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(54) **BRAIDED UPPER WITH OVERLAYS FOR ARTICLE OF FOOTWEAR AND METHOD FOR PRODUCING THE SAME**

(57) An article of footwear includes a braided upper with overlay portions. The overlay portions may be applied to edges of the braided upper. The overlay portions can include eyelets to receive a lace. The overlay portions

can extend around portions of the upper to reduce stretching and increase support. The overlay portions may facilitate attachment between the braided upper and a sole system.

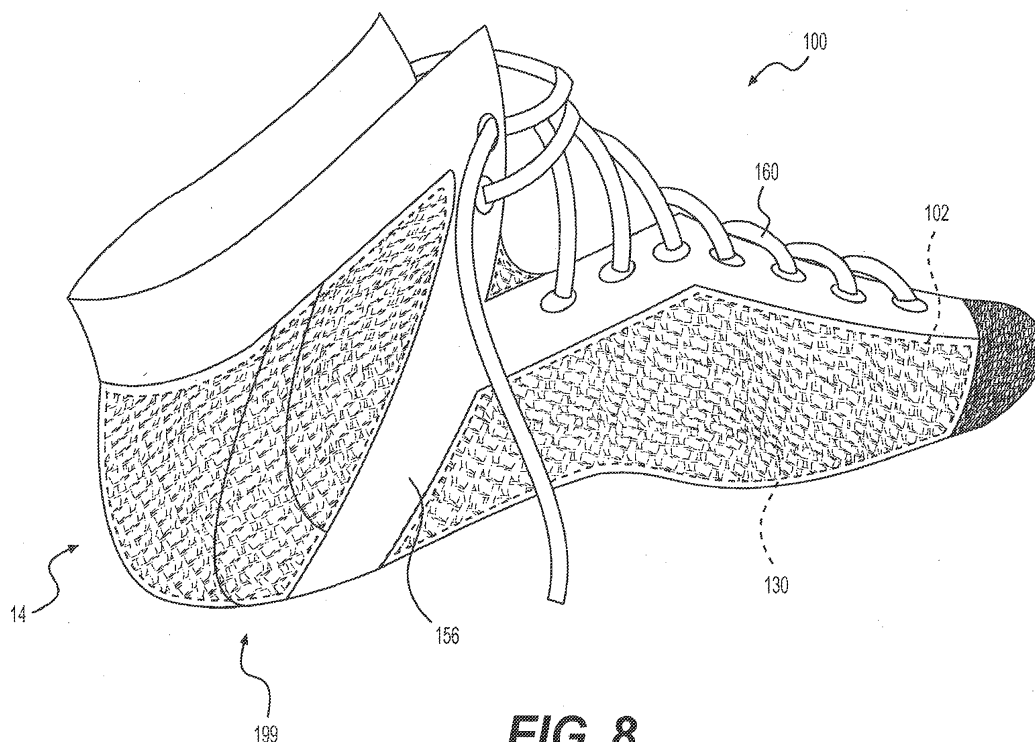


FIG. 8

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application 61/839,097, filed June 25, 2013, and titled "Article of Footwear with Braided Upper" (Attorney Docket No. 51-3210) the entirety of which is herein incorporated by reference and referred to throughout the detailed description as the "Braided Upper" application. This application is also related to co-pending U.S. Patent Application Publication Number 14/163,392, filed January 24, 2014, now U.S. Patent Application Number _____, and also titled "Article of Footwear with Braided Upper" (Attorney Docket No. 51-3642) the entirety of which is herein incorporated by reference.

BACKGROUND

[0002] The present embodiments relate to articles of footwear and in particular to uppers for articles of footwear.

[0003] Athletic shoes often have two major components, an upper that provides the enclosure for receiving the foot, and a sole secured to the upper. The upper may be adjustable using laces, hook-and-loop fasteners or other devices to secure the shoe properly to the foot. The sole has the primary contact with the playing surface. The sole may be designed to absorb the shock as the shoe contacts the ground or other surfaces. The upper may be designed to provide the appropriate type of protection to the foot and to maximize the wearers comfort.

SUMMARY

[0004] In one aspect, an article of footwear includes an upper and a sole system, where the upper made of a braided structure and an overlay portion. The overlay portion is bonded to the braided structure the overlay portion is less resistant to stretching than the braided structure.

[0005] In another aspect, an article of footwear includes an upper and a sole system, the upper being further associated with a lacing member. The upper is made of a braided structure and an overlay portion and the overlay portion includes a plurality of eyelets for receiving the lacing member.

[0006] In another aspect, a method of making an article of footwear includes forming a braided structure with an interior cavity, cutting an opening into the braided structure, thereby creating an opening in the braided structure and an edge associated with the opening and bonding an overlay portion to the edge, where the overlay portion includes a plurality of eyelets. The method also includes inserting a lace through the eyelets and associating a sole system with the braided structure to form the article of footwear.

[0007] Other systems, methods, features and advantages of the embodiments will be, or will become, appar-

ent to one of ordinary skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be induced within this description and this summary, be within the scope of the embodiments, and be protected by the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The embodiments can be better understood with reference to the following drawings and description. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the embodiments. Moreover, in the figures, like reference numerals designate corresponding parts throughout the different views.

FIG. 1 is a schematic isometric view of an embodiment of an article of footwear including a braided upper with overlays;

FIG. 2 is an exploded isometric view of the article of footwear of FIG. 1;

FIG. 3 is a schematic isometric view of the article of footwear of FIG. 1, including an enlarged view of strands disposed against the overlay;

FIG. 4 is a schematic isometric view of another embodiment of an arrangement of strands bonded to an overlay;

FIG. 5 is a schematic isometric view of the article of footwear of FIG. 1, including an enlarged cross-sectional view of an eyelet of the overlay;

FIG. 6 is a schematic enlarged view of an embodiment of an overlay including eyelets, in which each eyelet is partially encircled by a strand of a braided upper;

FIG. 7 is a schematic enlarged view of another embodiment of an overlay including eyelets, in which strands of a braided upper do not encircle each eyelet;

FIG. 8 is a schematic rear isometric view of an embodiment of an article of footwear including a braided upper with overlays;

FIG. 9 is a schematic exploded isometric view of an embodiment of an article of footwear including a braided upper with multiple distinct overlays;

FIG. 10 is a schematic side view of the article of footwear of FIG. 9;

FIG. 11 is a schematic top view of the article of footwear of FIG. 9;

FIG. 12 is a schematic isometric view of an embodiment of an article of footwear with two different braided regions and overlays covering the braided regions;

FIG. 13 is a schematic isometric view of the article of footwear of FIG. 12, in which a portion of the braided upper and an overlay are seen in cross-section;

FIG. 14 is a side schematic view of an embodiment of a pre-cut braided structure shaped as an upper

for an article of footwear;

FIG. 15 is a schematic view of a step of cutting the braided structure of FIG. 14 in order to form an opening in the upper, according to an exemplary process; FIG. 16 is an isometric view of a step of joining an overlay to the upper of FIG. 15, according to an exemplary process;

FIG. 17 is an isometric view of an embodiment of a finished article of footwear constructed using the exemplary process of FIGS. 14-16;

FIG. 18 is an isometric view of an embodiment of a braided upper with an overlay on a lower surface being associated with a sole member; and

FIG. 19 is an isometric view of the braided upper of FIG. 18 joined with the sole member.

DETAILED DESCRIPTION

[0009] FIG. 1 is an isometric view of an embodiment of an article of footwear 100, also referred to simply as article 100. Article 100 may be configured for use with various kinds of footwear including, but not limited to: hiking boots, soccer shoes, football shoes, sneakers, running shoes, cross-training shoes, rugby shoes, basketball shoes, baseball shoes as well as other kinds of shoes. Moreover, in some embodiments article 100 may be configured for use with various kinds of non-sports related footwear, including, but not limited to: slippers, sandals, high heeled footwear, loafers as well as any other kinds of footwear, apparel and/or sporting equipment (e.g., gloves, helmets, etc.).

[0010] In some embodiments, article of footwear 100 may include upper 102 and sole system 110. Sole system 110 is secured to upper 102 and extends between the foot and the ground when article 100 is worn. In different embodiments, sole system 110 may include different components. For example, sole system 110 may include an outsole, a midsole, and/or an insole. In some cases, one or more of these components may be optional.

[0011] Sole system 110 may provide one or more functions for article 100. For example, in some embodiments, sole system 110 may be configured to provide traction for article 100. In addition to providing traction, sole system 110 may attenuate ground reaction forces when compressed between the foot and the ground during walking, running or other ambulatory activities. The configuration of sole system 110 may vary significantly in different embodiments to include a variety of conventional or non-conventional structures. In some cases, the configuration of sole system 110 can be selected according to one or more types of ground surfaces on which sole system 110 may be used. Examples of ground surfaces include, but are not limited to: natural turf, synthetic turf, dirt, as well as other surfaces.

[0012] Generally, upper 102 may be any type of upper. In particular, upper 102 may have any design, shape, size and/or color. For example, in embodiments where article 100 is a basketball shoe, upper 102 could be a

high top upper that is shaped to provide high support on an ankle. In embodiments where article 100 is a running shoe, upper 102 could be a low top upper.

[0013] Referring to FIG. 1, for purposes of reference, components of article 100, such as upper 102, may be divided into forefoot portion 10, midfoot portion 12 and heel portion 14. Forefoot portion 10 may be generally associated with the toes and joints connecting the metatarsals with the phalanges. Midfoot portion 12 may be generally associated with the arch of a foot. Likewise, heel portion 14 may be generally associated with the heel of a foot, including the calcaneus bone. In addition, upper 102 may include lateral side 16 and medial side 18. In particular, lateral side 16 and medial side 18 may be opposing sides of article 100. Furthermore, both lateral side 16 and medial side 18 may extend through forefoot portion 10, midfoot portion 12 and heel portion 14.

[0014] It will be understood that forefoot portion 10, midfoot portion 12 and heel portion 14 are only intended for purposes of description and are not intended to demarcate precise regions of upper 102. Likewise, lateral side 16 and medial side 18 are intended to represent generally two sides of upper 102, rather than precisely demarcating upper 102 into two halves.

[0015] For consistency and convenience, directional adjectives are employed throughout this detailed description corresponding to the illustrated embodiments. The term "longitudinal" as used throughout this detailed description and in the claims refers to a direction extending a length of a component. For example, the longitudinal direction of upper 102 may extend from forefoot portion 10 to heel portion 14 of upper 102. Also, the term "lateral" as used throughout this detailed description and in the claims refers to a direction extending along a width of a component. For example, the lateral direction of upper 102 may extend between medial side 18 and lateral side 16 of upper 102. Additionally, the term "vertical" as used throughout this detailed description and in the claims refers to a direction that is perpendicular to both the longitudinal and lateral directions.

[0016] In addition, the term "proximal" refers to a portion of a footwear component that is closer to a portion of a foot when an article of footwear is worn. Likewise, the term proximal direction refers to a direction oriented towards a foot when an article is worn. The term "distal" refers to a portion of a footwear component that is further from a portion of a foot when an article of footwear is worn. The distal direction refers to a direction oriented away from a foot when an article is worn.

[0017] In some embodiments, upper 102 may be comprised of a braided structure, such as a braided fabric or other braided structure. Braided structures can be formed by intertwining three or more strands of yarn, filaments or other fibers to form the structure. As an example, upper 102 as seen in FIG. 1 is formed from a plurality of strands 130 that are braided together to form a shape that is globally similar to the shape of a foot.

[0018] Braiding can be used to form three-dimensional

structures, by braiding strands of yarn over a form or a last. Strands of the braided structure, such as plurality of strands 130 of the exemplary embodiment, can be fabricated from fibers such as nylon, carbon, polyurethane, polyester, cotton, aramid (e.g., Kevlar®), polyethylene or polypropylene. These strands can be braided to form three-dimensional structures for a wide variety of applications.

[0019] Braided structures may be fabricated manually, or may be manufactured using automated braiding machinery, such as the machinery disclosed in U.S. Patents Nos. 7,252,028; 8,261,648; 5,361,674; 5,398,586; and 4,275,638, all of which are incorporated by reference in their entirety wherein. Such three-dimensional braided structures may also be manufactured to a specific design by, for example, TEF Braids, Warrensburg, N.Y or A&P Technology, Cincinnati, Ohio.

[0020] By using braiding, uppers for articles of footwear may be engineered with specific features tailored to a particular athletic or recreational activity. Braided uppers can be very light while conforming closely and comfortably to the wearer's feet. In some embodiments, the fit of the upper may be adjusted to provide the specific degree of tension or tightness the wearer may prefer. Braided uppers are characterized by close containment over the wearer's foot. In some embodiments, the braided fabric may wrap all the way around the footwear, as shown in the figures. Such a structure has tensional integrity or "tensegrity," since the wearer's foot is in compression, while the braided strands are in tension around the wearer's foot.

