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(54) SPORTSBALL WITH SCULPTURAL BALL SURFACE

(57) A sportsball includes a ball body having a valve stem formed thereat, a plurality of cover panels overlappedly coupled on the ball body to form a ball carcass for enclosing the ball body therein, and a sculptural arrangement having a plurality of sculptural bumps integrally formed on an outer panel surface of one of the cover panels that create maximum grip and speed of the sportsball, wherein the sculptural bumps are raised above the outer panel surface of the cover panel without applying a depression force to indent on the outer panel surface of the cover panel.

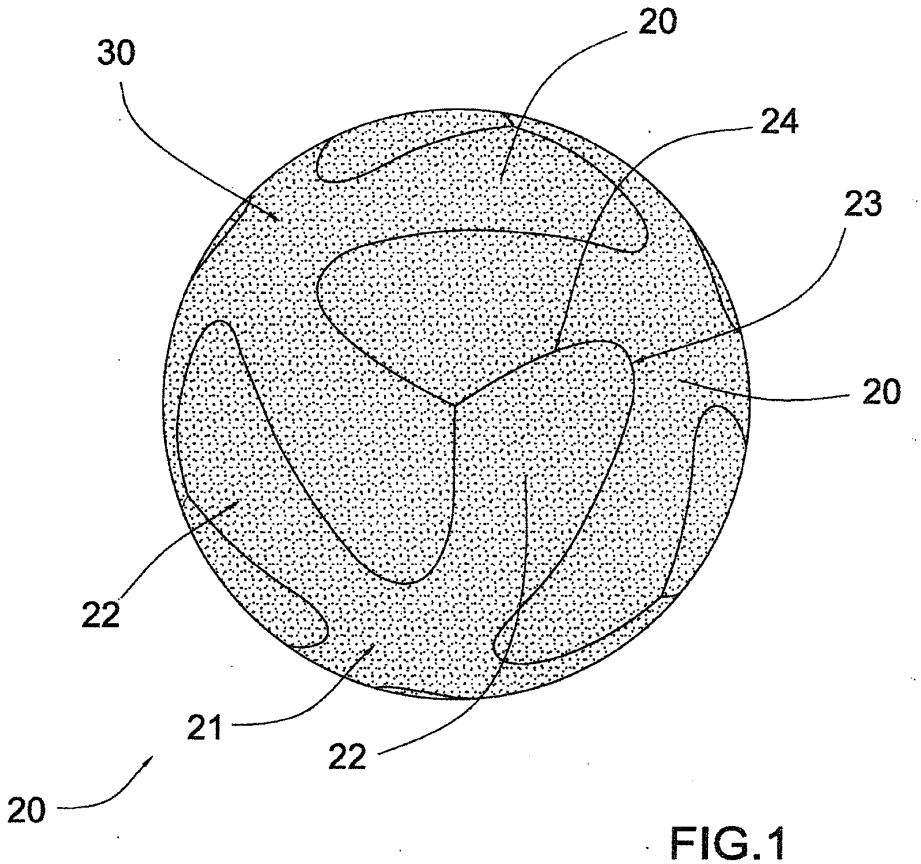


FIG.1

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Description

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BACKGROUND OF THE PRESENT INVENTION

FIELD OF INVENTION

[0002] The present invention relates to a sportsball, and more particular to a sportsball with sculptural ball surface that creates maximum grip and speed of the sportsball and enhances the aesthetic appearance of the sportsball.

DESCRIPTION OF RELATED ARTS

[0003] A conventional sportsball, such as a conventional soccer ball, usually comprises a ball bladder, an inner lining, and a ball casing. The ball casing comprises a plurality of cover panels stitched edge to edge together to cover or attached on the ball bladder. Usually, each of the cover panels is stitched to adjacent cover panels for forming a substantially round sportsball. Accordingly, the cover panels can be made of leather or rubber. The cover panels, being stitched onto the ball bladder, involve expensive and time-consuming manufacturing procedures, yet the resulting sportsball may not have the optimal roundness.

[0004] The leather made cover panels are durable and flexible material made by the tanning of animal rawhide and skin. Each of the leather made cover panels has a plurality of different sized grains naturally formed on the panel surface and having breathability. Accordingly, the sportsball with the leather made cover panels, such as basketball and volleyball, is mainly for indoor activity. It is known that water and moisture is not good for leather. If the leather made cover panels get wet and then dries, the cover panels can crack and dry out. In other words, most indoor sportsballs are not made by the leather made cover panels. In addition, in order to enhance the aesthetic appearance of the sportsball, a logo or design can be printed on the cover panels. However, the logo or design cannot be perfectly printed on the surface of the cover panels because of the naturally formed gains.

[0005] On the other hand, the rubber or synthetic leather made cover panels can solve the above mentioned problems of the leather made cover panels. Accordingly, the rubber made cover panels are durable and waterproof such that the outdoor sportsball, such as soccer ball, is made by the rubber or synthetic leather made cover panels. Furthermore, the rubber or synthetic leather made cover panel has a smooth surface, such that the logo or design can be easily printed on such cover panels. However, one drawback of the rubber or synthetic leather made cover panels is that there is no grain formed on the smooth panel surface. Therefore, the sportsball with the rubber made cover panels will substantially reduce the surface friction, such that the sportsball with the rubber made cover panels is too slippery and is hard to control. The ball manufacturer will intentionally form the grains on the rubber made cover panels by pressing a plurality of fine grooves to be indented on the panel surface to form a "texture" thereon. However, the indented grooves will substantially reduce the aesthetic appearance or even destroy the logo or design printed on the sportsball.

[0006] In particular, the manufacturing process of the cover panel will be complicated to involve the formation of the texture. The texture must be formed on the panel surface of the cover panel before the cover panels are attached on the ball bladder. Therefore, the grains at the edge of the cover panel will be partially cut. Especially, when the cover panels are attached edge to edge, the texture at the edges of the cover panels will be damaged. In other words, when the edges of the cover panels are pressed to form the channels of the sportsball, the grains will be disappeared at the channels of the sportsball.

[0007] U.S. Pat. No. 8,388,476 to Tsung Ming OU, who is the applicant of the present invention, disclosed a sportsball which comprises a ball pocket constructed to have a true roundness shape and to receive the inflatable bladder therein. Therefore, when the inflatable bladder is inflated, the ball pocket retains a true roundness shape of the inflatable bladder.

[0008] U.S. Pat. No. 6,656,067 to Tsung Ming OU, who also is the applicant of the present invention, disclosed a sportsball which comprises an exterior web layer integrally adhered on an outer surface of the inflatable bladder. Therefore, when the inflatable bladder is inflated, the exterior web layer retains a true roundness shape of the inflatable bladder.

SUMMARY OF THE PRESENT INVENTION

[0009] The invention is advantageous in that it provides a sportsball with a sculptural ball surface that creates maximum grip and speed of the sportsball and enhances the aesthetic appearance of the sportsball.

[0010] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein the sculptural design and pattern can be selectively formed on the sportsball surface not only to increase the frictional surface but also to enhance the aesthetic appearance of the sportsball.

[0011] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein a plurality of sculptural bumps (or pimples) are raised above an outer panel surface of the cover panel to form the

sculptural ball surface to enhance the grip and speed of the sportsball.

[0012] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein no depression force is required for applying on the outer panel surface of the cover panel in order to indent the outer panel surface of the cover panel. In other words, there is no damage on the outer panel surface of the cover panel in order to form the sculptural ball surface.

[0013] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein the manufacturing method is simple, cost-effective, and efficient. In other words, the present invention provides an optimal method of producing a large quantity of sportsball in a relatively short period of time.

[0014] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein the sportsball can be manufactured into a wide variety of ball types, so as to facilitate widespread applications of the present invention. For example, the sportsball can be manufactured as a soccer ball, an America football, or even a volley ball.

[0015] Another advantage of the invention is to provide a sportsball with a sculptural ball surface, wherein no expensive or complicated structure is required to employ in the present invention in order to achieve the above mentioned objects. Therefore, the present invention successfully provides an economic and efficient solution for providing a secure and reliable configuration for detachably mounting additional accessories at the firearm with compact and ergonomic design.

[0016] Additional advantages and features of the invention will become apparent from the description which follows, and may be realized by means of the instrumentalities and combinations particular point out in the appended claims.

[0017] According to the present invention, the foregoing and other objects and advantages are attained by a method of manufacturing a sportsball, comprising the following steps.

(a) Provide a ball body having a valve stem formed thereat.

(b) Provide a plurality of cover panels.

(c) Integrally form a plurality of sculptural patterns on at least a portion of one of the cover panels to form a sculptural ball surface of the cover panel.

(d) Form a ball carcass by covering the cover panels around the ball body to enclose the ball body inside the ball carcass, wherein one of the cover panels has a valve hole aligning with the valve stem of the ball body.

[0018] In one embodiment, in the step (d), the ball carcass can be made by stitching the cover panels edge to edge together to form a ball shape and the ball body is enclosed inside the ball carcass. In one embodiment, in the step (d), the cover panels are overlapped on the ball body to form the ball carcass in a stitch-less manner, wherein the cover panels are interlocked and bonded with each other edge-to-edge to enclose the ball body inside the ball carcass.

[0019] In one embodiment, the sculptural patterns formed in the step (c) are bumps or pimples which are raised above an outer panel surface of each of the cover panels without applying a depression force to indent on the outer panel surface of the cover panel.

