(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 347 667 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.07.2011 Bulletin 2011/30

(21) Application number: **11151650.6**

(22) Date of filing: **21.01.2011**

(51) Int Cl.:
A43B 17/02 *(2006.01)* ***A43B 7/14*** *(2006.01)*
A43B 13/40 *(2006.01)* ***A61F 5/14*** *(2006.01)*
A43B 7/22 *(2006.01)* ***A43B 17/03*** *(2006.01)*
A43B 13/41 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **22.01.2010 TW 99101857**
15.07.2010 TW 99123342
31.08.2010 CN 201010271745

(71) Applicant: **Cheng, Hsien-Hsiung**
Taipei City
100 (TW)

(72) Inventor: **Cheng, Hsien-Hsiung**
Taipei City
100 (TW)

(74) Representative: **Becker Kurig Straus**
Patentanwälte
Bavariastrasse 7
80336 München (DE)

(54) Multi-function shoe pad

(57) A multi-function shoe pad (1) is composed of a main body (10) for a user's human sole to tread. The main body (10) includes a hollow bulge (111) integrally protruding toward a top side (11) thereof and from a bottom side (23) in such way that a chamber (15) is formed below the hollow bulge (111). The chamber (15) is deformable between a compressed state and an uncompressed state, so the hot air inside the chamber (15) can exhaust and the cold air can be sucked into the chamber (15) to enhance the air convection inside the user's shoe. Besides, the hollow bulge (111) can allow the user's foot to tightly cling to the shoe to enable the shoe pad (1) to be skidproof.

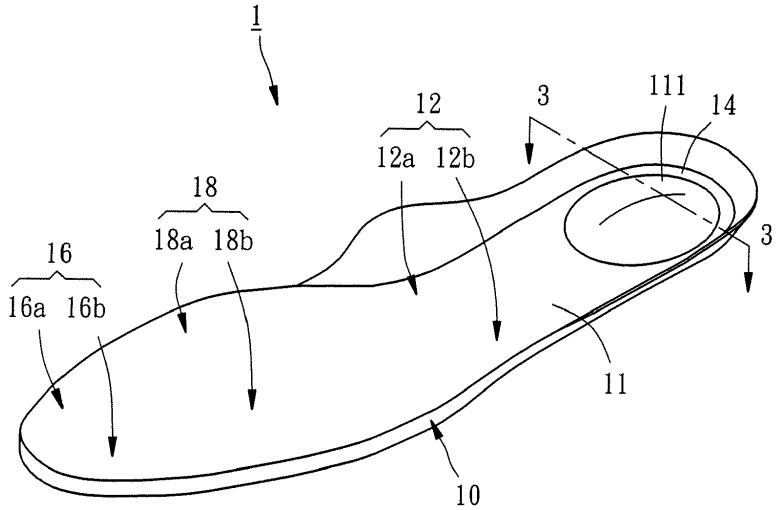


FIG. 1

EP 2 347 667 A2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to footwear, and more particularly, to a multi-function shoe pad.

2. Description of the Related Art

[0002] As disclosed in Taiwan Patent No. M307982 entitled "Compound Walking Shoe Pad" and No. M325753 entitled "Ergonomic Shoe Pad" and China Utility Model Pub. No. 2759247 entitled "Ergonomic Foot-arch Shoe Pad", the feature of each lies in that the shoe pad includes one or more rigid solid protrusions corresponding to specific positions of a human foot sole, like toe section, internal arch-foot section, or transverse-arch section, for allowing the shoe pad to conform to human feet ergonomics for average distribution of pressure applied to the feet, thus maintaining body balance, correcting standing posture, and relieving sore feet resulting from long standing. However, a user making use of such shoe pad for a long time can become dependent on it in such a way that the user may not be erect while making use of the common shoe pad. Besides, as indicated in the aforesaid Taiwan Patent No. M307982, the solid protrusions are additionally mounted to the main body of the shoe pad to cause complicated production procedure and after long-term use, the protrusions likely disengages from the main body.

SUMMARY OF THE INVENTION

[0003] The primary objective of the present invention is to provide a multi-function shoe pad, which is skidproof and can cause air convection.

[0004] The secondary objective of the present invention is to provide a multi-function shoe pad, which remind and alert the user to correct his or her standing posture.

[0005] Another objective of the present invention is to provide a multi-function shoe pad, which can enhance resilience and shock absorption.

[0006] The foregoing objectives of the present invention are attained by the multi-function shoe pad having a main body. Structurally corresponding to respective portions of the user's sole, the main body is composed of a foot arch portion, a heel portion located behind the foot arch portion, a toe portion located before the foot arch portion and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion located between the foot arch portion and the toe portion. The foot arch portion includes an internal foot-arch portion and an external foot-arch portion. The toe portion includes an internal toe portion corresponding to the first toe and an external toe portion corresponding to the other toes of the user's foot. The metatarsus portion includes an internal metatarsus portion and an external metatarsus portion. The multi-function shoe pad is characterized in that the main body includes a (first) hollow bulge having an external convex surface integrally protruding from a top side thereof, an internal concave surface integrally recessed from a bottom side thereof and corresponding to the external convex surface, and a chamber formed between the bottom side of the main body and the internal concave surface. The chamber is deformable between a compressed state and an uncompressed state.

[0007] The hollow bulge of the multi-function shoe pad is forced by the user's sole, while the user is walking, to enable the compressed state of the chamber to further exhaust the hot air inside the chamber. After the hollow bulge is repristinated due to its resilience to enable the uncompressed state of the chamber, the air pressure inside the chamber is less than that of the shoe. In this way, the cold air inside the shoe can be sucked into the chamber and thus cyclical air convection is generated. Therefore, the shoe pad of the present invention is effectively ventilative, not subject to generation of malodor, and to keep the user's sole dry to enhance the comfortableness for the user feet. Besides, the bulge allows tight contact between the human toes and the shoe pad for skidproof function.

[0008] Further, the multi-function shoe pad includes an (first) air groove longitudinally extending along a midst of the internal and external toe portions from a front peripheral edge adjacent to the toe portion toward the heel portion for communication with the chamber in such a way that the efficiency of exhaust of hot air and suction of cold air can be enhanced.

[0009] Further, the air groove includes a narrow part in communication with the chamber and the air groove. When the chamber is compressed, the hot air therein passing through the narrow part can be pressurized thereby to dash into the air groove to enhance the efficiency of exhaust of the hot air.

[0010] Further, the air groove includes an internal concave aperture formed at a front peripheral edge thereof adjacent to the toe portion for preventing the peripheral edge of the shoe pad from tightly clinging to the internal wall of the shoe in such a way that the amount of the hot-air exhaust and the cold-air suction can be increased.

[0011] Further, the main body of the shoe pad includes another (second) air groove in communication with the aforesaid air groove. The second air groove transversally extends along the midst of the toe portion and the metatarsus portion from an external peripheral edge of adjacent to the external toe portion toward an internal peripheral edge thereof adjacent to the internal toe portion and includes a concave aperture formed at an external or internal peripheral edge adjacent to the midst of the toe portion and the metatarsus portion. Alternatively, the second air groove transversally extends along the midst of the metatarsus portion and the foot arch portion from an external peripheral edge of the main body toward an internal peripheral edge of the main body and includes

a concave aperture formed at an external or internal peripheral edge adjacent to the midst of the metatarsus portion and the foot arch portion.

[0012] Further, the internal foot-arch portion includes an arc-shaped convex portion protruding from the bottom side of the main body and having an arc-shaped top side and an arc-shaped bottom side. The hollow bulge is preferably located at the heel portion or the arc-shaped convex portion. When the hollow bulge is located at the arc-shaped convex portion, the external convex surface of the hollow bulge is integrally formed from the arc-shaped top side. The internal concave surface is integrally formed from the arc-shaped bottom side. In light of this, the shoe pad can softly support the user's sole by the hollow bulge located at the internal foot-arch portion and remind the user to pay attention to his or her standing posture at any time for correcting the standing posture.

[0013] Further, the multi-function shoe pad includes another (second) hollow bulge composed of an external convex surface integrally protruding from the top side of the main body, an internal concave surface integrally recessed from the bottom side of the main body and corresponding to the external convex surface, and a chamber formed between the internal concave surface and the insole of the shoe. The chamber of the second hollow bulge is deformable between a compressed state and an uncompressed state. When the heel portion includes the first hollow bulge, the second hollow bulge is located at at least one of the internal foot-arch portion, the external foot-arch portion, the metatarsus portion, and the toe portion or at at least one of the internal foot-arch portion, the external foot-arch portion, the internal metatarsus portion, the external metatarsus portion, the internal toe portion, and the external toe portion. Similarly, when the arc-shaped convex portion has the first hollow bulge, the second hollow bulge is located at at least one of the heel portion, the external foot-arch portion, the metatarsus portion, and the toe portion or at at least one of the heel portion, the external foot-arch portion, the internal metatarsus portion, the external metatarsus portion, the internal toe portion, and the external toe portion.

[0014] Further, the multi-function shoe pad includes a shock-absorbing material and/or an elastic material, which is mounted to the chamber of the second hollow bulge. Preferably, the elastic material is mounted inside the chamber of the hollow bulge at the metatarsus portion or inside the chamber of at least one of the hollow bulges at the internal and external metatarsus portions. The shock-absorbing material is mounted inside the chamber of the hollow bulge located at the heel portion.

[0015] Further, the multi-function shoe pad includes at least one support member mounted below the hollow bulge and having a convex wall and an air space located at an internal side of the convex wall. In light of this, the support member can effectively keep the height of the hollow bulge.

[0016] Further, the multi-function shoe pad includes a plurality of support members, among which some are located below the hollow bulge of the heel portion, the internal foot-arch portion, or the external foot-arch portion and further include a nozzle communicating with the air space, the convex wall of each bulge tightly clinging to the internal concave surface of the hollow bulge, the nozzle of each support member in communication with the air groove and the air space, and some are located below the hollow bulge of the metatarsus portion (or the internal and external metatarsus portions) or the toe portion (or the internal and external toe portions) further include a bottom wall in connection with the convex wall in one piece for sealing the air space, the bottom wall of each support member is stopped against the insole of the shoe.

[0017] Further, the multi-function shoe pad includes at least two support members and a coupling piece integrally connected between the at least two support members.

[0018] Alternatively, the multi-function shoe pad also includes the main body for tread of the human sole. The main body is composed of the foot arch portion, the heel portion, the toe portion, and the metatarsus portion. The foot arch portion also includes the internal foot-arch portion and the external foot-arch portion. The metatarsus portion also includes the internal metatarsus portion and the external metatarsus portion. It is characterized in that the main body includes a first layer and a second layer mounted on the first layer. The first layer has a hollow bulge. The hollow bulge has an external convex surface integrally protruding from the first layer, an internal concave surface recessed from a bottom side of the first layer and corresponding to the external convex surface, and a chamber formed between the internal concave surface and the insole of the shoe. The chamber is deformable between a compressed state and an uncompressed state. The second layer has a hollow bulge having an external convex surface integrally protruding from the second layer, an internal concave surface recessed from a top side of the second layer and corresponding to the external convex surface, and a sealed chamber jointly defined by the internal concave surface and the top side of the first layer.

[0019] Because the hollow bulge has the sealed chamber, the shoe pad provides more bouncing force. If it is intended to enhance the bouncing force and/or shock absorbability, the elastic or shock-absorbing material can be mounted to the sealed chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1 is a perspective view of a first preferred embodiment of the present invention.

FIG. 2 is a bottom view of the first preferred embodiment of the present invention, illustrating that the hollow bulge corresponds to the heel of the human sole.

FIG. 3 is a sectional view taken along a line 3-3 in-

dicated in FIG. 1.

FIG. 4 is a bottom view of another pattern of the first preferred embodiment of the present invention.

FIG. 5 is a perspective view of another pattern of the first preferred embodiment of the present invention.

FIG. 6 is similar to FIG. 5, illustrating that the hollow bulges correspond to respective portion of the human sole.

FIG. 7 is a top view of a second preferred embodiment of the present invention.

FIG. 8A is a sectional view of the second preferred embodiment of the present invention, showing the hollow bulge located at the internal foot-arch portion.

FIG. 8B is similar to FIG. 8A, showing another pattern of the hollow bulge located at the internal foot-arch portion.

FIG. 9 is a perspective view of a third preferred embodiment of the present invention.

FIG. 10 is a bottom view of the third preferred embodiment of the present invention, illustrating that the hollow bulges correspond to respective portion of the human sole.

FIG. 11 is a sectional view taken along a line 11-11 of FIG. 9.

FIG. 12 is a perspective view of another pattern of the third preferred embodiment of the present invention.

FIG. 13 is a bottom view of FIG. 12, illustrating that the hollow bulges correspond to respective portion of the human sole.

FIG. 14 is a sectional view of a fourth preferred embodiment of the present invention.

FIG. 15A is similar to FIG. 13, illustrating that the shoe pad includes the support members.

FIG. 15B is similar to FIG. 13, illustrating that the shoe pad includes another support members.

FIG. 16 is a sectional view of a part of the fourth preferred embodiment of the present invention, showing the support member.

FIG. 17 is another sectional view of a part of the fourth preferred embodiment of the present invention, showing another pattern of the support member.