[0021] Some embodiments may include braided uppers that extend beneath the foot, thereby providing 360 degree coverage at some regions of the foot. However, other embodiments need not include uppers that extend beneath the foot. In other embodiments, for example, a braided upper could have a lower periphery joined with a sole structure and/or sock liner.

[0022] FIG. 2 illustrates an exploded isometric view of an embodiment of article 100, including upper 102 which is comprised of a braided structure. Referring to FIGS. 1-2, upper 102 is seen to have an opening 120 that may receive a foot. Additionally, upper 102 has a fastening region 124. Fastening region 124 may further include a fastening gap 125 that separates a lateral fastening edge 126 from a medial fastening edge 127 (see FIG. 2).

[0023] Fastening region 124 may be further associated with that a fastening member 160. In the exemplary embodiment, fastening member 160 may be a lace. In other embodiments, however, fastening member 160 could be any other kind of fastener including but not limited to, straps, snaps, buttons, zippers, hook and loop fasteners (e.g., Velcro), as well as other kinds of fasteners.

[0024] Embodiments utilizing braided uppers can include provisions to help provide additional structure to the upper. In some embodiments, for example, an article may include one or more additional material portions that are bonded or otherwise attached to specific portions of

the braided upper in order to enhance various characteristics of the upper. For example, these material portions may be used to increase strength and durability, provide stretch resistance at certain locations of the upper and facilitate the joining of other components with the braided structure.

[0025] Throughout the detailed description and in the claims, the term "overlay portion", or simply overlay, refers to any portion of material that is attached to a surface of a braided structure, such as a braided upper. In some embodiments, an overlay portion is comprised of a distinct material from the strands of the braided structure. Moreover, in some embodiments, an overlay portion may have substantially different material characteristics from the strands of the braided structure. In an exemplary embodiment, an overlay portion may resist stretching in comparison to a corresponding portion of a braided structure.

[0026] Generally, an overlay portion may be formed of any material. Exemplary materials include, but are not limited to: fabrics (including woven and non-woven fabrics), leathers (including natural and synthetic leathers), polymer materials, as well as other kinds of materials. In one embodiment, one or more overlay portions may be made of thermoplastic polyurethane (TPU).

[0027] In an exemplary embodiment, article 100 may be associated with overlay component 140. Overlay component 140 may be further comprised of several different overlay portions, including a first overlay portion 150, a second overlay portion 152 and a third overlay portion 154. Each overlay portion may be provided at a specific location on upper. For example, first overlay portion 150 may be associated with fastening region 124 of upper 102. Likewise, second overlay portion 152 may be associated with opening 120. Finally, third overlay portion 154 may be associated with heel portion 14 as well as portions of both lateral side 16 and medial side 18 of upper 102.

[0028] Referring now to FIG. 2, in some embodiments, first overlay portion 150 extends along the edges of fastening region 124. In particular, first overlay portion 150 includes a first section 181 that is associated with lateral fastening edge 126 of fastening region 124. Also, first overlay portion 150 includes a second section 182 that is associated with medial fastening edge 127 of fastening region 124. In some embodiments, an intermediate section 183 runs along a forward most edge 129 of fastening region 124 and joins first section 181 and second section 182 of first overlay portion 150.

[0029] With this configuration, first overlay portion 150 may form, or form part of, the lateral and medial eyestays for upper 102. In particular, first overlay portion 150 may facilitate the attachment of upper 102 with fastening member 160. As discussed in further detail below, the use of overlay portions along the edges of fastening region 124 may help to more evenly distribute the tensioning forces applied by fastening member 160 to upper 102.

[0030] In at least some embodiments, first overlay portion 150 may help finish the braided structure of upper

102 along lateral fastening edge 126, medial fastening edge 127 and forward most edge 129 of fastening region 124. Specifically, in embodiments where the strands of the braided structure may be open at any of lateral fastening edge 126, medial fastening edge 127 or forward most edge 129, first overlay portion 150 may help to bond, fuse or otherwise hold the ends of the strands in place in order to prevent unraveling of the strands along these edges.

[0031] In some embodiments, second overlay portion 152 extends among the edges of opening 120. In particular, second overlay portion 152 is associated with opening edge 195. In some embodiments, moreover, second overlay portion 152 is substantially continuous with first overlay portion 150, such that all of the edges of upper 102 associated with opening 120 and/or the opening at fastening region 124 are covered by first overlay portion 150 or second overlay portion 152.

[0032] This arrangement helps to finish opening edge 195 by bonding any open strands to second overlay portion 152. In addition, second overlay portion 152 may help reinforce opening 120, so that the braided structure in the vicinity of opening 120 may not be overly stretched. Such reinforcement may be especially useful at opening 120, since opening 120 may undergo a great deal of pulling and other stress as a user inserts and/or removes his or her foot.

[0033] In some embodiments, third overlay portion 154 may include a first section 171 that extends along lateral side 16 and a second section 172 that extends along medial side 18 of upper 102. Additionally, a third section 173 of third overlay portion 154 may extend beneath (e.g., on a lower side of) upper 102 at heel portion 14. In some embodiments, third section 173 joins first section 171 and second section 172 so that third overlay portion 154 wraps continuously around the sides and bottom of upper 102.

[0034] In some embodiments, first section 171 of third overlay portion 154 extends from, and is continuously formed with, first section 181 of first overlay portion 150. Additionally, in some embodiments, second section 172 of third overlay portion 154 extends from, and is continuously formed with, second section 182 of first overlay portion 150. Because third overlay portion 154 may act to reduce stretching along its length, this configuration may help increase support under the heel by resisting stretching of the upper between first overlay portion 150 (at the top of the foot) and the lower side 199 (see FIG. 8) of heel portion 14.

[0035] FIG. 3 illustrates an enlarged view of a portion of article 100 where some strands may be bonded to a second overlay portion 152. Referring to FIG. 3, some strands 304 may be disposed against inner surface 302 second overlay portion 152. In this exemplary embodiment, strands 304 may form part of a closed woven edge 305 of upper 102 that lacks any loose or free ends of strands. In this case, strands 304 may be bonded to second overlay portion 152 to reinforce the continuously wo-

ven section of the braided structure.

[0036] In an alternative embodiment, shown in FIG. 4, some strands 470 may be configured with loose or free ends 472. In this configuration, open ends 472 may be secured to overlay portion 452 in order to keep strands 470 in place and help prevent strands 470 from loosening or unraveling. Thus it can be seen that in some embodiments, an overlay portion may be used to retain the loose or free ends associated with the edge of a braided structure. Such an arrangement may provide a means of finishing cut edges of the braided structure, or any edges that include loose or free ends that might unravel.

[0037] The arrangement described here provides an overlay portion that may act to reinforce the edge of the braided structure at opening 120. This may help reduce stretching of upper 102 at opening 120, in order to preserve the structural integrity of upper 102. In addition, second overlay portion 152 may help secure any loose or open ends of the braided structure to prevent fraying of the ends and/or unraveling of the braided structure.

[0038] Various processes for bonding an overlay portion to a braided structure, such as a braided upper, are discussed in further detail below. Exemplary materials used for bonding can include any known adhesives, melts, resins or other bonding agents.

[0039] FIG. 5 illustrates an isometric view of article 100, including as enlarged schematic cross-sectional view of a portion of first overlay portion 150 and fastening member 160. Referring to FIG. 5, first overlay portion 150 includes a plurality of eyelets 400. Specifically, plurality of eyelets 400, including eyelet 402 shown in the enlarged cross-section, are openings in first overlay portion 150 that are configured to receive portions of fastening member 160.

[0040] In contrast to an alternative embodiment where strands of upper 102 may directly secure portions of a fastening member, the exemplary embodiment is configured so that strands of upper 102 are indirectly secured to fastening member 160 via eyelets in first overlay portion 400. Specifically, strands 410 are seen to be secured directly to first overlay portion 150, while fastening member 160 is secured through plurality of eyelets 400 in first overlay portion 150. This configuration may distribute forces imparted by fastening member 160 more evenly across the braided structure of upper 102. This may prevent fastening member 160 from tugging too much on a particular strand, for example, thereby facilitating better comfort and fit of article 100 on a foot.

[0041] FIGS. 6 and 7 illustrate two possible configurations for strands on the vicinity of eyelets on an overlay portion. Referring first to FIG. 6, in some embodiments, one or more strands may extend around an eyelet, thereby acting to reinforce the eyelet. For example, in FIG. 6, first strand 512 and second strand 514 wrap around first eyelet 502 and second eyelet 504, respectively. This may have the effect of reinforcing first eyelet 502 and second eyelet 504, as well as providing a more direct transfer of tension between fastening member 160 and the braided

strands of upper 102.

[0042] Referring to an alternative embodiment shown in FIG. 7, first eyelet 502 and second eyelet 504 are not surrounded by any strands of the upper. In particular, it may be seen that strands 610 are bonded to first overlay portion 150 without encircling first eyelet 502 and second eyelet 504. Of course, in still other embodiments, some eyelets may be surrounded or reinforced by strands while other eyelets may not be surrounded or reinforced.

[0043] FIG. 8 illustrates a rear isometric view of upper 102, in which strands 130 of upper 102 are shown in phantom. Referring to FIG. 7, third overlay component 156 is seen to wrap underneath a bottom side 199 of upper 102 at heel portion 14. In some cases, this configuration allows third overlay portion 156 to cradle the heel of the foot. Thus, this arrangement may provide further support for the heel of the foot when article 100 is worn by reducing stretching through heel portion 14.

[0044] In some embodiments, multiple distinct overlay components may be used. In some embodiments, distinct overlay components may be configured to intersect or overlap at predetermined portions of an upper. Such configurations of overlapping overlay components may provide a means for enhancing strength and stretch resistance over large portions of an upper, including, possibly, the entirety of the upper.

[0045] FIGS. 9-11 illustrate an embodiment of an article of footwear 800, comprising an upper 802 and a sole structure 805 (shown in FIG. 10 only). Referring first to FIG. 9, upper 802 is comprised of a braided structure that is braided from a plurality of strands 830. In addition, multiple overlay components are associated with upper 802, including a first overlay component 810, a second overlay component 812, a third overlay component 814 and a fourth overlay component 816.

[0046] In the exemplary embodiment, each overlay component is associated with a particular portion of upper 802. For example, first overlay component 810 is associated with the edges 870 of opening 860 and fastening region 862. Thus, in some cases, first overlay component 810 may be used to finish plurality of strands 830 along edges 870. Additionally, first overlay component 810 may provide stretch resistance in the vicinity of opening 860.

[0047] Second overlay component 812 is associated with forward toe portion 868 of upper 802. In some embodiments, second overlay component 812 may help improve stretch resistance at forward toe portion 868. Additionally, in some embodiments, second overlay component 812 may provide a covering for forward toe portion 868. In particular, the presence of second overlay component 812 may help prevent debris from entering upper 802 through forward toe portion 868.

[0048] Third overlay component 814 may be associated with a forefoot portion 811 of upper 802. In some embodiments, third overlay component 814 may be positioned forwards of fastening region 862. Furthermore, as clearly seen in FIG. 9, third overlay component 814 may

completely encircle upper 802 (and a foot within upper 802). In an exemplary embodiment, third overlay component 814 is comprised of a first band 817 and a second band 819, which are integrally joined at top intersection region 815. This arrangement may therefore provide targeted stretch resistance at forefoot portion 811 that enhances support of the foot during activities where forefoot portion 811 may be firmly planted on the ground.

[0049] Fourth overlay component 816 may be associated with heel portion 813 of upper 802. In some embodiments, fourth overlay component 816 may provide a heel-counter like overlay portion 825, as well as a strap-like overlay portion 827. In combination, overlay portion 825 and overlay portion 827 may help limit stretching at heel portion 813 and may therefore enhance support of the heel within upper 802.

[0050] As seen in FIGS. 10-11, when assembled with upper 802, some of the overlay components may overlap with one another. For example, third overlay component 814 is clearly seen to overlap with portions of first overlay component 810 at an overlap region 902. In addition, third overlay component 814 is seen to overlap with portions of second overlay component 812 at an overlap region 903. Likewise, fourth overlay component 816 is clearly seen to overlap with portions of first overlay component 810 at an overlap region 904. This overlapping arrangement may help enhance the structural integrity of upper 802, since portions of one overlay component may reinforce the support of an overlapping overlay component. Moreover, by overlapping and joining portions of different overlay components together, the overlay components may function as a unitary frame for supporting the braided structure of upper 802.