[0020] In accordance with another aspect of the invention, the present invention comprises a sportsball which comprises a ball body having a valve stem formed thereat, a plurality of cover panels, and a sculptural arrangement.

[0021] The cover panels are overlappedly laminated on the ball body to form a ball carcass in a stitch-less manner, wherein the cover panels are interlocked and bonded with each other edge-to-edge to enclose the ball body inside the ball carcass, wherein one of the cover panels has a valve hole aligning with the valve stem of the ball body.

[0022] The sculptural arrangement has a plurality of sculptural bumps integrally formed on at least a portion of one of the cover panels to form a sculptural ball surface of the cover panel that create maximum grip and speed of the sportsball, wherein the sculptural bumps are raised above an outer panel surface of the cover panel without applying a depression force to indent on the outer panel surface of the cover panel.

[0023] Still further objects and advantages will become apparent from a consideration of the ensuing description and drawings.

[0024] These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025]

Fig. 1 is a perspective view of a sportsball according to a preferred embodiment of the present invention.

Fig. 2 is a schematic diagram illustrating the manufacturing process of the sportsball according to the above preferred embodiment of the present invention.

Fig. 3 is a flow diagram illustrating the manufacturing process of the sportsball according to the above preferred embodiment of the present invention.

Fig. 4 illustrates the formation of the sculptural ball surface of the cover panel according to the above

preferred embodiment of the present invention.

Fig. 4A illustrates the structure of the sculptural bump according to the above preferred embodiment of the present invention, illustrating each sculptural bump having a base coating portion and a raised coating portion.

Fig. 5 illustrates an alternative mode of the formation of the sculptural ball surface of the cover panel according to the above preferred embodiment of the present invention.

Fig. 5A illustrates an alternative mode of the sculptural bump according to the above preferred embodiment of the present invention, illustrating each sculptural bump only having a raised coating portion.

Fig. 6 illustrates an alternative mode of the ball pocket of the sportsball according to the above preferred embodiment of the present invention.

Fig. 7 illustrates an alternative mode of the sculptural bumps according to the above preferred embodiment of the present invention, illustrating each sculptural bump having a semi-spherical shape.

Figs. 8A to 8C illustrate irregular shapes of logo and design formed on the cover panel via the sculptural bumps according to the above preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0026] The following description is disclosed to enable any person skilled in the art to make and use the present invention. Preferred embodiments are provided in the following description only as examples and modifications will be apparent to those skilled in the art. The general principles defined in the following description would be applied to other embodiments, alternatives, modifications, equivalents, and applications without departing from the spirit and scope of the present invention.

[0027] Referring to Figs. 1 to 3 of the drawings, a sportsball and its manufacturing method thereof according to a preferred embodiment of the present invention is illustrated, wherein the sportsball is shown as a soccer ball as an example. The sportsball comprises a ball body 10, a plurality of cover panels 20, and a sculptural arrangement 30.

[0028] The ball body 10, having a valve stem 101 formed thereat, comprises an inflatable bladder 11 and a ball pocket 12, which is constructed to have a true roundness shape, having an interior cavity receiving the inflatable bladder 11 therein, wherein when the inflatable bladder 11 is inflated, the ball pocket 12 retains a true roundness shape of the inflatable bladder 11.

[0029] Accordingly, the ball pocket 12 comprises a plurality of ball pocket leaves 121 integrally connected with each other. Practically, the fabric made ball pocket 12 is able to form a spherical body that the ball pocket 12 is constructed to have a true roundness shape so as to retain a maximum diameter of the inflatable bladder 11 after it is inflated.

[0030] The ball pocket 12 is preferred to be made of thread material or fabric material having a durability, stretchability and adhesiveablility. Preferably, the ball pocket 12 can be made of strengthened thread material evenly wound around and around the outer surface of the inflatable bladder as taught in US 6,390,941 patent or a mixture fabric mixed with cotton and polyester because the cotton has a good stretchability and is able to absorb adhesive material and the polyester is durable and has a strong strength that is able to resist strain when the inflatable bladder 11 is inflated.

[0031] The inflatable bladder 11 is disposed in the ball pocket 12 which has a size slightly bigger than the inflatable bladder 11 in such a manner that when the inflatable bladder 11 is inflated, an outer spherical surface of the inflatable bladder 11 is preferred to be slightly spaced apart from an inner spherical surface of the ball pocket 12 to form an air cushion layer therebetween. The air cushion layer is adapted for providing a cushion effect for the stitching ball to provide softness for the stitching ball and tolerate heavier impact thereon.

[0032] The cover panels 20 are overlappedly laminated on the ball body 10 to form a ball carcass in a stitchless manner, wherein the cover panels 20 are interlocked and bonded with each other edge-to-edge to enclose the ball body 10 inside the ball carcass, wherein one of the cover panels 20 has a valve hole 201 aligning with the valve stem 101 of the ball body 10. Accordingly, the cover panels 20 serve as the cushioning panels of the sportsball.

[0033] It is worth mentioning that the cover panels may also be stitched edge to edge together to form a ball structure as taught in the US 6,656,067 patent and US6,663,520 patent to form the ball carcass and receive the ball body 10 therein.

[0034] The sculptural arrangement 30 has a plurality of sculptural patterns 31 integrally formed on at least a portion of one of the cover panels 20 to form a sculptural ball surface of the cover panel 20 that create better grip and speed of the sportsball. The sculptural patterns 31 can be formed on the cover panels in a generally flat manner while providing a surface for easier grip and better speed of the sportsball. According to the preferred embodiment of the present invention, the sculptural patterns 31 are embodied as bumps or pimples raised above an outer panel surface of the cover panel 20 without applying a depression force to indent on the outer panel surface of the cover panel 20.

[0035] Accordingly, the method of manufacturing a sportsball comprises the following steps.

(1) Provide the ball body 10. For inflatable sportsball, a valve stem is formed at the ball body 10.

(2) Provide a plurality of cover panels 20.

[0036] Preferably, only six cover panels 20 are provided to form the soccer ball.

(3) Integrally form the sculptural patterns 31 on at least a portion of one of the cover panels 20 to form the sculptural ball surface of the cover panel 20.

[0037] According to the preferred embodiment, the sculptural patterns 31 are embodied as bumps or pimples which are raised above an outer panel surface of each of the cover panels 20 without applying a depression force to indent on the outer panel surface of the cover panel 20.

(4) Form a ball carcass by covering the cover panels 20 around the ball body 10 to enclose the ball body 10 inside the ball carcass. For inflatable sportsball, one of the cover panels has a valve hole aligning with the valve stem of the ball body 10.

[0038] According to the preferred embodiment of the present invention, the ball carcass is made by overlapping the cover panels 20 on the ball body 10 to form the ball carcass in a stitch-less manner. Preferably, the cover panels 20 are laminated on the ball body 10 to form the ball carcass in a stitch-less manner. Accordingly, the ball carcass is vulcanized to form an integral spherical carcass around the ball body 10 to provide a cushion effect for the sportsball at any point thereof. Note that the heat treatment (vulcanization) can be performed by conventional heating machine, such as a vulcanizing machine.

[0039] It is worth mentioning that the edge portion of each of the cover panels 20 is slanted that a top surface of the edge portion of the cover panel 20 downwardly and inclinedly extends a bottom surface thereof. Therefore, when the cover panels 20 are attached onto the ball body 10 edge-to-edge, the edge portions of the two adjacent cover panels 20 form an indented channel on the ball carcass. In other words, the edge portions of the adjacent cover panels 20 form the beveled seams for the cover panels 20 attaching onto the ball carcass edge-to-edge. Preferably, the edge portion of the cover panel 20 is trimmed to form the slanted edge portion. Alternatively, the ball carcass is pressed in a mold along the edge portions of the cover panels 20 to form the indented channels on the ball carcass.

[0040] In order to manufacture the ball body 10, the step (1) further comprises the following steps.

(1.1) Form the ball pocket 12, which is constructed to have a true roundness, having the interior cavity. The ball pocket 12 is made by the steps of:

(1.1.1) providing a parent bladder having a true roundness shape after the parent bladder is inflated, wherein the parent bladder has the same size and shape of the inflatable bladder 11;

(1.1.2) overlapping a plurality of pocket panels 121 on the parent bladder at a position that edge portions of the pocket panels 121 are overlapped with edge portions of the adjacent pocket panels 121, wherein one of the pocket panels 121, having a valve hole, is remained unattached to form an inlet opening of the ball pocket 12;

(1.1.3) heat-treating the pocket panels 121 to integrally bond the ball panels 121 together to form a hollow round pocket body having the inlet opening provided thereon; and

(1.1.4) removing the parent bladder from the hollow round pocket body through the inlet opening after the parent bladder is deflated, so as to form the ball pocket 12.

(1.2) Dispose the inflatable bladder 11 in the ball pocket 12, wherein when the inflatable bladder 11 is inflated, the ball pocket 12 retains a true roundness shape of the inflatable bladder 11. It is worth mentioning that after the inflatable bladder 11 is disposed in the ball pocket 12 through the inlet opening thereof, the inlet opening is sealed by attaching the unattached pocket panel 121 at a position that the valve hole 201 is aligned with the valve stem 101 to sealedly enclose the interior cavity to form the ball body 10.

