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(54) Title: INSOLES WITH STRATEGIC HOLE PLACEMENT FOR ENHANCED CUSHIONING AND PERFORMANCE, AND METHOD OF MAKING THE SAME

(57) Abstract: An insole for a shoe can include a top surface, an opposing bottom surface, a rear end and an opposing front end. A plurality of spaced-apart holes can extend through the insole from the top surface to the bottom surface.

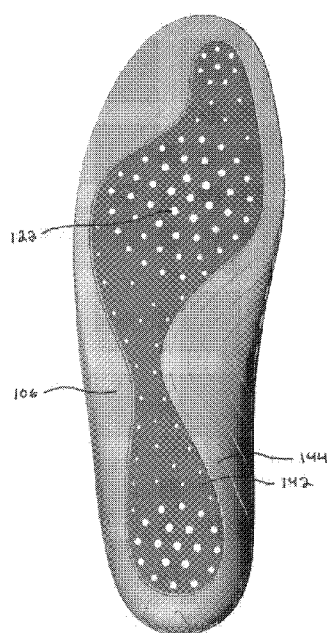


Fig. 6

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INSOLES WITH STRATEGIC HOLE PLACEMENT FOR ENHANCED CUSHIONING AND PERFORMANCE, AND METHOD OF MAKING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to U.S. Provisional Application No.

5 62/722,219, filed August 24, 2018, U.S. Provisional Application No. 62/824,405, filed March 27, 2019, and U.S. Provisional Application No. 62/849,470, filed May 17, 2019, the entire disclosures of which are hereby incorporated by reference in their entireties.

FIELD

[0002] The presently disclosed technology relates generally to the field of insoles. More

10 particularly, in one embodiment, the presently disclosed technology relates to insoles for shoes where increased or decreased cushioning and/or performance is desired.

BACKGROUND

[0003] Insoles improve the feel and/or performance of shoes. Insoles are typically made of two or more different materials or include several layers of different material to increase the
15 cushioning provided by the insoles.

[0004] Insoles for shoes have long included perforations in only a front or forefoot area, as opposed in the midfoot or heel areas. These known perforations are small, evenly distributed, and provide breathability to the insoles.

SUMMARY

20 [0005] It would be desirable to create insoles that can be tuned or adjusted to increase or decrease the cushioning provided to the user, and/or enhance the performance of the insole.

[0006] In one embodiment, the presently disclosed technology is directed generally to improving the feel, comfort and/or performance of insoles for shoes. The presently disclosed technology includes insoles having a plurality of spaced-apart holes that extend therethrough.

25 The size, shape and arrangement of the holes can contribute to increasing or decreasing cushioning in the insole.

[0007] In another embodiment, the presently disclosed technology is directed to an insole for a shoe. The insole can include a top surface, an opposing bottom surface, a rear end and an opposing front end. At least a portion of the top surface proximate the rear end can be concave.

30 At least a portion of the bottom surface proximate the rear end can be convex. The insole can

include a plurality of spaced-apart holes that extend through the body section (e.g., the forefoot, the midfoot, and/or heel areas of the insole) from the top surface to the bottom surface.

[0008] In yet another embodiment, the presently disclosed technology is directed to a method of tuning or adjusting the cushioning and/or performance of an insole for a shoe. The method includes creating a plurality of spaced-apart holes in the insole. Two adjacent holes of the plurality of spaced-apart holes have a different size.

[0009] In still another embodiment, the presently disclosed technology is directed to an insole for a shoe. The insole can include a top surface, an opposing bottom surface, a rear end and an opposing front end. A plurality of spaced-apart holes can extend through the top surface and the bottom surface. A first one of the plurality of spaced-apart holes can be larger than a second one of the plurality of spaced-apart holes. The first one of the plurality of spaced-apart holes can be positioned closer to a longitudinal axis of the insole than the second one of the plurality of spaced-apart holes. The plurality of spaced-apart holes can be configured to provide cushioning to a foot of a user.

[0010] In another embodiment, the presently disclosed technology is directed to a method of forming an insole for a shoe. The insole can have a contoured top surface, an opposing bottom surface, a rear end and an opposing front end. The method can include forming a plurality of spaced-apart holes that extend through the insole from the top surface to the bottom surface in both heel and forefoot areas of the insole to increase the cushioning of the insole.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0011] The foregoing summary, as well as the following detailed description of the presently disclosed technology, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the presently disclosed technology, there are shown in the drawings various illustrative embodiments. It should be understood, however, that the presently disclosed technology is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0012] Fig. 1 is a top perspective view of an insole according to an embodiment of the presently disclosed technology;

[0013] Fig. 2 is a bottom perspective view thereof;

[0014] Fig. 3 is an elevation view of a first (e.g., lateral) side thereof;

[0015] Fig. 4 is an elevation view of an opposing second (e.g., medial) side thereof;

[0016] Fig. 5 is a top plan view thereof;

[0017] Fig. 6 is a bottom plan view thereof;

[0018] Fig. 7 is a front elevation view thereof;

[0019] Fig. 8 is a rear elevation view thereof;

5 [0020] Fig. 9 is a top plan view of a schematic pressure diagram of a foot placed on top of the insole of Fig. 1;

[0021] Fig. 10 is top perspective view of an insole according to another embodiment of the presently disclosed technology; and

10 [0022] Fig. 11 is a schematic, cross-section side elevation view of a portion of the insole shown in Fig. 10, wherein a slight space is shown between a bottom surface of a fabric or cloth layer and a top surface of another portion of the insole, and portions of the insole are shown to have a cross-hashing, for clarity only.

DETAILED DESCRIPTION

15 [0023] While systems, devices and methods are described herein by way of examples and embodiments, those skilled in the art recognize that the systems, devices and methods of the presently disclosed technology are not limited to the embodiments or drawings described. Rather, the presently disclosed technology covers all modifications, equivalents and alternatives falling within the spirit and scope of the appended claims. Any headings used herein are for organizational purposes only and are not meant to limit the scope of the description or the

20 claims.

[0024] Certain terminology is used in the following description for convenience only and is not limiting. The words “bottom,” “top,” “left,” “right,” “lower” and “upper” designate directions in the drawings to which reference is made. Unless specifically set forth herein, the terms “a,” “an” and “the” are not limited to one element but instead should be read as meaning

25 “at least one.” As used herein, the word “may” is used in a permissive sense (i.e., meaning having the potential to) rather than the mandatory sense (i.e., meaning must). The terminology includes the words noted above, derivatives thereof and words of similar import.

[0025] Referring to the drawings in detail, wherein like numerals indicate like elements throughout, Figs. 1-9 show an insole, generally designated 100, according to the presently

30 disclosed technology. Figs. 1-9 show an insole designed for a right foot, and a corresponding or mirror-image insole can be designed for the left foot. In one embodiment, the insole is designed

for non-high heel or flatter shoes, such as running shoes or women's flats. However, with certain modifications appreciated by those of skill in the art, the insole can be incorporated into insoles for other types of shoes, such as high heel shoes.

[0026] The insole 100 can include a top surface 104, an opposing bottom surface 106, a rear end 108 (i.e., near the heel area of the insole) and an opposing front end 110 (i.e., near the forefoot area of the insole). At least a portion of the top surface 104 proximate the rear end 108 can be concave. At least a portion of the bottom surface 106 proximate the rear end 108 can be convex. However, the insole 100 can have other configurations, such as an entirely flat bottom surface 106.

