantially the same as that of the portion surrounded by the dash-dotted line in the figures. However, the outer circumferential surface 21 may be provided with holes; the three-dimensional web core 20 may be a regular or irregular porous structure.

[0013] Preferably, one of the inner circumferential surface 111 and the outer circumferential surface 21 includes an annular convex surface 113, the other of the inner circumferential surface 111 and the outer circumferential surface 21 includes an annular concave surface 211, and the annular convex surface 113 and the annular concave surface 211 are connected by one of the plurality of double-sided adhesive layers 40. In this embodiment, the inner circumferential surface 111 includes the annular convex surface 113, and the outer circumferential surface 21 includes the annular concave surface 211. Preferably, the annular convex surface 113 and the annular concave surface 211 each include sections which are transitionally connected to one another, which can increase the bonding area and bonding strength. The annular convex surface 113 and the annular concave surface 211 may be other curved surfaces or in other geometric shapes.

[0014] The frame body 10, the three-dimensional web core 20 and the two striking surface portions 30 are preferably made from reinforced fibers (such as glass fiber, carbon fiber or the like) which are of properties of light weight and strong structure. The three-dimensional web core 20 is resiliently deformable, for example, made from light hardening resin (UV light hardening resin), silicone, rubber, foam or similar elastic material, which provides good support and sufficient elastic deformability.

[0015] The plurality of channels 22 includes a plurality of first channels 221 and a plurality of second channels 222 corresponding to and being in communication with the plurality of through holes 31. The plurality of first channels 221 are disposed through the three-dimensional

web core 20 in the thickness direction T of the three-dimensional web core 20, and the plurality of second channels 222 extend through the three-dimensional web core 20 in a direction inclined to the thickness direction T, thus provides a structure of light weight and good structural strength. Preferably, a first portion 223 and a second portion 224 of the plurality of second channels 222 are transverse to each other and overlap with each other in the thickness direction T, so that the structural strength, elasticity and striking performance of the three-dimensional structure are considerably improved.

[0016] Specifically, the three-dimensional web core 20 further includes a plurality of curved walls 23, the plurality of curved walls 23 define the plurality of first channels 221 and the plurality of second channels 222, the plurality of curved walls 23 include a plurality of perforations 231 disposed therethrough and in communication with the plurality of first channels 221 and the plurality of second channels 222. The plurality of curved walls 23 can enhance the structural strength and striking performance, and the plurality of perforations 231 is in favor of light weight.

[0017] Preferably, each of the two opposing sides of the three-dimensional web core 20 includes a plurality of ribs 24, the two striking surface portions 30 and the plurality of ribs 24 are connected by the double-sided adhesive layer 40, and each of the plurality of ribs 24 has a width smaller than one half a diametric dimension of each of the plurality of channels 22. For example, the surface area of any of the opposing sides of the three-dimensional web core 20 is larger than the cross-sectional area of any radial section of the three-dimensional web core 20, so that it provides sufficient structural strength and sufficient area for adhered to the two striking surface portions 30. The three-dimensional web core 20 defines a diametric direction D. At least one of the plurality of ribs 24 continuously extends from side to side between the two opposing sides of the three-dimensional web core 20 in a direction parallel to the diametric direction D, which provides a large adhering area and good combination strength. Parts of the plurality of ribs 24 extend in intervals between the two opposing sides of the three-dimensional web core 20 in a direction parallel to the diametric direction D.

[0018] Preferably, at least one of the plurality of double-sided adhesive layers 40 between each of the two striking surface portions 30 and one of the two opposing sides of the three-dimensional web core 20 includes through holes 41 corresponding to and in communication with the through holes 31 of one of the striking surface portion 30, a first adhesive side 42 and a second adhesive side 43. The first adhesive side 42 is adhered to the three-dimensional web core 20, and the second adhesive side 43 is adhered to the striking surface portion 30. The adhesion of the second adhesive side 43 is greater than the adhesion of the first adhesive side 42, which is favor of detachment of either of the two striking surface portions 30 from the three-dimensional web core 20 for replace-

ment.

[0019] Preferably, the first adhesive side 42 and the second adhesive side 43 of at least one of the plurality of double-sided adhesive layers 40 between the inner circumferential surface 111 and the outer circumferential surface 21 are adhered to the inner circumferential surface 111 and the outer circumferential surface 21, respectively. The adhesion of the second adhesive side 43 is greater than the adhesion of the first adhesive side 42, which is favor of detachment of either of the three-dimensional web core 20 from the frame body 10 for replacement.