FIG. 18 is a sectional view of another pattern of the fourth preferred embodiment of the present invention.

FIG. 19 is a sectional exploded view of another pattern of the fourth preferred embodiment of the present invention, illustrating that the coupling piece is connected with the support members in one piece.

FIG. 20 is a perspective view of another pattern of the fourth preferred embodiment of the present invention, illustrating that the hollow bulge has a reinforcement recession.

FIG. 21 is similar to FIG. 20, illustrating that the hollow bulge has a plurality of reinforcement recessions.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0021] First of all, it is to be noted that the same reference signs in the following embodiments refer to identical or similar elements or structures.

[0022] Referring to FIG. 1, a multi-function shoe pad 1 constructed according to a first preferred embodiment of the present invention comprises a main body 10.

[0023] The main body 10 is made of not limited to PU foamed material with resilience. The main body 10 can be made of alternative material, such as cloth, fur, cork, latex, or TPR. As shown in FIGS. 1-2, the main body 10 is provided for tread of the human sole 4 composed of a foot arch section 41 having an internal foot-arch part 41 a and an external foot-arch part 41b; a heel section 43 located behind the foot arch section 41; a toe section 45 located before the foot arch section 41 and having a first toe 451, a second toe 452, a third toe 453, a fourth toe 454, and a fifth toe 455; and a metatarsus section 47 having an internal metatarsus part 47a and an external metatarsus part 47b. The main body 10 includes a foot arch portion 12 corresponding to the foot arch section 41, an internal foot-arch portion 12a corresponding to the internal foot-arch part 41a, an external foot-arch portion 12b corresponding to the extern foot-arch part 41 b, a heel portion 14 corresponding to the heel section 43, a toe portion 16 corresponding to the toe section, an internal toe portion 15a corresponding to the first toe 451, an external toe portion 15b corresponding to the other toes 452-455, a metatarsus portion 18 corresponding to the metatarsus section 47, an internal metatarsus portion 18a corresponding to the internal metatarsus section 47a, and an external metatarsus portion 18b corresponding to the external metatarsus portion 47b.

[0024] The main body 10 includes a first hollow bulge 111 formed on a top side 11 thereof and located at the heel portion 14. Referring to FIG. 3, the first hollow bulge 111l includes an external convex surface 111a integrally protruding from the top side 11, an internal concave surface 111b integrally recessed from a bottom side 13 of the main body 10, and a first chamber 15 formed between the internal concave surface 111b and the insole of a shoe for deformation between a compressed state and uncompressed state.

[0025] When the shoe pad 1 is actually used, as the heel portion 14 is forced, the first hollow bulge 111 can be squeezed downward to enable the first chamber 15 to be compressed under the compressed state; meanwhile, the hot air inside the first chamber 15 can be squeezed out. On the contrary, when the first bulge 111 is repristinated because no more external force is applied thereto, the first chamber 15 is under the uncompressed state, the air pressure of the first chamber 15 is less than that of the shoe, such that the cold air inside the shoe can be sucked into the first chamber 15. In this way, cyclic air convection is generated between the bottom side 13 of the main body 10 and the inside of the shoe.

[0026] Referring to FIG. 4, the multi-function shoe pad 1' of another pattern in accordance with the first preferred embodiment of the present invention also includes the first hollow bulge 111 formed at the top side I of the main body 10 and located at the heel portion 14. The hollow bulge 111 also has the first chamber 15. The main body 10 further includes a first air groove 131 formed at a bottom side thereof longitudinally extending along the midst of the internal and external toe portions 16a and 16b from a front peripheral edge 101 adjacent to the toe portion 16 toward the heel portion 14 for communication with the first chamber 15. The first air groove 131 has an arc-shaped aperture 102 located adjacent to the front peripheral edge 101 and recessed inwardly. The aperture 102 prevents the peripheral edge of the main body 10 from tightly clinging to the internal wall of the shoe to increase the amount of exhaust of hot air and suction of the cold air.

[0027] When the shoe pad 1' is actually used, as the heel portion 14 is forced, the first chamber15 can be squeezed under the compressed state; meanwhile, the hot air inside the first chamber 15 can be squeezed out through the first air groove 131. On the contrary, when the first bulge 111 is repristinated because no more external force is applied thereto, the first chamber 15 is under the uncompressed state and the cold air inside the shoe can be sucked into the first chamber 15 through the first air groove 131. In this way, the efficiency of the cyclic air convection between the shoe pad 1' and the inside of the shoe can be enhanced via the air groove.

[0028] Referring to FIGS. 5-6, a multi-function shoe pad 1" of another pattern in accordance with the first preferred embodiment of the present invention also includes the first hollow bulge 111 formed at the top side 11 of the main body 10 and located at the heel portion 14. The hollow bulge 111 also has the first chamber 15. The main body 10 further includes a first air groove 131', a second air groove 132, a third air groove 133, and a fourth air groove 134 at the bottom side 13 thereof. The first air groove 131' is provided with a first extended part 131 a extending longitudinally along the midst of the internal and external toe portions 16a and 16b from the front peripheral edge 101 adjacent to the toe portion 16 toward the heel portion 14 and communicating with the first chamber 15, a second extended part 131b communicating with the first extended part 131a and transversally extending to external and external peripheral edges 103 and 104 adjacent to the heel portion 14, and a narrow part 131c smaller than the first air groove 131' and communicating with the second extended part 131b and the first chamber 15. The first air groove 131' is provided with an arc-shaped aperture 102 formed at the front peripheral edge 101 thereof adjacent to the toe portion 16 and recessed inwardly. The second air groove 132 communicates with the first air groove 131' and transversally extends along the midst of the toe portion 16 and the metatarsus portion 18 from the external peripheral edge 103 adjacent to the external toe portion 16b to the internal peripheral edge 104 adjacent to the internal toe portion 16a. The second air groove 132 is provided two arc-shaped apertures 105, each of which is recessed inwardly and formed at one of the internal and external peripheral edges 103 and 104 adjacent to the toe portion 16 and the metatarsus portion 18. The third air groove 133 communicates with the first air groove 131' and transversally extends along the midst of the metatarsus portion 18 and the foot-arch portion 12 from the external peripheral edge 103 to the internal peripheral edge 104. The third air groove 133 is provided two arc-shaped apertures 106, each of which is recessed inwardly and formed at one of the internal and external peripheral edges 103 and 104 adjacent to the metatarsus portion 18 and the foot-arch portion 12. The fourth air groove 134 communicates with the third air groove 133 and extends along an internal profile of the internal foot-arch portion 12a from the third air groove 133 toward the heel portion 14.

[0029] When the shoe pad 1" is actually used, as indicated above, and the heel portion 14 is forced to compress the first chamber 15 (under the compressed state), the hot air inside the first chamber 15 can be pressurized, while passing through the narrow part 131c, to dash into the first air groove 131' and then exhaust through the second, third, and fourth air grooves 132-134 in communication with the first air groove 131'. On the contrary, when the heel portion 14 is not forced, the first hollow bulge 111 can be repristinated to uncompress the first chamber 15 (under the uncompressed state), the cold air inside the shoe can be sucked through the first, second, third, and fourth air grooves 131'-134 into the first chamber 15.

[0030] It is to noted that where the first, second, third, and fourth air grooves 131'-134 are mounted is based on how the human sole 4 treads on the ground while the user is walking and thus when the human sole 4 treads on the shoe pad 1", they are not squashed or deformed by the user's weight. Thus, even if the shoe pad 1" is used for a long time, the shoe pad 1" can still keep effective air convection.

[0031] Because the material and partitions of the shoe pad in the following embodiment are identical to those of the first embodiment, their detailed recitation except the differences between the two embodiments is skipped.

[0032] Referring to FIGS. 7-8, a multi-function shoe pad 2 of a second preferred embodiment of the present invention is composed of a main body 20.

[0033] The internal foot-arch portion 12a includes an arc-shaped convex portion 25 integrally protruding from a bottom side of the main body 20 and having an arc-shaped top side 251, an arc-shaped bottom side 253, and a hollow bulge 255. As shown in FIG. 8A, the hollow bulge 255 includes an external convex surface 255a integrally protruding from the top side 251 thereof, an internal concave surface 255b integrally recessed from the bottom side 253 thereof, and a chamber 27 formed between the bottom side of the main body 20 and the internal concave surface 255b. The chamber 27 is deformable between a compressed state and an uncompressed

state.

[0034] When the shoe pad 2 is actually used, it not only causes the aforesaid air convection inside the shoe but softly supports the user's sole to remind the user to watch his or her standing posture at any time. The shoe pad 2 can correct the user's standing posture after it is used for a long time.

[0035] It is to be noted that the external convex surface 255a can be directly connected with the top side 21 of the main body 20, as shown in FIG. 8A, or the arc-shaped convex portion 25 can have a connection part 257 for connection between the external convex surface 255a and the top side 21. Besides, the length of the connection part 257 has none of any particular limitation.

[0036] Referring to FIGS. 9-11, a multi-function shoe pad 3 constructed according to a third preferred embodiment of the present invention is composed of the main body 10

[0037] The main body 10 includes the first hollow bulge 111, a second hollow bulge 112, a third hollow bulge 113, a fourth hollow bulge 114, a fifth hollow bulge 115, and a six hollow bulge 116 at the top side 11. The position and pattern of the first hollow bulge 111 are identical to those of the first embodiment. The second hollow bulge 112 is located at the foot arch portion 12. The third hollow bulge 113 is located at the internal metatarsus portion 18a. The fourth hollow bulge 114 is located at the external metatarsus portion 18b. The fifth hollow bulge 115 5 is located at the internal toe portion 16a. The sixth hollow bulge 116 is located at the external toe portion 16b. As shown in FIG. 11, each of the fifth and sixth hollow bulges 115 and 116 includes an external convex surface 115a (116a) integrally protruding from the top side 11 of the main body 10, an internal concave surface 115b(116b) integrally recessed from the bottom side 13 of the main body 10, and a fifth chamber 17(19) formed between the internal concave surface 115b(116b). It is to be noted that the second, third, and fourth hollow bulges 112-114 also include the aforesaid external convex surfaces, internal concave surfaces, second, third, and fourth chambers separately. In this way, the chambers of the first, second, third, fourth, fifth, and sixth hollow bulges 111-116 are deformable between the compressed state and the uncompressed state.

[0038] When the shoe pad 3 is actually used, as the heel portion 14 is forced, the first hollow bulge 111 can be squashed to enable the first chamber 15 to be compressed under the compressed state; meanwhile, the hot air inside the first chamber 15 can be squeezed out. When the external force applied to the heel portion 14 is transferred to the foot arch portion 12, the second hollow bulge 112 is squashed to enable the second chamber (not shown) to be under the compressed state to allow the hot air inside the second chamber to exhaust. In the meantime, the first hollow bulge 111 is repristinated because no more external force is applied thereto to enable the first chamber 15 to be under the uncompressed state; meanwhile, the air pressure of the first chamber 15 is less than that of the shoe, such that the cold air inside the shoe can be sucked into the first chamber 15. Similarly, when the external force applied to the foot arch portion 12 is transferred to the internal and external metatarsus portions 18a and 18b or to the internal and external toe portions 16a and 16b, the hot air inside the compressed chambers can exhaust and the cold air can be sucked into the uncompressed chambers. In this way, cyclic air convection is generated between the bottom side 13 of the main body 10 and the inside of the shoe.

[0039] Referring to FIGS. 12 and 13, the shoe pad 3' of another pattern in accordance with a third preferred embodiment of the present invention includes a plurality of the hollow bulges, which can be formed at the heel portion 14, the foot-arch portion 12, the metatarsus portion 18, and the toe portion 16, and namely, a seven bulge 117 is formed at the metatarsus portion 18 and an eighth bulge 118 is formed at the toe portion 16. In other words, the seventh bulge 117 is composed of the third and fourth hollow bulges 113 and 114 and the eighth bulge 118 is composed of the fifth and six hollow bulges 115 and 116. In this way, the hot air inside the chambers can also exhaust and the cold air inside the shoe is sucked into the uncompressed chambers as where the external force is applied is changed, such that the cyclic air convection is generated between the bottom side 13 of the main body 13 and the inside of the shoe.

[0040] It is to be noted that when the main body includes a plurality of the hollow bulges in each of the aforesaid embodiments, the shoe pad can further include at least one shock-absorbing and/or elastic material mounted to at least one of the hollow bulges to effectively enhance the user's bouncing force, while the user intends to leap, and for shock absorption. Preferably, the shock-absorbing material is mounted to the chamber of the hollow bulge of the heel portion of the main body and the elastic material is mounted to the chamber of the hollow bulge of the metatarsus portion and/or the toe portion of the main body.

[0041] Referring to FIG. 14, a multi-function shoe pad 5 in accordance with a fourth preferred embodiment of the present invention includes a main body 50 and an elastic material 60.