[0027] The rear end 108 of the insole 100 is proximate a heel area 130 of the insole 100. The front end 110 of the insole 100 is proximate a forefoot (e.g., ball) area 134 of the insole 100. An arch or midfoot area 132 of the insole is between the heel area 130 and the forefoot area 134. Optionally, at least a portion of the forefoot area 134 of the insole has a thickness (i.e., measured from the top surface 104 to the bottom surface 106) of approximately or exactly 4.5 millimeters (mm), and at least a portion of the heel area 130 (e.g., a center thereof) has a thickness of approximately or exactly 12 mm. Optionally, the thickness of at least a portion of the forefoot area 134 is between 2.5 - 20 millimeters, and optionally between 2.5 - 25 millimeters. Optionally, the thickness of at least a portion of the heel area 130 is between 6 - 40 millimeters.

[0028] The insole 100 can include means for turning or adjusting the cushioning, performance and/or flexibility thereof. In one embodiment, the means can be in the form of a plurality of spaced-apart holes 122 that extend through the insole 100 from the top surface 104 to and through the bottom surface 106. Optionally, the holes 122 can increase the force attenuation and/or force distribution capacity of the insole 100, thereby creating, adding or decreasing cushioning provided by the insole 100, flexibility to the insole 100, and/or creating a more comfortable insole for the user.

[0029] Flexibility is important for two reasons. First, flexibility allows the contour of the insert to flex and accommodate the shape of the foot, while distributing load more evenly, thereby reducing peak loads and enhancing comfort. Second, dynamic flexion of the insert provides cushioning and/or impact attenuation during walking and running.

[0030] The holes 122 can lower the elastic modulus of the insole and thereby make the insole more flexible or elastic than if the holes 122 were not included in the insole. Optionally, the holes 122 provide for the spatial redistribution of load.

[0031] At least one of the plurality of holes 122 can be located in and/or extend through the heel area 130 of the insole 100. Alternatively or additionally, at least one of the plurality of holes 122 can be located in the midfoot area 132 of the insole 100.

[0032] Optionally, as shown in Fig. 5, fewer holes 122 can be located in the midfoot area 132 than both or either the heel area 130 and the forefoot area 134. In addition, any holes extending through the midfoot area 132 can have a size and/or diameter that is less than or equal to one, some or all of the holes 122 that extend through either or both of the heel area 130 and the forefoot area 134.

[0033] In one embodiment, the holes 122 are not necessarily arranged in rows, but arranged in an eccentric, non-random pattern. Certain prior art, such as U.S. Publication No. 2013/0340288, describe random distributions of apertures. The presently disclosed technology is not random. Instead, the presently disclosed technology includes specific size, shape and/or placement of holes 122 to achieve particular tuning, adjustment, performance and/or cushioning.

[0034] Adjacent holes 122 are not necessarily the same size. Instead, the size, shape and/or location of each of the holes 122 is dependent upon, at least in part, the desired level or amount of cushioning and/or performance incorporated into the insole 100. For example, two adjacent holes 122 can have a different size, shape and/or diameter. More particularly, a first one of the plurality of spaced-apart holes 122 can be larger than a second one of the plurality of spaced-apart holes 122. The presently disclosed technology is not limited to the insole 100 having only two different categories, types, and/or sizes of the holes 122, as the insole 100 can include three or more different categories, types, and/or sizes of the holes 122.

[0035] In one embodiment, the largest one of the plurality of spaced-apart holes 122 can have a diameter of approximately 3, 4 or more millimeters, and a smallest one of the plurality of spaced-apart holes 122 can have a diameter of approximately 1, 0.5 or less millimeters. Thus, in the present embodiment, the size, shape and/or location of each of the holes 122 can be used to adjust, modify or fine tune (e.g., increase and/or decrease) the cushioning and/or performance provided by the insole 100. The size, shape and pattern of the holes 122 shown in Figs. 1-9

contribute to or dictate the cushioning and/or performance capabilities provided by the insole 100.

[0036] In one embodiment, at least the radially outer-most holes 122 are arranged in a predetermined pattern around the insole 100 and spaced a predetermined distance inwardly from the outer contour or periphery of the insole.

[0037] As shown in Fig. 9, in one embodiment, at least some of the plurality of spaced-apart holes 122 are configured to form three distinct and spaced-apart circles of holes. The circles of holes are optionally placed in locations or regions of greatest pressure on the insole 100 by the foot. For example, the eccentrically-shaped solid line 146 that surrounds each of the three circles of holes surrounds a region in which the greatest average pressure is placed on the insole by the foot. Pressure outside of the eccentrically-shaped solid line 146 is (or generally) less than pressure at or inside the eccentrically-shaped solid line.

[0038] Optionally, a first one of the circles, generally designated 136, is positioned at or near (e.g., beneath) the head of the first metatarsal of the user's foot. A second one of the circles, generally designated 138, is optionally positioned beneath the forefoot of the user's foot. A third one of the circles, generally designated 140, is optionally positioned beneath the heel of the user's foot.

[0039] In one embodiment, the second circle 138 is larger (e.g., includes more holes 122) than the third circle 140, which is larger than the first circle 136. In one embodiment, the second circle 138 has as a radius of at least four holes 122, the third circle 140 has a radius of at least three holes 122, and the first circle 136 has a radius of at least two holes 122. Optionally, the holes 122 that form the three circles can be the same size, while the remaining holes 122 in the insole 100 are smaller.

[0040] In addition to or instead of the three circles of holes 122, the holes 122 can be arranged on or in the insole 100 to match a pressure diagram created when a user's foot is placed on the ground. For example, the holes 122 can be located in the areas of the insole where the most weight or pressure is applied by the user's foot. Optionally, smaller and/or fewer holes 122 are positioned proximate the arch than the forefoot and the heel.

[0041] Optionally, the holes 122 positioned proximate the ball of the user's foot are generally larger than the holes 122 positioned proximate the arch of the user's foot. This is because, in at least certain shoes, it can be desirable to provide more cushioning to the balls of

the user's foot than the arch of the user's foot. Optionally, the holes 122 extend across the width of the insole 100. Optionally, one or more of the holes 122 are located along a longitudinal axis A (e.g., equidistant from either lateral edge, as shown in Fig. 5) of the insole 100.

[0042] Depending upon the desired level of cushioning, the plurality of holes 122 can be located in only a certain portion or portions of the insole 100, while another portion or portions of the insole 122 would not include any holes 122 or perforations. For example, the heel area of the insole 100 can include the plurality of holes 122, while the forefoot area can be void of any perforations or can include only smaller perforations for breathability purposes.

[0043] Optionally, the size of the holes 122 can be based on the durometer of the insole and the curvature of contour of at least a portion of the top surface 104 of the insole 100. For example, for an insole having a lower durometer, the size of the holes 122 is generally smaller than an insole having a higher durometer. Conversely, in one embodiment, an insole having a higher durometer has holes 122 that are generally larger than an insole having a plate with a lower durometer. This is because less cushioning, performance and/or flexibility on account of the holes 122 is needed or desired for an insole with material or a plate (i.e., a component of certain types of insoles) having a lower durometer. Curvature and/or contour of a top surface 104 of the insole 100 can impact the size of the holes 122.

[0044] In one embodiment, the plurality of holes 122 can be in only two different sizes. For example, some of the plurality of holes 122 can have a diameter of or approximately 3 or 4 millimeters, and the remainder of the plurality of holes 122 can have a diameter of or approximately 1 mm. In another embodiment, the plurality of holes 122 can be in only three different sizes. In yet another embodiment, the plurality of holes 122 can be in four or more different sizes.