[0020] According to the structure of the present invention, it has following advantages:

1. Compared with colloid (fluid) adhesive: as applied to the three-dimensional web core 20 which has an irregular binding surface, the double-sided adhesive layer 40 does not cause the colloid overflow which is easy to stick to dust.
2. Compared with colloid: the double-sided adhesive layer 40 can be quickly and comprehensively adhered to the three-dimensional web core 20 having an irregular surface (colloid coating is not easy to be uniform, and it is quite time-consuming when the irregular surface of the three-dimensional web core 20 is large).
3. Compared with colloid: it is easy and quick to peeled off the double-sided adhesive layer 40 from a release paper to use it, so there will be no colloid overflow, uneven sticking, time-consuming and other disadvantages (the binding of parts by using the colloid has to be completed in a very short time, otherwise there will be problems with colloid drying before binding of parts).
4. Effect of using the double-sided adhesive layer 40: it allows replacement of either of the two striking surface portions 30 and the three-dimensional web core 20 without repurchasing a new paddle racket when the structure is damaged; the frame body 10 and the two striking surface portions 30 and the three-dimensional web core 20 which is made of different material can be peeled off and recycled for environmental protection since they are adhered to one another by the double-sided adhesive layer 40; it allows to select a thick or thin one of striking surface portion for the paddle racket according to strong or weak striking performance; with adhesive surfaces with different adhesion it is in favor of detaching either of the two striking surface portions 30 or/and the three-dimensional web core 20 without damaging the three-dimensional web core 20.

[0021] Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited

except as by the appended claims.

Claims

1. A paddle racket (1), including:

a frame body (10), including a frame wall (11) and a handle (12) connected to the frame wall (11), the frame wall (11) having an inner circumferential surface (111) and defining a receiving space (112);
a three-dimensional web core (20), disposed in the receiving space (112) and including an outer circumferential surface (21) facing the inner circumferential surface (111), including a plurality of channels (22) disposed through the three-dimensional web core (20) in a thickness direction (T) of the three-dimensional web core (20);
two striking surface portions (30), disposed on two opposing sides of the three-dimensional web core (20), each of the two striking surface portions (30) including a plurality of through holes (31), the plurality of through holes (31) corresponding to and being in communication with parts of the plurality of channels (22); and
a plurality of double-sided adhesive layers (40), connecting the outer circumferential surface (21) of the three-dimensional web core (20) to the inner circumferential surface (111) of the frame wall (11) and connecting the two striking surface portions (30) to the two opposing sides of the three-dimensional web core (20).

2. The paddle racket (1) of claim 1, wherein one of the inner circumferential surface (111) and the outer circumferential surface (21) includes an annular convex surface (113), the other of the inner circumferential surface (111) and the outer circumferential surface (21) includes an annular concave surface (211), and the annular convex surface (113) and the annular concave surface (211) are connected by one of the plurality of double-sided adhesive layers (40).

3. The paddle racket (1) of claim 1, wherein the three-dimensional web core (20) is resiliently deformable.

4. The paddle racket (1) of claim 1, wherein the plurality of channels (22) include a plurality of first channels (221) and a plurality of second channels (222) corresponding to and being in communication with the plurality of through holes (31), the plurality of first channels (221) are disposed through the three-dimensional web core (20) in the thickness direction (T), and the plurality of second channels (222) extend through the three-dimensional web core (20) in a direction inclined to the thickness direction (T).

5. The paddle racket (1) of claim 4, wherein a first portion (223) and a second portion (224) of the plurality of second channels (222) are transverse to each other and overlap with each other in the thickness direction (T). 5
6. The paddle racket (1) of claim 4, wherein the three-dimensional web core (20) further includes a plurality of curved walls (23), the plurality of curved walls (23) define the plurality of first channels (221) and the plurality of second channels (222), the plurality of curved walls (23) include a plurality of perforations (231) disposed therethrough and in communication with the plurality of first channels (221) and the plurality of second channels (222). 10 15
7. The paddle racket (1) of claim 1, wherein each of the two opposing sides of the three-dimensional web core (20) includes a plurality of ribs (24), the two striking surface portions (30) and the plurality of ribs (24) are connected by the double-sided adhesive layer (40), and each of the plurality of ribs (24) has a width smaller than one half a diametric dimension of each of the plurality of channels (22). 20 25
8. The paddle racket (1) of claim 7, wherein the three-dimensional web core (20) defines a diametric direction (D), at least one of the plurality of ribs (24) continuously extends from side to side between the two opposing sides of the three-dimensional web core (20) in a direction parallel to the diametric direction (D), and parts of the plurality of ribs (24) extend in intervals between the two opposing sides of the three-dimensional web core (20) in a direction parallel to the diametric direction (D). 30 35
9. The paddle racket (1) of claim 1, wherein at least one of the plurality of double-sided adhesive layers (40) between each of the two striking surface portions (30) and one of the two opposing sides of the three-dimensional web core (20) includes a first adhesive side (42) and a second adhesive side (43), the first adhesive side (42) is adhered to the three-dimensional web core (20), the second adhesive side (43) is adhered to the striking surface portion (30), and the adhesion of the second adhesive side (43) is greater than the adhesion of the first adhesive side (42). 40 45
10. The paddle racket (1) of claim 1, wherein at least one of the plurality of double-sided adhesive layers (40) between the inner circumferential surface (111) and the outer circumferential surface (21) includes a first adhesive side (42) and a second adhesive side (43), the first adhesive side (42) is adhered to the inner circumferential surface (111), the second adhesive side (43) is adhered to the outer circumferential surface (21), and the adhesion of the second 50 55