[0051] Embodiments utilizing braided regions having different properties may include provisions for further reinforcing some regions but not others. In some embodiments, an article may include an overlay portion that is configured to cover a predetermined region of the article.

[0052] FIGS. 12 and 13 illustrate isometric views of an article 1100 that is configured with overlay portions that cover two specific regions of an upper 1102. Specifically, FIG. 12 illustrates an isometric exploded view of article 1100, while FIG. 13 illustrates an isometric view including an enlarged cross-sectional view. Referring to FIGS. 12 and 13, article 1100 includes upper 1102 and sole system 1110. Upper 1102 is further configured with at least four distinct regions, including a first region 1151, a second region 1152, a third region 1153 and a fourth region 1154. In the exemplary embodiment, first region 1151 is a toe region of upper 1102. Second region 1152 is disposed directly adjacent to, and rearwards of, first region 1151. Third region 1153 is disposed adjacent to, and rearwards of, second region 1152. Finally, fourth region 1154 extends rearwards of third region 1153. Moreover, fourth region 1154 is a substantially larger region than the remaining regions, and includes the entirety of midfoot portion 1103 and heel portion 1105 of upper 1102. Thus, first region 1151, second region 1152 and third region

1153 may be characterized as bands of upper 1102 that extend laterally across upper 1102.

[0053] Each region of upper 1102 may be associated with a particular material characteristic, such as a braiding density. In the exemplary embodiment, first region 1151 and third region 1153 are both associated with a first braiding density, while second region 1152 and fourth region 1154 are associated with a second braiding density. In some embodiments, the first braiding density may be greater than the second braiding density. Thus, first region 1151 and third region 1153 are more tightly braided and may provide regions of increased strength and may also resist stretching in some embodiments.

[0054] Article 1100 may be further associated with first overlay portion 1160 and second overlay portion 1162. First overlay portion 1160 may be shaped to cover first region 1151 of upper 1102. Second overlay portion 1162 may be shaped to cover third region 1153 of upper 1102. For example, as shown in the enlarged cross-sectional view of FIG. 13, second overlay portion 1162 may be disposed over strands 1170 of third region 1153. With this arrangement, first overlay portion 1160 and second overlay portion 1162 may further reinforce first region 1151 and second region 1153, thereby enhancing support and stretch resistance in these regions.

[0055] The exemplary embodiments are only intended to illustrate some possible configurations for overlay portions on an upper. It should be understood that some other embodiments may include overlay portions configured in a variety of different shapes, sizes and locations. Moreover, any number of distinct overlay components can be used in alternative embodiments. The number, shape, size and location of overlay components or overlay portions can be selected to achieve desired properties including stretch resistance, enhanced strength, support, comfort or any other desired properties at any locations on an article of footwear.

[0056] As discussed in the Braided Upper application, braided uppers can be configured with a variety of different features and functionality. It should be understood that the overlay portions described in this detailed description may be utilized with a variety of different embodiments of braided uppers, which may or may not include some of the features discussed in the Braided Upper application. As an example, in some embodiments, strands with different material properties could be braided together, or otherwise associated with one another, to provide specific properties at one or more regions of an upper. For example, an upper may be fabricated from fibers that stretch to a certain degree, as the wearer's foot moves through each stride he or she takes, thus increasing the wearer's comfort. In that case, high tensile strength, non-stretch fibers may be threaded through those specific regions of the footwear that require additional structural support. As another example, an upper may be fabricated with a more open braid in some areas, for example to improve breathability or comfort. In that case, additional fibers may be laced through the braid to

provide additional support in certain parts of those areas, or to provide increased durability for high-impact regions of the footwear. An upper having any of these configurations may be further associated with one or more overlay portions in order to further control the characteristics and functionality of the upper, including support and/or stretch resistance in various areas of the upper.

[0057] The upper may also have floating cables, i.e., cables that are not braided into the fabric of the upper may be used to relieve the stress on certain sections of the upper. The floating cables may be made of a different material that is separate from and not attached to the braided structure. The cables may also be used as laces to secure the footwear to the foot, or to tighten up certain parts of the footwear, as described below. For example, the cables may be anchored at a first end at the sole of the footwear, and at a second end at an eyelet, for example. Such floating cables may also be used to add to the support and stability of certain parts of the footwear, such as around the ankle opening. In some embodiments, overlay portions may be used with braided uppers incorporating floating cables, and in some cases the overlay portions may be used to reinforce portions with cables or portions without cables. In some embodiments, overlay portions could be used to help anchor ends of the floating cables to the upper.

[0058] The combination of these features, including any of the features described in the Braided Upper application, in conjunction with the overlay portions described above and shown in the figures may facilitate the creation of uppers tailored to a particular athletic or recreational activity. Braided uppers with combinations of these features can be very light while conforming closely and comfortably to the wearer's feet. In some embodiments, the fit of the upper may be adjusted to provide the specific degree of tension or tightness the wearer may prefer.

[0059] FIGS. 14-17 illustrate several steps in an exemplary process of forming an article comprised of a braided upper and overlay portions. Initially, as shown in FIG. 14, a braided upper 1402 may be formed using any kind of braiding process. An exemplary process for forming braided particles is disclosed in the Braided Upper application, which has been previously discussed and incorporated by reference. Next, as shown in FIG. 15, in some embodiments, an opening 1502 may be cut into upper 1402. This may create a new edge 1504 that bounds opening 1502. Opening 1502 may be used for insertion of a foot, and may provide a region for a fastener, such as a lace.

[0060] In an exemplary embodiment, an overlay portion 1510 may then be bonded along edge 1504 (see FIG. 15) of upper 1402, as shown in FIG. 17. In some embodiments, the bonding may be achieved using a welding process, such as an ultrasonic welding process. The strands exposed along edge 1504 may thereby be fused to overlay portion 1510 to finish the ends as well as to reinforce and support edge 1504 when the article

is fastened. Finally, as shown in FIG. 17, a lace 1602 may be inserted through eyelets 1610. Additionally, in some embodiments, a sole system 1620 may be added to the bottom of upper 1402.

[0061] Some embodiments can include provisions to facilitate the joining of an upper and a sole system. In some embodiments, an overlay portion may be provided between an upper and a sole system, thereby facilitating the joining of the upper and the sole system.

[0062] FIGS. 18 and 19 illustrate isometric views of an embodiment in which an overlay portion may be used to help attach a sole system to an upper. Referring to FIGS. 18 and 19, an upper 1702 may be associated with an overlay component 1720 and an overlay component 1722. In some embodiments, overlay component 1720 may be associated with an opening 1716 of upper 1702. Overlay component 1722 may be associated with a lower side 1703 of upper 1702. In some embodiments, overlay component 1722 may extend over the entirety lower side 1703, though in other embodiments, overlay component 1722 may only extend over some portions of lower side 1703. Moreover, in some cases, overlay component 1722 may partially extend up around a lower periphery 1705 of upper 1702.

[0063] In some embodiments, a sole system 1730 may be associated with upper 1702. In some embodiments, moreover, overlay component 1722 may facilitate the bonding or joining of sole system 1730 to upper 1702. For example, as clearly seen in the enlarged cross-sectional view in FIG. 19, overlay component 1722 may be disposed between sole system 1730 and lower side 1703 of upper 1702 to facilitate the joining sole system 1730 with upper 1702.

[0064] In some embodiments, the material properties of overlay component 1722 and sole system 1730 can be selected so that overlay component 1722 and sole system 1730 may be easily bonded using an adhesive or other process. For example, it is contemplated that in some embodiments, overlay component 1722 may be made of a thermoplastic urethane (TPU) material, and sole system 1730 may be made of a similar material or a material that easily bonds with TPU. In still other embodiments, however, overlay component 1722 and sole system 1730 can be made of any other materials that can be joined with or without a separate adhesive.

[0065] While various embodiments have been described, the description is intended to be exemplary, rather than limiting and it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of the embodiments. Accordingly, the embodiments are not to be restricted except in light of the attached claims and their equivalents. Also, various modifications and changes may be made within the scope of the attached claims. The following items are also referred to:

1. An article of footwear, comprising:

an upper and a sole system;
wherein the upper is further comprised of a braided structure and an overlay portion;
wherein the overlay portion is bonded to the braided structure; and
wherein the overlay portion is less resistant to stretching than the braided structure.

2. The article of footwear according to item 1, wherein the overlay portion is disposed on an edge of the upper associated with an opening of the upper that receives a foot.

3. The article of footwear according to item 1, wherein the overlay portion includes eyelets for receiving a fastener.

4. The article of footwear according to item 1, wherein the overlay portion is disposed on a toe portion of the upper.

5. The article of footwear according to item 1, wherein the overlay portion includes a section disposed on a lower side of the upper.

6. The article of footwear according to item 1, wherein the overlay portion is made of a polymer material.

7. An article of footwear, comprising:

an upper and a sole system, the upper being further associated with a lacing member;
the upper being comprised of a braided structure and an overlay portion; and
wherein the overlay portion includes a plurality of eyelets for receiving the lacing member.

8. The article of footwear according to item 7, wherein the overlay portion forms an eyestay for the upper.

9. The article of footwear according to item 7, wherein the overlay portion is disposed on a lateral edge of a fastening region of the upper, and wherein the overlay portion is disposed on a medial edge of the fastening region.

10. The article of footwear according to item 7, wherein the overlay portion extends on a lateral side of the upper, a medial side of the upper and a lower side of the upper.

11. The article of footwear according to item 7, wherein the overlay portion is a first overlay portion and wherein the article of footwear includes a second overlay portion that is different than the first overlay portion.

12. The article of footwear according to item 11,

wherein the first overlay portion overlaps with the second overlay portion at an overlap region.

12. The article of footwear according to item 7, wherein the second overlay portion covers a lower side of the upper. 5

13. The article of footwear according to item 12, wherein the second overlay portion can be joined to the sole system to secure the sole system in place on the article of footwear. 10

14. A method of making an article of footwear, comprising:

forming a braided structure with an interior cavity;
cutting an opening into the braided structure, thereby creating an opening in the braided structure and an edge associated with the opening;
bonding an overlay portion to the edge, wherein the overlay portion includes a plurality of eyelets; inserting a lace through the eyelets; and associating a sole system with the braided structure to form the article of footwear. 20

15. The method according to item 14, wherein forming the braided structure includes creating the braided structure with a central cavity. 25

16. The method according to item 14, wherein forming the braided structure includes overbraiding the braided structure on a last. 30

17. The method according to item 14, wherein bonding the overlay portion includes welding the overlay portion to the edge. 35

18. The method according to item 14, wherein bonding the overlay portion includes fixing at least one open end of a strand of the braided structure to the overlay portion. 40

19. The method according to item 14, wherein the overlay portion is a first overlay portion and wherein a second overlay portion is bonded to a bottom side of the braided structure and wherein the sole system is attached to the second overlay portion. 45

20. The method according to item 14, wherein the overlay portion is bonded to the edge such that at least one strand of the braided structure extends around at least one eyelet of the overlay portion. 50

Claims

1. An article of footwear, comprising:

an upper (102; 802; 1102; 1402; 1702) and a sole system (110; 1110; 1620; 1730); wherein the upper (102; 802; 1102; 1402; 1702) is further comprised of a braided structure and an overlay portion (150, 152, 154; 452; 810, 812, 814, 816; 1160, 1162; 1510; 1720; 1722); wherein the overlay portion (150, 152, 154; 452; 810, 812, 814, 816; 1160, 1162; 1510; 1720; 1722) is bonded to the braided structure (102; 1402); and wherein the overlay portion (150, 152, 154; 452; 810, 812, 814, 816; 1160, 1162; 1510; 1720; 1722) is less resistant to stretching than the braided structure.

