



US 20150289590A1

(19) **United States**

(12) **Patent Application Publication**
JONES et al.

(10) **Pub. No.: US 2015/0289590 A1**

(43) **Pub. Date: Oct. 15, 2015**

(54) **FOOTWEAR SYSTEM WITH REMOVABLE INSERTS**

Publication Classification

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(51) **Int. Cl.**
A43B 13/38 (2006.01)

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(52) **U.S. Cl.**
CPC **A43B 13/38** (2013.01)

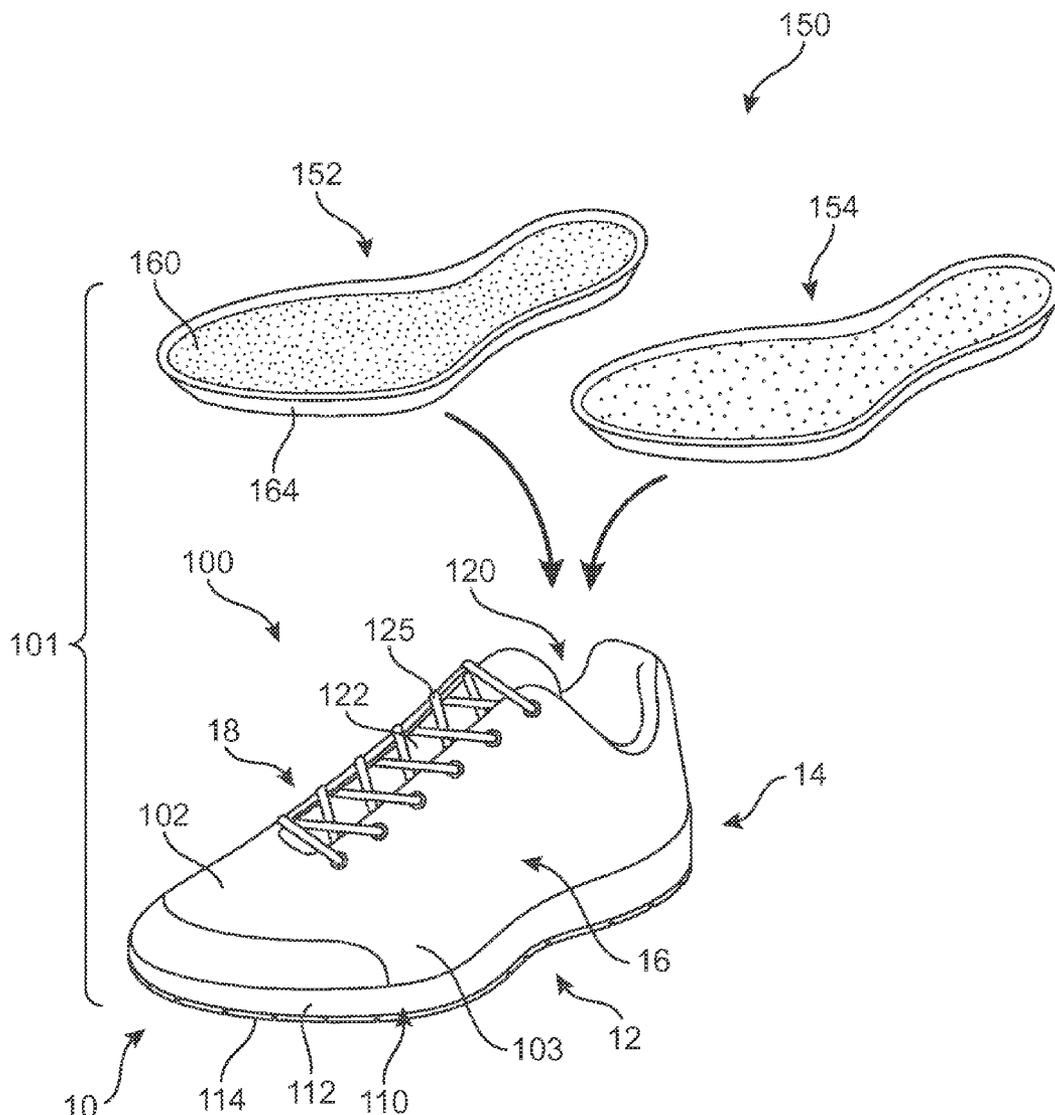
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(57) **ABSTRACT**

(21) Appl. No.: **14/248,431**

A footwear system includes an article of footwear and a set of removable inserts. The article of footwear includes a midsole with a cavity that receives one of the removable inserts at a time, where the inserts are interchangeable. The inserts and cavity have corresponding tapered geometries that allow the midsole to expand laterally as the inserts are compressed. This may act to pull the upper down more tightly against the top of the foot.