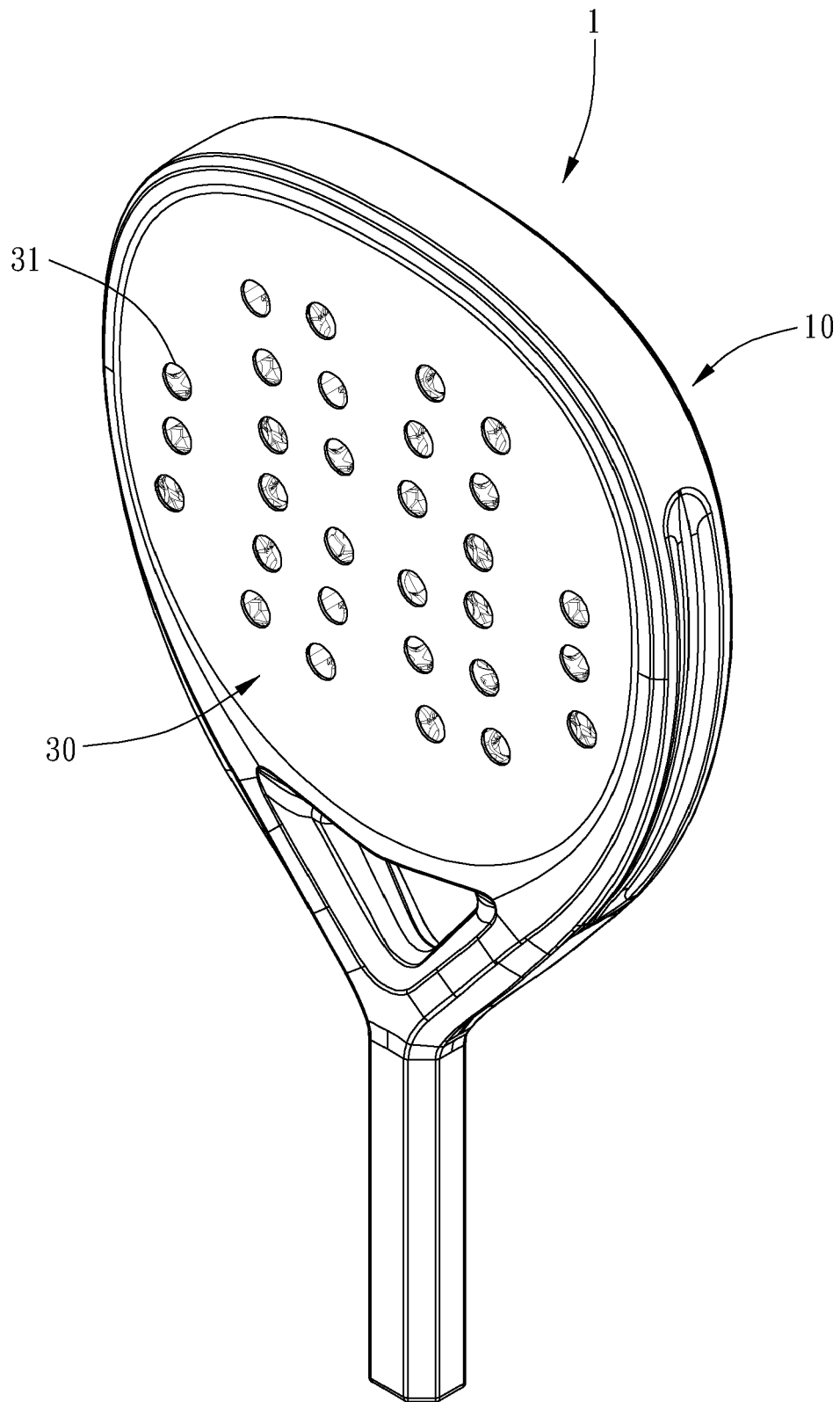


FIG. 1

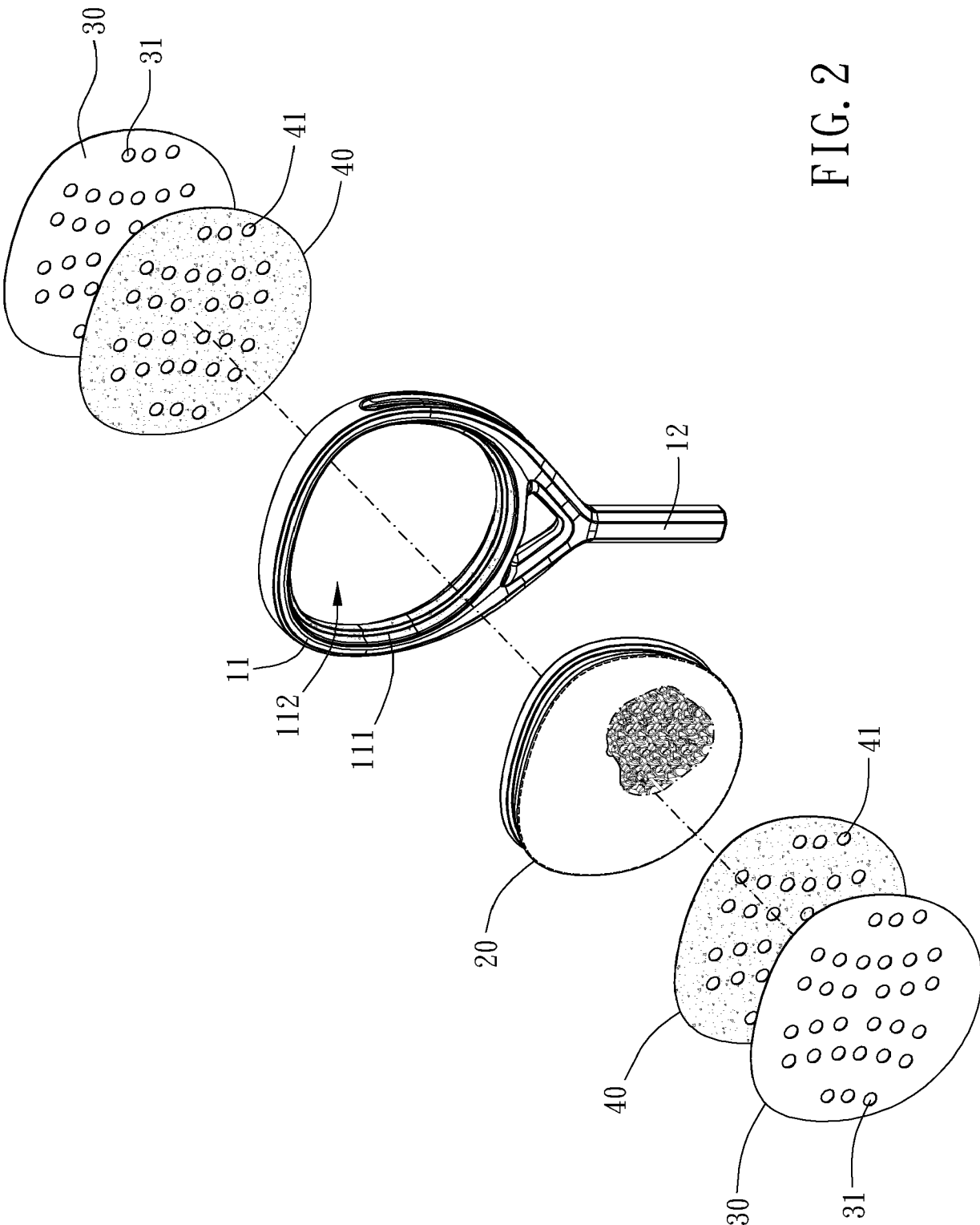


FIG. 2

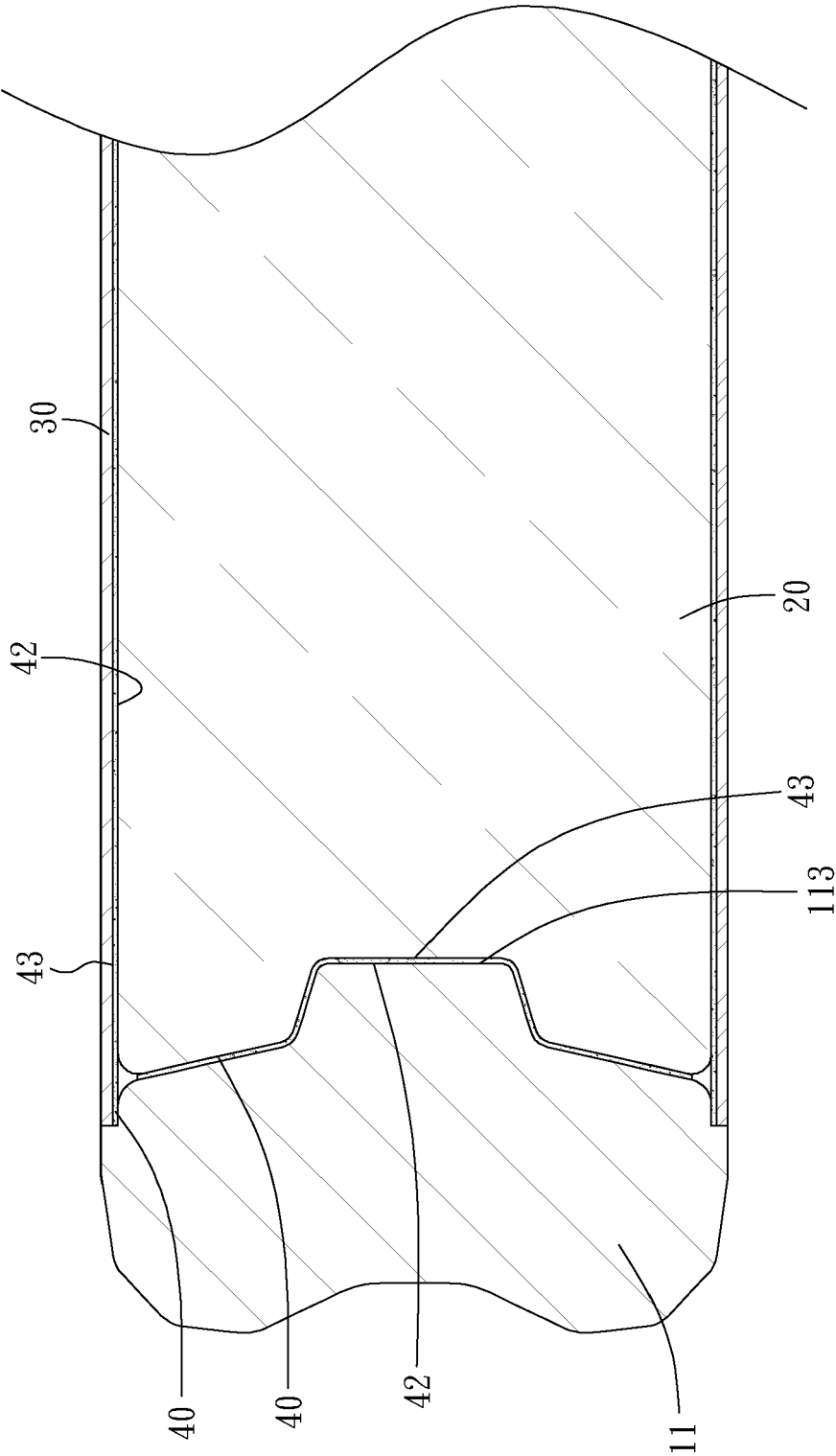