[0042] The main body 50 includes a first layer 70 and a second layer 80. The first layer 70 has a hollow bulge 711 formed at a top side 71 thereof and corresponding to the heel portion 14 of the main body 50. The hollow bulge 711 has an external convex surface 711a integrally protruding from the top side 71 of the first layer 70, an internal concave surface 711b integrally recessed from the bottom side 73 of the first layer 70, and a chamber 75 formed between the internal concave surface 711b and the insole of the shoe for deformation between a compressed state and an uncompressed state. The second layer 80 is fixed to the first layer 70 by not limited to adhesion. The second layer 80 has a first hollow bulge 811 formed at a top side 81 thereof and corresponding to the heel portion 14, a second hollow bulge 812 corre-

sponding to the metatarsus portion 18, and third hollow bulge 813 corresponding to the toe portion 16. The first, second, third hollow bulges 811-813 have respective external convex surfaces 811a, 812a, and 813a integrally protruding from the top side 81 of the second layer 80, and respective internal concave surfaces 811 b, 812b, and 813b integrally recessed from a bottom side 83 of the second layer 80. The first hollow bulge 811 of the second layer 80 is superimposed on the hollow bulge 711 of the first layer 70 to allow the internal concave surface 811b of the first hollow bulge 811 to tightly cling to the external convex surface 711a of the hollow bulge 711. The internal concave surfaces 812b and 813b of the second and third hollow bulges 812 and 813 define a first sealed chamber 85 and a second sealed chamber 87 with the top side 71 of the first layer 70 separately.

[0043] The elastic material 60 can enhance elasticity and in this embodiment, it is mounted to and filled in not limited to the first sealed chamber 85 of the second layer 80. The elastic material 60 can also be mounted to the second sealed chamber 87.

[0044] When the heel portion 14 is forced in actual use of the shoe pad 5, the hollow bulge 711 and the first hollow bulge 811 can be squashed to enable the chamber 75 to be under the compressed state and meanwhile, the hot air can be squeezed out of the chamber 75. When the heel portion 14 is not forced, the external force applied to the hollow bulge 711 and the first hollow bulge 811 is released to repristinate to enable the chamber 75 to be under the uncompressed state and then the cold air inside the shoe can be sucked into the chamber 75. Besides, the elastic material 60 located inside the first sealed chamber 85 can help enhance the user's bouncing force while the user intends to leap.

[0045] In actual production, the shoe pad 5 can further include a shock-absorbing material (not shown) mounted to the sealed chamber below the first hollow bulge 811.

[0046] Referring to FIGS. 15-18, the multi-function shoe pad of the present invention further includes at least one support member 90. The support member 90 is made of rubber or another material which has great structural strength and resilience for keeping the height of the hollow bulge. The support member 90 includes four patterns as follows.

[0047] In the first pattern, the support member 90 includes a convex wall 901 and an air space 903 (FIG. 15A) formed at an internal side of the convex wall 901. In the second pattern, the support member 90 includes the convex wall 901, the air space 903, and a nozzle 905 (FIG 16) for communication with the air space 903. In the third pattern, the support member 90 includes the convex wall 901, the air space 903, the nozzle 905, and a bottom wall 907 (FIG. 17) connected with the convex wall 901 and the nozzle 905 in one piece. In the fourth pattern, the support member 90 includes the convex wall 901, the air space 903, and a bottom wall 907 other than the nozzle 905, as shown in FIG. 18.

[0048] In other words, as shown in FIG. 15A, the support member 90 located at the heel portion 14 does not include the bottom wall 907; the support member 90 located at the toe portion 16 and the metatarsus portion 18 does not have the bottom wall 907, either. However, the air space 903 is sealed by the first layer 70 and the convex wall 901. In this way, the shoe pad can keep the air exhaust and enhance the bouncing force. As shown in FIG. 15B, similar to FIG. 15A, the first layer 70 can be applied to the general flat main body and meanwhile, a third sealed chamber 89 is formed at the heel portion 14. As shown in FIG. 16a and 17, the support member 90 at the heel portion 14 includes the nozzle 905 received in the first air groove 131, such that the shoe pad can enhance its performance of air exhaust. As shown in FIG. 18, the support member 90 located at the heel portion 14 does not include the bottom wall 907 and the support member 90 located at the toe portion 16 and the metatarsus portion 18 both include the bottom wall 907, such that the shoe pad of the present invention can keep the air exhaust and enhance the bouncing force.

[0049] It is to be noted that the support member 90 can have many patterns, e.g. whether the bottom wall or the nozzle is available or not, and the shoe pad of the present invention also has many patterns, so a variety of interchangeable structures under the sprit of the present invention fall within the scope of the present invention. Besides, the support member 90 can be directly fixed to the bottom side of the main body and when the shoe pad is put inside the shoe, the arc-shaped surface of the support member 90 contacts the insole of the shoe.

[0050] On the other hand, referring to FIG. 19, the support members 90 can be interconnected with one another by a coupling piece 92. Besides, the support members 90 located at the toe portion 16, the metatarsus portion 18, and the heel portion 14 each have the nozzle for enhancing the efficiency of air exhaust; alternatively, those support members 90 do not have any nozzle but each can have a hole running through the convex wall relative to the air groove to allow communication between the air space and the air groove for the purpose of enhancing the efficiency of air exhaust.

[0051] It is to be further noted that the support members 90 interconnected by the coupling piece 92 can be made to be larger to be fixed to the main body. Besides, referring to FIG. 20, the external convex surface 111a can further have a reinforcing recession 113 for enhancing the structural strength of the hollow bulge 111. Alternatively, referring to FIG. 21, the external convex surface 111a can further have a plurality of protrusions 15 formed on the external convex surface 111a; the reinforcing recession 113 is located at the midsection of the external convex surface 111a; the protrusions 15 surround the reinforcing recession 113.

[0052] When the shoe pad is usually manufactured, to enhance the confortability of the shoe pad, a cloth is adhered to a raw main body and then a die forming process proceeds. However, if the cloth adhered to the raw main body is less ductile, it will adversely affect the further

forming process of the main body. Thus, depending on the actual requirement, the cloth can be adhered to the shoe pad of the present invention after the main body is formed.

[0053] It is to be noted that the above embodiments are cited for detailed illustration of the present invention only but the present invention is not limited to them. For example, the number of the hollow bulge is not limited and preferably 1-7. When the hollow bulge is more than one, if one of the hollow bulges is located at the heel portion, the rest will be located at at least one of the internal foot-arch portion, the external foot-arch portion, the metatarsus portion, and the toe portion or at least one of the internal foot-arch portion, the external foot-arch portion, the internal metatarsus portion, the external metatarsus portion, the internal toe portion, and the external toe portion. If one of the hollow bulges is located at the arc-shaped convex portion of the internal foot-arch portion, the rest will be located at at least one of the heel portion, the external foot-arch portion, the metatarsus portion, and the toe portion, or at least one of the heel portion, the external foot-arch portion, the internal metatarsus portion, the external metatarsus portion, the internal toe portion, and external toe portion. Besides, the number of the air groove is also not limited and can the air groove can communicate with the chamber below either of the hollow bulges. Each of the air grooves has the narrow part for communication with the chambers below the hollow bulges to enhance the pressure for exhaust of hot air. Similarly, when the main body is double-layered, the number of the hollow bulges of the first and second layers are not limited and their positions can be variable as it depends, e.g. when the hollow bulges are plural, the bulges of the first and second layers can be located at at least one of the heel portion, the internal foot-arch portion, the external foot-arch portion, the internal metatarsus portion, the external metatarsus portion, the internal toe portion, and the external toe portion.

[0054] In addition, the positions of the elastic material and the shock-absorbing material are also not limited. Preferably, the elastic material is mounted to the chamber corresponding to the metatarsus portion of the main body and the shock-absorbing material is mounted to the chamber corresponding to the heel portion of the main body. Thus, the changes and modifications in accordance with the spirit of the present invention fall within the scope of the present invention.

[0055] In conclusion, the hollow bulges are mounted to the forced portions of the main body of the multi-function shoe pad of the present invention according to the user's tread on the ground while the user is walking, so the air convection can be generated inside the shoe and the shoe pad is effectively ventilative, not subject to moldiness and malodor, can keep human sole dry for a long time, and enhance comfortability for human sole. Besides, the air grooves in coordination can further heighten the air convection. Moreover, the hollow bulges can keep tight contact between the user's feet and the shoe, so the present invention is also skidproof. Furthermore, the hollow bulge is formed from the main body in one piece, compared with the conventional shoe pad, to which the protrusions are additionally mounted, so the present invention is more durable and can be produced more easily. When the hollow bulge is mounted to the arc-shaped convex portion of the internal foot-arch portion, the shoe pad can further correct the user's standing posture. Finally, the present invention includes the support member below the hollow bulge and the hollow bulge has certain structural strength and great resilience, such that the hollow bulge can not only effective keep the height but be durable to avoid deformation.

Claims

1. A multi-function shoe pad (1) comprising a main body (10), which can allow a user's human sole to tread and structurally corresponds to respective portions of the user's human sole to be composed of a foot arch portion (12), a heel portion (14) located behind the foot arch portion (12), a toe portion (16) located before the foot arch portion (12) and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion (18) located between the foot arch portion (12) and the toe portion (16), the foot arch portion (12) having an internal foot-arch portion (12a) and an external foot-arch portion (12b), the toe portion (16) having an internal toe portion (12a) corresponding to the first toe and an external toe portion (12b) corresponding to the other toes of the user's foot, the metatarsus portion (18) having an internal metatarsus portion (18a) and an external metatarsus portion (18b); wherein the shoe pad (1) is **characterized in**:

   the main body (10) having a hollow bulge (111), the hollow bulge (111) having an external convex surface (111a) integrally protruding from a top side (11) of the main body (10), an internal concave surface (111b) integrally recessed from a bottom side (13) of the main body (10) and corresponding to the external convex surface (111a), and a chamber (15) defined by the internal concave surface (111b) and being deformable between a compressed state and an uncompressed state.

2. The shoe pad (1) as defined in claim 1, wherein the external convex surface (111a) of the hollow bulge (111) comprises a reinforcing recession (113), preferably wherein the external convex surface (111a) of the hollow bulge (111) comprises a plurality of protrusions (115); the reinforcing recession (113) is located at a midsection of the external convex surface (111a), the protrusions (115) surrounding the reinforcing recession (113).

3. The shoe pad (2) as defined in claim 1, wherein the internal foot-arch portion (12a) comprises an arc-shaped convex portion (25) integrally protruding from the bottom side (13) of the main body (10), the arc-shaped convex portion (25) having an arc-shaped top side (251) and an arc-shaped bottom side (253); the hollow bulge (255) is located at the arc-shaped convex portion (25); the external convex surface (255a) of the hollow bulge (255) integrally protrudes from the arc-shaped top side (251); the internal concave surface (255b) of the hollow bulge is integrally recessed from the arc-shaped bottom side (253).

4. The shoe pad (2) as defined in claim 3,
wherein the arc-shaped convex portion (25) comprises a connection part (257) for connection with the external convex surface (255a) of the hollow bulge (255) and the top side (21) of the main body (20); or
wherein the main body (20) further comprises another hollow bulge (255) located at at least one of the heel portion (14), the external foot-arch portion (12b), the metatarsus portion (18), and the toe portion (16) and having an external convex surface (255a) integrally protruding from a top side (21) of the main body (20), an internal concave surface (255b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state; or
wherein the main body (20) further comprises another hollow bulge (255) located at at least one of the heel portion (14), the external foot-arch portion (12b), the internal metatarsus portion (12a), the external metatarsus portion (18a), the internal toe portion (18b), and the external toe portion (16b) and having an external convex surface (255a) integrally protruding from a top side (21) of the main body (20), an internal concave surface (255b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state.

5. The shoe pad as defined in claim 1, wherein the hollow bulge is located at the heel portion (14).

6. The shoe pad (2) as defined in claim 5, wherein the main body (20) further comprises another hollow bulge (255) located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the metatarsus portion (18), and the toe portion (16) and having an external convex surface (111a) integrally protruding from a top side (21) of the main body (20), an internal concave surface (111b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (111a), and a chamber (27) defined by the internal concave surface (111b) and being deformable between a compressed state and an uncompressed state.

7. The shoe pad (2) as defined in claim 8, wherein the main body (20) further comprises another hollow bulge (255) located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal toe portion (16a), and the external toe portion (16b) and having an external convex surface (111a) integrally protruding from a top side (21) of the main body (20), an internal concave surface (111b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (111a), and a chamber (27) defined by the internal concave surface (111b) and being deformable between a compressed state and an uncompressed state.

8. The shoe pad (5) as defined in claim 7 further comprising at least one elastic material (60), which is located in the chamber (75) of the hollow bulge (711) of at least one of the internal toe portion (16a), the external toe portion (16b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal foot-arch portion (12a), the external foot-arch portion (12b), and the heel portion (14).

9. The shoe pad (5) as defined in claim 7 further comprising at least one shock-absorbing material, which is located in the chamber (75) of the hollow bulge (711) of at least one of the internal toe portion (16a), the external toe portion (16b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal foot-arch portion (12a), the external foot-arch portion (12b), and the heel portion (14).

10. The shoe pad (2) as defined in claim 6, wherein the internal foot-arch portion (12a) comprises an arc-shaped convex portion (25) integrally protruding from the bottom side (23) of the main body (20), the arc-shaped convex portion (25) having an arc-shaped top side (251) and an arc-shaped bottom side (253); the another hollow bulge (255) is located at the arc-shaped convex portion (25); the external convex surface (255a) of the hollow bulge (255) integrally protrudes from the arc-shaped top side (251); the internal concave surface (255b) of the hollow bulge (255) is integrally recessed from the arc-shaped bottom side (253).