[0045] Although the figures show all of the plurality of holes 122 having a circular shape (when viewed from above or below), application of the present technology is not so limited. For example, each or at least one of the plurality of holes 122 can have a different geometric shape, such as elliptical or rectangular (when viewed from above), depending upon the cushioning levels and traits desired for the insole 122. Optionally, one or more or each of the plurality of holes 122 can have a cone or frusto-conical shape (see, e.g., Fig. 11) when viewed from the side or in elevation.

[0046] Optionally, the insole 100 can be designed and/or manufactured separately from a shoe to which the insole 100 is to be used with. The insole 100 can be inserted or slipped into the shoe for use. In one embodiment, there is no requirement to mechanically or chemically attach the insole 100 to the interior of the shoe, such as by stitching.

5 [0047] Optionally, the insole 100 can be formed of one, or two or more materials. For example, in one embodiment, the insole 100 can be formed by a dual or tri-density chassis. The chassis can be formed of a first portion 142 (e.g., commensurate in scope with the area surrounded eccentrically-shaped solid line 146 shown in Fig. 9) and a second portion 144 (e.g., commensurate in scope with the area outside of the eccentrically-shaped solid line 146 shown in
10 Fig. 9). The second portion 144 can surround at least a portion of the first portion 142. The first portion 142 can have a harder durometer than the second portion 144. Optionally, the outer periphery or contour of the first portion 142 can match or mimic a portion of the pressure diagram of a user's foot.

[0048] The presently disclosed technology includes a method of forming the plurality of
15 holes 122 by a punching process, a perforation process, laser cutting, and/or injection molding.

[0049] Fig. 10 shows another embodiment of the presently disclosed technology. Similar or identical structure between the embodiment of Figs. 1-10 and the embodiment of Fig. 11 is distinguished in Fig. 11 by a reference number with a magnitude one hundred (100) greater than that of Figs. 1-10. Description of certain similarities between the embodiment of Figs. 1-10 and
20 the embodiment of Fig. 11 may be omitted herein for convenience and brevity only.

[0050] The insole 200 can be formed of a single material, such as a single, unitary piece of material, such as but not limited to material having a single density. One example of such a material is polyurethane (PU). Other examples are ethylene-vinyl acetate (EVA) or foam.

[0051] In one embodiment, the insole 200 can be constructed from two or more layers of
25 different material. Optionally, the insole 200 is formed, at least in part, of a foam and/or polymeric material(s) (e.g., nylon and/or thermoplastic urethane) and/or composite materials. A contoured plate can form all or a portion of the bottom surface 206 of the insole 200. The plate can be formed of a polymeric material, and can be more rigid than a material used to form the top surface 204 of a body section 202.

30 [0052] Optionally, the insole 200 can be formed of three discreet or different materials or layers. For example, the bottom surface 206 of at least the body section 202 can be formed of a

polymeric material, a midsection of the insole 200 can be formed of a first foam or fabric material, and the top surface 204 of the insole 200 can be formed of a second foam or fabric material.

[0053] In another embodiment, the top and bottom surfaces 204, 206 can be formed of the same material. In such an embodiment, a fabric or cloth layer 224 can optionally contact the top surface 204 (such as that shown in Fig. 11) and directly engage the sock or foot of the user. Optionally, there are no holes in the fabric or cloth layer 224. In another embodiment, the only holes in the fabric or cloth layer 224 are located in the forefoot area 224 thereof.

[0054] The following exemplary embodiments further describe optional aspects of the presently disclosed technology and are part of this Detailed Description. These exemplary embodiments are set forth in a format substantially akin to claims (each with numerical designations followed by a letter (e.g., A, B, etc.)), although they are not technically claims of the present application. The following exemplary embodiments refer to each other in dependent relationships as “embodiments” instead of “claims.”

[0055] 1A. An insole for a shoe, the insole comprising:
a top surface, an opposing bottom surface, a rear end and an opposing front end; and
a means for tuning or providing cushioning.

[0056] 2A. The insole of embodiment 1A, wherein the means for tuning or providing cushioning comprises a plurality of spaced-apart holes that extend through the insole from the top surface to the bottom surface, a first one of the plurality of spaced-apart holes being larger than a second one of the plurality of spaced-apart holes.

[0057] 3A. The insole of embodiment 1A or 2A, wherein the insole has a predetermined or particular durometer.

[0058] 4A. The insole of any one of embodiments 1A-3A, wherein the rear end of the insole is proximate a heel area of the insole, wherein the front end of the insole is proximate a forefoot area of the insole, wherein at least one of the plurality of holes is located in the heel area of the insole, and wherein at least one of the plurality of holes is located in the forefoot area of the insole.

[0059] 5A. The insole of any one of embodiments 1A-4A, wherein each of the plurality of spaced-apart holes is circular in shape.

[0060] 6A. The insole of one of embodiments 1A-5A, wherein the top surface of the insole includes a fabric layer, and wherein each of the plurality of spaced-apart holes extends through the fabric layer.

[0061] 1B. An insole for a shoe, the insole comprising:

5 a top surface, an opposing bottom surface, a rear end and an opposing front end, the rear end being proximate a heel area, the front end being proximate a forefoot area, a midfoot area being between the heel area and the forefoot area; and

a plurality of spaced-apart holes extending through the top surface to the bottom surface in at least the heel and forefoot areas, a first one of the plurality of spaced-apart holes being
10 larger than a second one of the plurality of spaced-apart holes, the plurality of spaced-apart holes providing cushioning to the foot.

[0062] 2B. The insole of embodiment 1B, where at least some of the plurality of spaced-apart holes extend through the top surface to the bottom surface in the midfoot area.

[0063] It will be appreciated by those skilled in the art that changes could be made to the
15 embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that the presently disclosed technology is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the presently disclosed technology as defined by the appended claims.

CLAIMS

I/we claim:

1. An insole for a shoe, the insole comprising:

a top surface, an opposing bottom surface, a rear end and an opposing front end, the rear
5 end being proximate a heel area, the front end being proximate a forefoot area, a midfoot area
being between the heel area and the forefoot area, the midfoot area being configured to be at
least partially beneath an arch of a foot of a user; and

a plurality of spaced-apart holes extending through the top surface and the bottom surface
in each of the heel area, the forefoot area, and the midfoot area, a first one of the plurality of
10 spaced-apart holes being larger than a second one of the plurality of spaced-apart holes, the
plurality of spaced-apart holes providing cushioning to a foot of a user.

2. The insole of claim 1, wherein at least some of the plurality of spaced-apart holes
form three distinct and spaced-apart circles of holes.

3. The insole of claim 2, wherein a first circle of holes is positioned at or near a head of
a first metatarsal of the foot, wherein a second circle of holes is positioned in the forefoot area,
and wherein a third circle of holes is positioned in the heel area.

4. The insole of claim 2 or 3, wherein the second one of the circles is larger than the
third one of the circles.

5. The insole of claim 1, wherein two adjacent holes of the plurality of spaced-apart
holes have a different size.

6. The insole of any one of claims 1-3 and 5, wherein the size and shape of each of the
plurality of spaced-apart holes is dependent upon a desired amount of cushioning.

7. The insole of claim 1, wherein two adjacent holes of the plurality of spaced-apart
30 holes have a different diameter.