2. The article of footwear according to claim 1, wherein the overlay portion (150; 1510) is disposed on an edge (126; 127; 1504) of the upper (102; 1402) associated with an opening (125; 1502) of the upper (102; 1402) that receives a foot. 25

3. The article of footwear according to claim 1, wherein the overlay portion (150; 1510) includes eyelets (400, 402; 502, 504; 1610) for receiving a fastener. 30

4. The article of footwear according to claim 1, wherein the overlay portion (812; 1160) is disposed on a toe portion (868; 1151) of the upper (802; 1102). 35

5. The article of footwear according to claim 1, wherein the overlay portion (152, 154; 814, 816; 1162; 1722) includes a section disposed on a lower side of the upper (102; 802; 1102; 1702). 40

6. The article of footwear according to claim 1, wherein the overlay portion (150, 152, 154; 452; 810, 812, 814, 816; 1160, 1162; 1510; 1720; 1722) is made of a polymer material. 45

7. An article of footwear, comprising:

an upper (102; 1402) and a sole system (110; 1620), the upper (102; 1402) being further associated with a lacing member (160; 1602); the upper (102; 1402) being comprised of a braided structure (102; 1402) and an overlay portion (150; 1510); and wherein the overlay portion (150; 1510) includes a plurality of eyelets (400, 402; 502, 504; 1610) for receiving the lacing member. 50

8. The article of footwear according to claim 7, wherein the overlay portion (150; 1510) forms an eyestay for the upper (102; 1402), or wherein the overlay portion (150; 1510) is disposed on a lateral edge of a fastening region of the upper (102; 1402), and wherein the overlay portion (150; 1510) is disposed on a medial edge of the fastening region, or 55

wherein the overlay portion (150; 1510) extends on a lateral side of the upper (102; 1402), a medial side of the upper (102; 1402) and a lower side of the upper (102; 1402).

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9. The article of footwear according to claim 7, wherein the overlay portion (150; 1510) is a first overlay portion and wherein the article of footwear includes a second overlay portion that is different than the first overlay portion. 10
10. The article of footwear according to claim 9, wherein the first overlay portion overlaps with the second overlay portion at an overlap region. 15
11. The article of footwear according to claim 7, wherein the second overlay portion covers a lower side of the upper (102; 802; 1102; 1402; 1702). 20
12. The article of footwear according to claim 11, wherein the second overlay portion can be joined to the sole system (110; 1620) to secure the sole system (110; 1620) in place on the article of footwear. 25
13. The article of footwear according to any one of claims 1 to 12, wherein strands (304) of the braided structure form part of a closed woven edge (305) of the upper (102) that lacks any loose or free ends of strands, the strands (304) are disposed against inner surface (302) of the overlay portion (152), and the strands (304) bonded to the overlay portion (152). 30
14. The article of footwear according to any one of claims 1 to 12, wherein strands (470) of the braided structure are configured with loose or free ends (472) secured to the overlay portion (452). 35
15. The article of footwear according to any one of claims 3 and 7 to 12, wherein one or more strands (512, 514) of the braided structure extend around the eyelet (502, 504). 40

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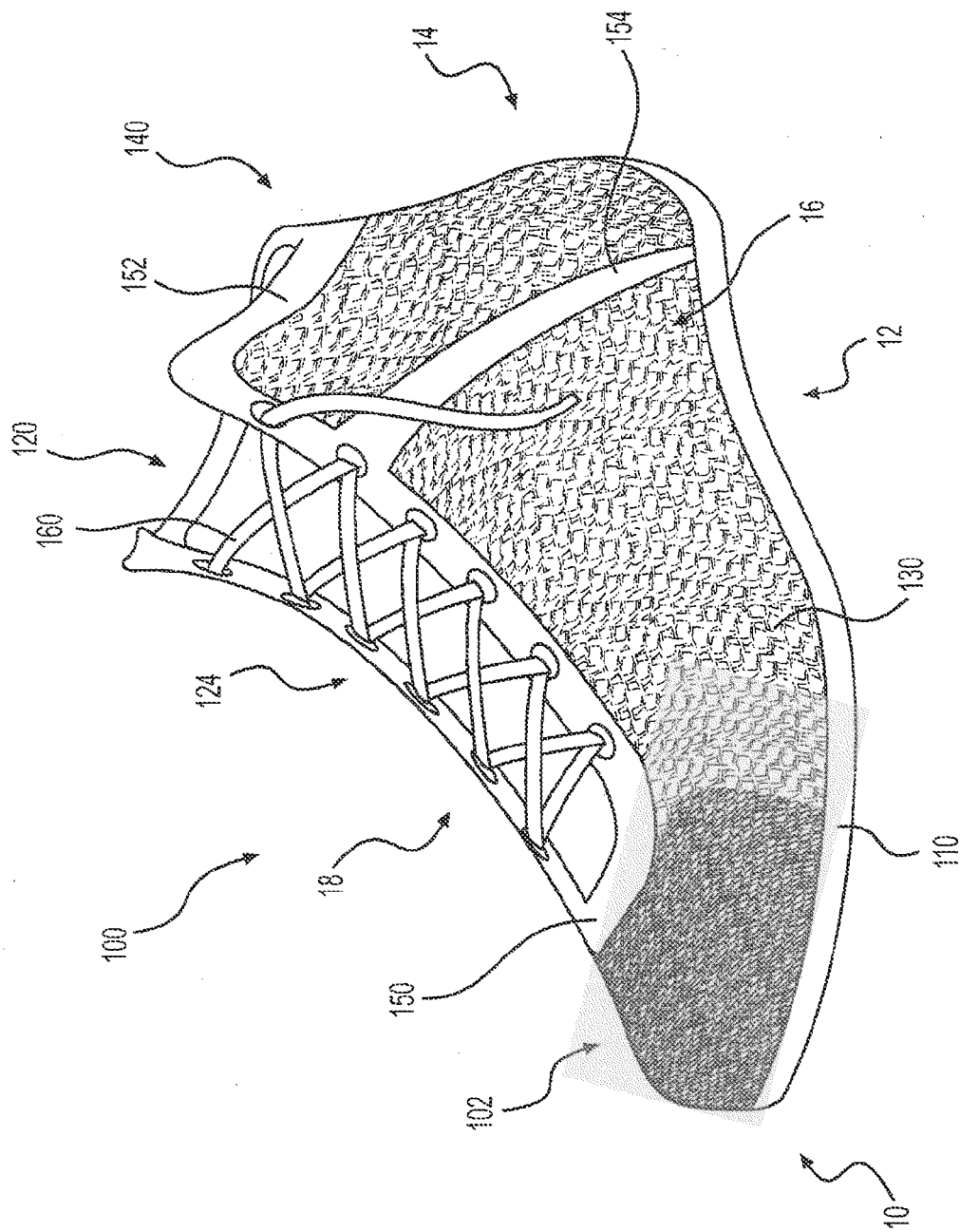
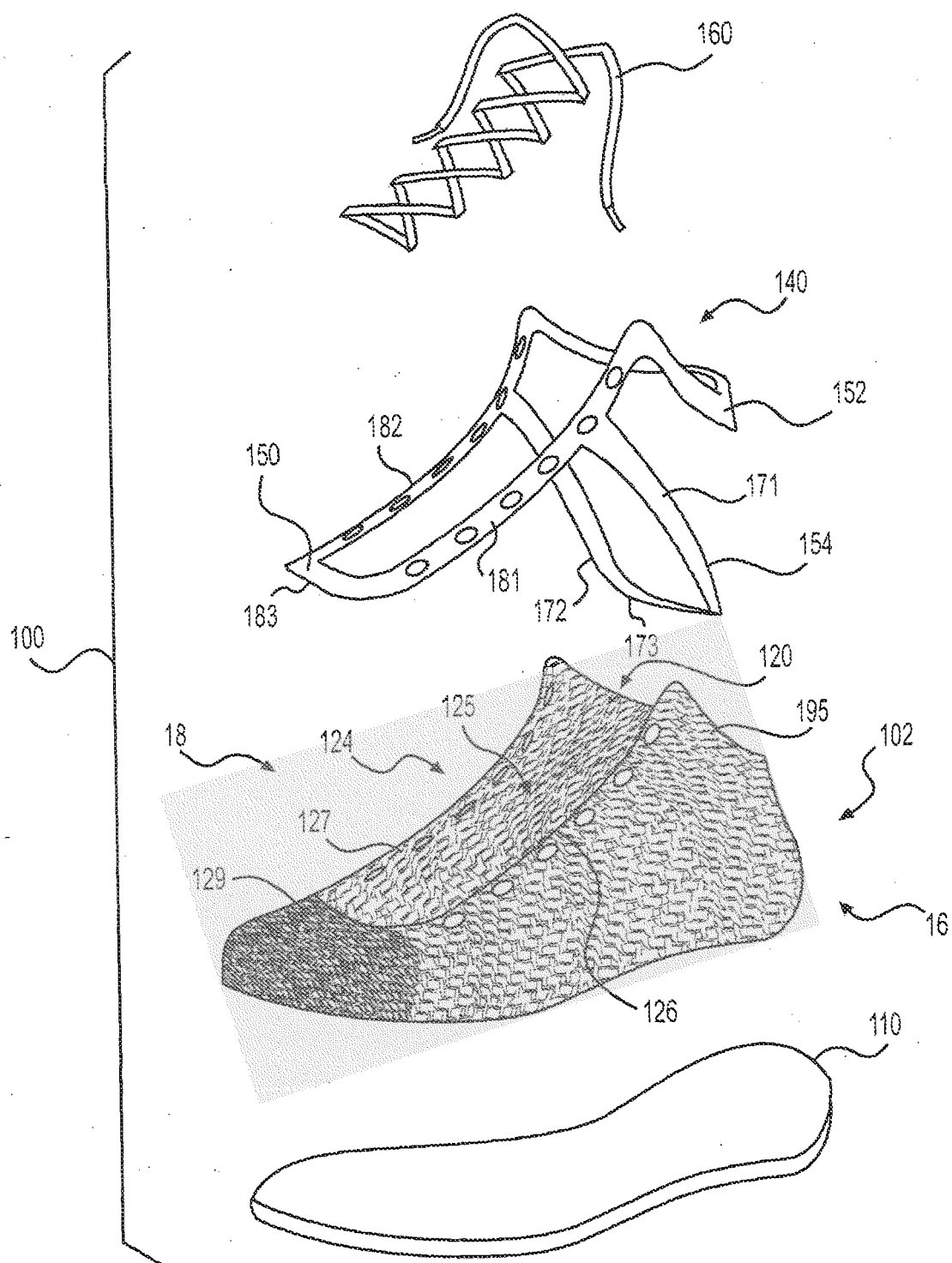