[0041] Fig. 6 illustrates an alternative mode of forming the ball pocket 12' which comprises an exterior web layer 121', which is integrally attached on an outer surface of the inflatable bladder 11, and comprising at least an elongated strengthened thread 122' evenly wound around the outer surface of the inflatable bladder 11 such that the web layer 121' embraces the inflatable bladder 11 for resisting stress and impact force applied to the inflatable bladder 11. In order to enable the strengthened threads 122' being permanently affixed on the outer surface of the inflatable bladder 11, before winding onto the inflatable bladder 11, the strengthened threads 122' are coated with glue for adhering onto the outer surface of the inflatable bladder 11 and each other. Moreover, the inflatable bladder 11 with the adhering strengthened threads 122' thereon are together cured by heating in a mold, so that the adhering strengthened threads 122' will be hardened to form the exterior web layer 121' which is permanently united with the inflatable bladder 11 integrally.

[0042] Accordingly, the step (1.1) further comprises the steps of:

(1.1.1') applying adhesive along the strengthened threads 122';

(1.1.2') evenly winding at least an elongated strengthened thread 122' around the outer surface of the inflatable bladder 11 to form the web layer 121', such that the web layer 121' embraces the inflatable bladder 11 for resisting stress and impact force applied to the inflatable bladder 11; and

(1.1.3') hardening the strengthened threads 122' by heat to form the exterior web layer 121' which is permanently united with the inflatable bladder 11 integrally.

[0043] As it is mentioned above, there are six cover panels 20 overlappedly laminated on the ball body 10 to form the ball carcass in a stitch-less manner. In particular, the cover panels 20 are interlocked and bonded with each other edge-to-edge to enclose the ball body 10 inside the ball carcass.

[0044] According to the preferred embodiment, the step (2) further comprises a step of cutting the cover panel 20 into a predetermined shape. Each of the cover panels 20 has a "X" configuration to define a center panel portion 21 and four panel extension portions 22 outwardly extended from the center panel portion 21. Each of the cover panels 20 further has a plurality of curved edges 23 and at least a straight edge 24 extended from one of the curved edges 23. In particular, at least one curved edge 23 and at least one straight edge 24 are formed at each of the panel extension portions 22 of the cover panels 20.

[0045] Having the "X" configuration of the cover panel 20 with the curved and straight edges 23, 24, minimum numbers of cover panel 20 can be used to form the ball carcass not only for simplifying the manufacturing process of the sportsball but also for enhancing the true roundness for the sportsball at any point thereof. It is worth mentioning that the curved edges 23 and the straight edges 24 of the cover panels 20 are aligned with each other to interlock the cover panels 20.

[0046] Furthermore, the step (2) further comprises the steps of:

(2.1) providing a cushioning layer 25, wherein the cushioning layer 25 is made of foam material provide a uniform cushion effect to the sportsball for ensuring uniform performance thereof when the sportsball is actually in use in a ball game;

(2.2) attaching a skin layer 26 on the top side of the cushioning layer 25, wherein the skin layer 26 is made of durable and waterproof material, such as rubber; and

(2.3) attaching a backing layer 27 at the bottom side of the cushioning layer 25 to form the cover panel 20. Accordingly, the backing layer 27 can be made of fabric to enhance the strength of the cover panel 20 and to ensure the cover panel 20 to be laminated on the ball body 10. In other words, the cushioning layer 25 is sandwiched between the skin layer 26 and the backing layer 27.

[0047] In addition, the step (2) further comprises a step of forming a logo and/or design pattern on the skin layer 26. Accordingly, the logo and/or design pattern in different colors can be coated or printed on the skin layer 26. It is worth mentioning that the skin layer 26 provides a flat and smooth surface, such that the logo and/or design pattern can be easily printed on the skin layer 26. Preferably, the logo and/or design pattern can be coated on the skin layer 26 by screen printing. For example, ink is forced to pass through a screen stencil to coat the ink on the skin layer 26 in order to form the logo and/or design pattern.

[0048] As shown in Figs. 8A to 8C, the sculptural patterns 31 can be selectively bonded on a desired area of the cover panel 20 to form the logo and/or design pattern on the skin layer 26. It is worth mentioning that irregular shapes of logo and design can be formed on the cover panel 20 by integrally forming the sculptural patterns 31 on the cover panel 20. For example, the logo with different colors can be formed on the cover panel 20 as shown in Fig. 8A. Different design patterns of the sculptural patterns 31, such as a spiral configuration or an arrow configuration, can be also formed on the cover panel 20 as shown in Figs. 8B and 8C. As mentioned above, the sculptural patterns 31 are embodied as bumps or pimples according to the preferred embodiment of the present invention.

[0049] As shown in Fig. 4, in order to form the sculptural ball surface of the cover panel 20, the step (3) further comprises the following steps.

(3.1) Place a treatment layer 40 on top of the cover panel 20, wherein the treatment layer 40 comprises a mesh layer 41 having a plurality of meshes 411 thereon, and a sculptural layer 42 formed at a bottom side of the mesh layer 41. In particular, the sculptural layer 42 is made of sculptural substance, such as adhesive, formed at the bottom side of the mesh layer 41 and filled at the meshes 411 of the mesh layer 41.

[0050] Accordingly, the mesh layer 41 is a thin film made of non-stick material. The sculptural layer 42 also is a thin film overlapped at the bottom side of the mesh layer 41 to define a film portion at the bottom side of the mesh layer and a plurality of protruded portions filled at the meshes 411 of the mesh layer 41. In other words, the thickness of each of the protruded portions of the sculptural layer 42 is larger than the thickness of the film portion of the sculptural layer 42. The thickness of each of the protruded portions of the sculptural layer 42 is the

total thickness of the film portion of the sculptural layer 42 and the thickness of the mesh layer 41.

(3.2) Integrally bond the sculptural layer 42 on the outer panel surface of the cover panel 20, such that the sculptural substances filled at the meshes 411 of the mesh layer 41 forms the sculptural bumps 31 on the outer panel surface of the cover panel 20 respectively. Preferably, heat is gently applied onto the treatment layer 40 to detach the sculptural layer 42 from the mesh layer 41 and to integrally bond the sculptural layer 42 on the outer panel surface of the cover panel 20. As shown in Fig. 4, a heater with an elongated heater head is reciprocatingly moved on the treatment layer 40 in order to evenly apply the head on the treatment layer 40. Once the sculptural substance is heated, the sculptural layer 42 will be detached from the mesh layer 41 and will be integrally bonded on the outer panel surface of the cover panel 20. It is worth mentioning that relatively low heat, preferably 40-50°C, is applied onto the treatment layer 40.

[0051] The sculptural substance is preferably PU composite ink to be formed on the bottom side of the mesh layer 41, such that the sculptural layer 42 will form a clear coat on the outer panel surface of the cover panel 20. It is worth mentioning that the sculptural substance can be transparent or configured with a desired color to be coated on the outer panel surface of the cover panel 20.

(3.3) Remove the mesh layer 41 on top of the cover panel 20 to leave the sculptural layer 41 on the outer panel surface of the cover panel 20. Accordingly, once the sculptural layer 42 is integrally bonded on the outer panel surface of the cover panel 20, the non-stick mesh layer 41 can be easily removed from the sculptural layer 42, such that the sculptural substances, which are previously filled at the meshes 411 of the mesh layer 41, will integrally protrude out from the outer panel surface of the cover panel 20 so as to form the sculptural patterns 31 on the outer panel surface of the cover panel 20 respectively. Preferably, the sculptural patterns 31 are identical in size and shape. In particular, each of the sculptural patterns 31 has a flat top surface to enhance an aerodynamics of the sportsball.

[0052] According to the preferred embodiment, the sculptural patterns 31 can be evenly formed on the entire outer panel surface of the cover panel 20, such that the entire outer panel surface of the cover panel 20 will form the sculptural ball surface. It should be appreciated that the sculptural patterns 31 can be only formed on a portion of the outer panel surface of the cover panel 20, such as only the logo thereon, such that only the logo surface will form the sculptural ball surface. It is worth mentioning that the sculptural layer 42 also serves as a protection layer to protect the logo and/or design pattern on the skin layer 26 of the cover panel 20.

[0053] As shown in Fig. 4, the meshes 411 are orderly formed at the mesh layer 41 in a wavy configuration to sculpture the sculptural patterns 31 in a wavy pattern on the cover panel 20. Furthermore, each of the meshes 411 has a quadrilateral shape to sculpture each of the sculptural patterns 31 with quadrilateral shape. It should be appreciated that the sizes and shapes of the meshes 411 can be changed to sculpture different sculptural patterns 31 in different arrangement of bumps or pimples and different shapes. For example, each of the sculptural patterns 31 can have a semi-spherical shape protruded out of the outer panel surface of the cover panel 20. It is worth mentioning that the sculptural patterns 31 are formed by the sculptural substances, wherein no depression force is required for applying on the outer panel surface of the cover panel 20 in order to indent the outer panel surface of the cover panel 20. In other words, there is no damage on the outer panel surface of the cover panel 20 in order to form the sculptural ball surface.

[0054] As shown in Fig. 4A, each of the sculptural patterns 31 has a base coating portion 311 and a raised coating portion 312 integrally protruded therefrom, wherein the base coating portions 311 of the sculptural patterns 31 are integrally extended from each other, such that the base coating portions 311 of the sculptural patterns 31 form a base coating layer to enclose the outer panel surface of the cover panel 20: In other words, the raised coating portions 312 are spacedly raised above the base coating layer formed by the base coating portions 311 of the sculptural patterns 31.