FIG. 3

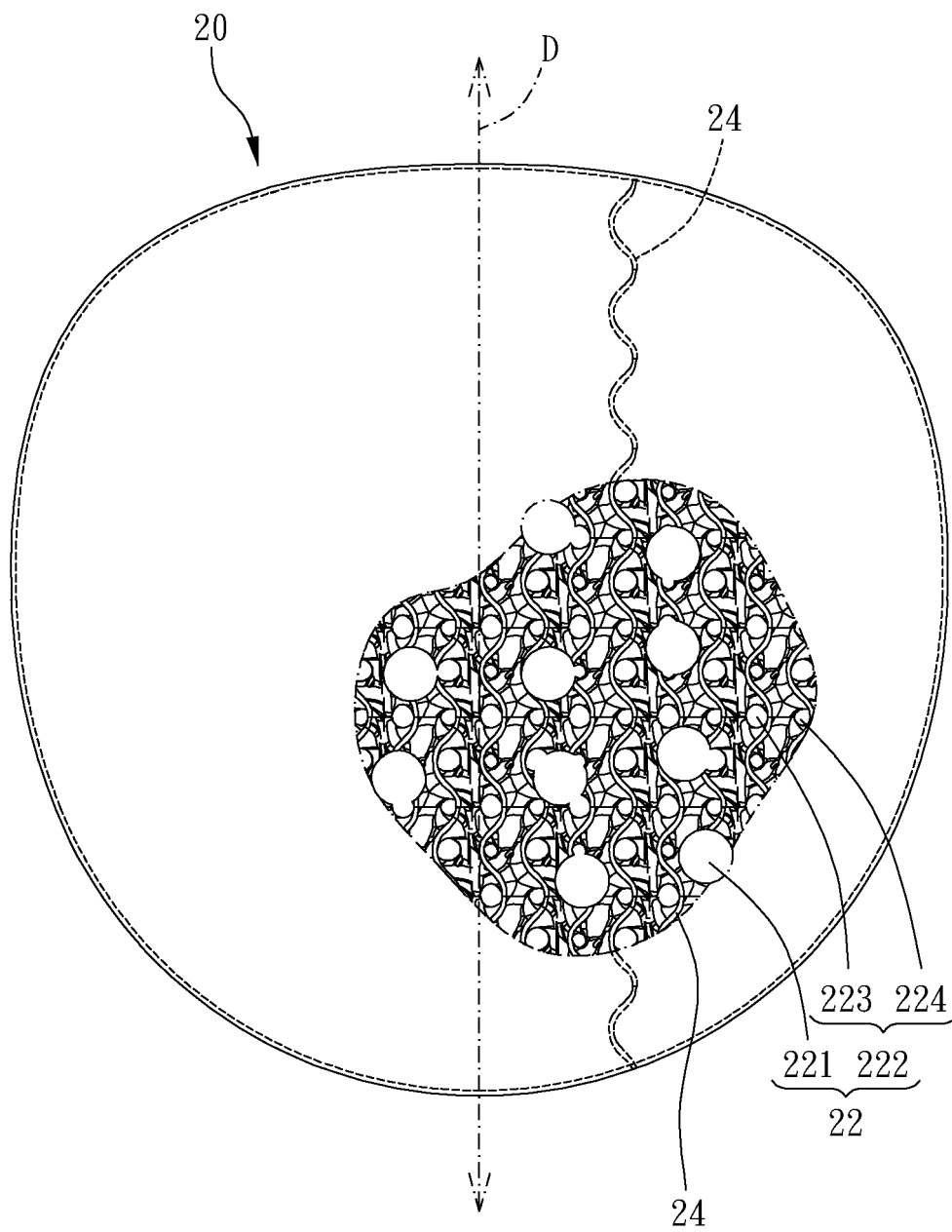


FIG. 4

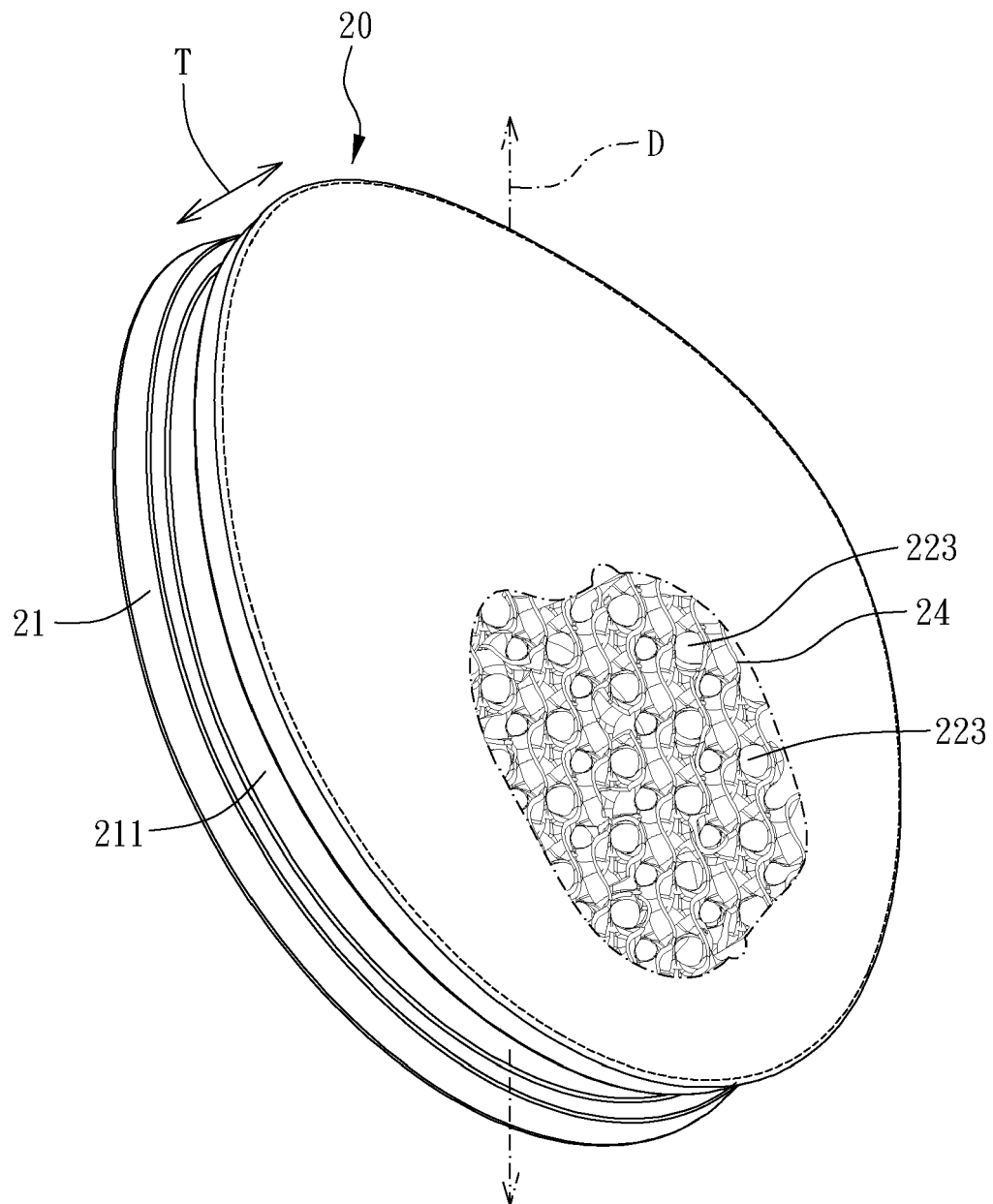


FIG. 5

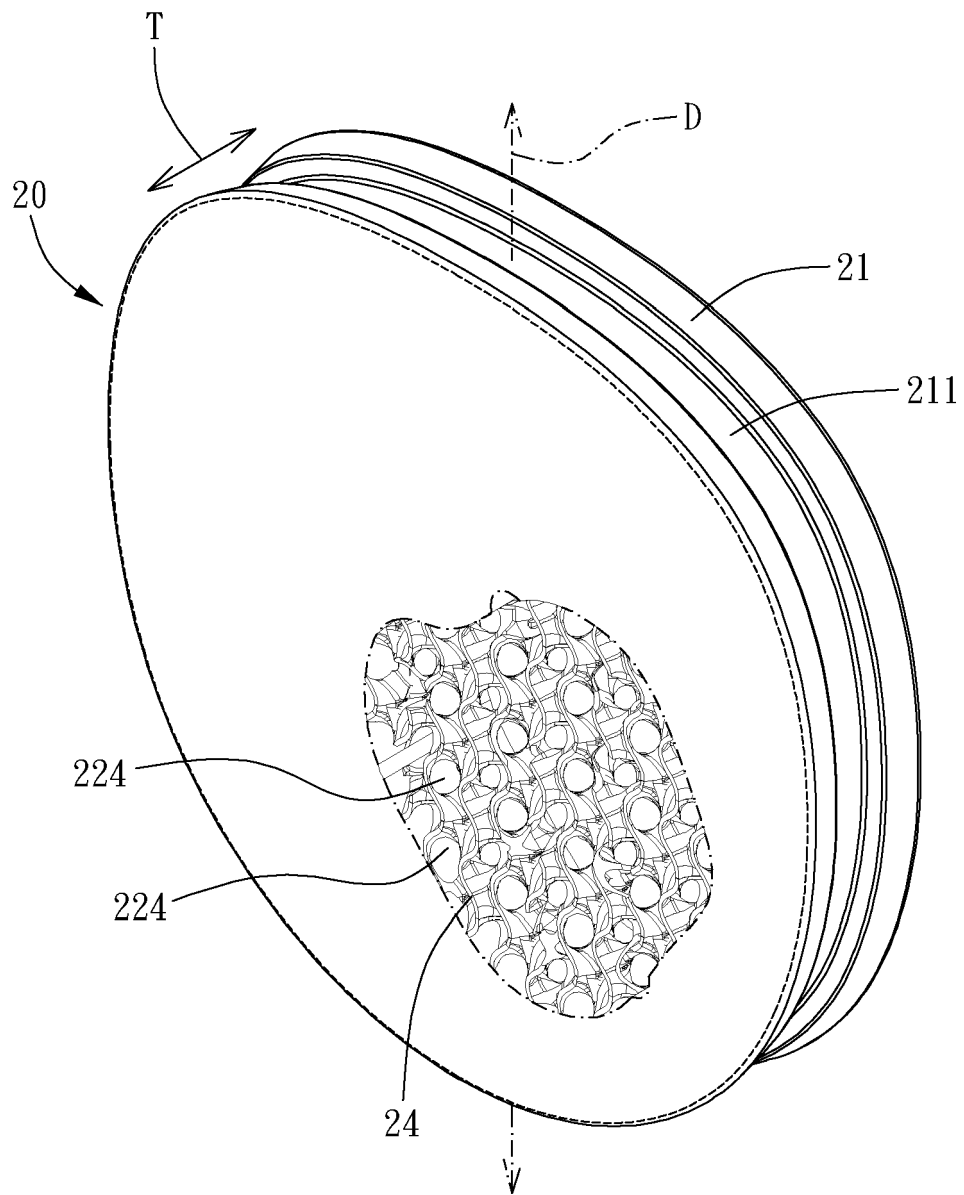