(22) Filed: **Apr. 9, 2014**



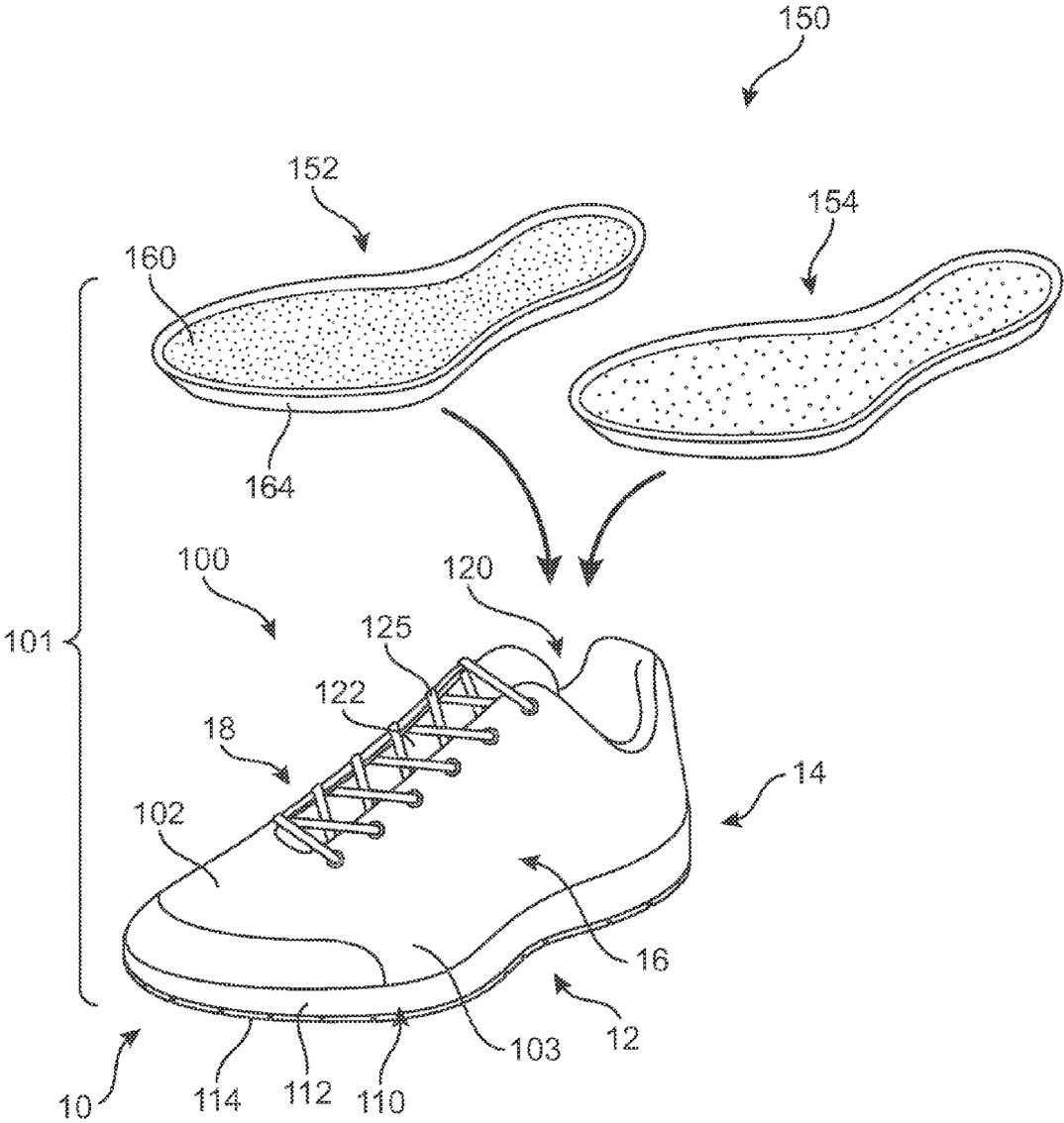


FIG. 1

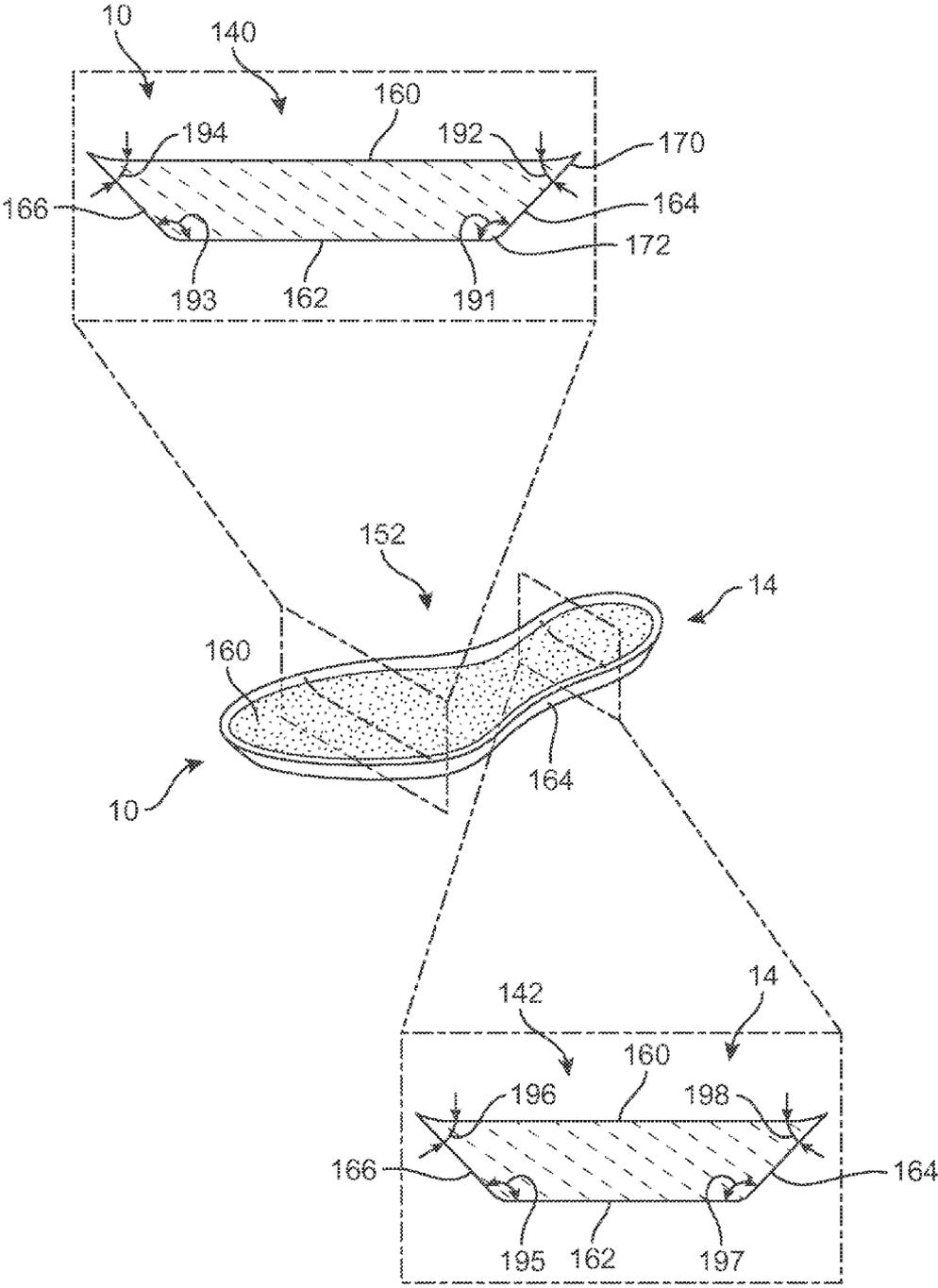