FIG. 1

**FIG. 2**

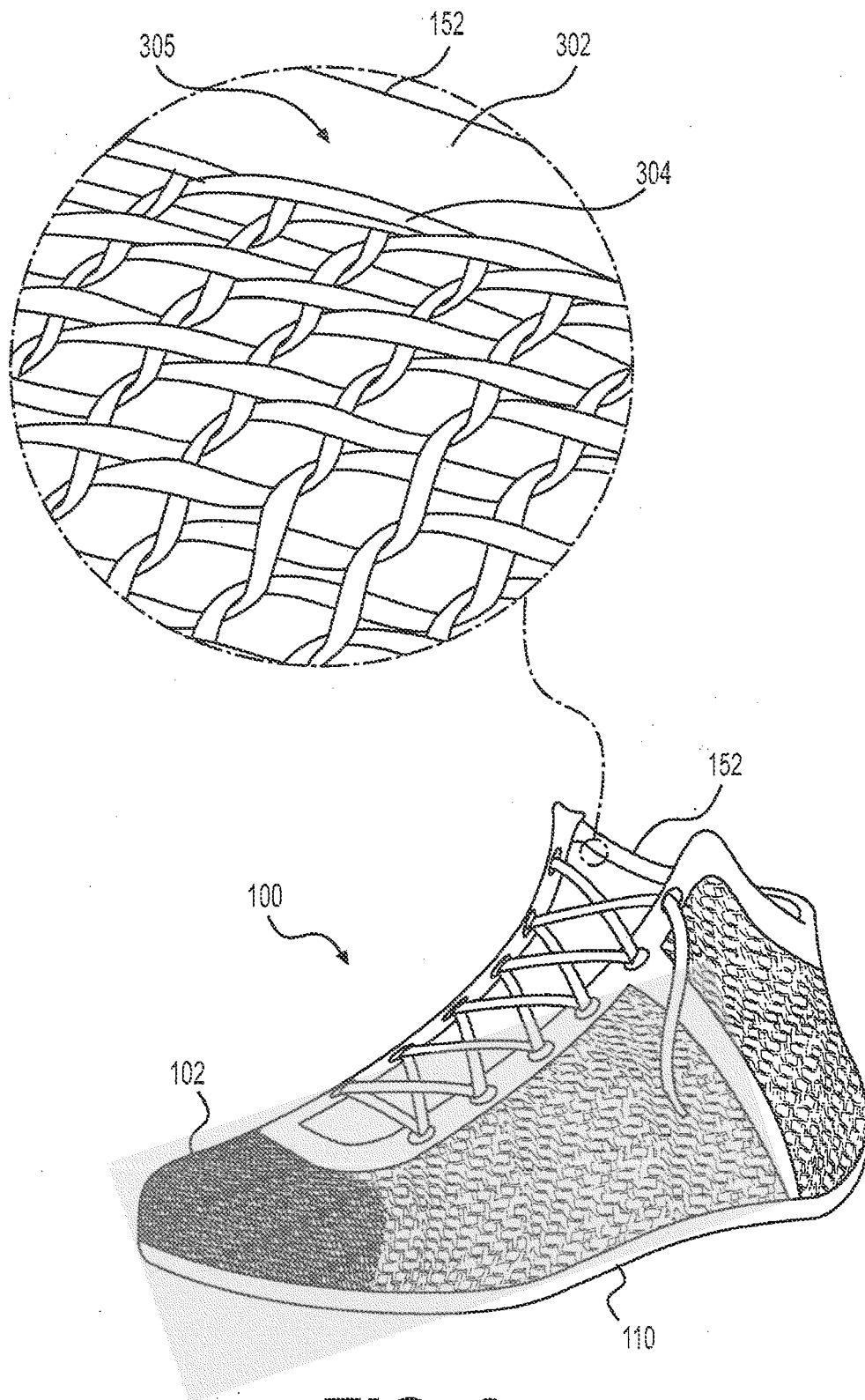


FIG. 3

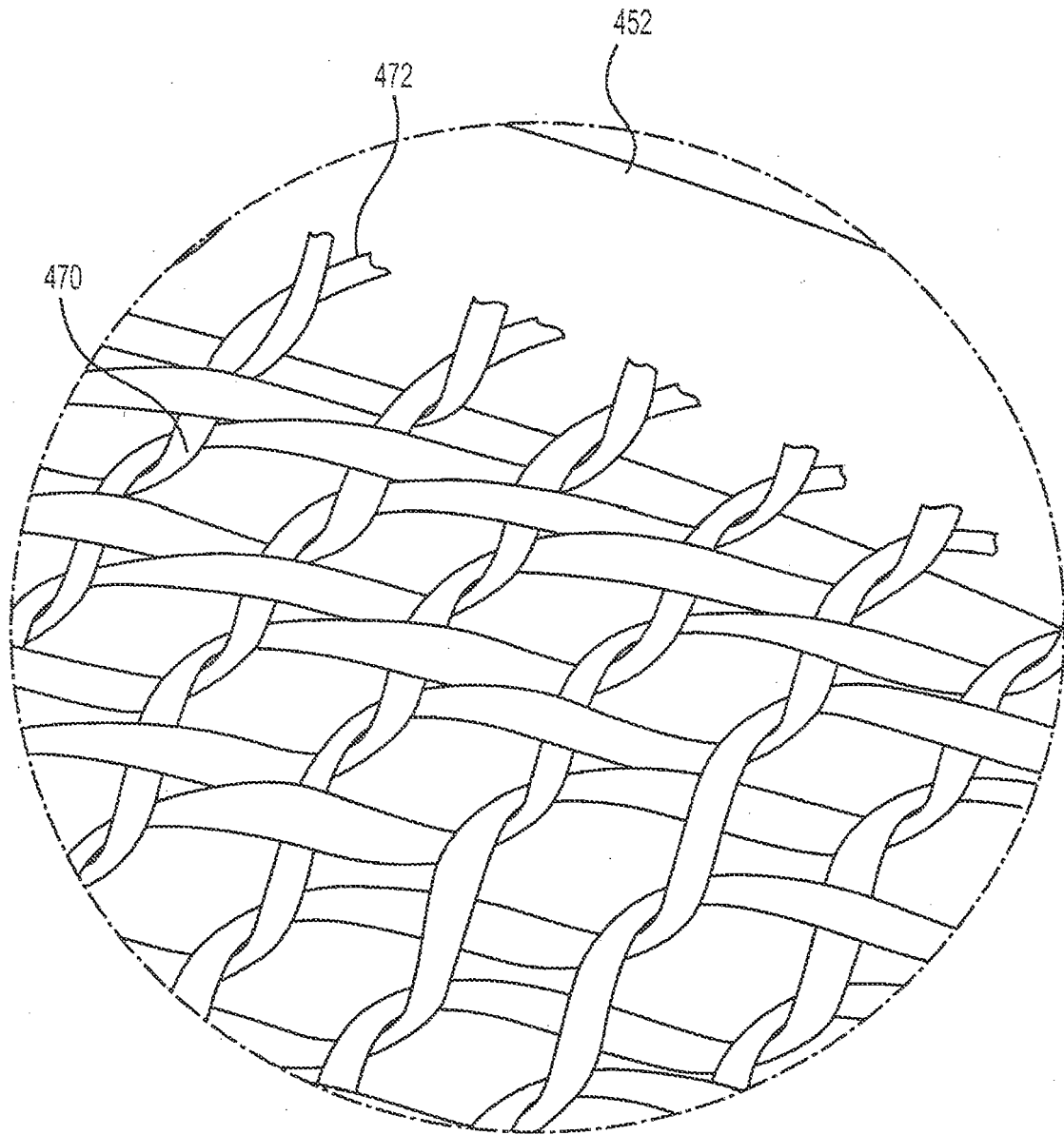


FIG. 4

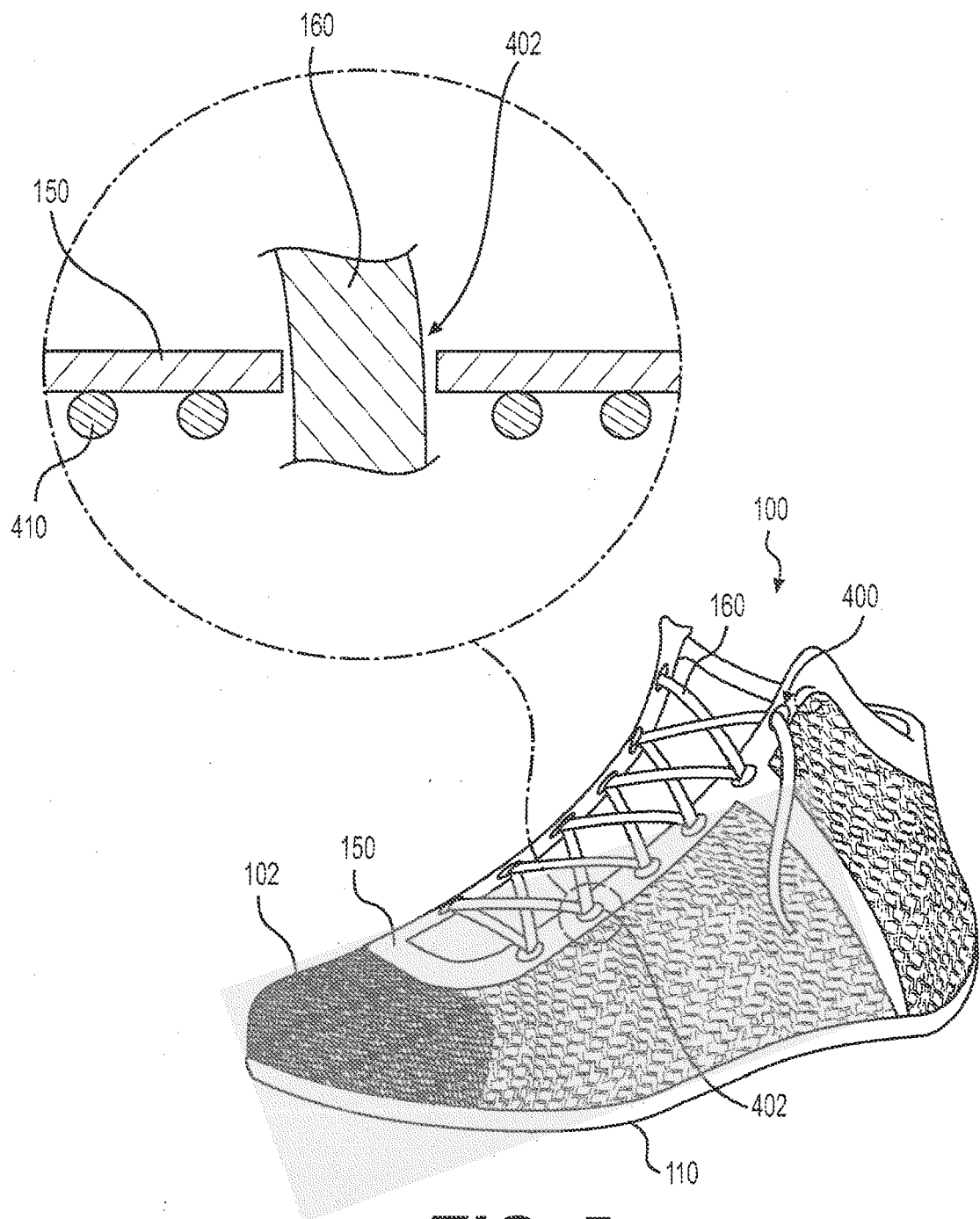


FIG. 5

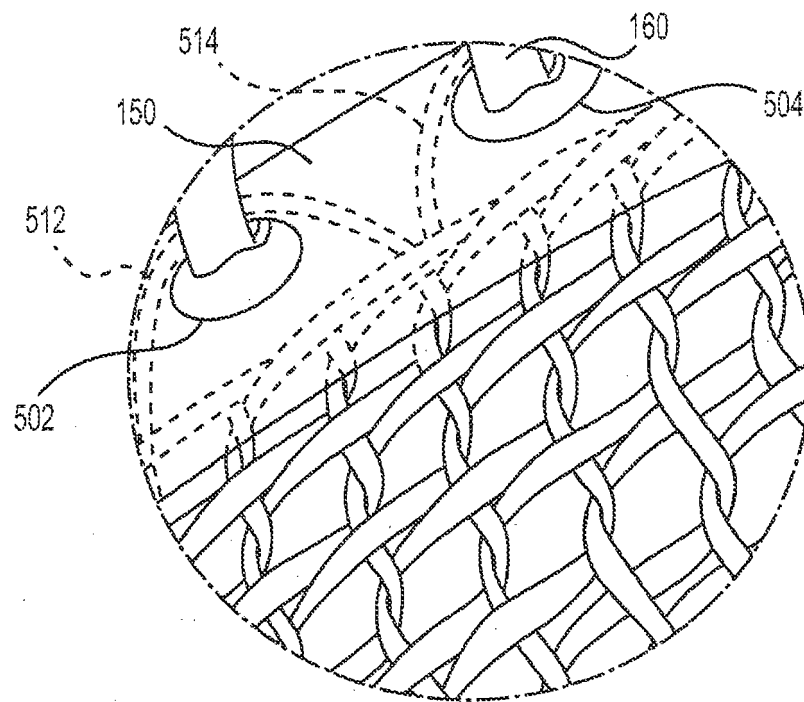


FIG. 6

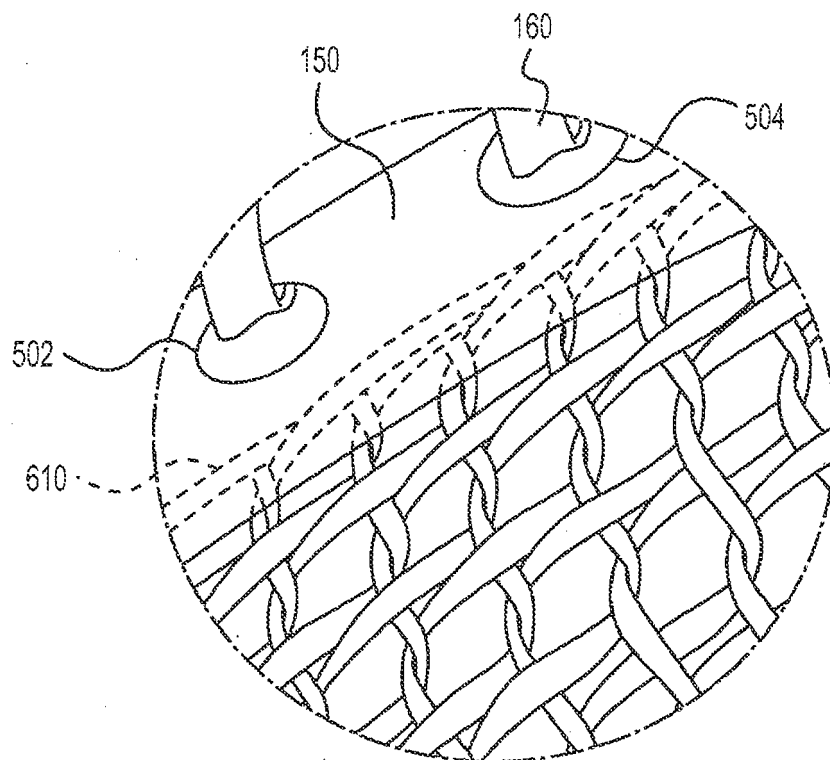


FIG. 7

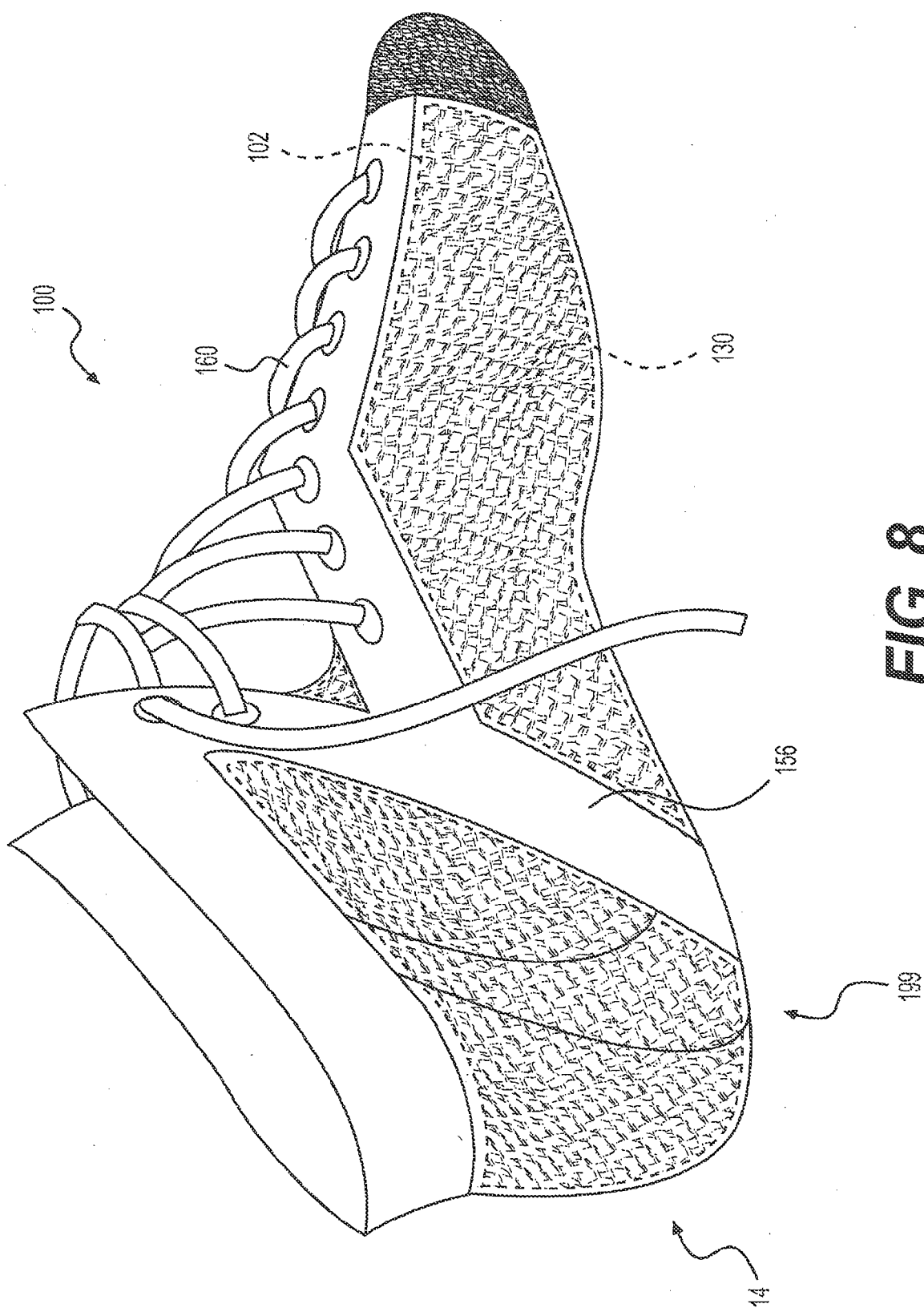


FIG. 8

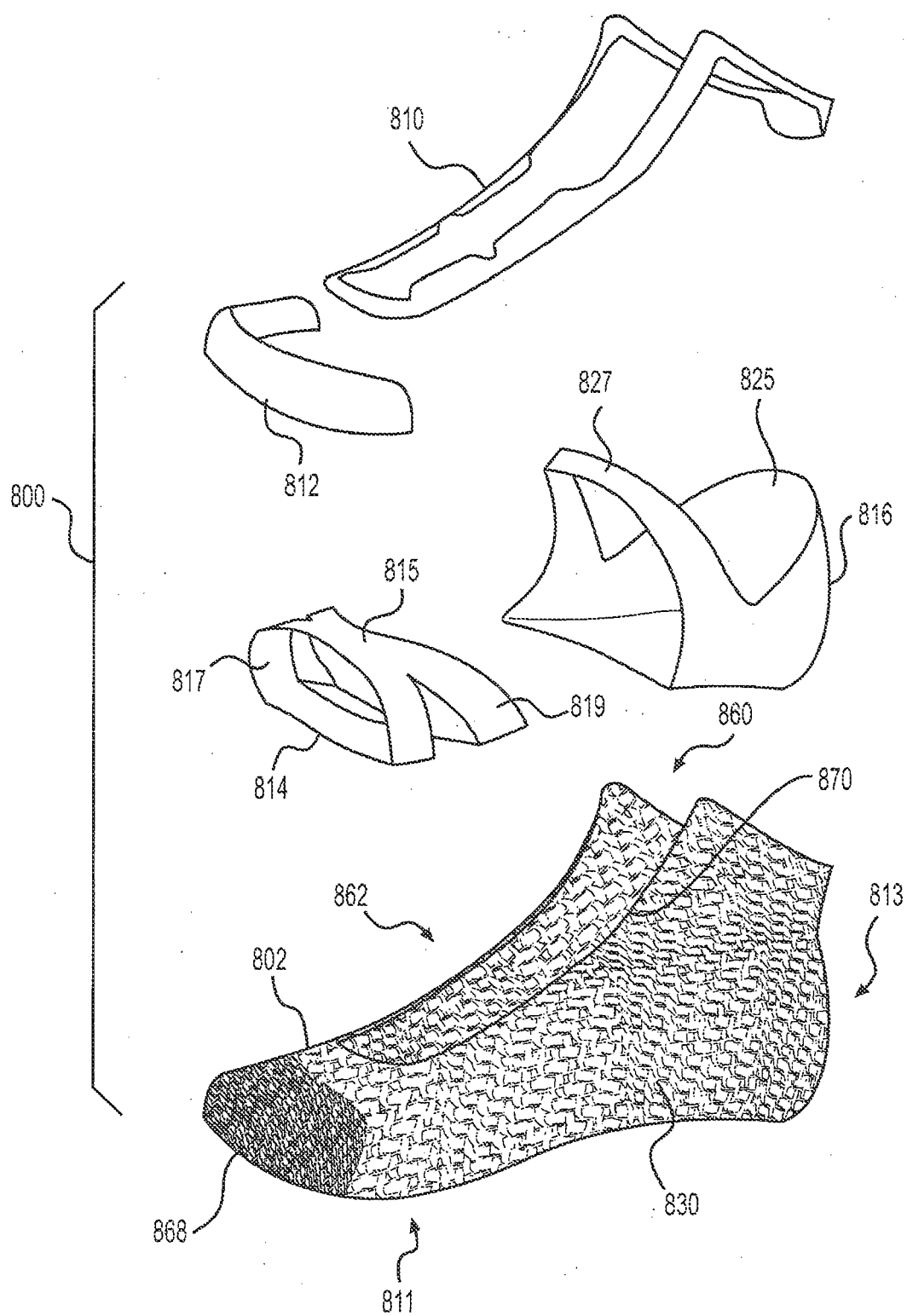


FIG. 9

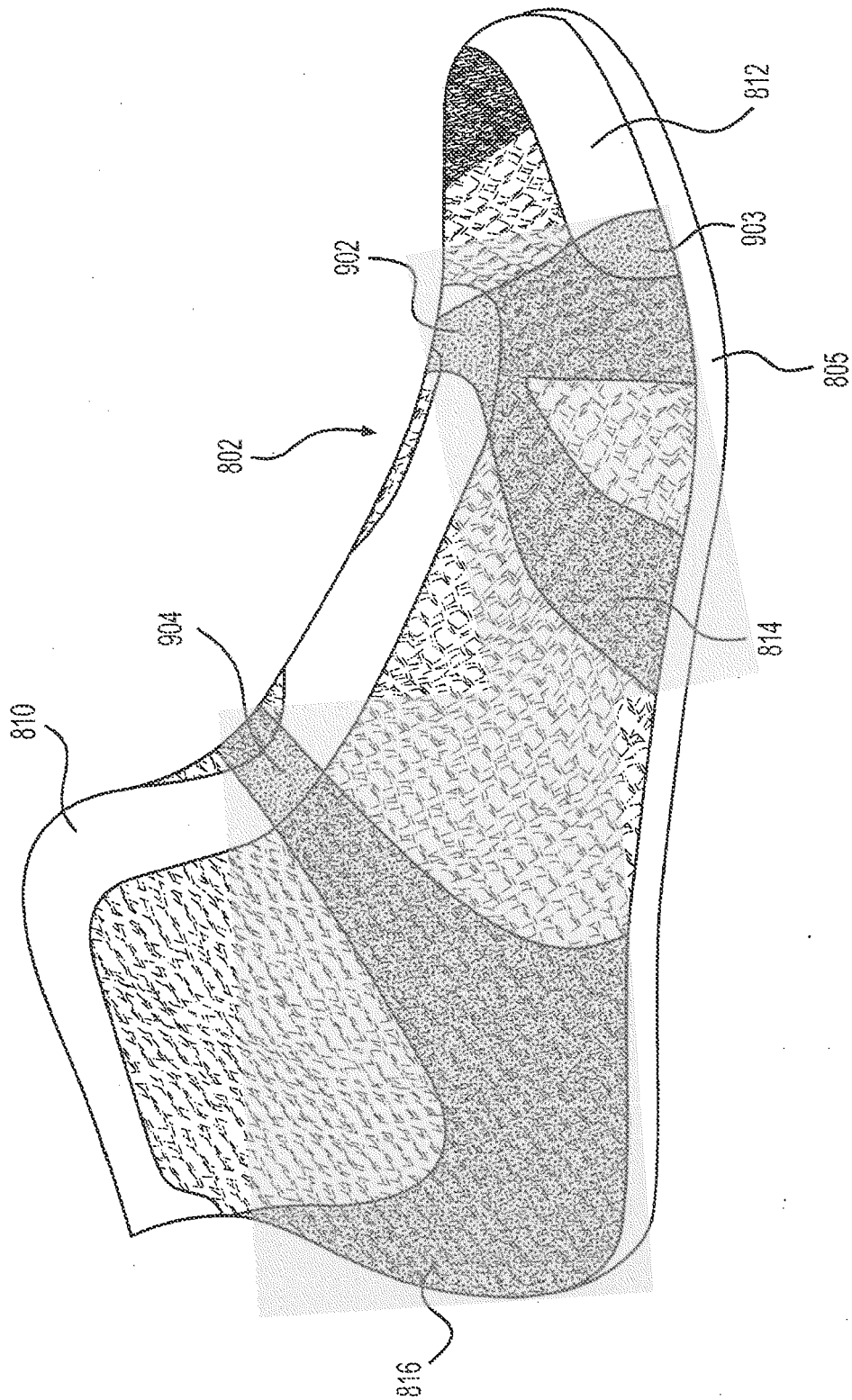


FIG. 10

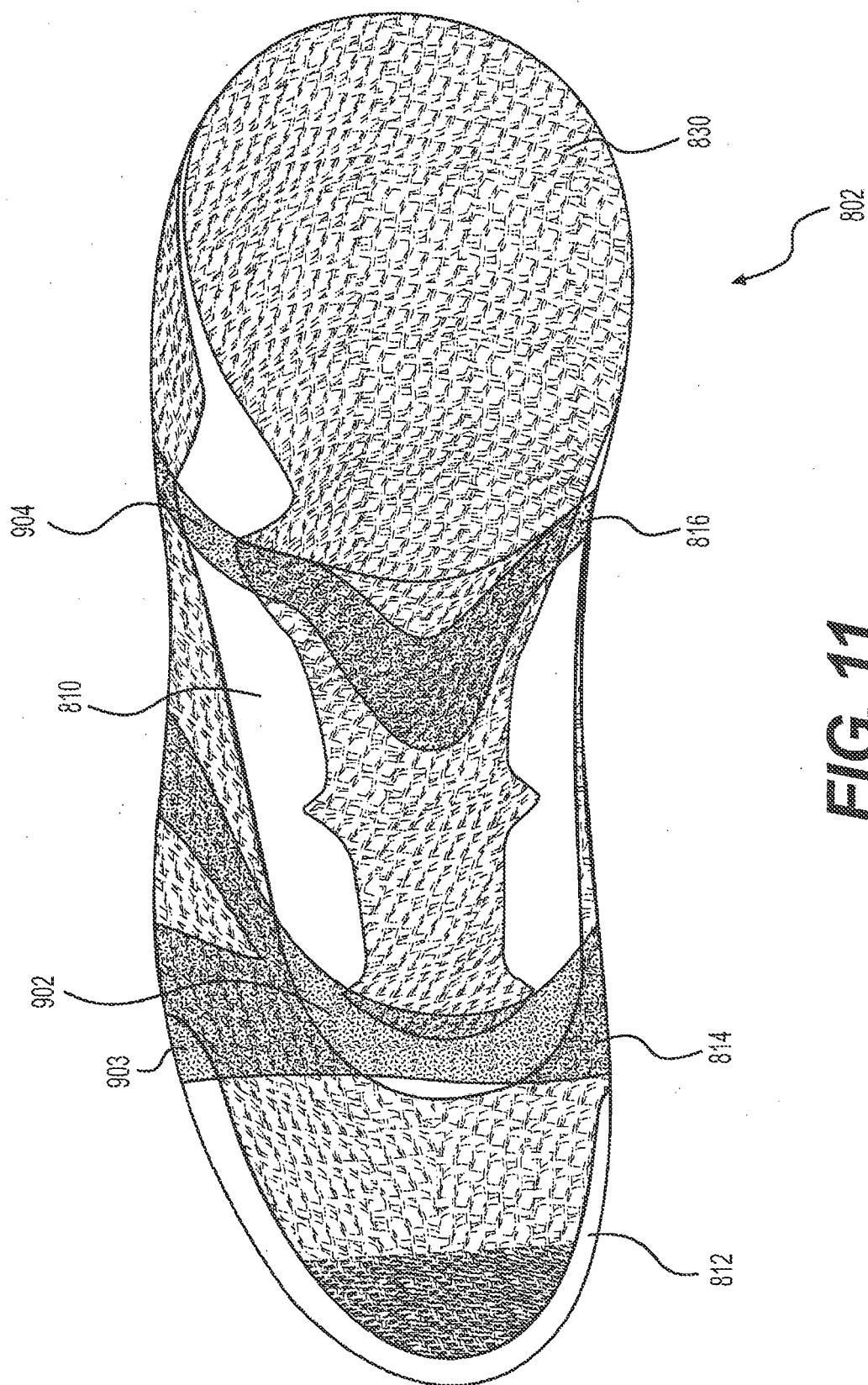


FIG. 11

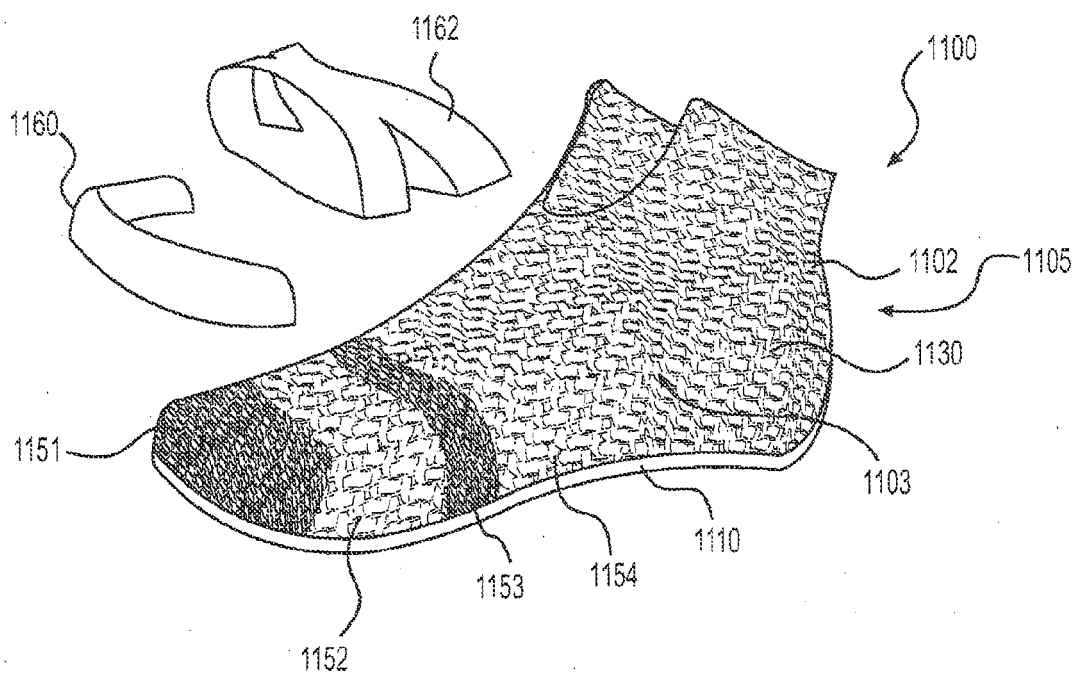


FIG. 12

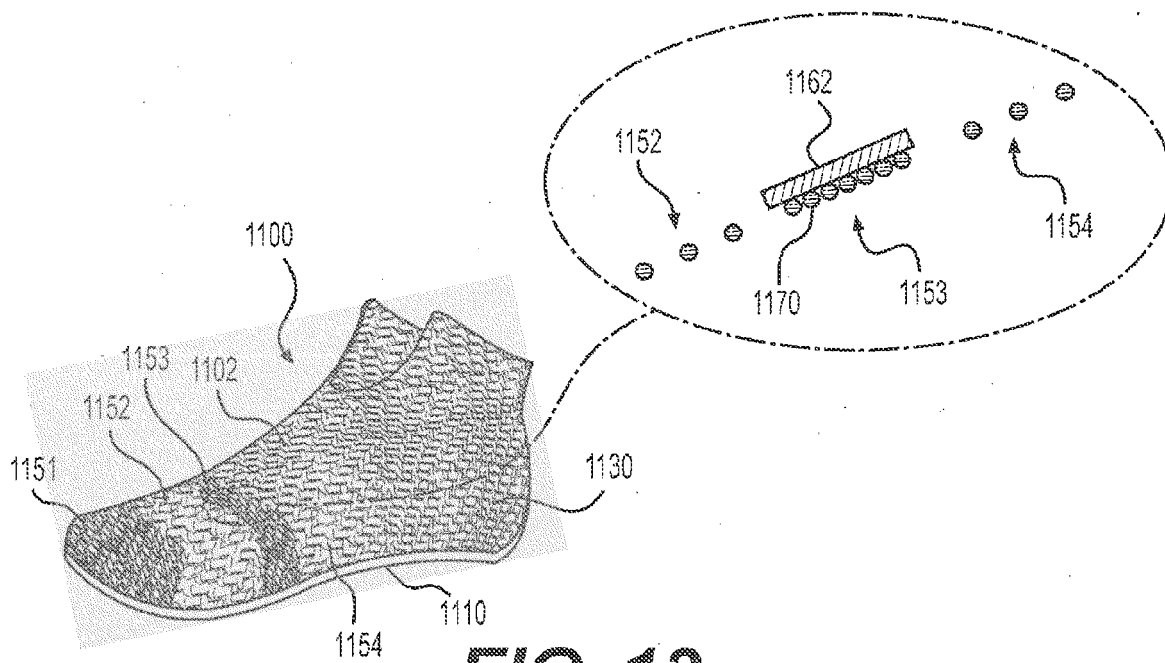


FIG. 13

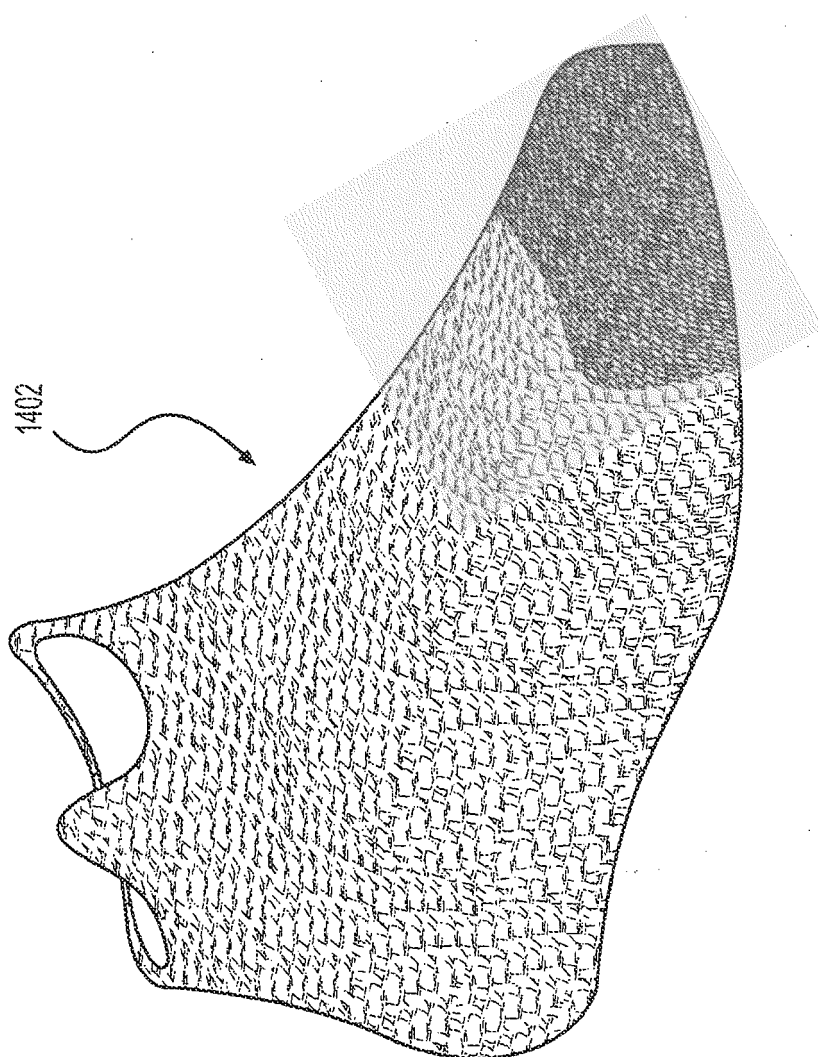


FIG. 14

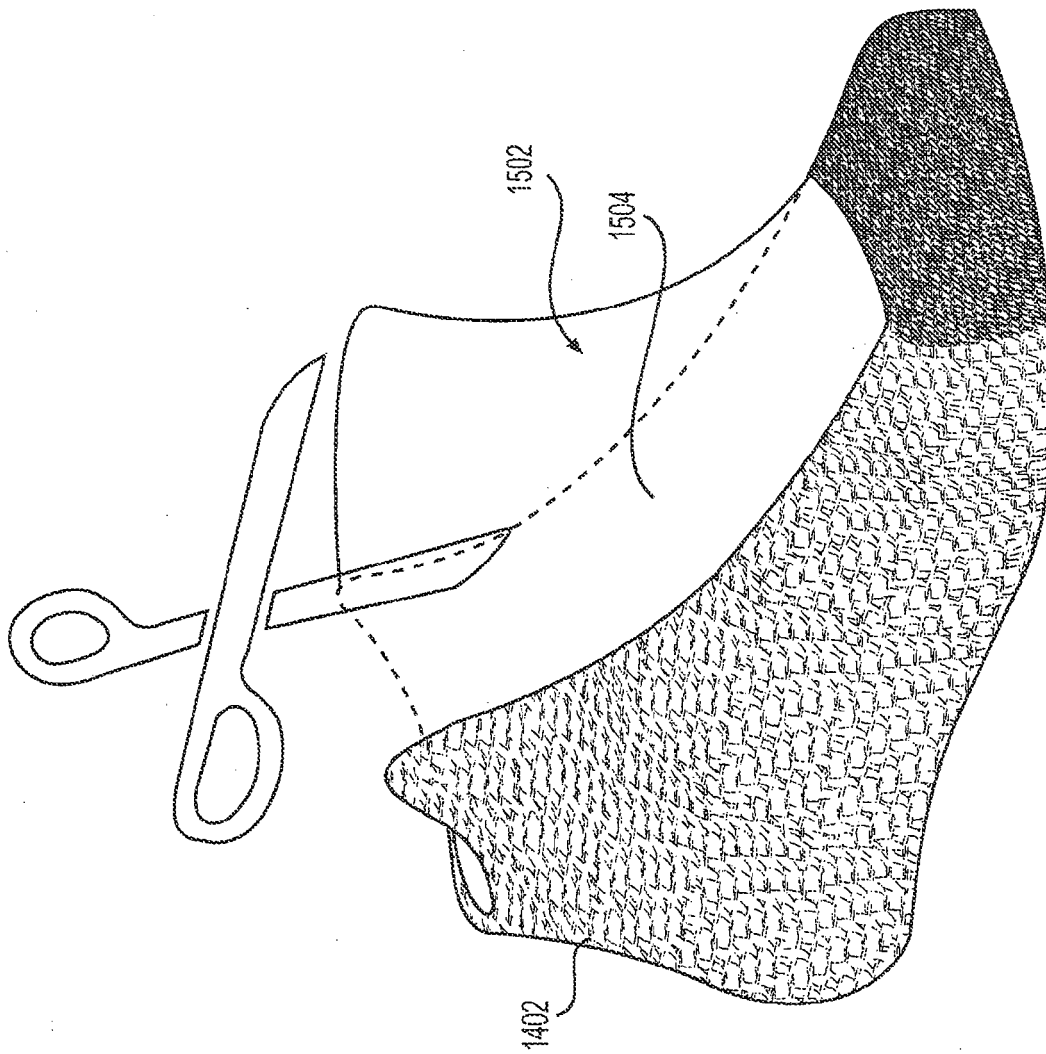


FIG. 15

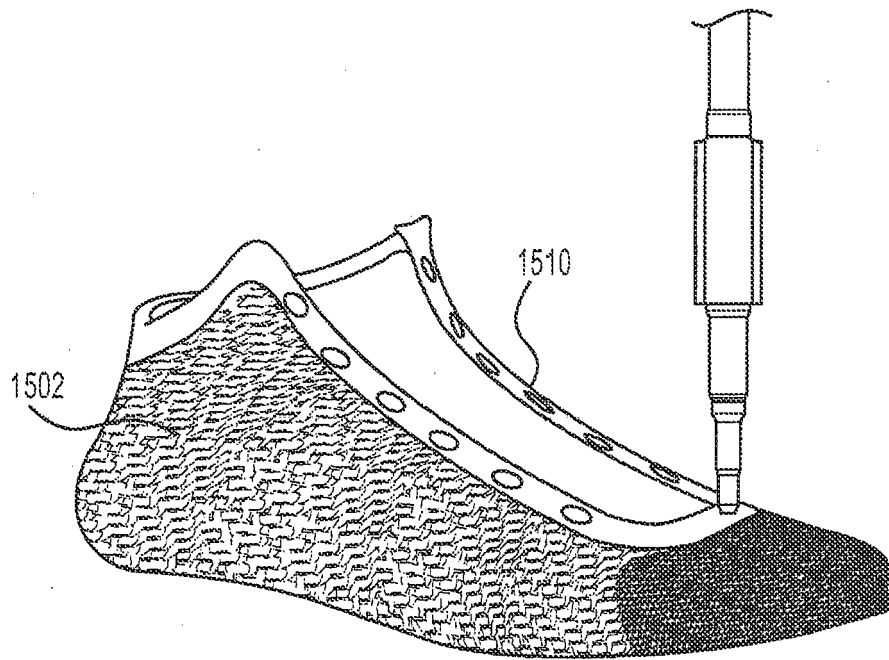


FIG. 16

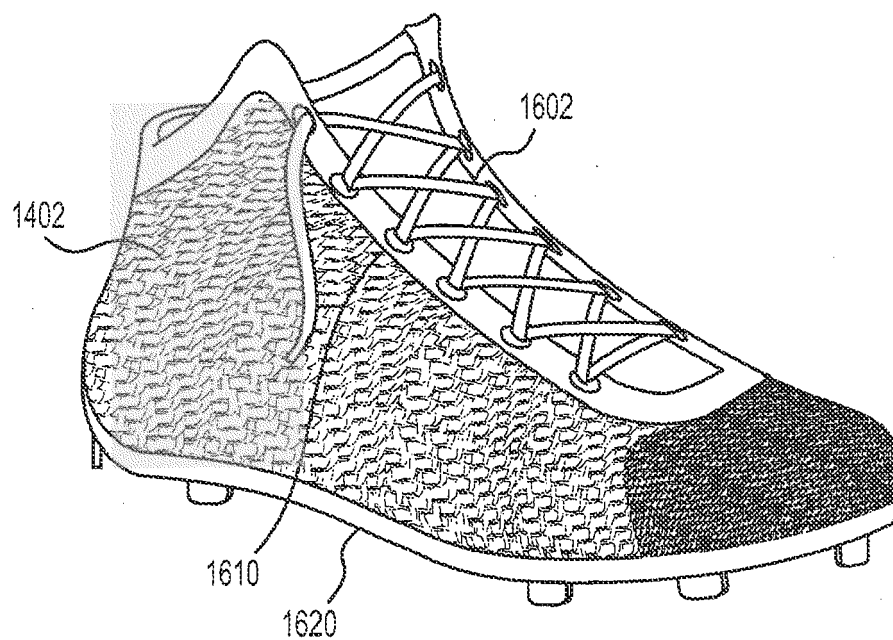


FIG. 17

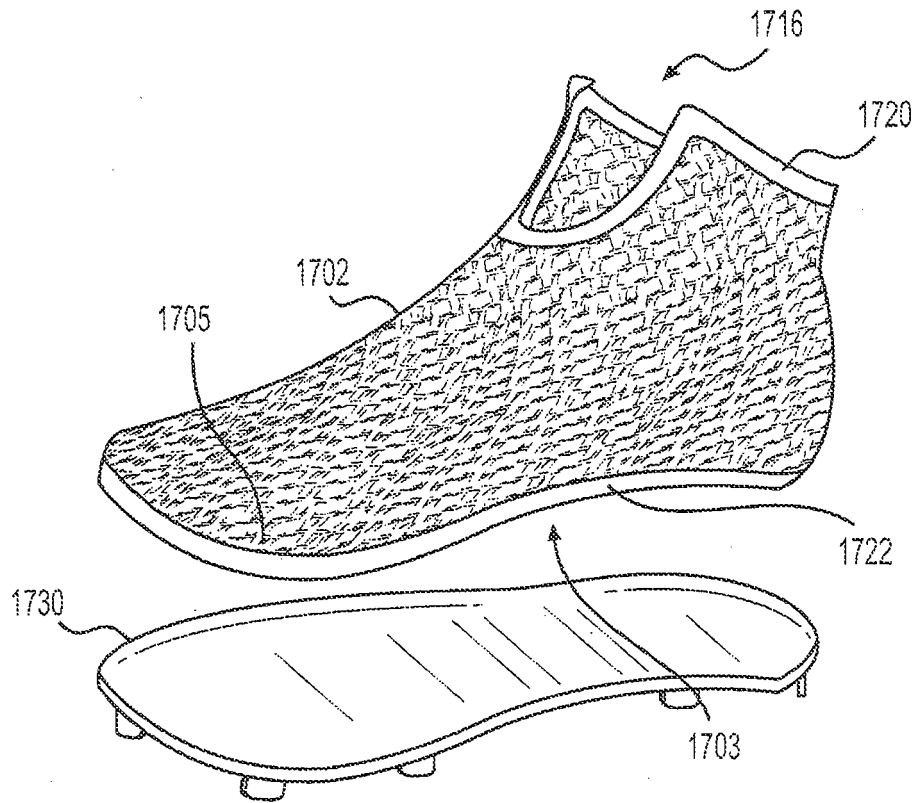