[0055] Fig. 5 illustrates an alternative method to form the sculptural ball surface, wherein the step (3) comprises the following steps.

(3.1') Place a mesh layer 41' on top of the cover panel 20, wherein the mesh layer 41' has a plurality of meshes 411' thereon.

(3.2') Evenly apply a sculptural substance 42' on the mesh layer 41' that the sculptural substance 42' passes through the meshes 411' to be integrally bonded on the outer panel surface of the cover panel 20 to form the sculptural bumps 31 thereon. Accordingly, the sculptural substance 42' is in liquid form when applying on the mesh layer 41' and is in solid form after dried. In other words, the fluid sculptural substance 42' is directly applied on the mesh layer 41' such that the fluid sculptural substance 42' will fill into the meshes 411' and will contact with the outer panel surface of the cover panel 20. Once the fluid sculptural substances 42' at the meshes 411 are dried, the fluid sculptural substances 42' will integrally bond on the outer panel surface of the cover panel 20 to form the sculptural bumps 31 thereon.

[0056] The sculptural substance 42' is preferably PU composite ink to be applied on the outer panel surface

of the cover panel 20, such that the sculptural substance 42' will form a clear coat on the outer panel surface of the cover panel 20. It is worth mentioning that the sculptural substance 42' can be transparent or configured with a desired color to be coated on the outer panel surface of the cover panel 20.

[0057] Accordingly, the sculptural substance 42', such as the PU composite ink, is coated on the outer panel surface of the cover panel 20 by screen printing. In other words, the mesh layer 41' serves as a screen stencil to enable the sculptural substance 42' to pass through the meshes 411' and to apply on the outer panel surface of the cover panel 20. Preferably, the sculptural substance 42' is sprayed on the mesh layer 41' via a spraying head to evenly apply the sculptural substance 42' on the mesh layer 41' to the outer panel surface of the cover panel 20.

[0058] The step (3.2') further comprises the following steps.

(3.2.1') Sweep the sculptural substance 42' on the mesh layer 41' to ensure the sculptural substance 42' to be evenly applied on the mesh layer 41' and to be evenly penetrated through the meshes 411' on the outer panel surface of the cover panel 20. Accordingly, a sweeper having an elongated sweeping head is reciprocatingly moved on the mesh layer 41' to evenly apply the sculptural substance 42' on the mesh layer 41' and to ensure the sculptural substance 42' to be filled at the meshes 411' of the mesh layer 41'.

(3.2.2') Swab excessive sculptural substance on the mesh layer 41' after the sculptural substance 42' is applied on the outer panel surface of the cover panel 20. Once the sculptural substances 42' are filled at the meshes 411' of the mesh layer 41', the sweeping head can reciprocatingly move on the mesh layer 41' to swab excessive sculptural substance on the mesh layer 41'. Accordingly, the sweeping and swabbing actions in the steps (3.2.1') and (3.2.2') can be repeatedly preformed until the sculptural substances 42' are filled at all the meshes 411' of the mesh layer 41' and no excessive sculptural substance leaves on the mesh layer 41'.

(3.3') Remove the mesh layer 41' on top of the cover panel 20. Accordingly, the non-stick mesh layer 41' can be easily removed from the sculptural substances 42', such that the sculptural substances 42', which are previously filled at the meshes 411' of the mesh layer 41', will integrally protrude out from the outer panel surface of the cover panel 20 so as to form the sculptural bumps 31 on the outer panel surface of the cover panel 20 respectively.

[0059] Furthermore, heat can be gently applied onto the cover panel 20 to integrally bond the sculptural substances 42' on the outer panel surface of the cover panel 20. It is worth mentioning that relatively low heat, preferably 40-50°C, is applied onto the sculptural substance 42' in order to integrally bond the sculptural substance 42' on the outer panel surface of the cover panel 20.

[0060] Likewise, the meshes 411' are orderly formed at the mesh layer 41' in a wavy configuration to sculpture the sculptural bumps 31 in a wavy pattern on the cover panel 20. Furthermore, each of the meshes 411' has a quadrilateral shape to sculpture each of the sculptural bumps 31 with quadrilateral shape. It should be appreciated that the sizes and shapes of the meshes 411' can be changed to sculpture different sculptural bumps 31 in different patterns and different shapes. It is worth mentioning that the sculptural bumps 31 are formed by the sculptural substances, wherein no depression force is required for applying on the outer panel surface of the cover panel 20 in order to indent the outer panel surface of the cover panel 20. In other words, there is no damage on the outer panel surface of the cover panel 20 in order to form the sculptural ball surface.

[0061] As shown in Fig. 5A, the sculptural bumps or pimples 31 are individually and spacedly protruded from the outer panel surface of the cover panel 20 that the outer panel surface of the cover panel 20 is exposed at a gap between the sculptural bumps or pimples 31. In other words, each of the sculptural bumps 31 only has the raised coating portion 312 directly protruded from the outer panel surface of the cover panel 20, such that no base coating portion 311 is formed on the outer panel surface of the cover panel 20.

[0062] Accordingly, thousands of sculptural patterns 31 can be integrally protruded from the outer surface of the ball carcass, i.e. all the outer panel surfaces of the cover panels 20, to substantially increase the surface friction of the sportsball so as to maximize the gripping ability of the sportsball. Therefore, the player, such as the soccer player, is able to easily control the sportsball and to accurately shoot the sportsball. In addition, an air channel is formed between the sculptural patterns 31 to enhance the aerodynamics of the sportsball. In particular, the wavy configuration of the sculptural patterns 31 will create the wavy air channel to enhance the speed of the sportsball, especially when the sportsball is spinning. It is worth mentioning that the sculptural patterns 31 are relatively light weight, such that the overall weight of the sportsball will be determined without taking into account of the weight of the sculptural patterns 31. Furthermore, the size of the sculptural patterns 31 is adjustably controlled by the dimension, such as the depth, of each of the meshes 411, 411' of the mesh layer 41, 41'. Accordingly, since the ball body 10 is constructed to have the ball pocket 12, 12' to reinforce the entire ball structure and to have a better flexibility and impact resisting ability, the cover panels 20 serve as the cushioning panels for stress absorption. In addition, the cover panels 20 with the sculptural patterns 31 will provide a better control for the sportsball.

[0063] Fig. 7 illustrates an alternative mode of the

sculptural patterns 31A, wherein each of the sculptural patterns 31A has a semi-spherical shape integrally formed on the outer panel surface of the cover panel 20. It is appreciated that each of the meshes 411A of the mesh layer 41A has a semi-spherical configuration. Since the sculptural substance is initially formed in a liquid form, the sculptural substance can be easily filled at the meshes 411A of the mesh layer 41A. Once the sculptural substance, which is filled within the mesh 411A and formed on the outer panel surface of the cover panel 20, is dried at the time the heat is applied, the sculptural patterns 31A with the semi-spherical shape will integrally form on the outer panel surface of the cover panel 20.

[0064] It is worth mentioning that each of the sculptural patterns 31A can have a base coating portion 311A and a raised coating portion 312A integrally protruded therefrom, wherein the base coating portions 311A of the sculptural patterns 31A are integrally extended from each other, such that the base coating portions 311A of the sculptural patterns 31A form a base coating layer to enclose the outer panel surface of the cover panel 20. In addition, each of the raised coating portions 312A has a semi-spherical shape, wherein the raised coating portions 312A are spacedly raised above the base coating layer formed by the base coating portions 311A of the sculptural patterns 31A. It is appreciated that each of the sculptural patterns 31A only has the semi-spherical shaped raised coating portion 312A without the base coating portion 311A as mentioned above.

[0065] One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

[0066] It will thus be seen that the objects of the present invention have been fully and effectively accomplished. The embodiments have been shown and described for the purposes of illustrating the functional and structural principles of the present invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

Claims

1. An sportsball, comprising:

a ball body;
a plurality of cover panels covering said ball body to form a ball carcass to receive said ball body therein, wherein said cover panels are coupled with each other edge-to-edge to enclose said ball body inside said ball carcass; and
a sculptural arrangement having a plurality of sculptural patterns integrally formed on at least a portion of an outer panel surface of one of said cover panels to form a sculptural ball surface of said cover panel that creates gripping ability and speed of said sportsball, wherein said sculptural patterns are formed on said outer panel surface of said cover panel without applying a depression force to indent on said outer panel surface of said cover panel.

2. The sportsball, as recited in claim 1, wherein said sculptural patterns are sculptural bumps raised above said outer panel surface of said cover panel without applying the depression force to indent on said outer panel surface of said cover panel.

3. The sportsball, as recited in claim 2, wherein each of said sculptural bumps is made of sculptural substance which is PU composite ink.

4. The sportsball, as recited in claim 2, wherein said sculptural bumps are individually and spacedly protruded from said outer panel surface of said cover panel that said outer panel surface of said cover panel is exposed at a gap between said sculptural bumps.

5. The sportsball, as recited in claim 3, wherein said sculptural bumps are individually and spacedly protruded from said outer panel surface of said cover panel that said outer panel surface of said cover panel is exposed at a gap between said sculptural bumps.

6. The sportsball, as recited in claim 1, wherein each of said sculptural patterns has a base coating portion and a raised coating portion integrally protruded therefrom, wherein said base coating portions of said sculptural patterns are integrally extended from each other and form a base coating layer to enclose said outer panel surface of said cover panel, such that said raised coating portions are spacedly raised above said base coating layer.