8. The insole of claim 7, wherein one of the two adjacent holes of the plurality of spaced-apart holes has a diameter of 3 or more millimeters.

5 9. The insole of claim 1, wherein each of the plurality of holes has a circular shape.

10. The insole of any one of claims 1-3, 5 or 7-9, wherein the rear end of the insole is proximate a heel area of the insole, wherein the front end of the insole is proximate a forefoot area of the insole, wherein at least one of the plurality of spaced-apart holes is located in the heel
10 area of the insole, and wherein at least one of the plurality of spaced-apart holes is located in the forefoot area of the insole.

11. The insole of any one of claims 1-3, 5 or 7-9, wherein the top surface of the insole includes a fabric layer, and wherein each of the plurality of spaced-apart holes extends through
15 the fabric layer.

12. The insole of claim 1, wherein the first one of the plurality of spaced-apart holes is positioned closer to a longitudinal axis of the insole than the second one of the plurality of spaced-apart holes.

20 13. A method of forming an insole for a shoe, the insole having a top surface, an opposing bottom surface, a rear end and an opposing front end, the method comprising:

forming a plurality of spaced-apart holes that extend through the insole from the top surface to the bottom surface in each of heel, midfoot, and forefoot areas of the insole to increase
25 the cushioning of the insole,

wherein a first one of the plurality of spaced-apart holes being larger than a second one of the plurality of spaced-apart holes.

14. The method of claim 13, wherein each hole of the plurality of holes is formed by one
30 of a punching process, laser cutting, and injection molding.

15. The method of claims 13 or 14, further comprising:

determining the size and placement of each of the plurality of holes based upon a desired amount of cushioning.

5 16. The method of claims 13 or 14, wherein the plurality of spaced-apart holes are arranged in an eccentric, non-random pattern.

17. The method of claims 13 or 14, wherein two adjacent holes of the plurality of spaced-apart holes have a different size.

10

18. The method of claims 13 or 14, wherein two adjacent holes of the plurality of spaced-apart holes have a different diameter.

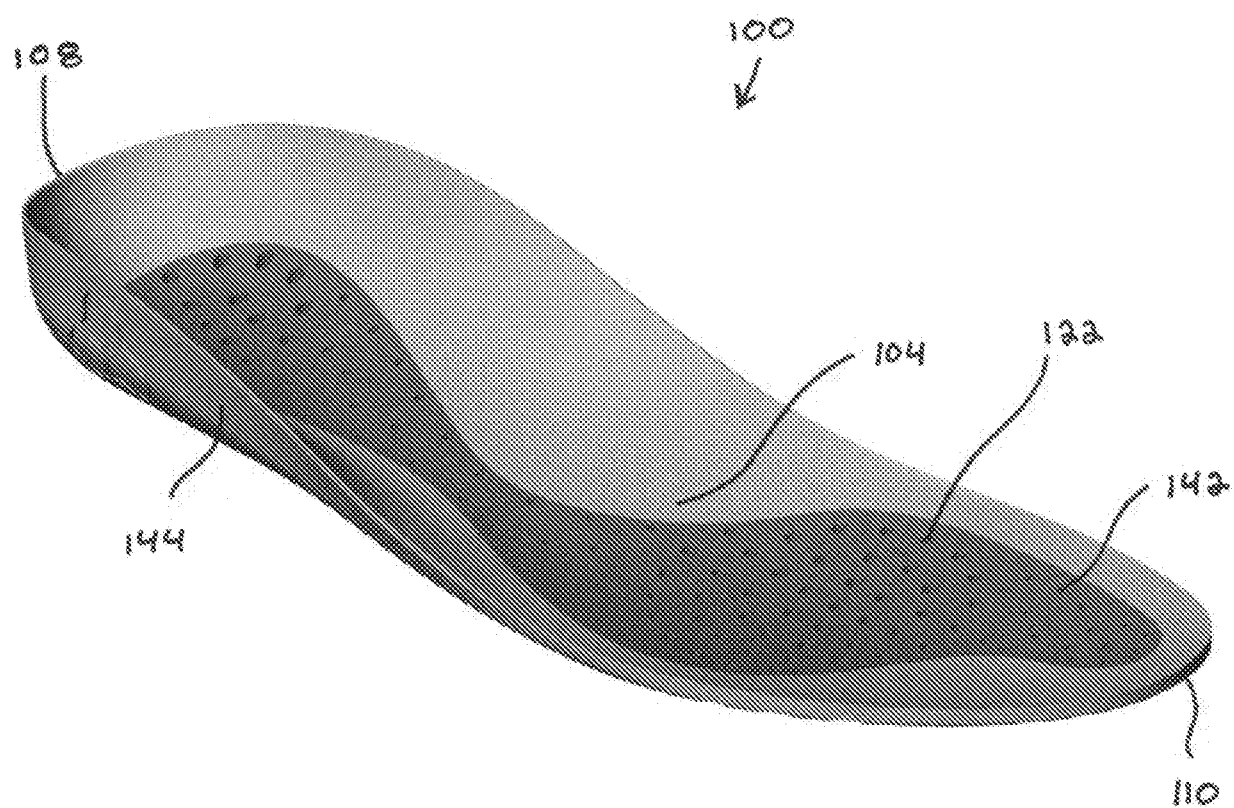
15 19. The method of claim 13, wherein one of the two adjacent holes of the plurality of spaced-apart holes has a diameter of 3 or more millimeters.

20. The method of claim 13 or 14, wherein each of the plurality of holes has a circular shape.

20 21. The method of claim 14 or 14, wherein at least some of the plurality of spaced-apart holes form three distinct and spaced-apart circles of holes, wherein a first circle of holes is positioned at or near a head of a first metatarsal of the foot, wherein a second circle of holes is positioned in the forefoot area, wherein a third circle of holes is positioned in the heel area, and wherein the second one of the circles is larger than the third one of the circles.