FIG. 3

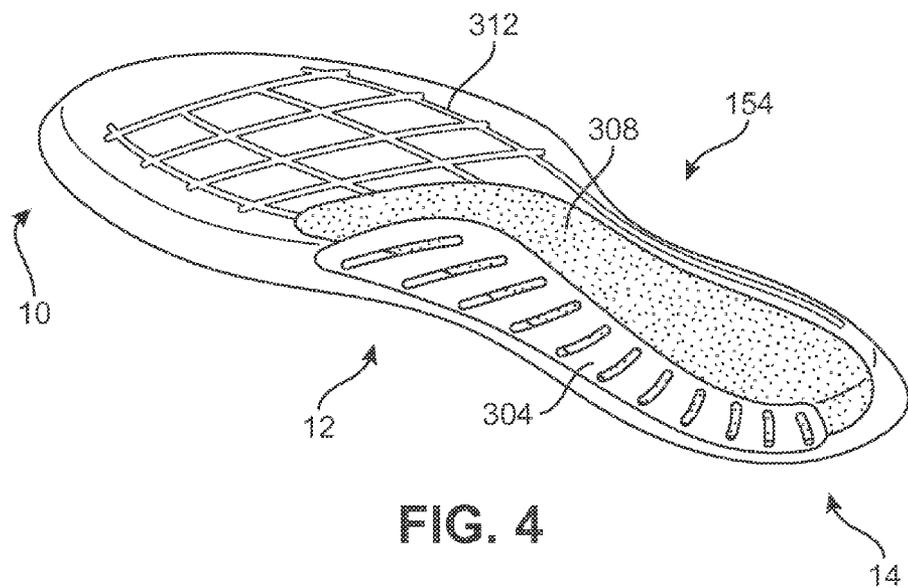
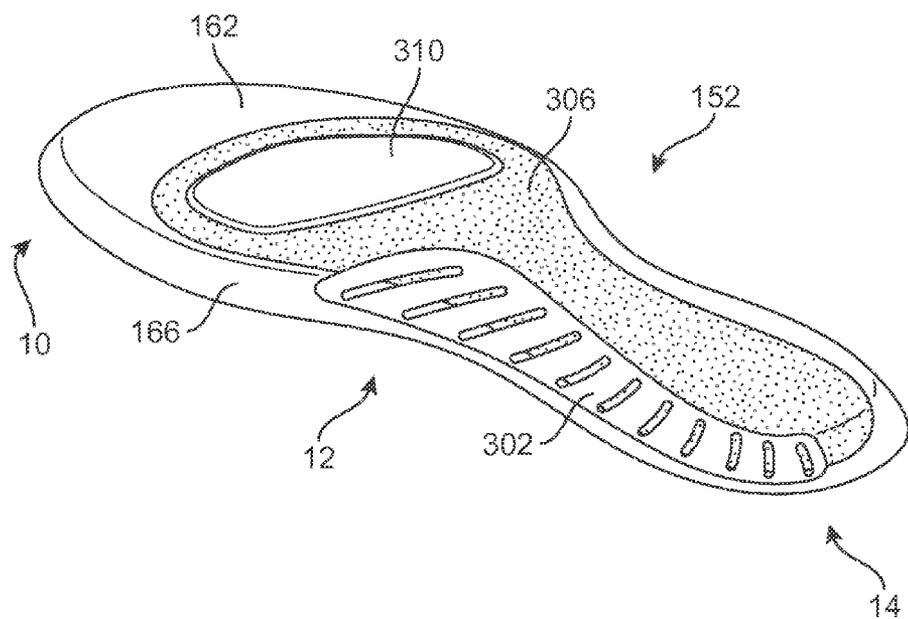