7. The sportsball, as recited in claim 4, wherein each of said sculptural bumps has a base coating portion and a raised coating portion integrally protruded therefrom, wherein said base coating portions of said sculptural bumps are integrally extended from each other and form a base coating layer to enclose said outer panel surface of said cover panel, such that said raised coating portions are spacedly raised above said base coating layer.

8. The sportsball, as recited in claim 1, wherein said sculptural patterns are identical in size and shape.

9. The sportsball, as recited in claim 4, wherein said sculptural bumps are identical in size and shape.

10. The sportsball, as recited in claim 7, wherein said sculptural bumps are identical in size and shape.

11. The sportsball, as recited in claim 1, wherein each of said sculptural patterns has a flat top surface.

12. The sportsball, as recited in claim 4, wherein each of said sculptural bumps has a flat top surface.

13. The sportsball, as recited in claim 7, wherein each of said sculptural bumps has a flat top surface.

14. The sportsball, as recited in claim 1, wherein said sculptural patterns are orderly sculptured in a wavy pattern on said cover panel to form an air channel between said sculptural patterns so as to enhance an aerodynamics of the sportsball.

15. The sportsball, as recited in claim 4, wherein said sculptural bumps are orderly sculptured in a wavy pattern on said cover panel to form an air channel between said sculptural bumps so as to enhance an aerodynamics of the sportsball.

16. The sportsball, as recited in claim 7, wherein said sculptural bumps.are orderly sculptured in a wavy pattern on said cover panel to form an air channel between said sculptural bumps so as to enhance an aerodynamics of the sportsball.

17. The sportsball, as recited in claim 15, wherein each of said sculptural bumps are sculptured in a quadrilateral shape.

18. The sportsball, as recited in claim 16, wherein each of said sculptural bumps are sculptured in a quadrilateral shape.

19. The sportsball, as recited in claim 1, wherein six of said cover panels are provided to interlock with each other edge-to-edge to form said ball carcass, wherein each of said cover panels has a "X" configuration to define a center panel portion and four panel extension portions, wherein each of said cover panels has a plurality of curved edges and at least a straight edge extended from one of said curved edges, wherein each of said cover panels comprises a skin layer, a backing layer, and a cushioning layer sandwiched between said skin layer and said backing layer, wherein a design pattern is printed on said skin layer.

20. The sportsball, as recited in claim 4, wherein six of said cover panels are provided to interlock with each other edge-to-edge to form said ball carcass, wherein each of said cover panels has a "X" configuration to define a center panel portion and four panel extension portions, wherein each of said cover panels has a plurality of curved edges and at least a straight edge extended from one of said curved edges, wherein each of said cover panels comprises a skin layer, a backing layer, and a cushioning layer sandwiched between said skin layer and said backing layer, wherein a design pattern is printed on said skin layer.

21. The sportsball, as recited in claim 7, wherein six of said cover panels are provided to interlock with each other edge-to-edge to form said ball carcass, wherein each of said cover panels has a "X" configuration to define a center panel portion and four panel extension portions, wherein each of said cover panels has a plurality of curved edges and at least a straight edge extended from one of said curved edges, wherein each of said cover panels comprises a skin layer, a backing layer, and a cushioning layer sandwiched between said skin layer and said backing layer, wherein a design pattern is printed on said skin layer.