FIG. 6

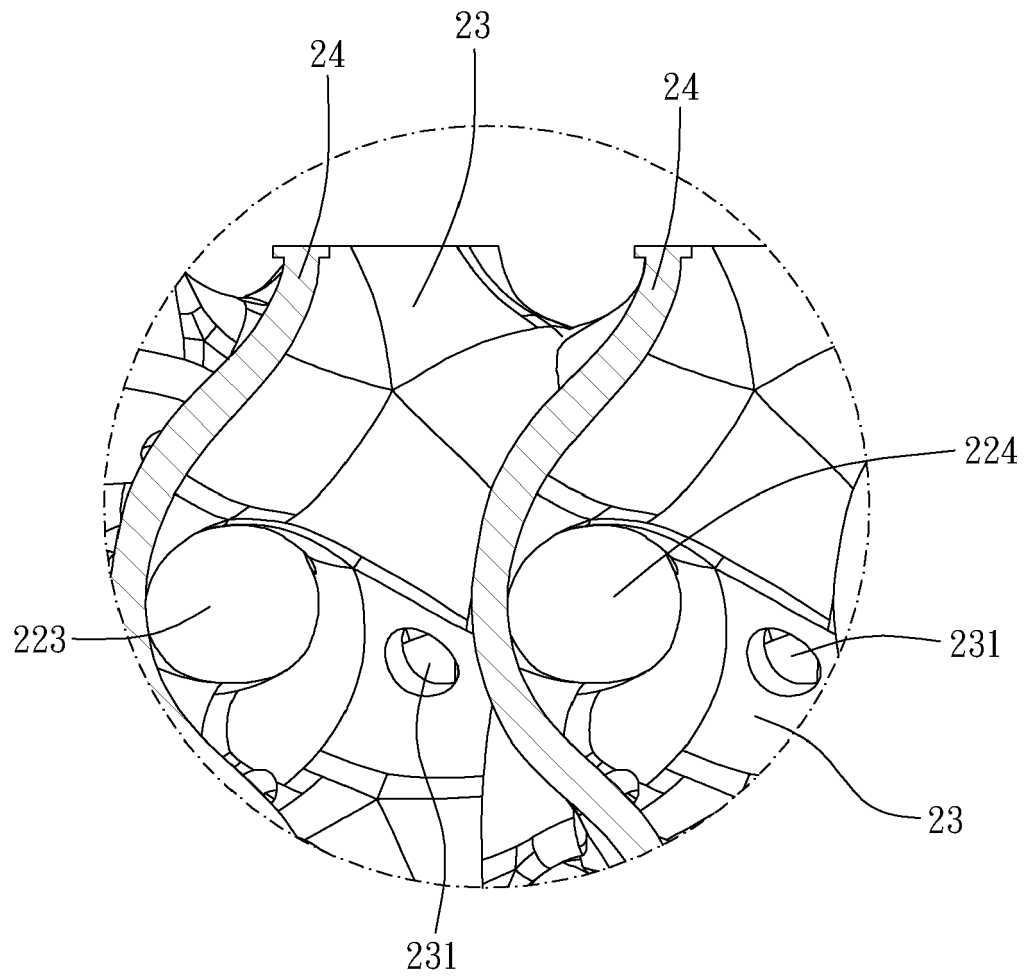


FIG. 7

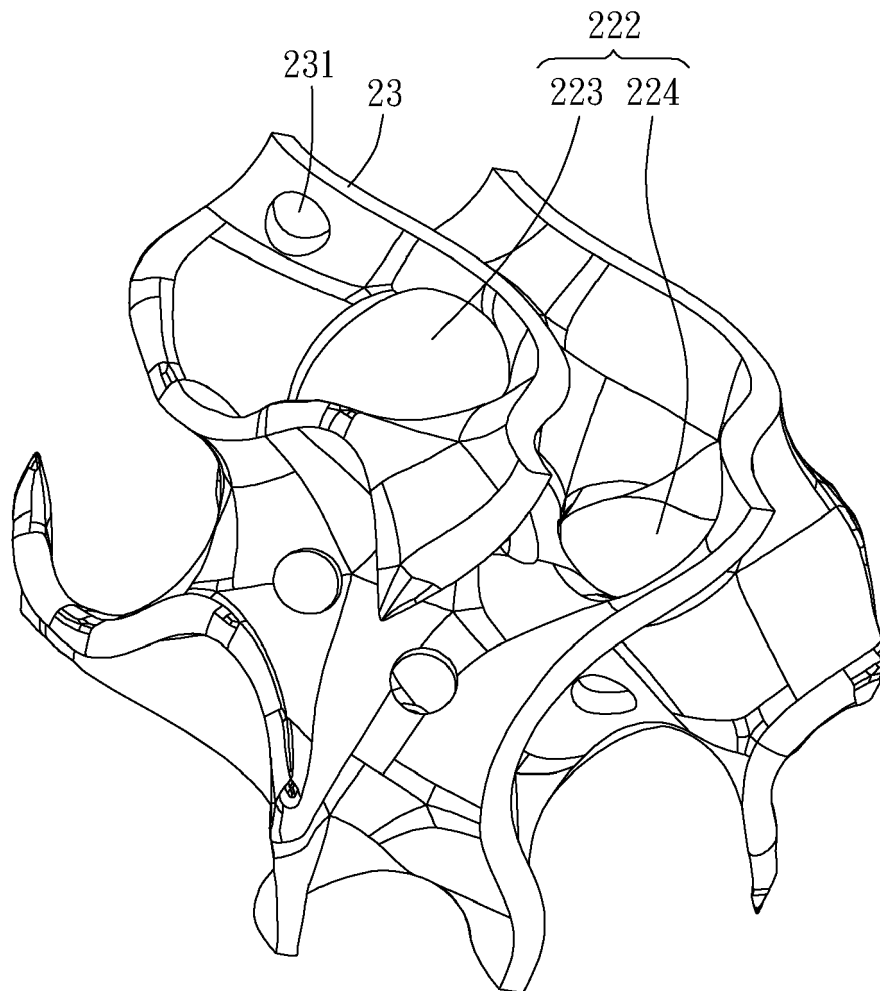


FIG. 8



EUROPEAN SEARCH REPORT

Application Number

EP 23 15 3334

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	ES 1 056 714 U (LIN SHU-WEI [TW]) 1 May 2004 (2004-05-01) * column 2, line 25 - column 4, line 22; figures 1-6 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 August 2023	Examiner Jekabsons, Armands
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EP 23 15 3334

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