25

22. The method of claim 13 or 14, wherein the top surface has a contoured shape.

**Fig. 1**

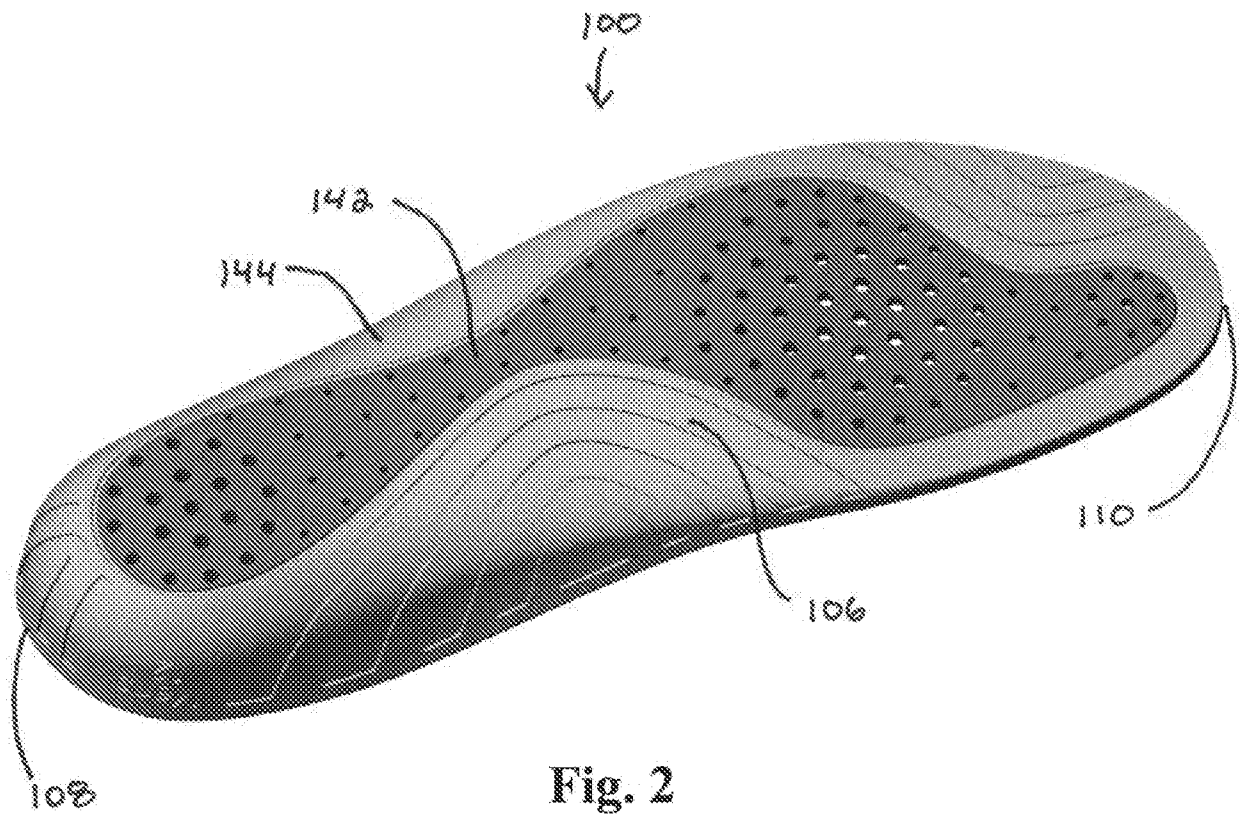


Fig. 2

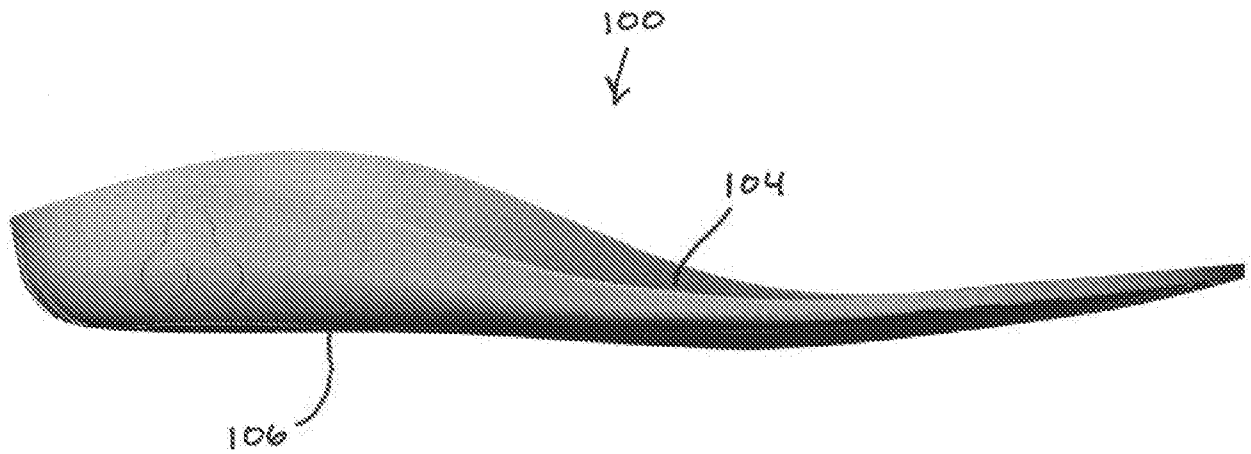