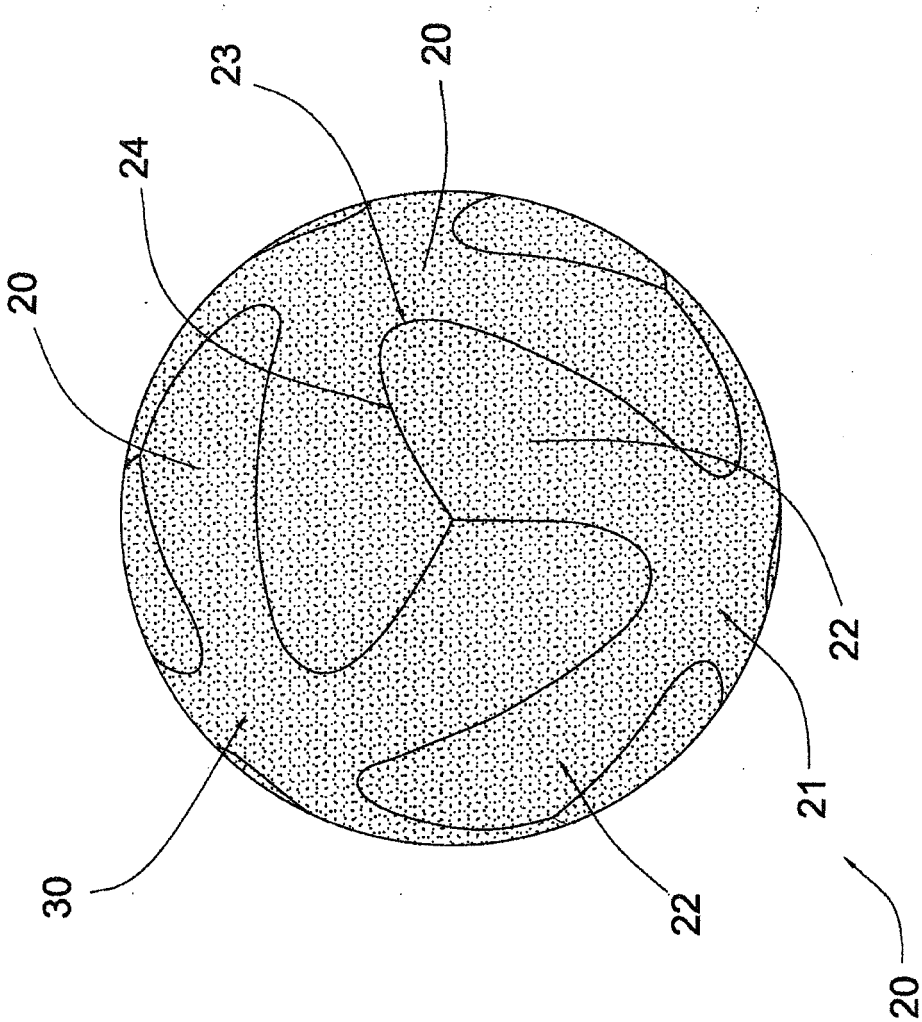


FIG.1

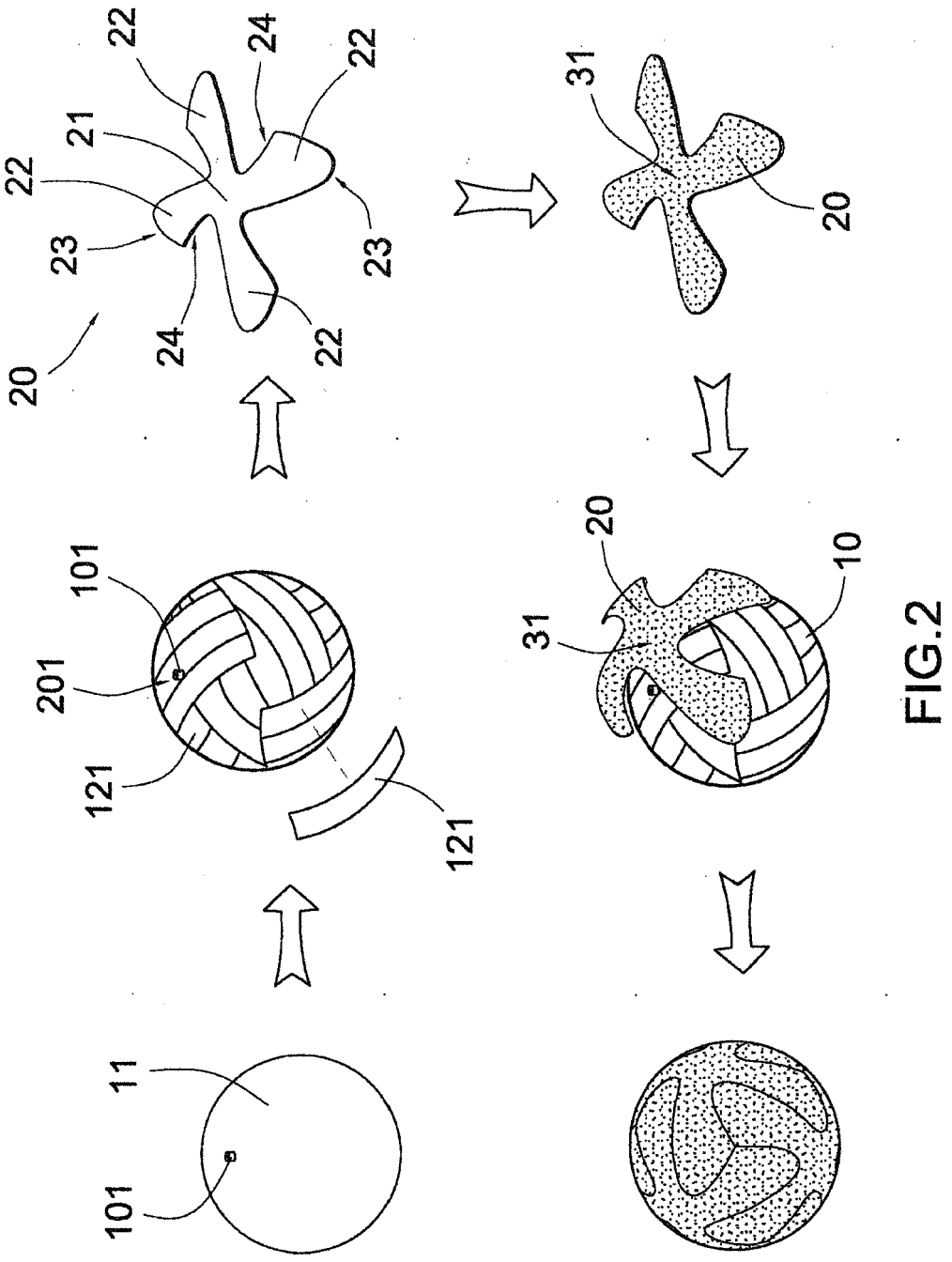


FIG.2

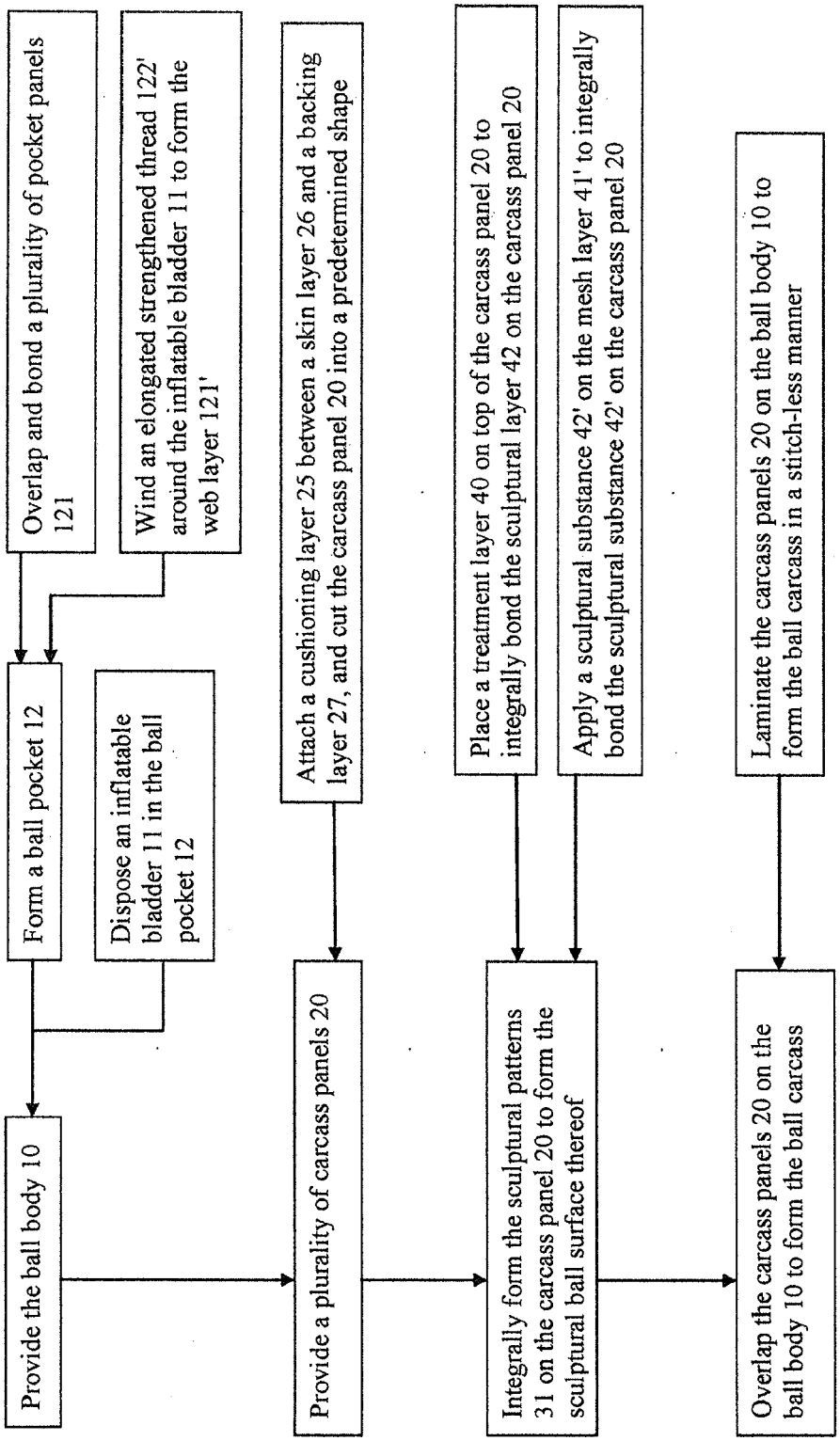

Provide the ball body 10
Form a ball pocket 12
Overlap and bond a plurality of pocket panels 121
Wind an elongated strengthened thread 122' around the inflatable bladder 11 to form the web layer 121'
Dispose an inflatable bladder 11 in the ball pocket 12
Provide a plurality of carcass panels 20
Attach a cushioning layer 25 between a skin layer 26 and a backing layer 27, and cut the carcass panel 20 into a predetermined shape
Integrally form the sculptural patterns 31 on the carcass panel 20 to form the sculptural ball surface thereof
Place a treatment layer 40 on top of the carcass panel 20 to integrally bond the sculptural layer 42 on the carcass panel 20
Apply a sculptural substance 42' on the mesh layer 41' to integrally bond the sculptural substance 42' on the carcass panel 20
Overlap the carcass panels 20 on the ball body 10 to form the ball carcass
Laminate the carcass panels 20 on the ball body 10 to form the ball carcass in a stitch-less manner