11. The shoe pad (1') as defined in claim 5, wherein the main body (10) further comprises a first air groove (131) formed at the bottom side (13) thereof and longitudinally extending along the midst of the internal and external toe portions (16a and 16b) from a front peripheral edge thereof adjacent to the toe portion (16) toward the heel portion (14) for communication with the chamber (15).

12. The shoe pad (1") as defined in claim 11, wherein the first air groove (131') comprises a first extended part (131a) and second extended part (131b), the first extended part (131a) extending longitudinally along the midst of the internal and external toe portions (16a and 16b) from a front peripheral edge of main body (10) adjacent to the toe portion (16) toward the heel portion (14) and communicating with the chamber (15), the second extended part (131b) communicating with the first extended part (131a) and transversally extending to an internal peripheral edge or an external peripheral edge of the main body (10) or both adjacent to the heel portion (14),
preferably
wherein one of the first and second extended parts (131a and 131b) of the first air groove (131) comprises an aperture (102) recessed inwardly and located at one of the front peripheral edge adjacent to the toe portion (16) and of an internal or external peripheral edge of the main body (10) adjacent to the heel portion (14); the main body (10) further comprises:

a second air groove (132) communicating with the first air groove (131') and transversally extending along the midst of the toe portion (16) and the metatarsus portion (18) from the external peripheral edge of the main body (10) adjacent to the external toe portion (16b) to the internal peripheral edge of the main body (10) adjacent to the internal toe portion (16a), the second air groove (132) having an aperture (105) recessed inwardly and formed at the external or internal peripheral edge of the main body (10) adjacent to the midst of the toe portion (16) and the metatarsus portion (18);
a third air groove (133) communicating with the first air groove (131) and transversally extending along the midst of the metatarsus portion (18) and the foot arch portion (12) from the external peripheral edge of the main body (10) to the internal peripheral edge of the main body (10), the third air groove (133) having an aperture (106) recessed inwardly and formed at the external or internal peripheral edge of the main body (10) adjacent to the midst of the metatarsus portion (18) and the foot arch portion (12); and
a fourth air groove (134) communicating with the third air groove (133) and longitudinally extending along the profile of the internal foot-arch portion (12a) from the third air groove (1333) toward the heel portion (14) to the second extended part (131b) of the first air groove (131),
more preferably
wherein the main body (10) further comprises another hollow bulge (255) located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the metatarsus portion (18), and the toe portion (16) and having an external convex surface (255a) integrally protruding from a top side (21) of the main body (22), an internal concave surface (255b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state, one of the first, second, third, and fourth air grooves (131-134) communicating with at least one of the chambers (25 and 27) of the two hollow bulges (111 and 255); or
wherein the main body (20) further comprises another hollow bulge (255) located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal toe portion (16a), and the external toe portion (16b) and having an external convex surface (255a) integrally protruding from a top side (21) of the main body (20), an internal concave surface (255b) integrally recessed from a bottom side (23) of the main body (20) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state, one of the first, second, third, and fourth air grooves (131-134) communicating with at least one of the chambers (25 and 27) of the two hollow bulges (111 & 255), preferably further comprising at least one support member (90), which is mounted below at least one of the two hollow bulges (711 and 811) and each has a convex wall (901) and an air space (903) located at an internal side of the convex wall (901).

13. The shoe pad (1") as defined in claim 11,
wherein the first air groove (131') comprises a smaller narrow part (131c) communicating with the first air groove (131') and the chamber (15); or
wherein the first air groove (131) comprises an aperture (102) recessed inwardly formed at the front peripheral edge of the main body (10) adjacent to the toe portion (16).

14. The shoe pad (5) as defined in claim 8 further comprising a support member (90), which is mounted below the hollow bulge (111) and has a convex wall (901) and an air space (903) located at an internal side of the convex wall (901),
preferably
wherein the support member (90) comprises a bottom wall (907) connected with the convex wall (901) in one piece; the air space (903) is jointly defined by the bottom wall (907) and the convex wall (901); or further comprising at least two support members (90), wherein the main body (10) further comprises another hollow bulge (255) having an external convex surface (255a) integrally protruding from a top side (11) of the main body (10), an internal concave surface (111b) integrally recessed from a bottom side (13) of the main body (10) and corresponding to the external convex surface (111a), and a chamber (27) defined by the internal concave surface (111b) and being deformable between a compressed state and an uncompressed state, a coupling piece (92) being connected between the two support members (90) in one piece.

15. A multi-function shoe pad (5)
comprising a main body (50), which can allow a user's human sole to tread and structurally corresponds to respective portions of the user's human sole to be composed of a foot arch portion (12), a heel portion (14) located behind the foot arch portion (12), a toe portion (16) located before the foot arch portion (12) and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion (18) located between the foot arch portion (12) and the toe portion (16), the foot arch portion (12) having an internal foot-arch portion (12a) and an external foot-arch portion (12b), the toe portion (16) having an internal toe portion (16a) corresponding to the first toe and an external toe portion (16b) corresponding to the other toes of the user's foot, the metatarsus portion (18) having an internal metatarsus portion (18a) and an external metatarsus portion (18b); wherein the shoe pad (5) is **characterized in that** the main body (50) comprises:

a first layer (70) having a hollow bulge (711), which has an external convex surface (711 a) integrally protruding from the first layer (70), an internal concave surface (711 b) recessed from a bottom side (71) of the first layer (70) and corresponding to the external convex surface (711 a), and a chamber (75) formed defined by the internal concave surface (711b), the chamber (75) being deformable between a compressed state and an uncompressed state; and
a second layer (80) mounted onto the first layer (70) and having a hollow bulge (811), which has an external convex surface (811a) integrally protruding from the second layer (80), an internal concave surface (811b) recessed from a top side (81) of the second layer (80) and corresponding to the external convex surface (811a), and a sealed chamber (85) jointly defined by the internal concave surface (811b) and the top side (71) of the first layer (70).

16. The shoe pad (5) as defined in claim 15,
wherein the hollow bulge (711) of the first layer (70) is located at a position corresponding to the heel portion (14), the first layer (70) further comprising another hollow bulge (255), which is located at at least one of the internal foot-arch portion (16a), the external foot-arch portion (16b), the metatarsus portion (18), and the toe portion (16) and has an external convex surface (255a) integrally protruding from a top side of the main body (50), an internal concave (255b) surface integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state; and
the hollow bulge (811) of the second layer (80) being located at a position corresponding to the metatarsus portion (18), the second layer (80) further comprising another hollow bulge (255), which is located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the heel portion (14), and the toe portion (16) and has an external convex surface (255a) integrally protruding from a top side of the main body (50), an internal concave surface (255b) integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (255a), and a sealed chamber (811) jointly defined by the internal concave surface (255b) and the top side (71) of the first layer (70).
or
wherein the hollow bulge (711) of the first layer (70) is located at a position corresponding to the heel portion (14), the first layer (70) further comprising another hollow bulge (255), which is located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal toe portion (16a), and the external toe portion (16b) and has an external convex surface (255a) integrally protruding from a top side of the main body (50), an internal concave (255b) surface integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (255a), and a chamber (27) defined by the internal concave surface (255b) and being deformable between a compressed state and an uncompressed state; and
the hollow bulge (811) of the second layer (80) being located at a position corresponding to the metatarsus

portion (18), the second layer (80) further comprising another hollow bulge (255), which is located at at least one of the internal foot-arch portion (12a), the external foot-arch portion (12b), the heel portion (14), and the toe portion (16) and has an external convex surface (255a) integrally protruding from a top side of the main body (50), an internal concave surface (255b) integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (255a), and a sealed chamber (811) jointly defined by the internal concave surface (255b) and the top side (71) of the first layer (70), preferably further comprising at least one elastic material (60), which is located in the sealed chamber (85) of the hollow bulge (811) of the second layer (80) corresponding to at least one of the internal toe portion (16a), the external toe portion (16b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal foot-arch portion (12a), the external foot-arch portion (12b), and the heel portion (14); or

further comprising at least one shock-absorbing material, which is located in the sealed chamber (85) of the hollow bulge (811) of the second layer (80) corresponding to at least one of the internal toe portion (16a), the external toe portion (16b), the internal metatarsus portion (18a), the external metatarsus portion (18b), the internal foot-arch portion (12a), the external foot-arch portion (12b), and the heel portion (14).

17. A multi-function shoe pad (5)

comprising a main body (50), which can allow a user's human sole to tread and structurally corresponds to respective portions of the user's human sole to be composed of a foot arch portion (12), a heel portion (14) located behind the foot arch portion (12), a toe portion (16) located before the foot arch portion (12) and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion (18) located between the foot arch portion (12) and the toe portion (16), the foot arch portion (12) having an internal foot-arch portion (12a) and an external foot-arch portion (12b), the toe portion (16) having an internal toe portion (16a) corresponding to the first toe and an external toe portion (16b) corresponding to the other toes of the user's foot, the metatarsus portion (18) having an internal metatarsus portion (18a) and an external metatarsus portion (18b); wherein the shoe pad (5) is **characterized in that** the main body (50) comprises:

a first layer (70) having a hollow bulge (711), which has an external convex surface (711a) integrally protruding from the first layer (70), an internal concave surface (711b) recessed from a bottom side (71) of the first layer (70) and corresponding to the external convex surface (711a), and a chamber (75) formed defined by the internal concave surface (711b), the chamber (75) being deformable between a compressed state and an uncompressed state; and

a second layer (80) mounted onto the first layer (70) and having a hollow bulge (811), which has an external convex surface (811a) integrally protruding from the second layer (80), an internal concave surface (811b) recessed from a top side (81) of the second layer (80) and corresponding to the external convex surface (811a), and a sealed chamber (85) jointly defined by the internal concave surface (811 b) and the top side (71) of the first layer (70); and

at least two support members (90) mounted below the hollow bulges (711 and 811) of the first and second layers (70 and 80) and having a convex wall (901) and an air space (903) located at an internal side of the convex wall (901).

preferably

wherein the at least two support members (90) each comprise a bottom wall (907) connected with the convex wall (901) in one piece, the bottom wall (907) and the convex wall (901) jointly defining the air space (903); or

further comprising at least one more support member (90), wherein the first layer (70) further comprises another hollow bulge (711) having an external convex surface (711 a) integrally protruding from a top side of the main body (50), an internal concave surface (711b) integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (711 a), and a chamber (75) defined by the internal concave surface (711b) and being deformable between a compressed state and an uncompressed state, a coupling piece (92) being integrally connected between the two support members (90) below the two hollow bulges (711 and 811) mounted to the first layer (70); or

further comprising at least one more support member (90), wherein the second layer (80) further comprises another hollow bulge (811) having an external convex surface (811a) integrally protruding from a top side of the main body (50), an internal concave surface (811 b) integrally recessed from a bottom side of the main body (50) and corresponding to the external convex surface (811 a), and a sealed chamber (85) jointly defined by the internal concave surface (811b) and the top side (71) of the first layer (70), a coupling piece (92) being integrally connected between the two support members (90) below the two hollow bulges (711 and 811) mounted to the second layer (80).

or comprising a main body (50), which can allow a user's human sole to tread and structurally corre-

sponds to respective portions of the user's human sole to be composed of a foot arch portion (12), a heel portion (14) located behind the foot arch portion (12), a toe portion (16) located before the foot arch portion (12) and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion (18) located between the foot arch portion (12) and the toe portion (16), the foot arch portion (12) having an internal foot-arch portion (12a) and an external foot-arch portion (12b), the toe portion (16) having an internal toe portion (16a) corresponding to the first toe and an external toe portion (16b) corresponding to the other toes of the user's foot, the metatarsus portion (18) having an internal metatarsus portion (18a) and an external metatarsus portion (18b); wherein the shoe pad (5) is **characterized in that** the main body (50) comprises:

a first air groove (131) formed at the bottom side (13) of the main body (10) and not located at the internal foot-arch portion (12a), the external foot-arch portion (12b), the heel portion (14), the internal toe portion (16a), the external toe portion (16b), the internal metatarsus portion (18a), or the external metatarsus portion (18b), the first air groove (131) having two ends each extending to a peripheral edge of the main body (10, the first air groove (131) having a first extended part (131a) and a second extended part (131b), the first extended part (131a) extending longitudinally along the midst of the internal and external toe portions (16a and 16b) from a front peripheral edge of the main body (10) adjacent to the toe portion (16) toward the heel portion (14), the second extended part (131b) communicating with the first extended part (131a) and transversally extending to an internal peripheral edge or an external peripheral edge of the main body (10) or both adjacent to the heel portion (14), the first extended part (131a) having an aperture (102) recessed inwardly and located at one of the front peripheral edge adjacent to the toe portion (16) and of an internal or external peripheral edge of the main body (10) adjacent to the heel portion (14);

a second air groove (132) communicating with the first air groove (131) and transversally extending along the midst of the toe portion (16) and the metatarsus portion (18) from the external peripheral edge of the main body (10) adjacent to the external toe portion (16b) to the internal peripheral edge of the main body (10) adjacent to the internal toe portion (16a), the second air groove (132) having an aperture (105) recessed inwardly and formed at the external or internal peripheral edge of the main body (10) adjacent to the midst of the toe portion (16) and the metatarsus portion (18);