Fig. 3

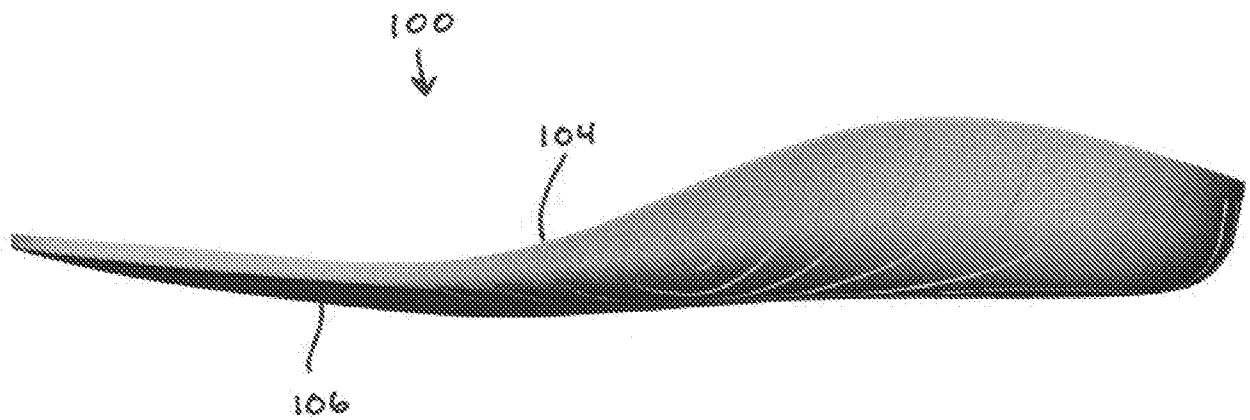


Fig. 4

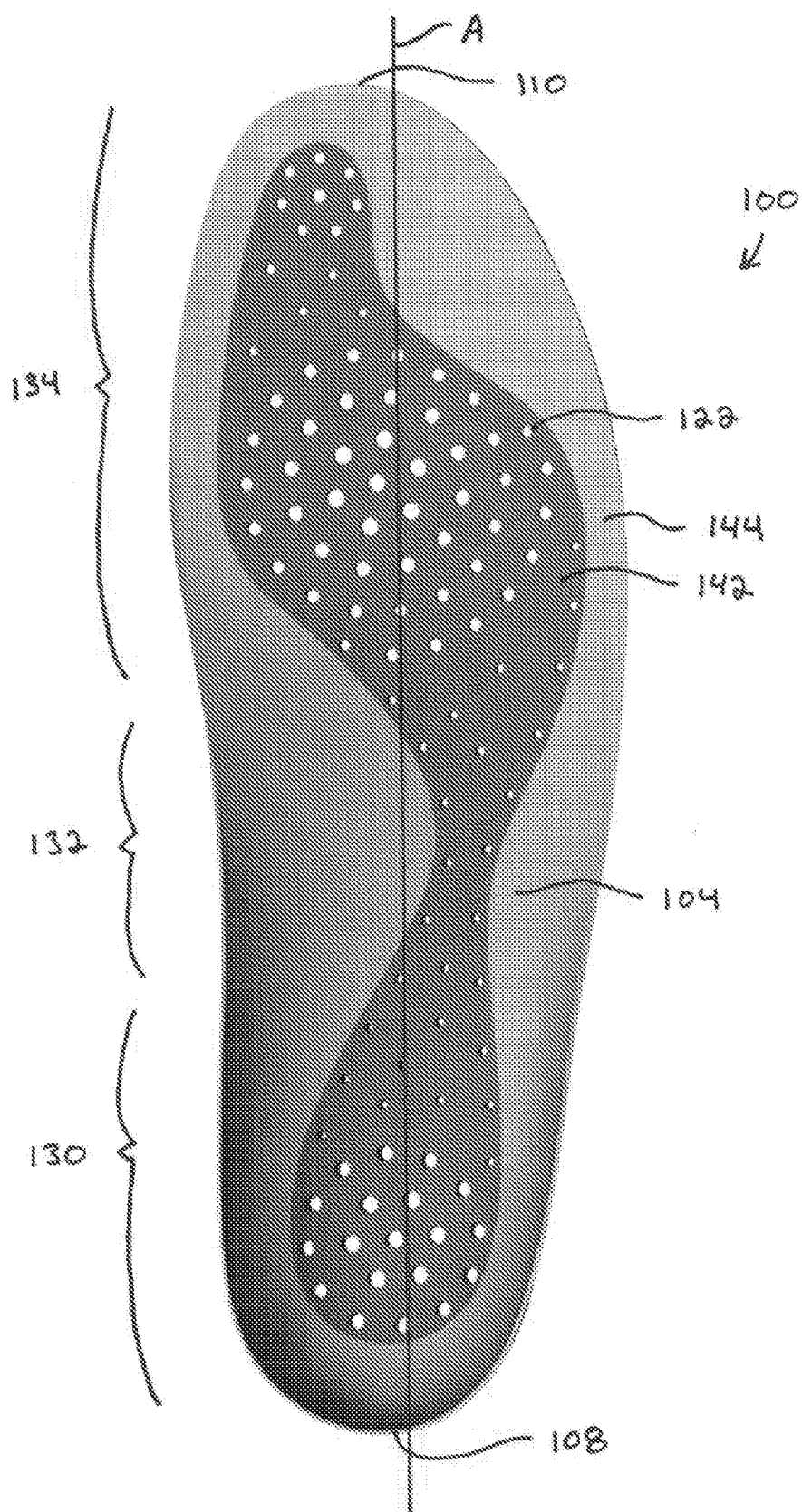


Fig. 5

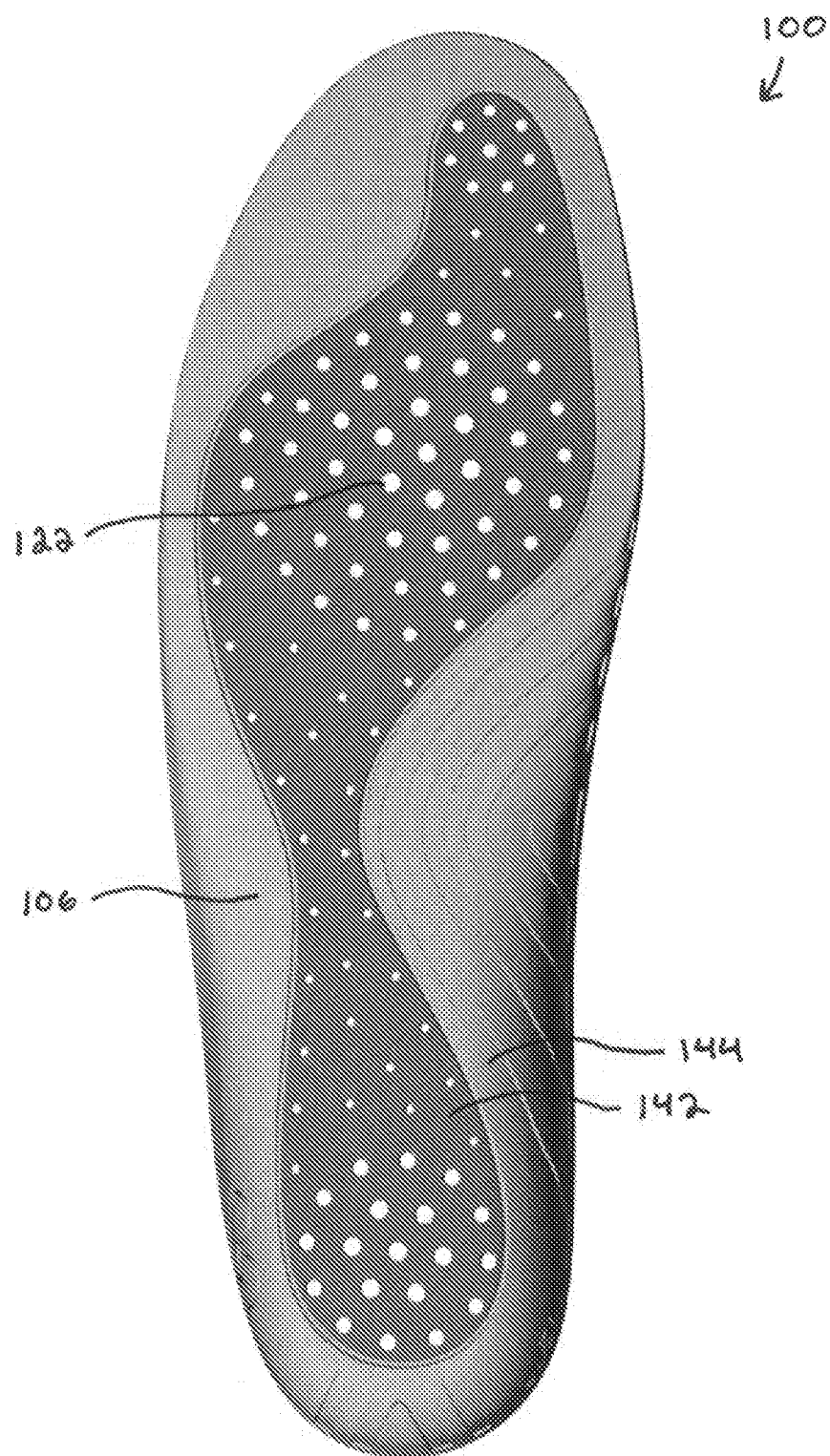


Fig. 6