FIG. 4

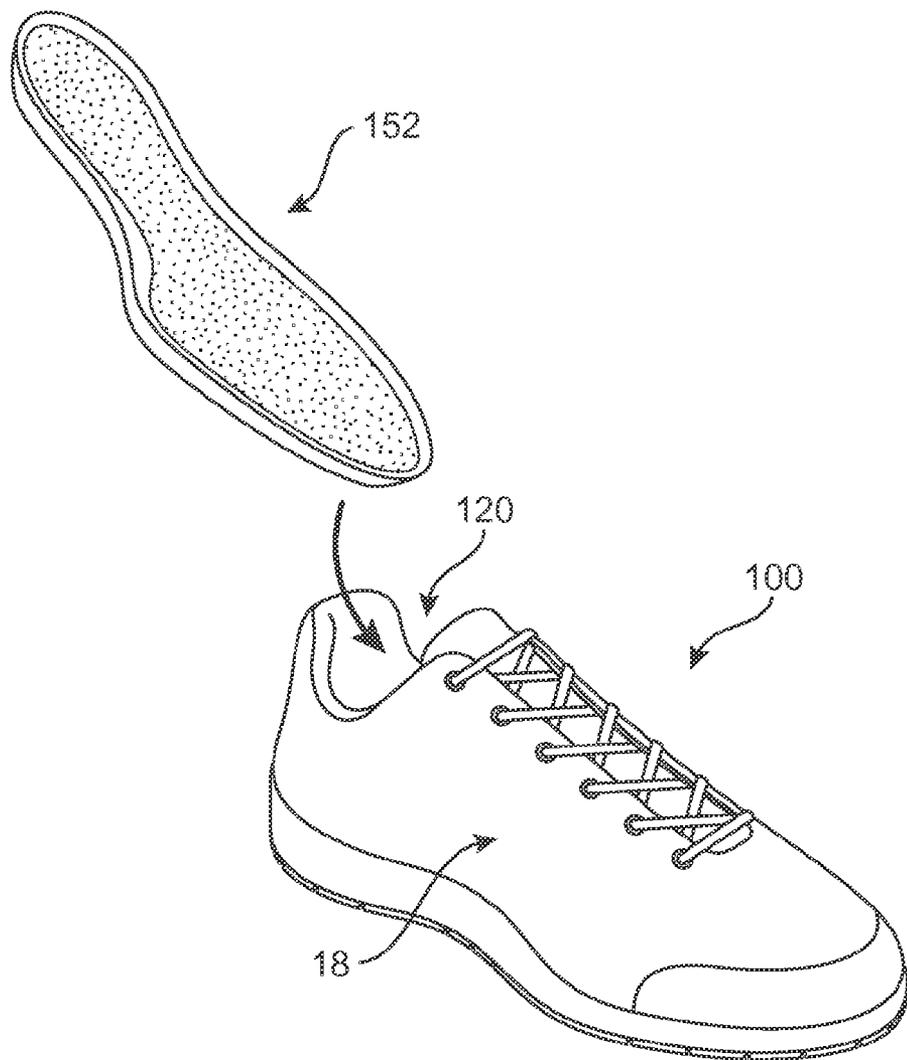


FIG. 5

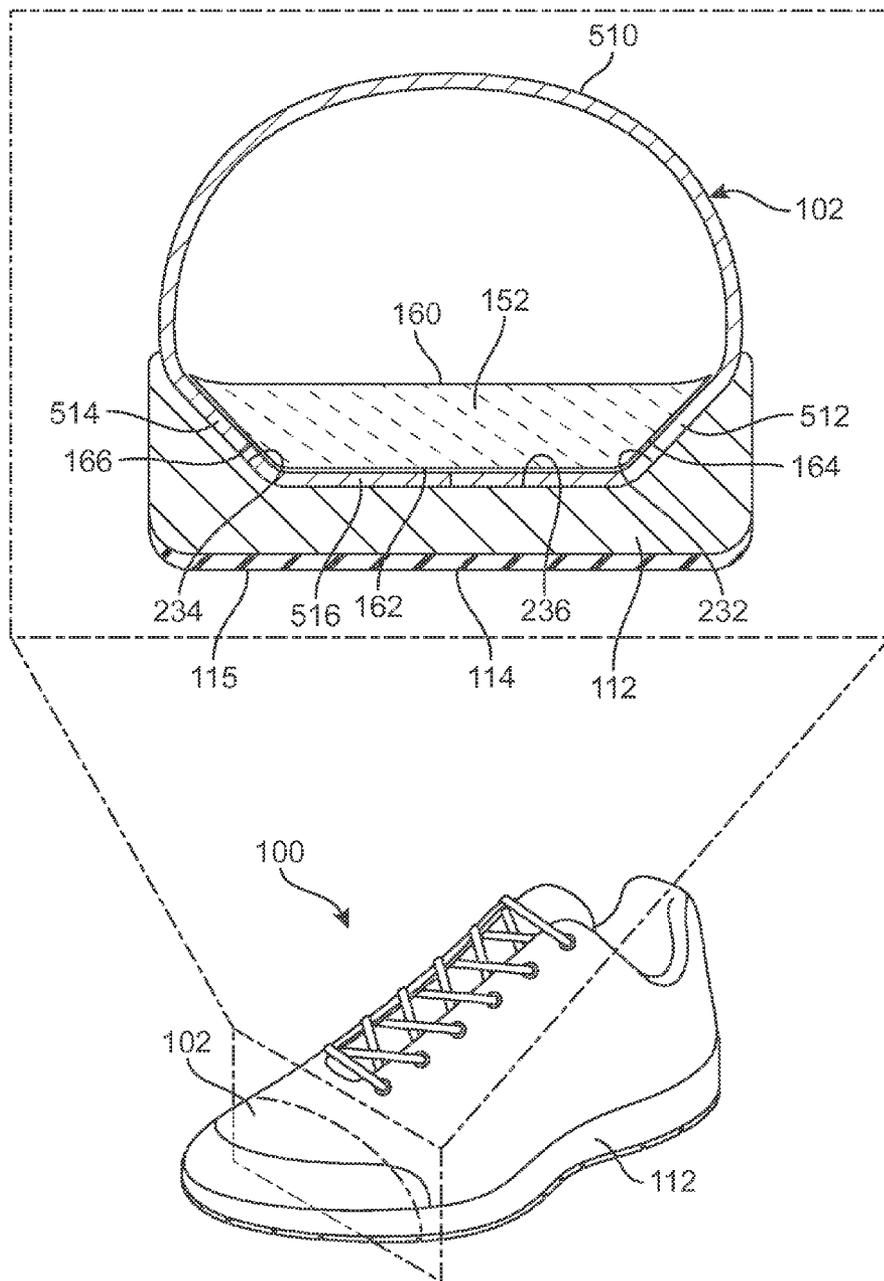


FIG. 6

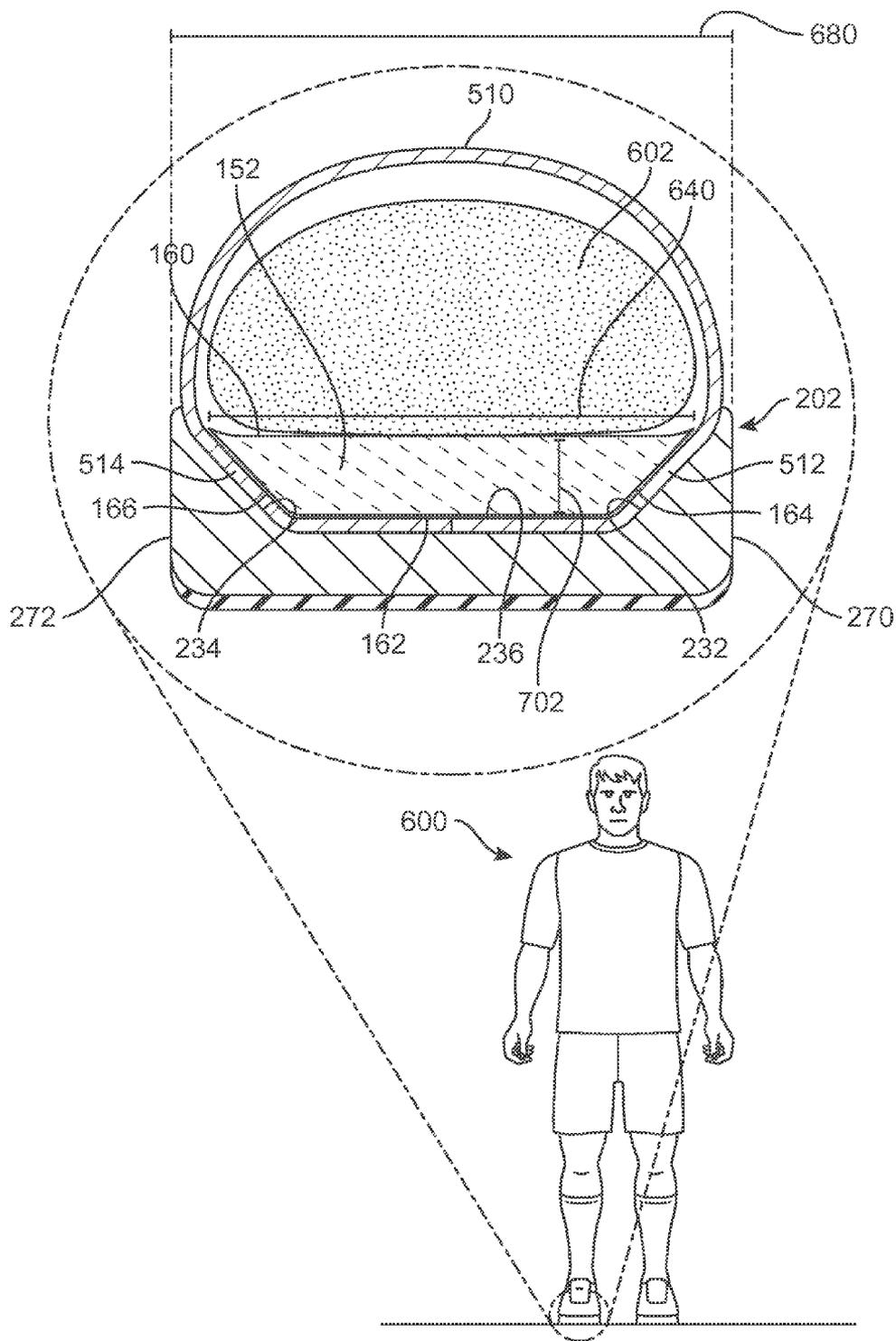


FIG. 7

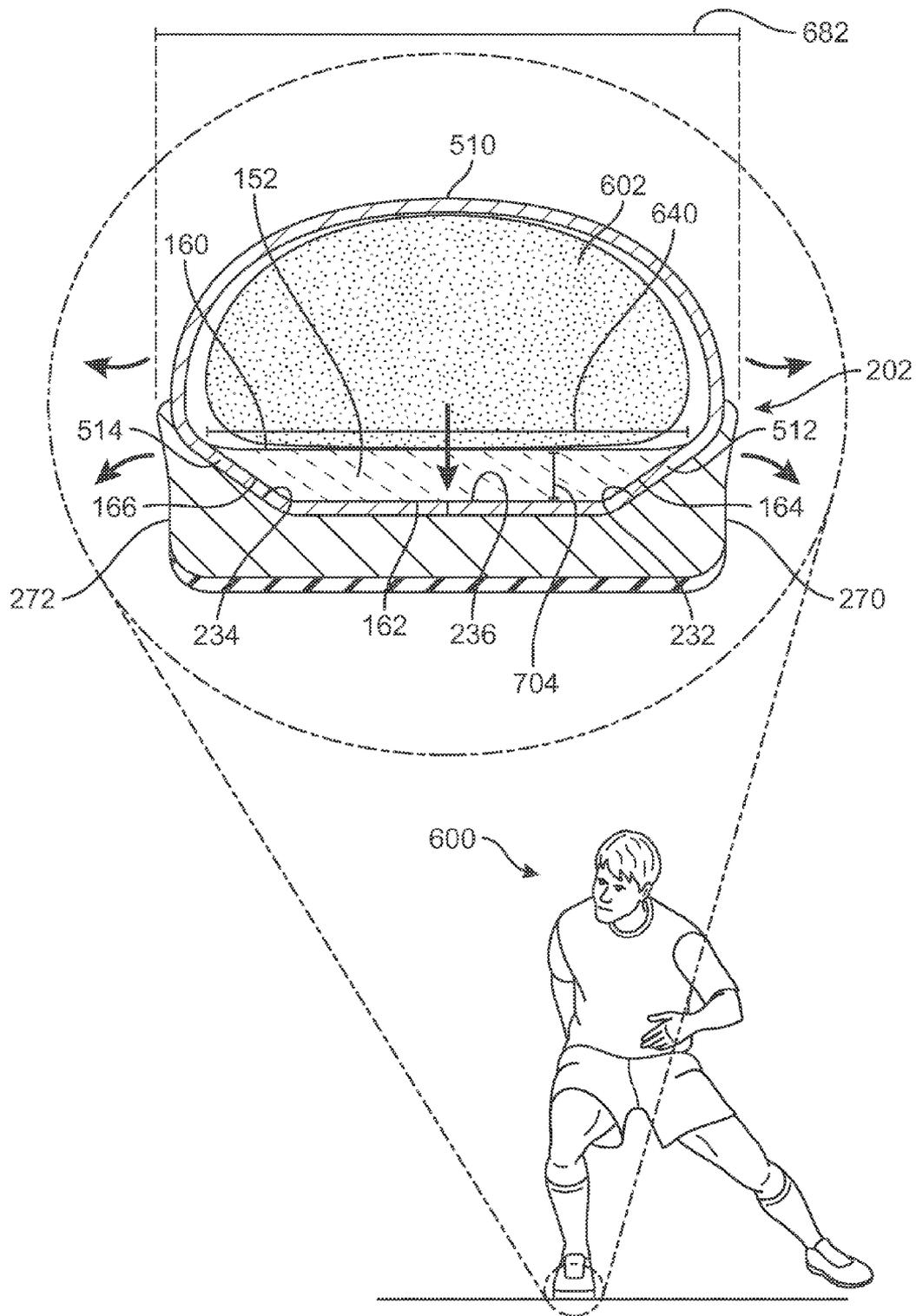


FIG. 8

FOOTWEAR SYSTEM WITH REMOVABLE INSERTS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is related to U.S. Patent Publication No. _____, currently U.S. patent application Ser. No. _____, filed _____, and entitled "Articles of Footwear Having a Similar Appearance and Different Sole Assemblies" (Attorney Docket Number 51-3669), which application is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] The present embodiments relate generally to articles of footwear, and in particular to articles of footwear with interchangeable inserts.

[0003] Articles of footwear generally include two primary elements: an upper and a sole structure. The upper is often formed from a plurality of material elements (e.g., textiles, polymer sheet layers, foam layers, leather, synthetic leather) that are stitched or adhesively bonded together to form a void on the interior of the footwear for comfortably and securely receiving a foot. More particularly, the upper forms a structure that extends over instep and toe areas of the foot, along medial and lateral sides of the foot, and around a heel area of the foot. The upper may also incorporate a lacing system to adjust the fit of the footwear, as well as permitting entry and removal of the foot from the void within the upper. In addition, the upper may include a tongue that extends under the lacing system to enhance adjustability and comfort of the footwear, and the upper may incorporate a heel counter.

SUMMARY