a third air groove (133) communicating with the first air groove (131) and transversally extending along the midst of the metatarsus portion (18) and the foot arch portion (12) from the external peripheral edge of the main body (10) to the internal peripheral edge of the main body (10), the third air groove (133) having an aperture (106) recessed inwardly and formed at the external or internal peripheral edge of the main body (10) adjacent to the midst of the metatarsus portion (18) and the foot arch portion (12); and

a fourth air groove (134) communicating with the third air groove (133) and longitudinally extending along the profile of the internal foot-arch portion (12a) from the third air groove (133) toward the heel portion (14) to the second extended part (131b) of the first air groove (131);

or

comprising a main body (50), which can allow a user's human sole to tread and structurally corresponds to respective portions of the user's human sole to be composed of a foot arch portion (12), a heel portion (14) located behind the foot arch portion (12), a toe portion (16) located before the foot arch portion (12) and corresponding to the user's first, second, third, fourth, and fifth toes, and a metatarsus portion (18) located between the foot arch portion (12) and the toe portion (16), the foot arch portion (12) having an internal foot-arch portion (12a) and an external foot-arch portion (12b), the toe portion (16) having an internal toe portion (16a) corresponding to the first toe and an external toe portion (16b) corresponding to the other toes of the user's foot, the metatarsus portion (18) having an internal metatarsus portion (18a) and an external metatarsus portion (18b); wherein the shoe pad (5) is **characterized in that** the main body (50) comprises

a first layer (70); and

a second layer (80) mounted onto the first layer (70) and having a hollow bulge (811), which has an external convex surface (811a) integrally protruding from the second layer (80), an internal concave surface (811b) recessed from a top side (81) of the second layer (80) and corresponding to the external convex surface (811a), and a sealed chamber (85) jointly defined by the internal concave surface (811b) and the top side (71) of the first layer (70),

preferably further comprising at least one support member (90), which is mounted inside the sealed chamber (85) and each has a convex wall (901) and an air space (903) located at an internal side of the convex wall (901).