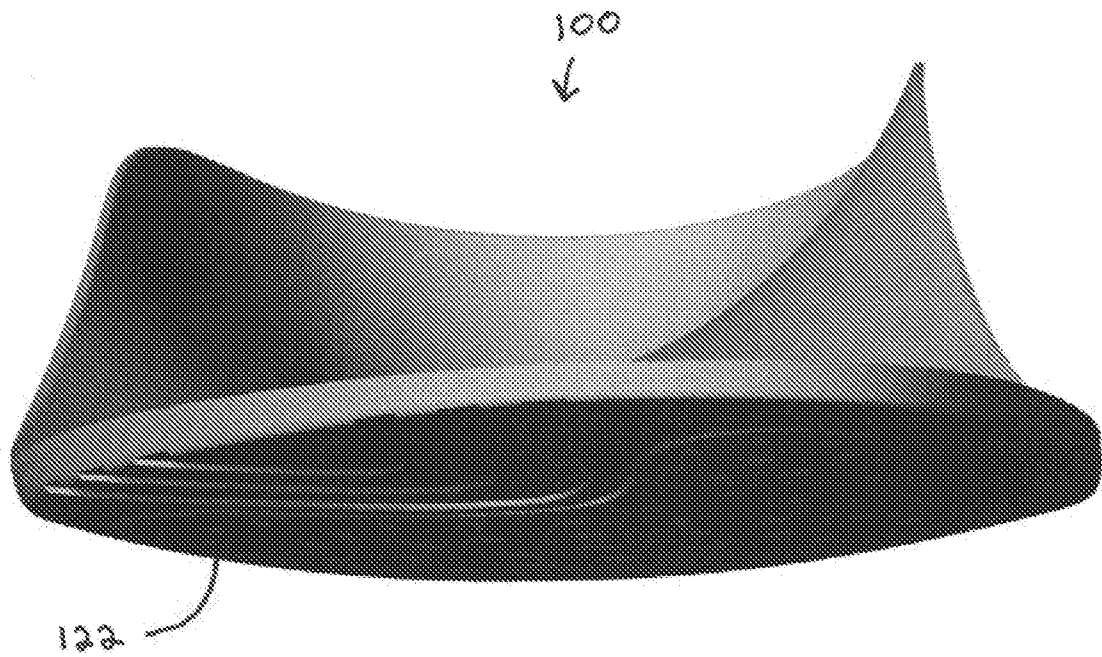


Fig. 7

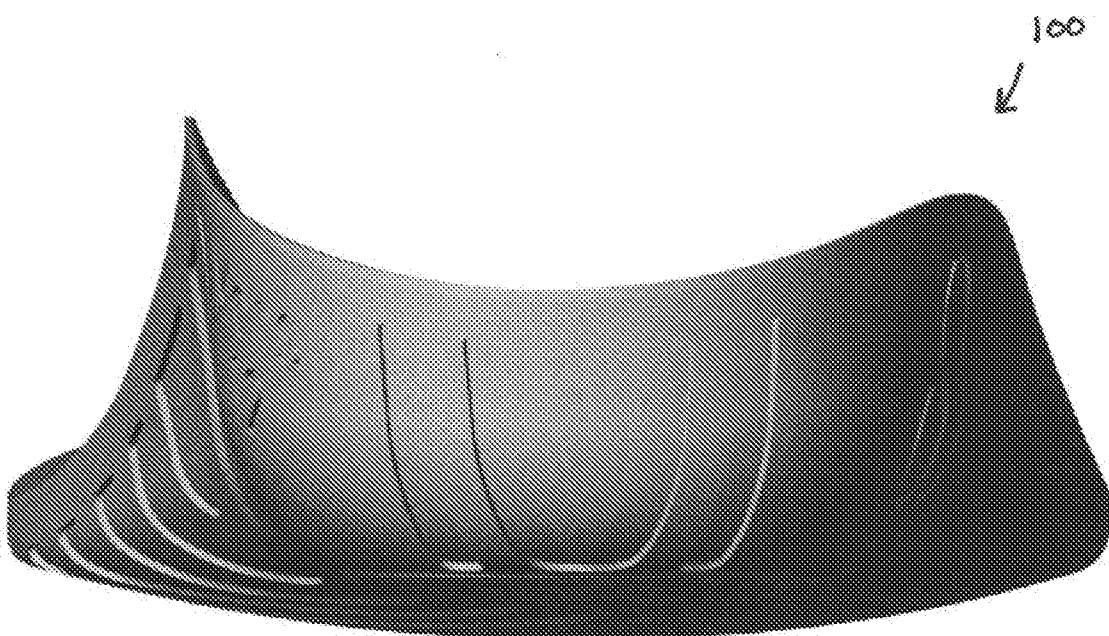
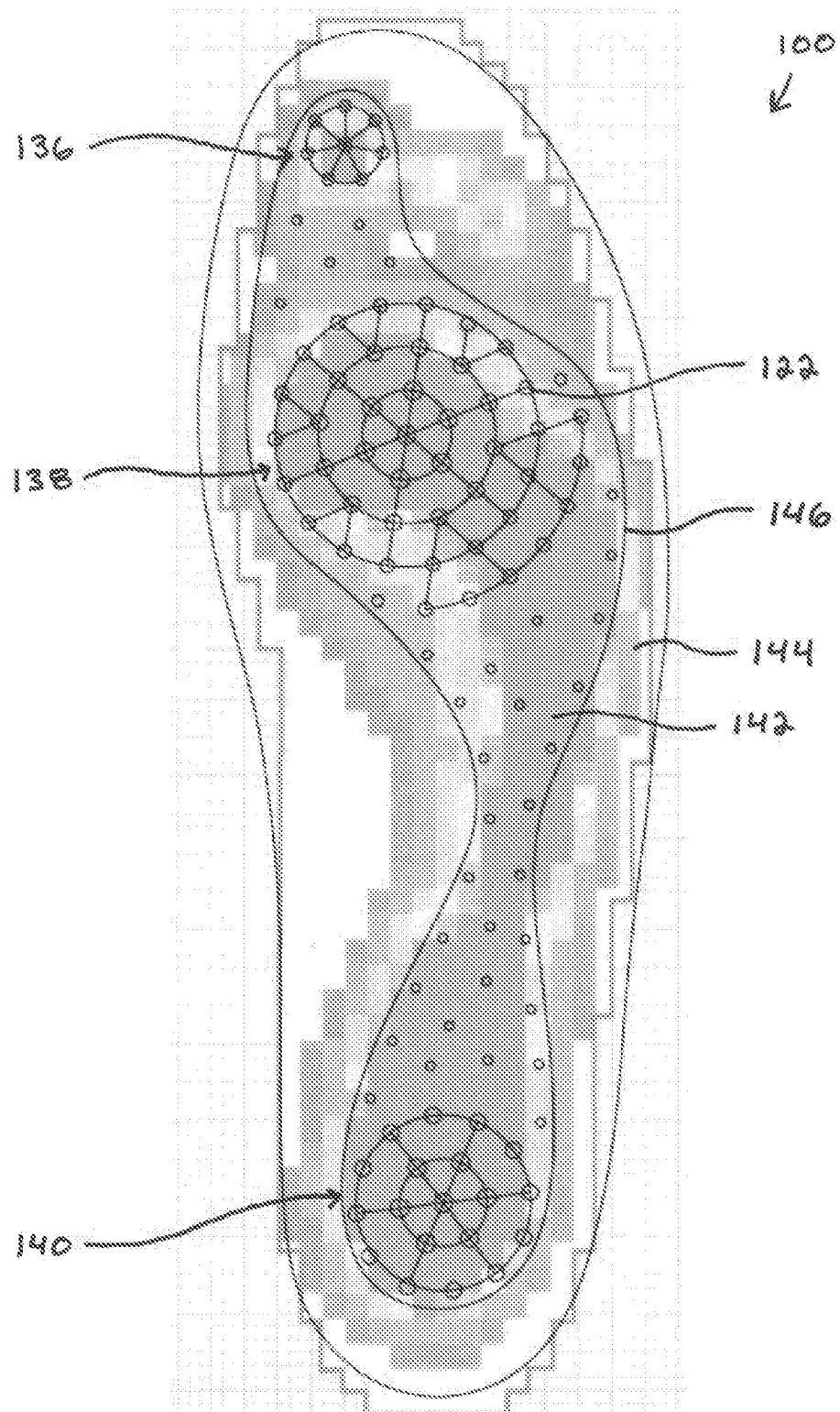
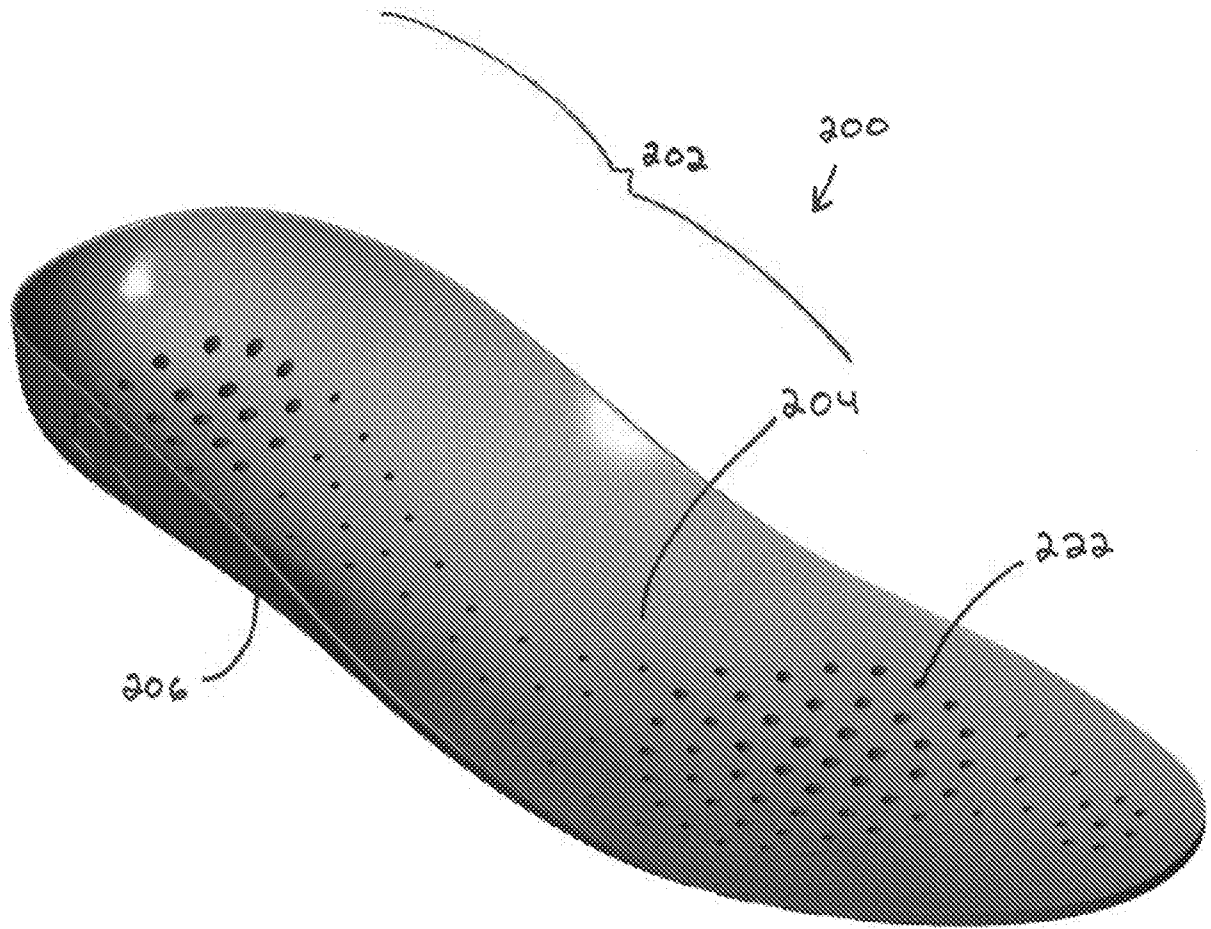