FIG. 3

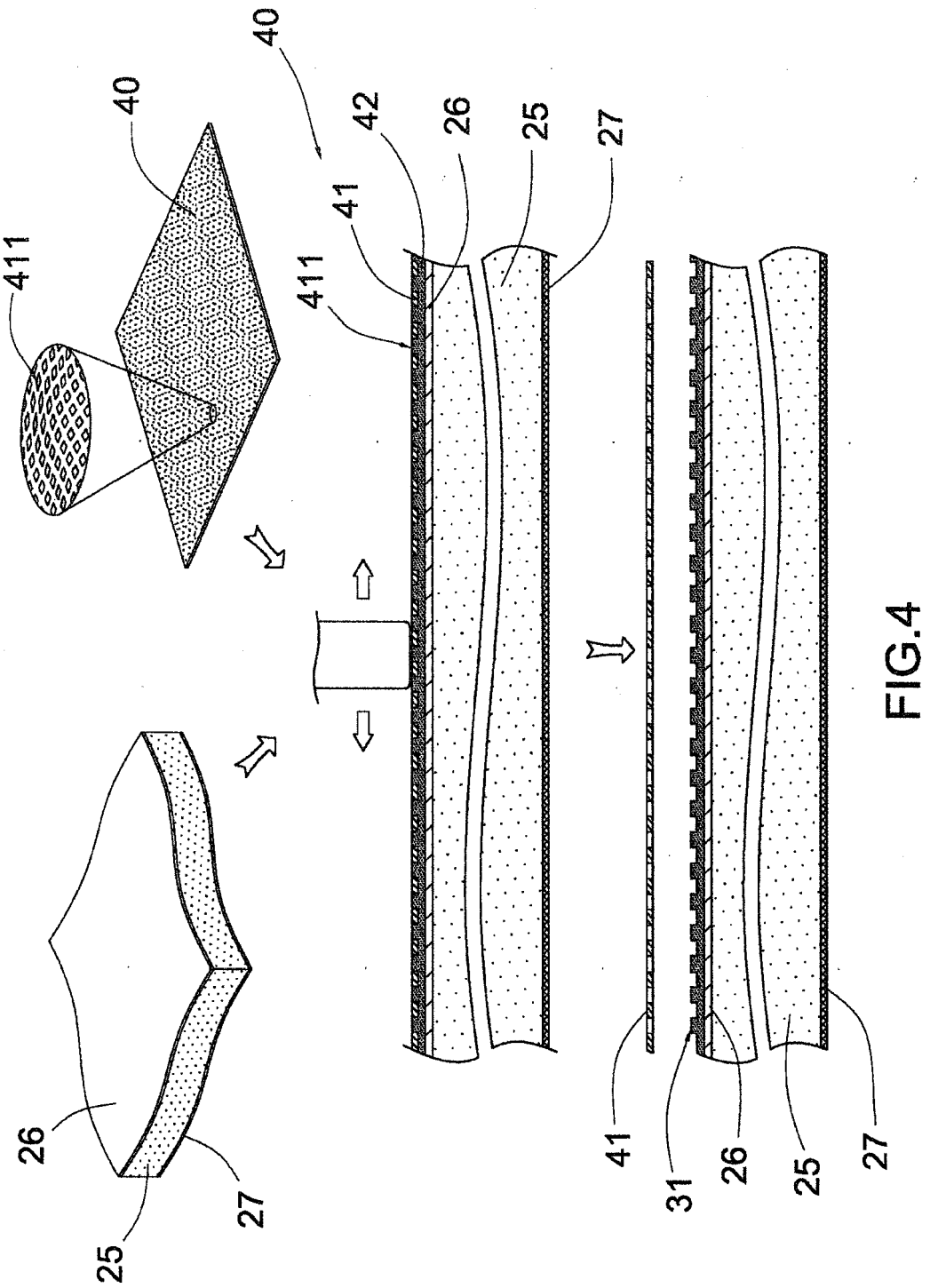


FIG.4

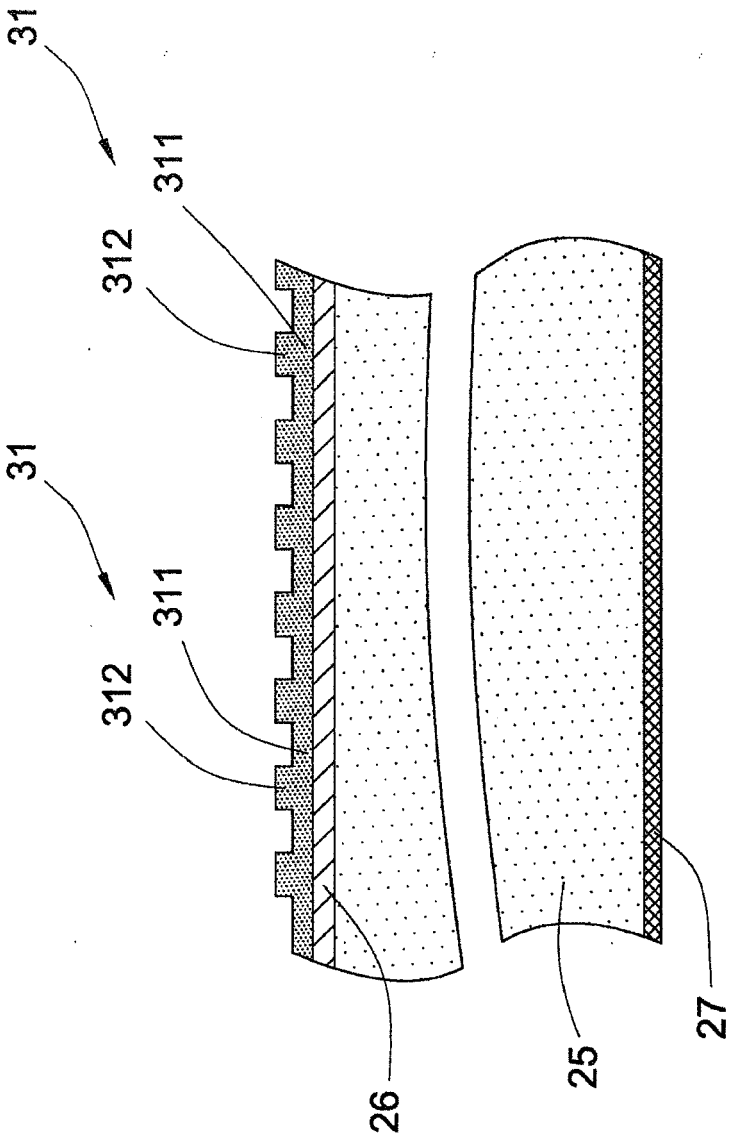


FIG.4A

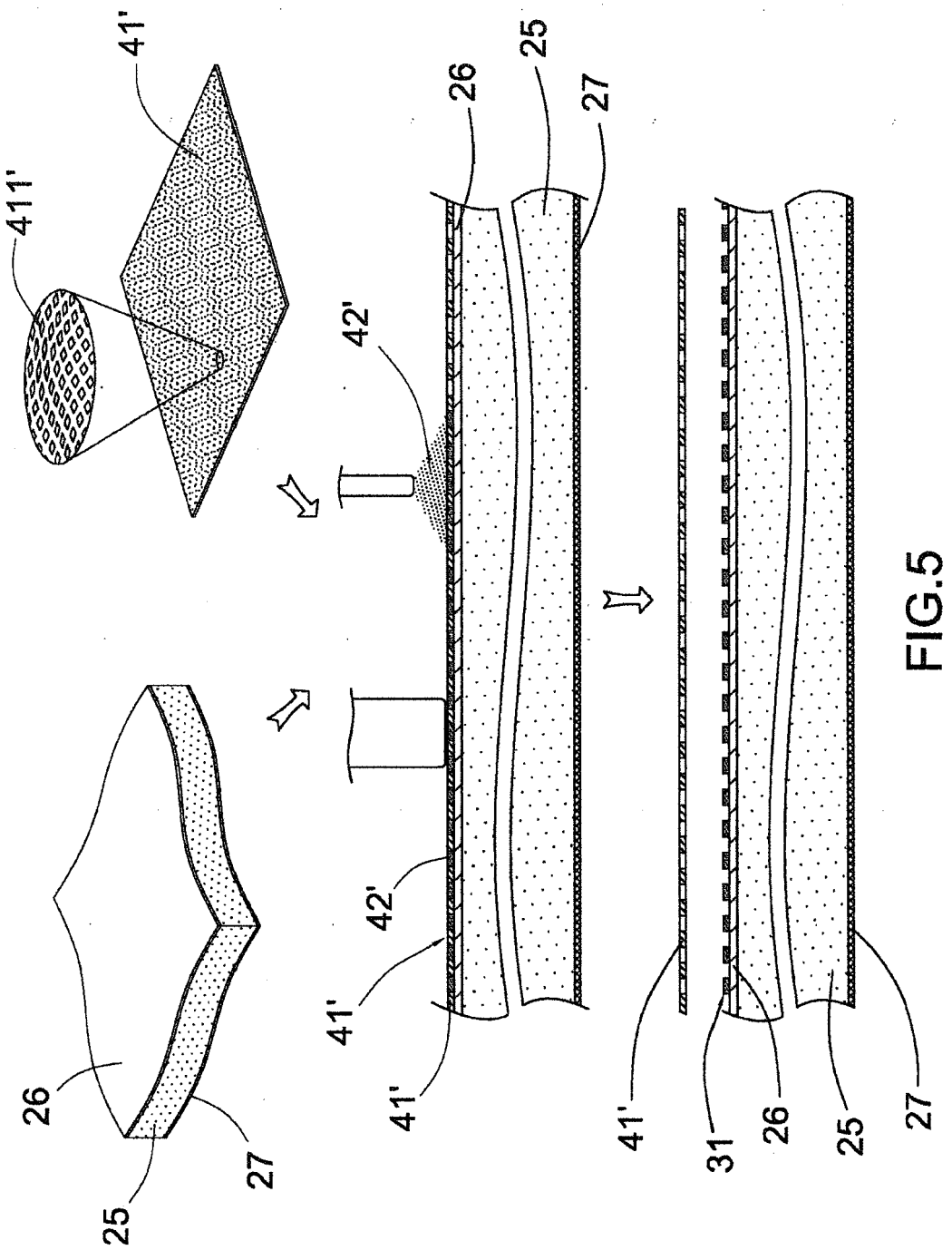


FIG.5

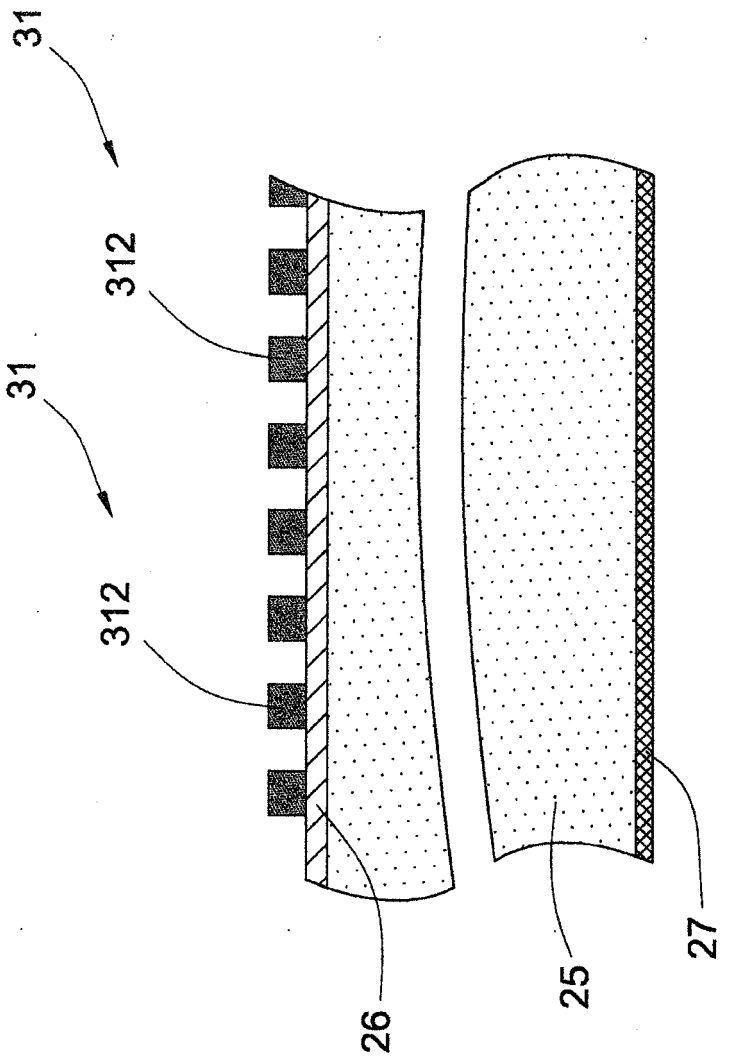


FIG.5A

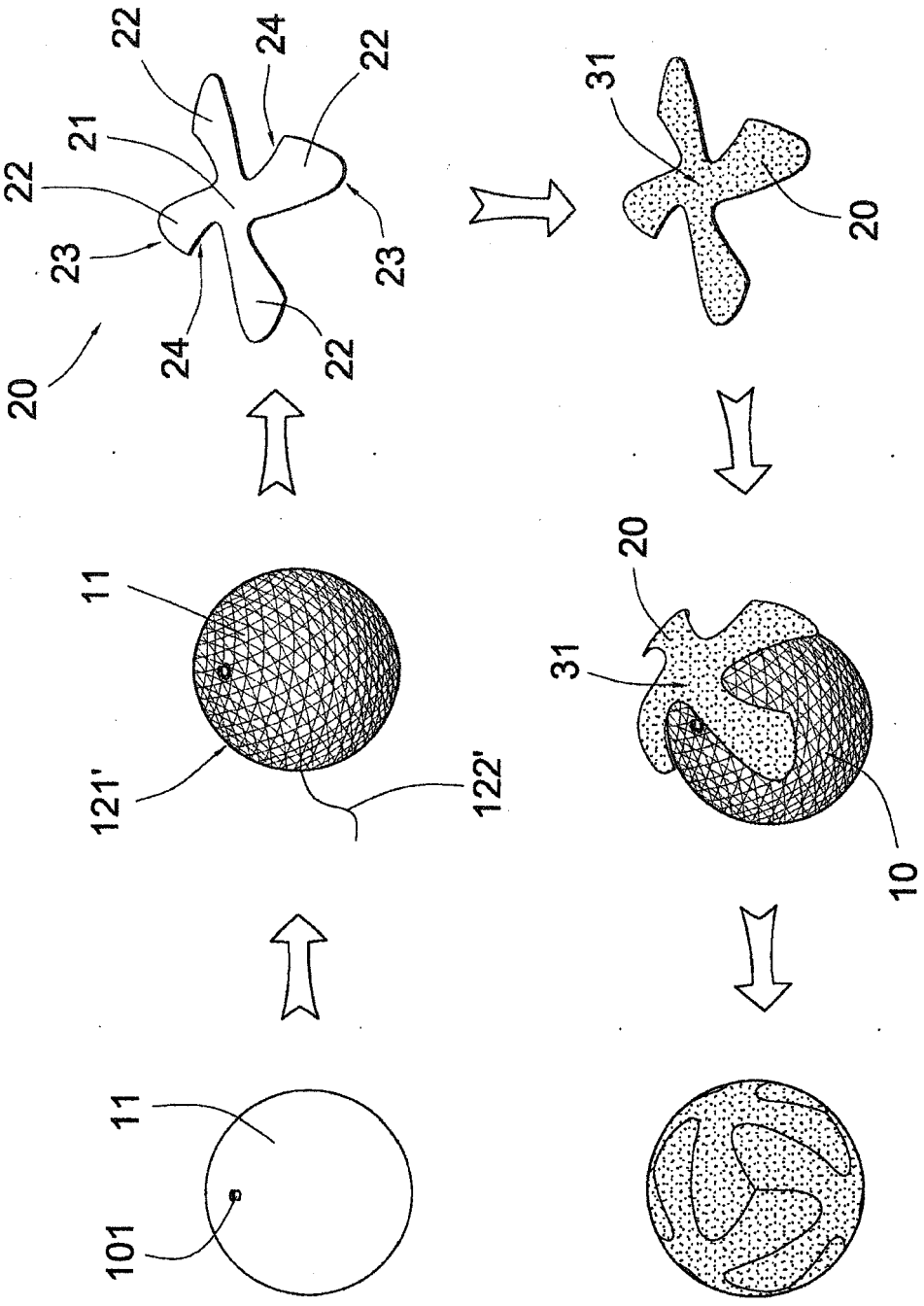


FIG.6

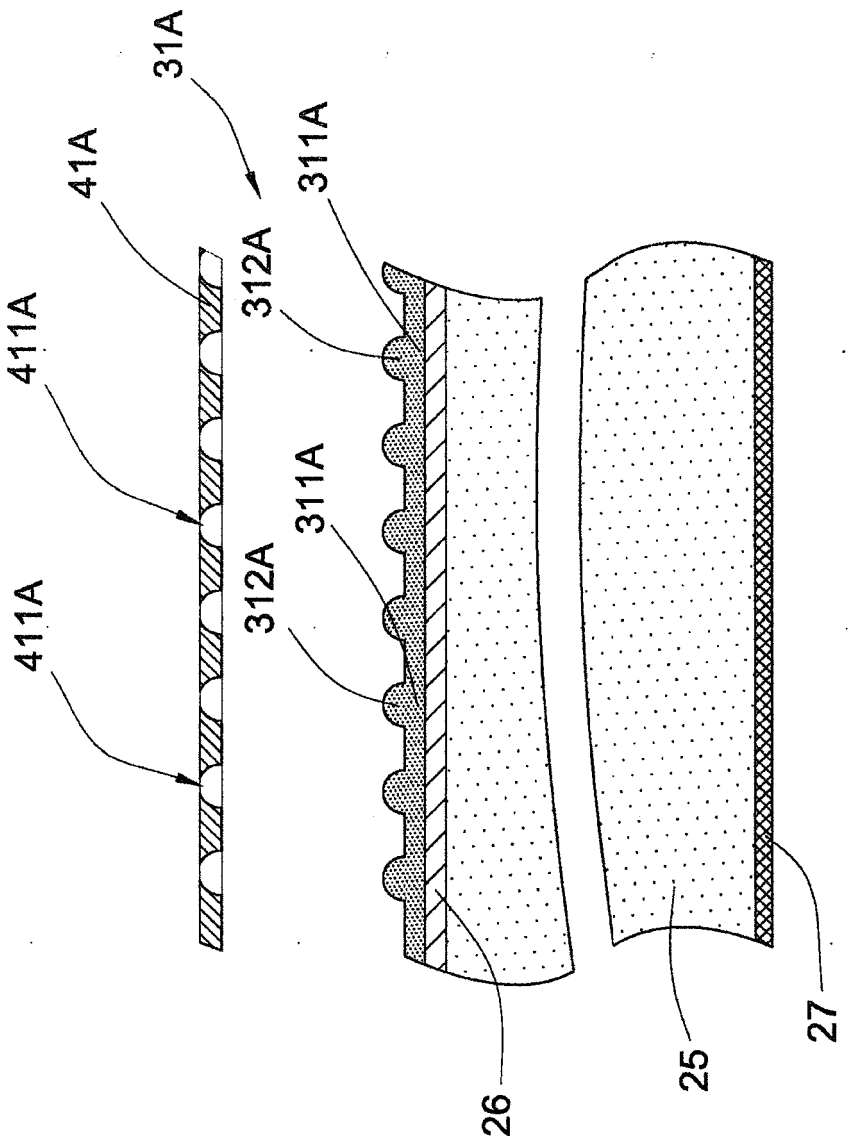


FIG.7

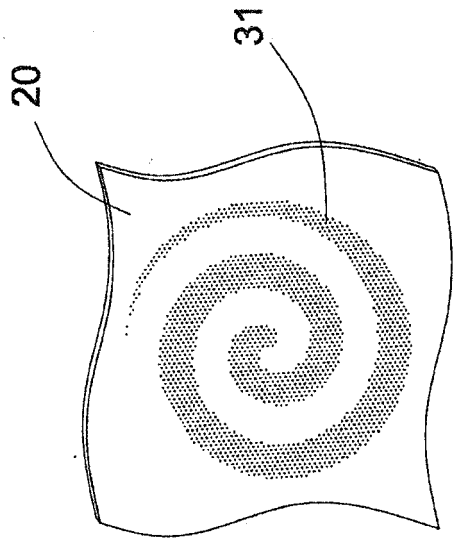