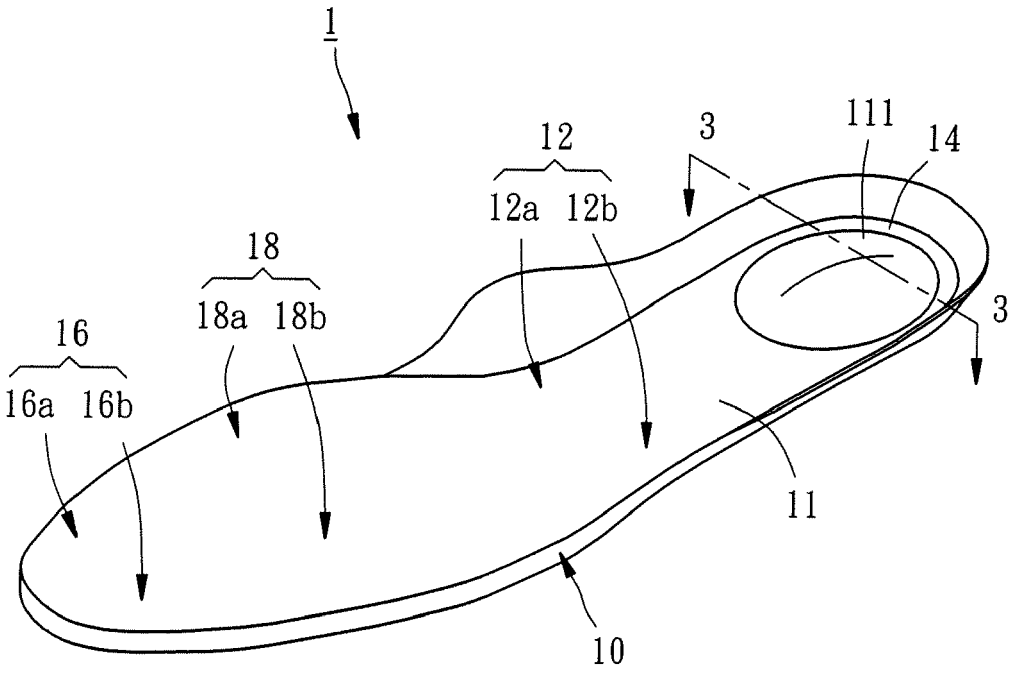


FIG. 1

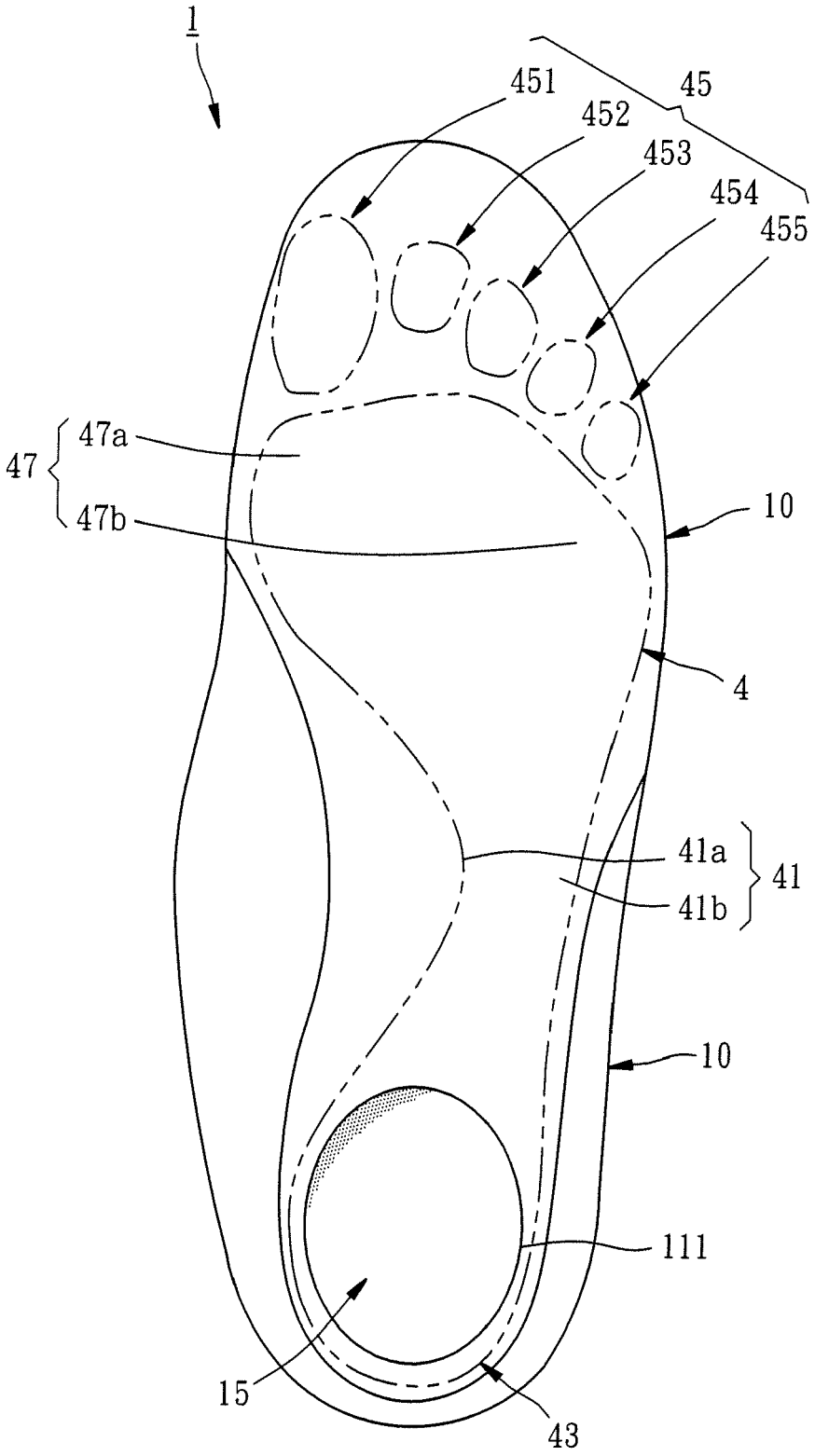


FIG. 2

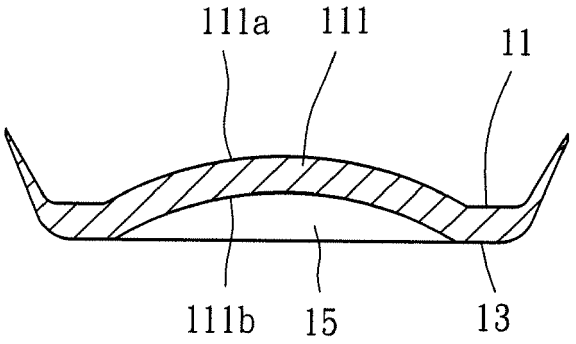


FIG. 3

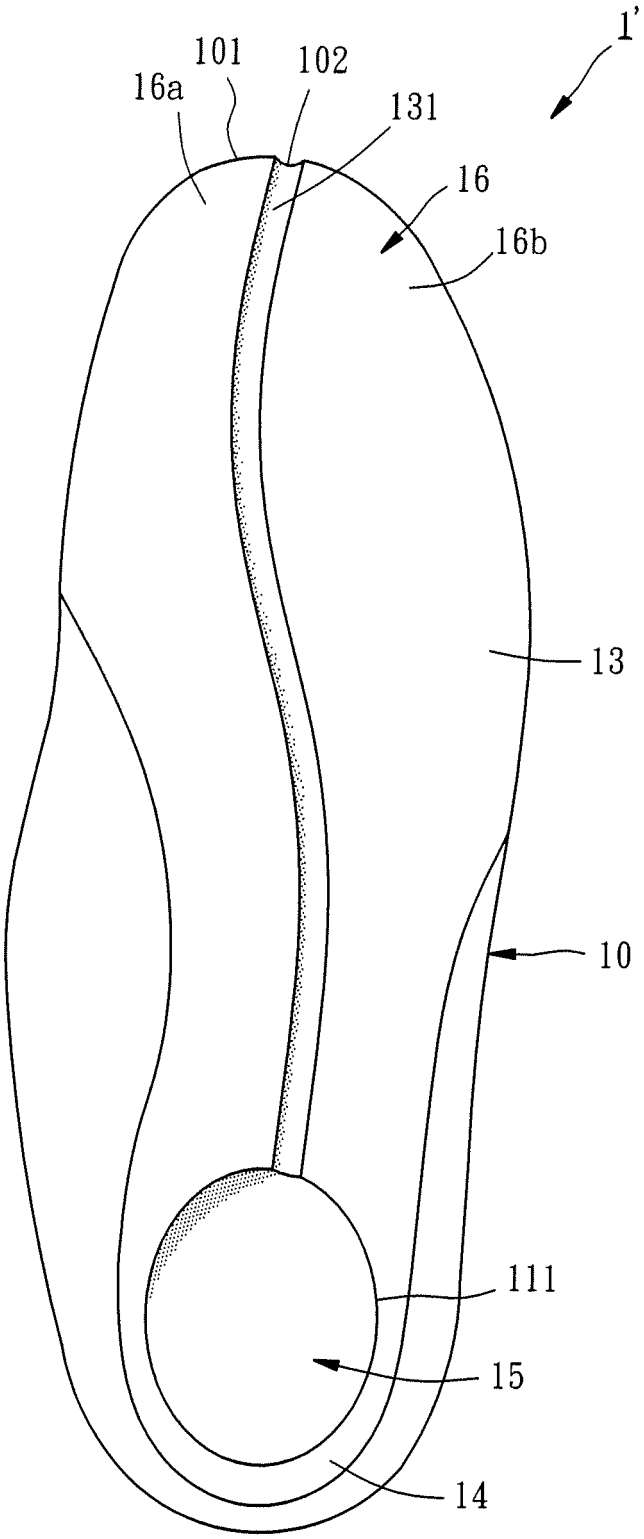


FIG. 4

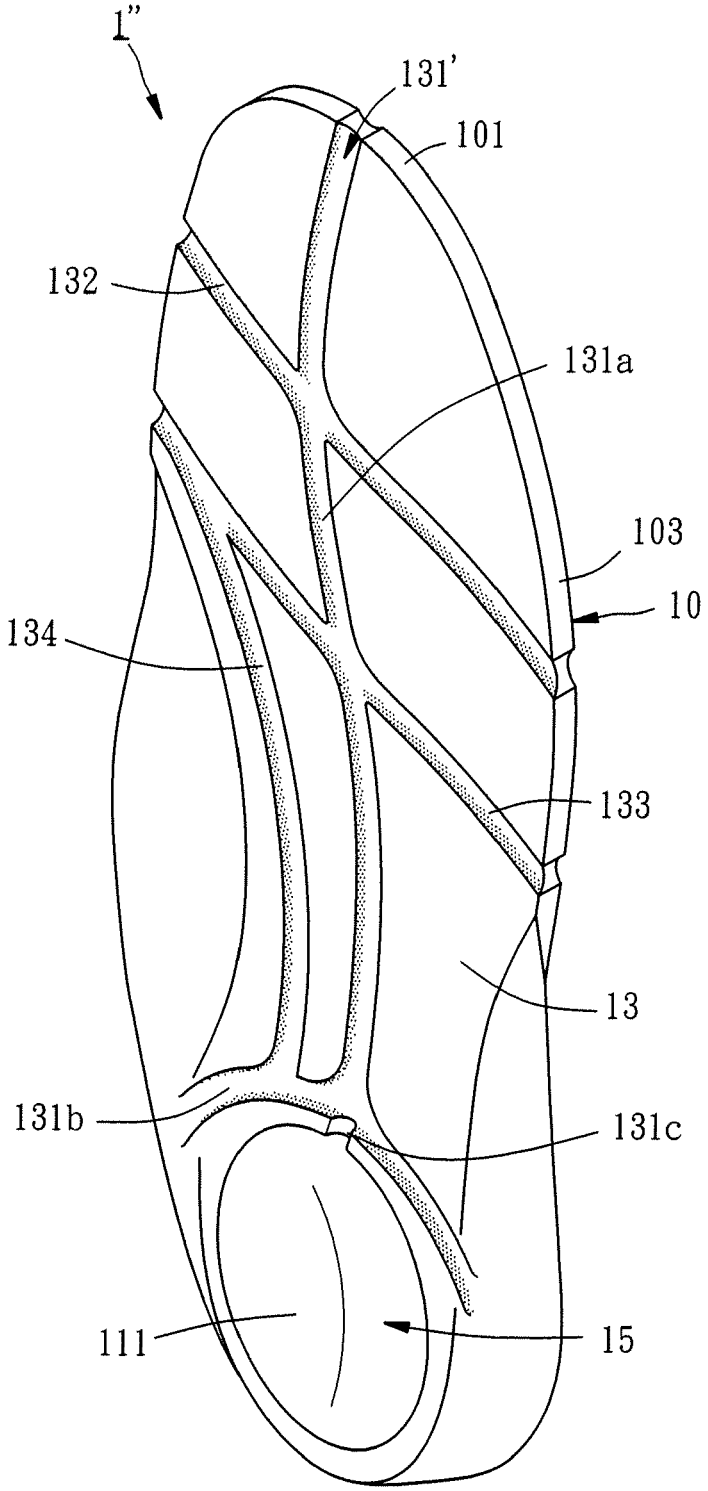


FIG. 5

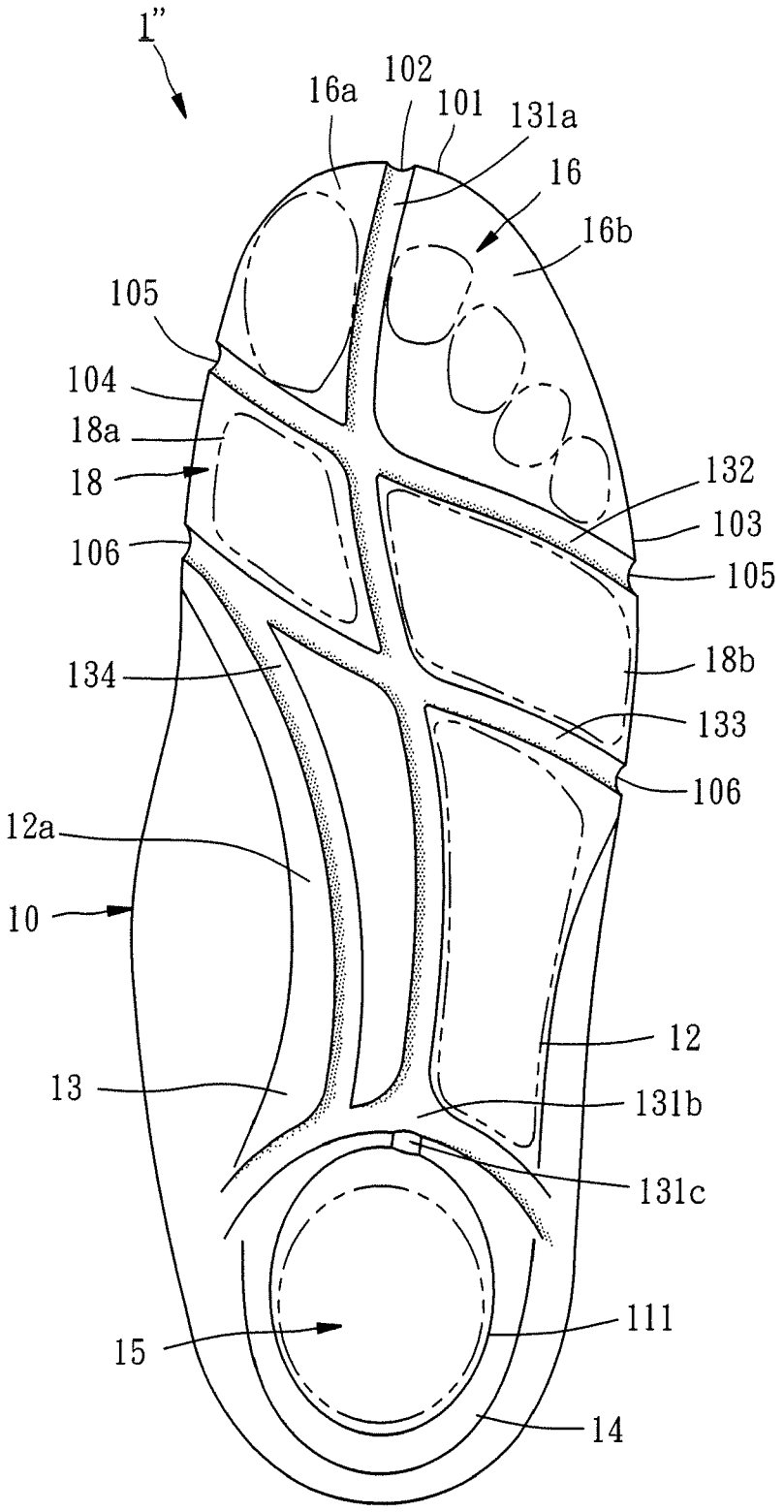

1"
16a
102
101
131a
16
16b
105
104
18a
18
106
132
103
105
134
18b
133
106
12a
10
12
13
131b
131c
15
111
14