Fig. 8

**Fig. 9**

**Fig. 10**

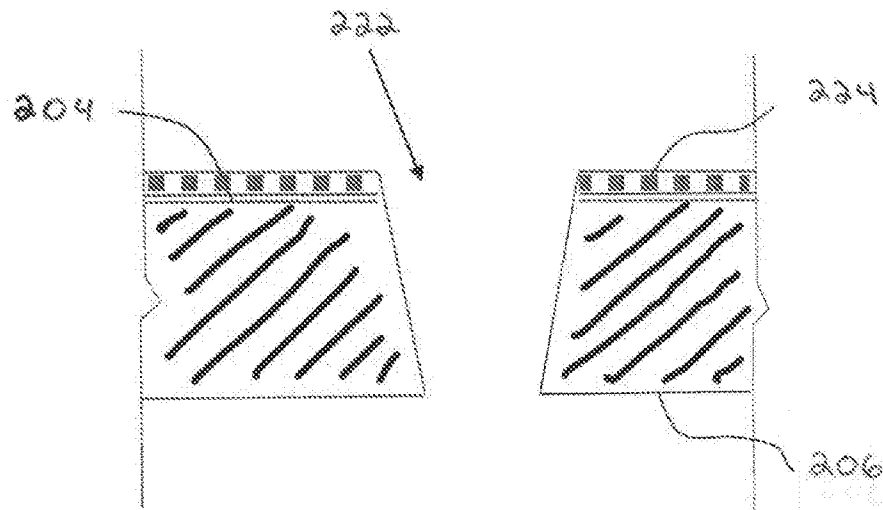


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 19/47936

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A43B 13/14, A43B 17/00, A43B 17/08, A43B 7/14, A43B 13/40 (2019.01)

CPC - A43B 13/14, A43B 13/38, A43B 17/00, A43B 17/08, A43B 7/14, A43B 1/00, A43B 13/12, A43B 13/40, A43B 17/006, A43B 7/148, A43B 13/141, A43B 13/386, A43B 7/1435, A43B 7/144, A43B 7/1445, A43B 13/18, A43D 1/02, A43B 3/00, A43B 13/186, A43B 3/0094, A43B 13/181

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2017/0303636 A1 (NIKE, Inc.) 26 October 2017 (26.10.2017), entire document, especially Fig. 2, 9, 10, 11, 12, 13, 14, 15, 18; para[0092]; para[0127]; para[0044]; para[0125]; para[0133]; para[0130]; para[0083]; para[0093]; para[0088]; para[0034];	1-2, 5, 6/(1-2, 5), 7-9, (10-11)/(1-2, 5, 7-9), 12-14, (15-20, 22)/(13-14)
X	US 2016/0345667 A1 (NIKE, Inc.) 01 December 2016 (01.12.2016), entire document, especially Fig. 3, 8, 11, 12, 13, 25; para[0170]; para[0161]; para[0038]; para[0053]; para[0164]; para[0165]; para[0063]; para[0167]; para[0171]; para[0124]; para[0122];	1-3, 4/(2-3), 6/(1-3), 10/(1-3), 11/(1-3), 13-14, 21/(13-14)
A	US 5,611,153 A (Fisher et al.) 18 March 1997 (18.03.1997), entire document	1-22
A	US 5,068,983 A (Marc) 03 December 1991 (03.12.1991), entire document	1-22
A	US 2009/0044424 A1 (Kohler et al.) 19 February 2009 (19.02.2009), entire document	1-22
A	US 2014/0230274 A1 (Spenco Medical Corporation) 21 August 2014 (21.08.2014), entire document	1-22
A	US 2013/0340288 A1 (Nike, Inc.) 26 December 2013 (26.12.2013), entire document	1-22
A	US 5,322,056 A (Menghi et al.) 21 June 1994 (21.06.1994), entire document	1-22
A	US 2017/0245586 A1 (NIKE, Inc.) 31 August 2017 (31.08.2017), entire document	1-22
A	US 2010/0126041 A1 (Francis) 27 May 2010 (27.05.2010), entire document	1-22

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

17 October 2019

Date of mailing of the international search report

24 JAN 2020

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