FIG.8B

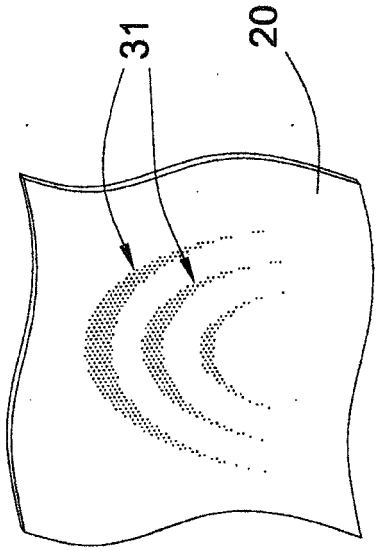


FIG.8C

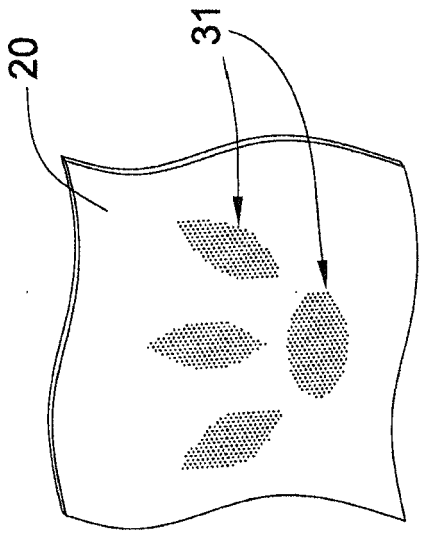


FIG.8A

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EUROPEAN SEARCH REPORT

Application Number
EP 17 20 8543

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 April 2018	Jekabsons, Armands

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