[0004] In one aspect, an insert system with an article of footwear and a set of removable inserts includes an upper and a sole structure comprising a midsole. The midsole has a front peripheral portion, a rear peripheral portion, a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion and a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion. The second side peripheral portion is disposed on an opposing side of the midsole from the first side peripheral portion. The midsole includes a bottom portion, a top portion and a cavity. The cavity has a first cavity sidewall associated with the first side peripheral portion of the midsole and the cavity has a second cavity sidewall associated with the second side peripheral portion of the midsole. The cavity has a lower cavity surface associated with the bottom portion of the midsole. The insert system includes a removable insert from the set of removable inserts, and the removable insert is configured to fit within the cavity of the midsole. The removable insert includes a first insert sidewall and a second insert sidewall, and the removable insert includes an insert bottom portion. The first cavity sidewall is tapered and the second cavity sidewall is tapered. The first insert sidewall is tapered and the second insert sidewall is tapered. The first cavity sidewall is associated with the first insert sidewall when the removable insert is disposed in the cavity, the second cavity sidewall is associated with the second insert sidewall when the removable insert is disposed in the cavity and the lower cavity surface is associated with the insert bottom portion when the removable insert is disposed in the cavity.

[0005] In another aspect, an article of footwear configured to receive a removable insert includes an upper and a sole structure with a midsole. The midsole has a front peripheral portion, a rear peripheral portion, a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion and a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion. The second side peripheral portion is disposed on an opposing side of the midsole from the first side peripheral portion. The midsole includes a bottom portion, a top portion and a cavity. The cavity has a first cavity sidewall associated with the first side peripheral portion and the cavity has a second cavity sidewall associated with the second side peripheral portion. The cavity has a lower cavity surface associated with the bottom portion. The first cavity sidewall is tapered and the second cavity sidewall is tapered.

[0006] In another aspect, an article of footwear with a removable insert includes an upper and a sole structure with a midsole. The midsole has a front peripheral portion, a rear peripheral portion, a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion, where the first side peripheral portion has a first outer sidewall, and a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion. The second side peripheral portion is disposed on an opposing side of the midsole from the first side peripheral portion. The second side peripheral portion has a second outer sidewall. The midsole includes a bottom portion and a top portion. The midsole also includes a cavity configured to receive the removable insert. The midsole has a first configuration wherein the midsole has a first width measured between the first outer sidewall and the second outer sidewall. The