FIG. 6

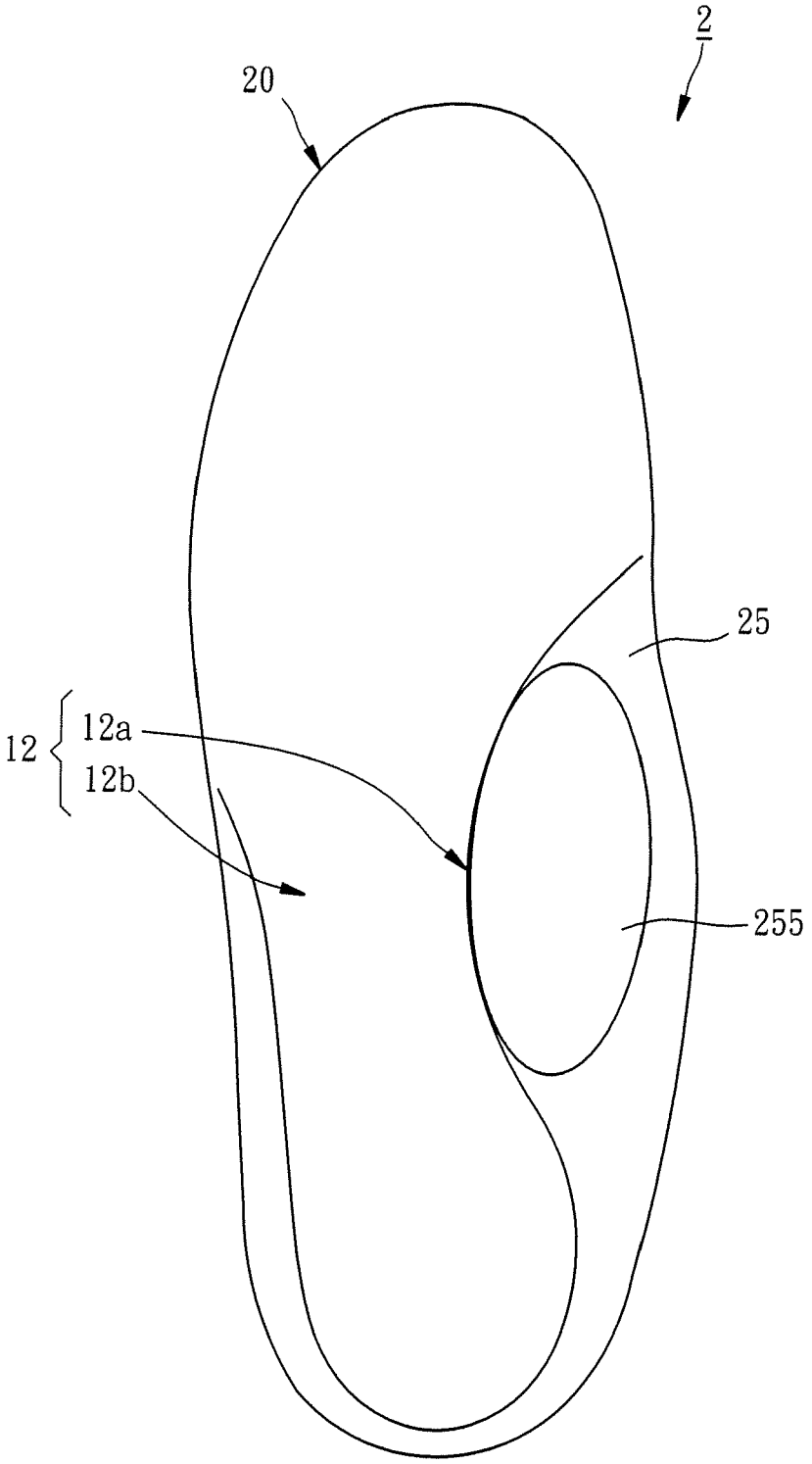


FIG. 7

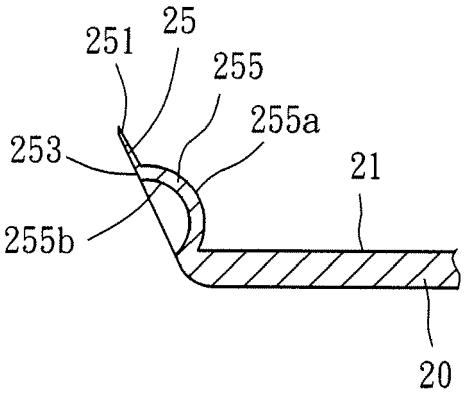


FIG. 8A

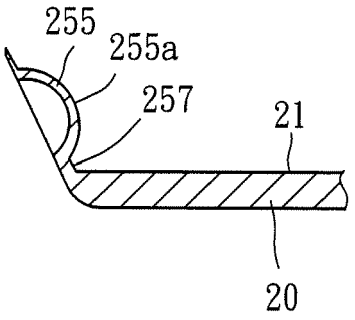


FIG. 8B

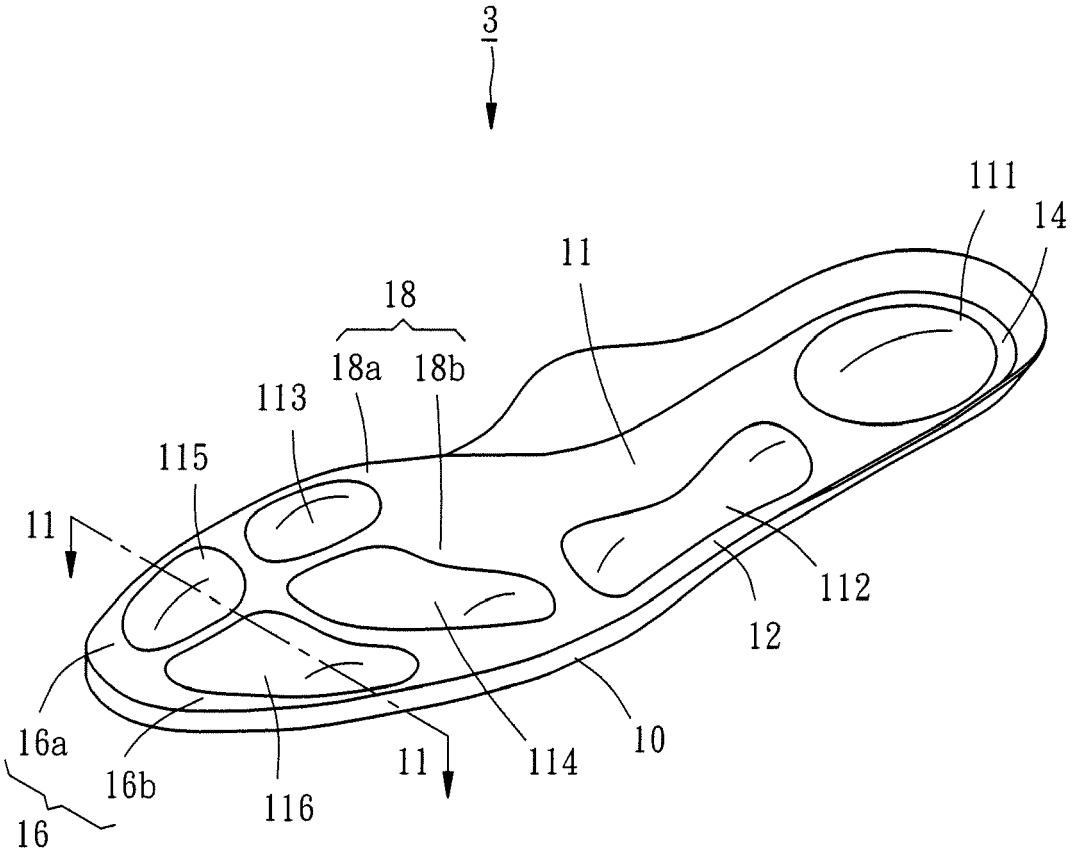


FIG. 9

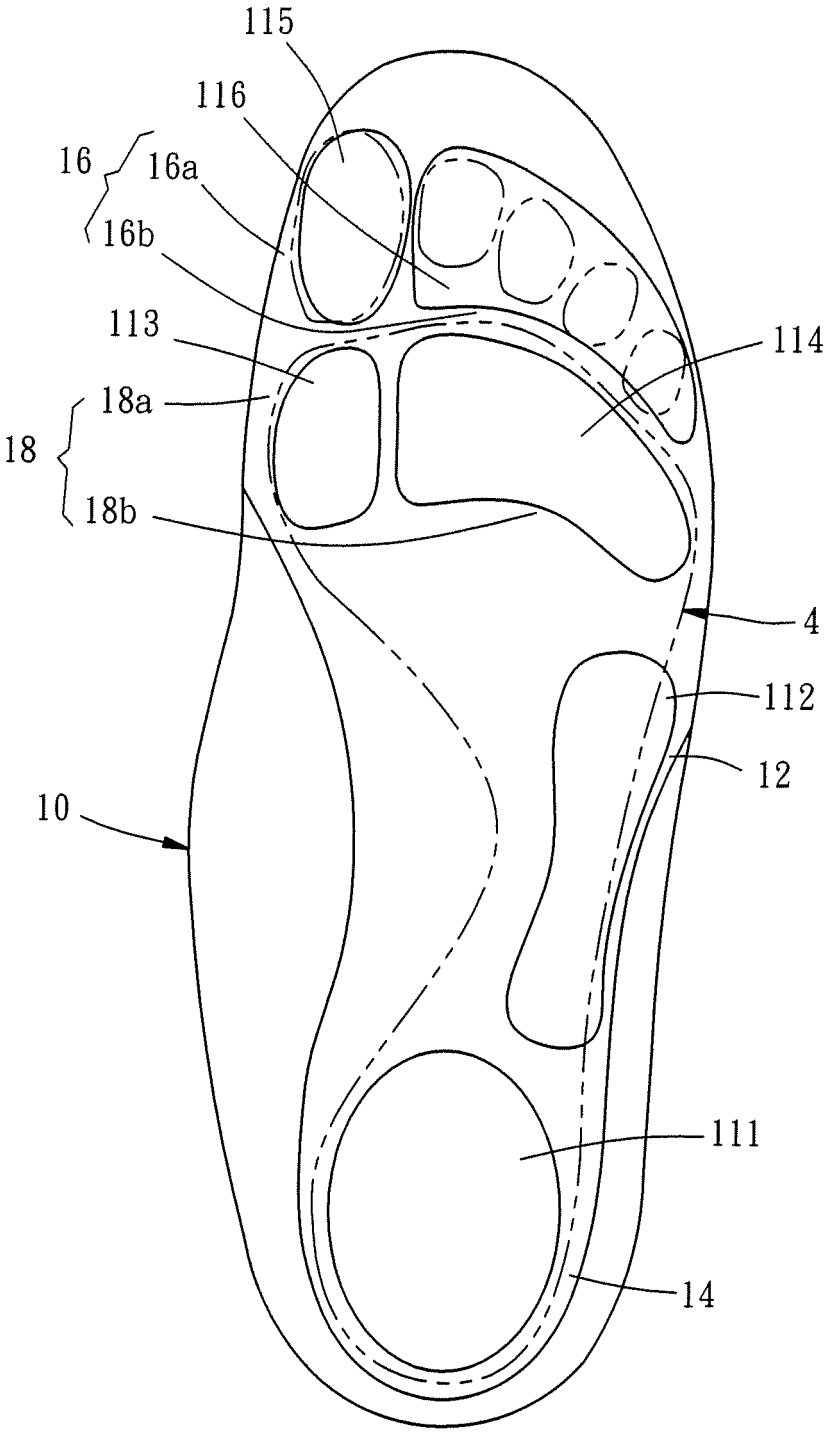


FIG. 10

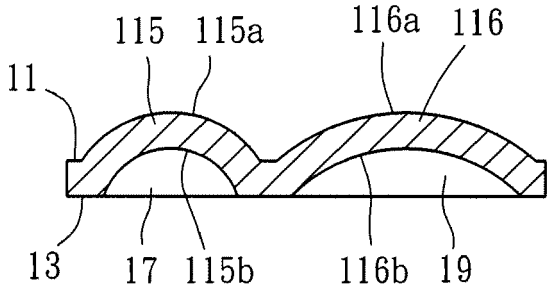

115
115a
116a
116
11
13
17
115b
116b
19

FIG. 11

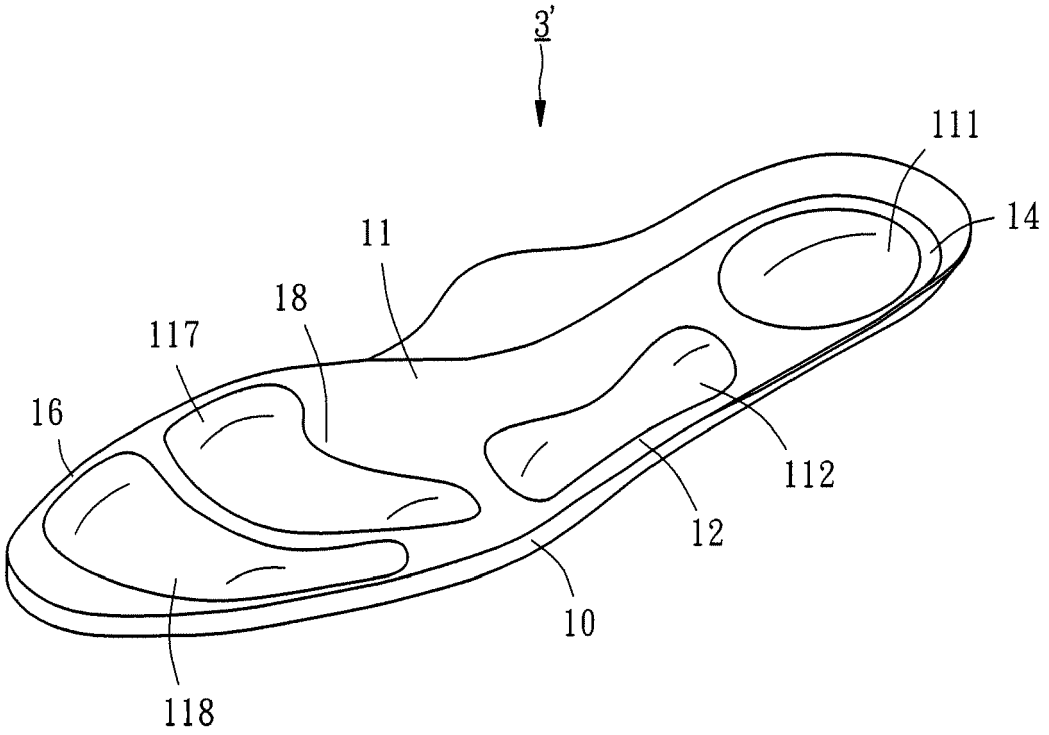

3'
111
14
11
18
117
16
112
12
10
118

FIG. 12

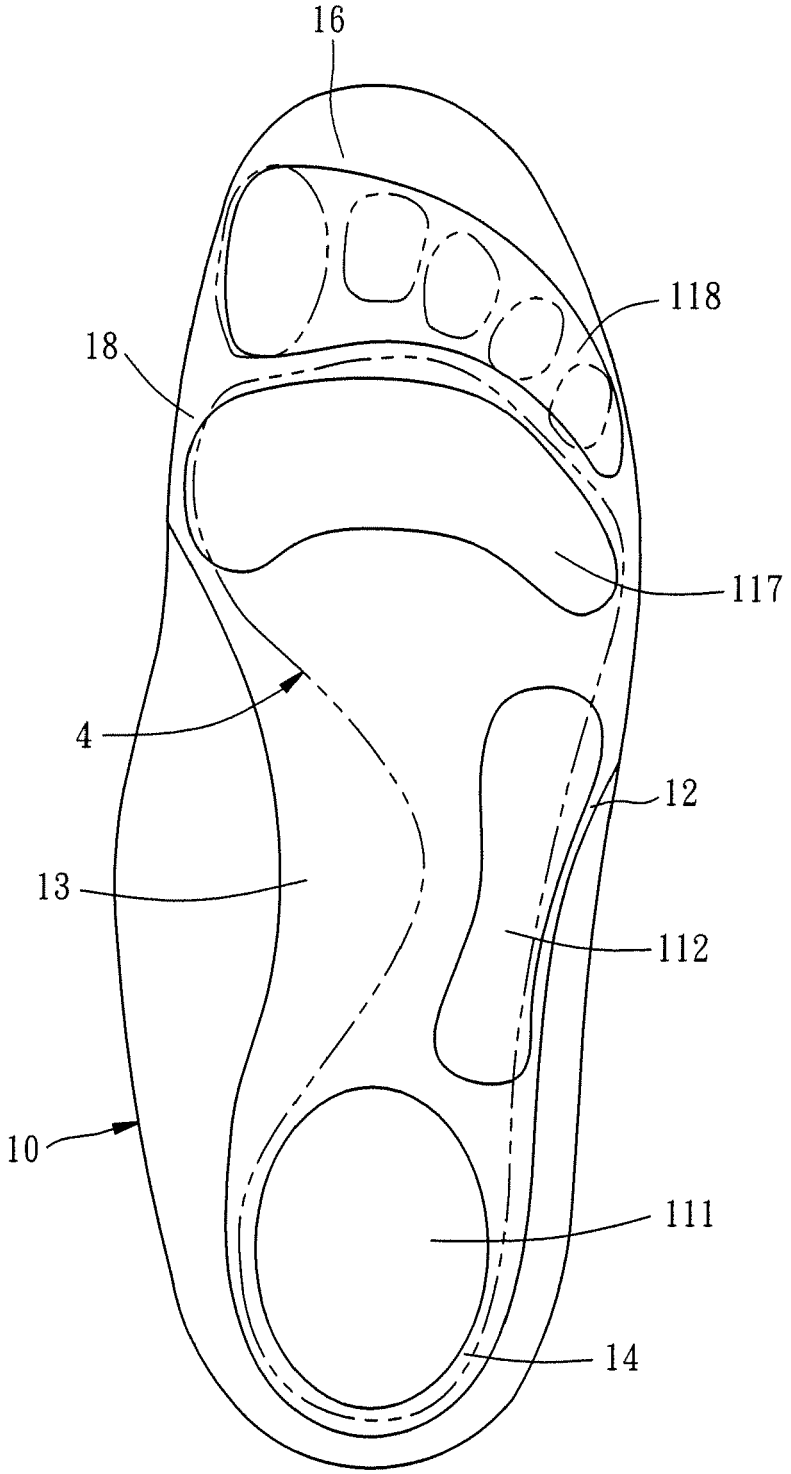


FIG. 13

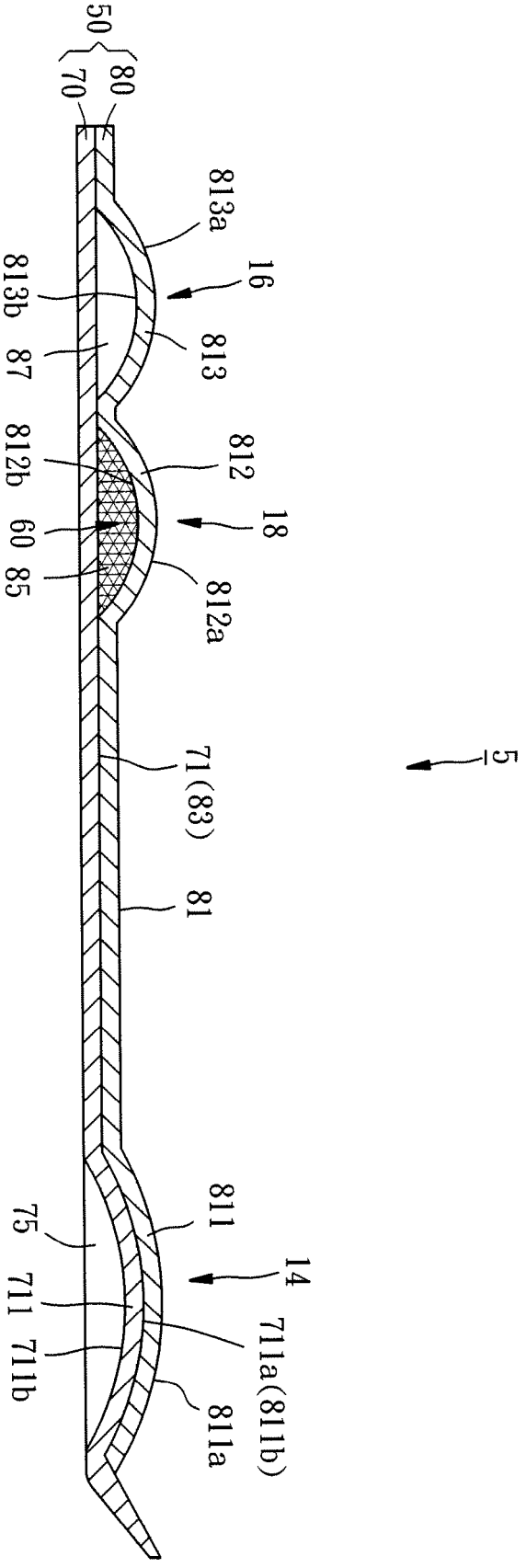

50
80
70
813a
16
813b
813
87
812
812b
18
60
85
812a
5
71(83)
81
811
14
75
711
711a(811b)
711b
811a