FIG. 18

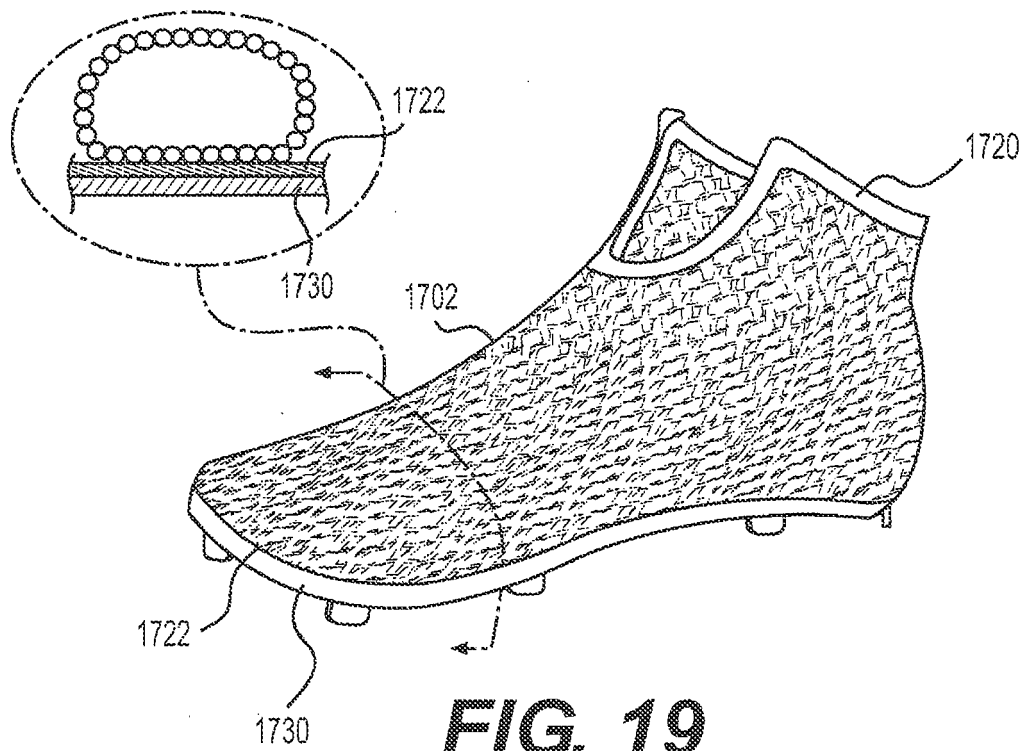


FIG. 19

**PARTIAL EUROPEAN SEARCH REPORT**

Application Number

under Rule 62a and/or 63 of the European Patent Convention.
This report shall be considered, for the purposes of
subsequent proceedings, as the European search report

EP 16 00 1887

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 1 012 719 A (EMILIE DIMITCH) 16 July 1952 (1952-07-16) * page 1; figures *	1-4	INV. A43B7/08 A43B23/02
X	US 2012/159813 A1 (DUA BHUPESH [US] ET AL) 28 June 2012 (2012-06-28) * paragraph [0044]; figures 9, 12, 13 *	1	
X	WO 2013/071679 A1 (DAI RENDE [CN]) 23 May 2013 (2013-05-23) * abstract; claims *	1	
A	US 2 147 197 A (GLIDDEN ALFRED A) 14 February 1939 (1939-02-14) * claims; figures *	1	
A	US D 164 847 S (JEAN DRONOFF) 16 October 1951 (1951-10-16) * column 1; figure 1 *	1,4	