midsole has a second configuration wherein the midsole has a second width measured between the first outer sidewall and the second outer sidewall. The second width is greater than the first width. The second configuration occurs when a force is applied to the top portion of the removable insert by a foot.

[0007] Other systems, methods, features and advantages of the embodiments will be, or will become, apparent 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 included 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.

[0009] FIG. 1 is a schematic isometric view of an embodiment of a footwear system including an article of footwear and a set of removable inserts;

[0010] FIG. 2 is a schematic exploded isometric view of an embodiment of an article of footwear configured to receive a removable insert;

[0011] FIG. 3 is a schematic isometric view of a removable insert, including two enlarged cross-sectional views, according to an embodiment;

[0012] FIG. 4 is a schematic bottom isometric view of a set of removable inserts;

[0013] FIG. 5 is a schematic isometric view of an embodiment of an article of footwear and a removable insert being inserted into the article of footwear;

[0014] FIG. 6 is a schematic isometric view of an embodiment of an article of footwear with a removable insert disposed in a cavity of a midsole of the article of footwear;

[0015] FIG. 7 is a schematic view of an embodiment of a configuration of an article of footwear as an athlete is standing in place; and

[0016] FIG. 8 is a schematic view of an embodiment of a configuration of an article of footwear as an athlete is applying a downward force to an insert within the article of footwear.