FIG. 14

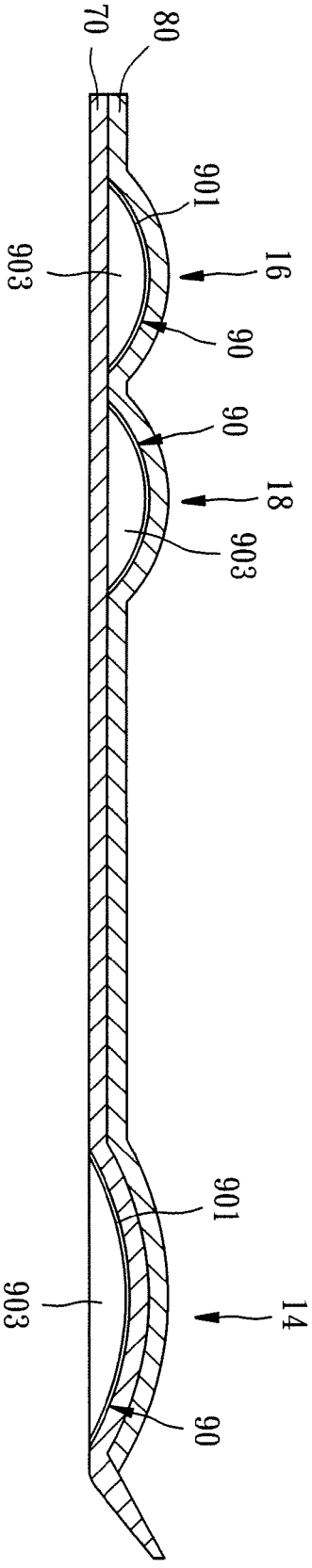


FIG. 15A

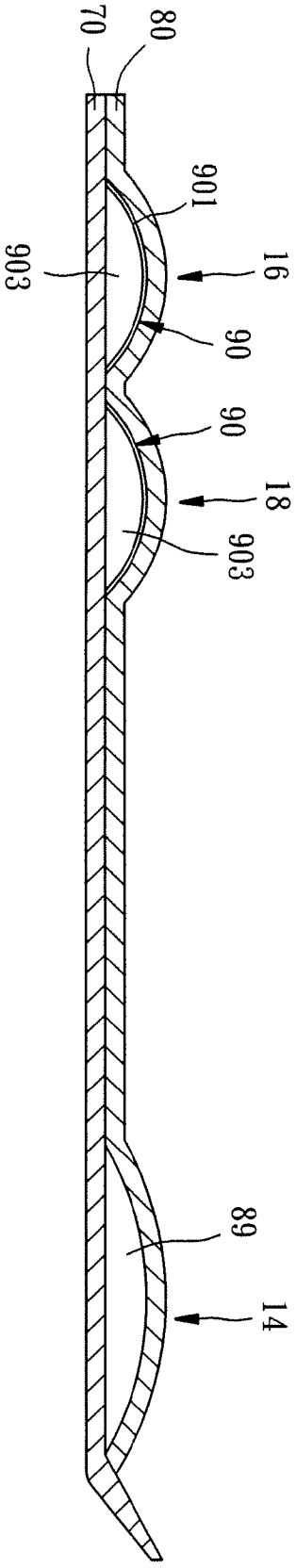
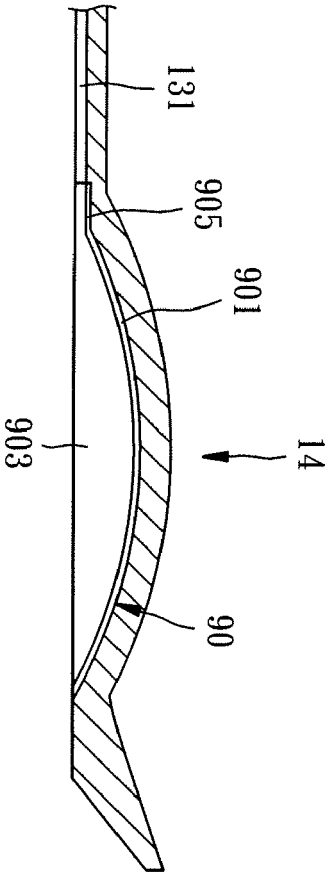


FIG. 15B

FIG. 16



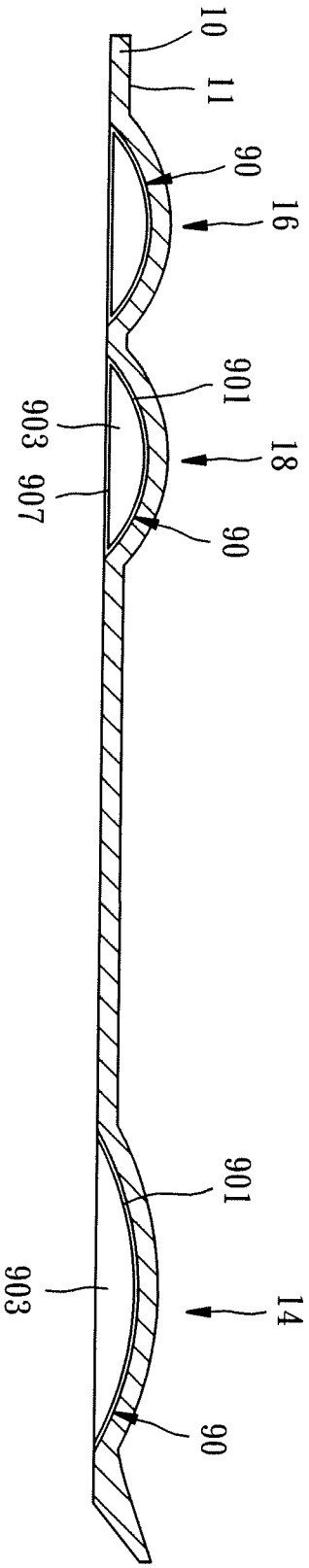

10
11
90
16
901
903
907
18
90
901
903
14
90

FIG. 18

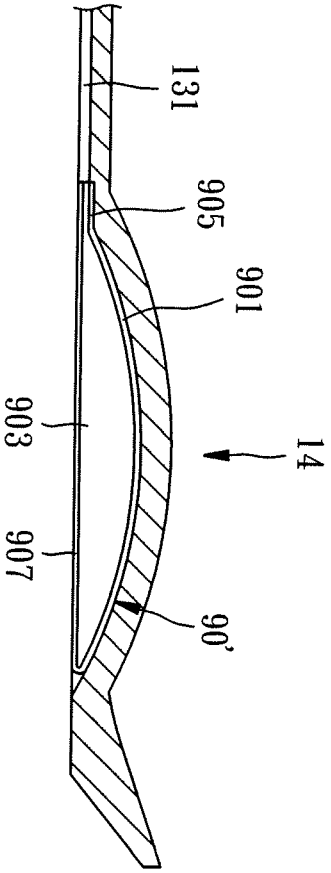

131
905
901
903
14
907
90'

FIG. 17

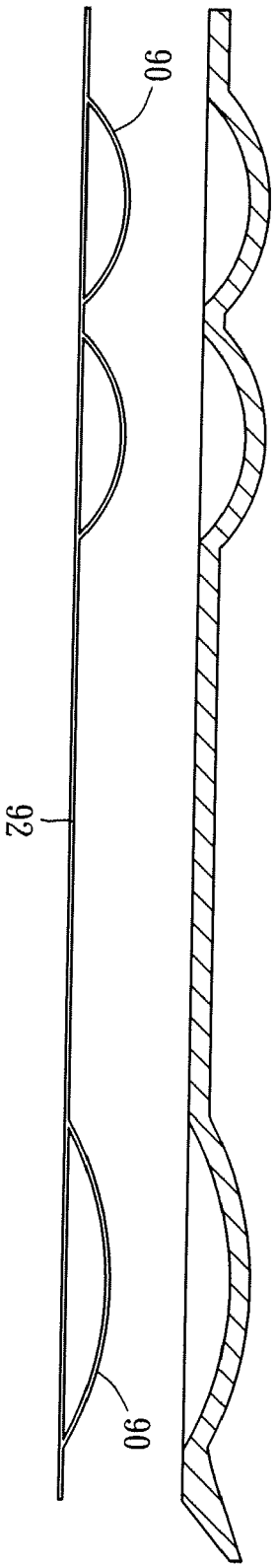


FIG. 19

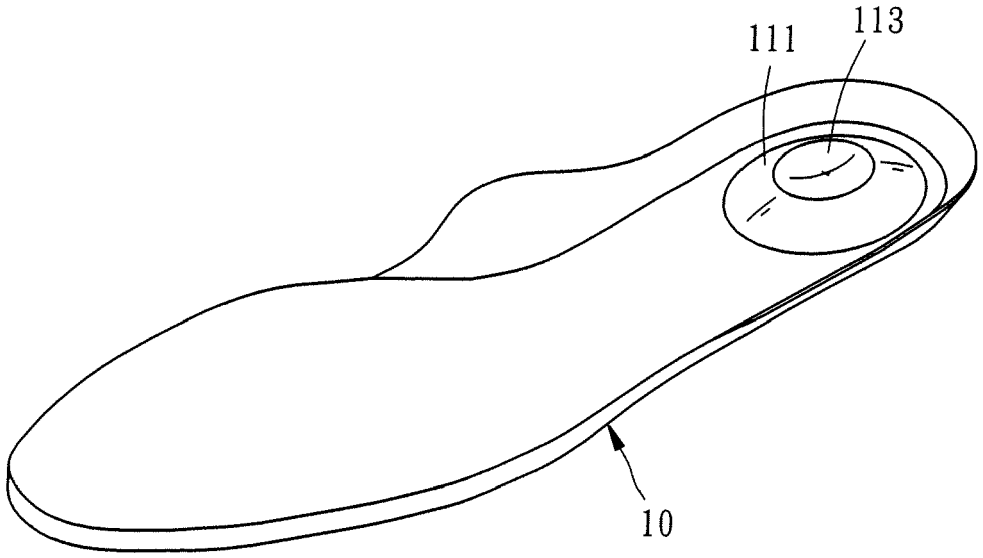


FIG. 20

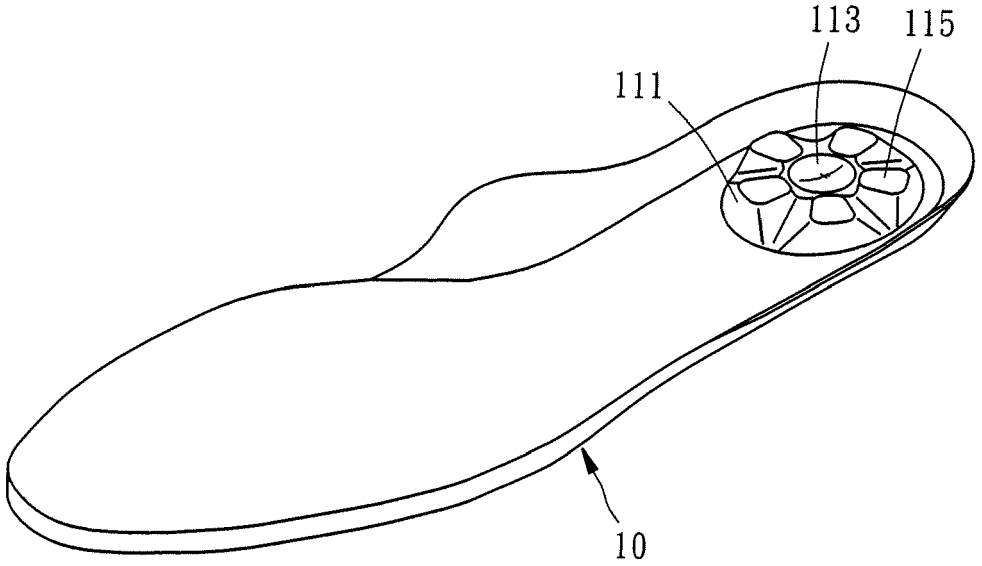


FIG. 21

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- TW M307982 **[0002]**
- TW M325753 **[0002]**
- CN 2759247 **[0002]**
- CN M307982 **[0002]**