			TECHNICAL FIELDS SEARCHED (IPC)
			A43B
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out. Claims searched completely : Claims searched incompletely : Claims not searched : Reason for the limitation of the search: see sheet C			
Place of search		Date of completion of the search	Examiner
The Hague		7 March 2017	Claudel, Benoît
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03/82 (P04E07)

**INCOMPLETE SEARCH
SHEET C**

Application Number

EP 16 00 1887

5

Claim(s) completely searchable:
1-6, 13-15

10

Claim(s) not searched:
7-12

Reason for the limitation of the search:

15

After Invitation pursuant to Rule 62a EPC, applicant requested the search to be limited to claims 1-6, 13-15

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 00 1887

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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07-03-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 1012719 A	16-07-1952	NONE	
US 2012159813 A1	28-06-2012	CN 1925763 A	07-03-2007
		CN 101756428 A	30-06-2010
		TW I279198 B	21-04-2007
		US 2005193592 A1	08-09-2005
		US 2008196181 A1	21-08-2008
		US 2010325916 A1	30-12-2010
		US 2012005922 A1	12-01-2012
		US 2012159813 A1	28-06-2012
		US 2014150294 A1	05-06-2014
		US 2015013080 A1	15-01-2015
		WO 2005092134 A1	06-10-2005
WO 2013071679 A1	23-05-2013	NONE	
US 2147197 A	14-02-1939	NONE	
US D164847 S	16-10-1951	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 61839097 A [0001]
- US 16339214 A [0001]
- US 7252028 B [0019]
- US 8261648 B [0019]
- US 5361674 A [0019]
- US 5398586 A [0019]
- US 4275638 A [0019]