DETAILED DESCRIPTION

[0017] FIG. 1 is a schematic view of an embodiment of footwear system 101. In some embodiments, footwear system 101 may include at least one article of footwear 100, as well as a set of inserts 150. Although a single article is shown in the embodiments for purposes of clarity, footwear system 101 may include a corresponding first article of footwear and second article of footwear (not shown), configured for a left and right foot, respectively. Thus, it will be understood that the principles discussed herein may equally apply to another article of footwear corresponding to article of footwear 100. Likewise, the principles taught in association with set of inserts 150 may equally apply to additional inserts that could be included in set of inserts 150 in other embodiments.

[0018] Article of footwear 100, also referred to simply as article 100, may be configured as 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 as various other kinds of non-sports related footwear, including, but not limited to: slippers, sandals, high heeled footwear, and loafers.

[0019] Referring to FIG. 1, for purposes of reference, article 100 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, article 100 may include lateral side 16 and medial side 18 (see also FIG. 5). 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.

[0020] 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 article 100. Likewise, lateral side 16 and medial side 18 are intended to represent generally two sides of an article, rather than precisely demarcating article 100 into two halves. Moreover, throughout the embodiments, forefoot portion 10, midfoot portion 12, heel portion 14, lateral side 16 and medial side 18 may be used to refer to portions/sides of individual components of article 100, as well as portions/sides of any inserts from set of inserts.

[0021] 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 (e.g., article of footwear or insert). In some cases, the longitudinal direction may extend from a forefoot portion to a heel portion of the component. 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. In other words, the lateral direction may extend between a medial side and a lateral side of a component. Furthermore, the term “vertical” as used throughout this detailed description and in the claims refers to a direction generally perpendicular to a lateral and longitudinal direction. For example, in cases where an article is planted flat on a ground surface, the vertical direction may extend from the ground surface upward. 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 “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. This detailed description makes use of these directional adjectives in describing both a midsole and an insert.

[0022] The following embodiments can include any of the features and/or components described in the “Articles of Footwear Having a Similar Appearance and Different Sole Assemblies” application described above and incorporated by reference.

[0023] Article 100 may include an upper 102 as well as a sole structure 110. 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.

[0024] In some embodiments, upper 102 includes opening 120 that provides entry for the foot into an interior cavity of upper 102. In some embodiments, upper 102 may include a tongue 122 that provides cushioning and support across the instep of the foot. Some embodiments may include fastening provisions, including, but not limited to: laces, cables, straps, buttons, zippers as well as any other provisions known in the art for fastening articles. In some embodiments, a lace 125 may be applied at a fastening region of upper 102.

[0025] In some embodiments, upper 102 could be open on a lower portion. In such cases, upper 102 may be associated with a lower opening that is bounded by a lower peripheral portion 103. In other embodiments, upper 102 could be closed on a lower portion. In such cases, upper 102 could have a lower portion of material separated from the side portions of upper 102 by lower peripheral portion 103. In some embodiments, as depicted in FIGS. 6-8, upper 102 includes portions extending below lower peripheral portion 103 and may even be closed beneath a foot.

[0026] In some embodiments, sole structure 110 may be configured to provide traction for article 100. In addition to providing traction, sole structure 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 structure 110 may vary significantly in different embodiments to include a variety of conventional or non-conventional structures. In some cases, the

configuration of sole structure **110** can be configured according to one or more types of ground surfaces on which sole structure **110** may be used. Examples of ground surfaces include, but are not limited to: natural turf, synthetic turf, dirt, as well as other surfaces.

[0027] Sole structure **110** is secured to upper **102** and extends between the foot and the ground when article **100** is worn. In different embodiments, sole structure **110** may include different components. For example, sole structure **110** may include an outsole, a midsole, and/or an insole. In some cases, one or more of these components may be optional. In the embodiment of FIG. 1, sole structure **110** includes a midsole **112** and an outsole **114**.

[0028] FIG. 2 illustrates an exploded isometric view of an embodiment of article of footwear **100**, including upper **102**, midsole **112** and outsole **114**. Referring to FIG. 2, midsole **112** may be characterized as having various portions. In one embodiment, midsole **112** includes a top portion **202** and a bottom portion **204**, which is disposed opposite of top portion **202**. Additionally, midsole **112** may include a front peripheral portion **206** and a rear peripheral portion **208**. Midsole **112** may also include a first side peripheral portion **210**, which extends from front peripheral portion **206** to rear peripheral portion **208**. Also, midsole **112** may include a second side peripheral portion **212**, which extends from front peripheral portion **206** to rear peripheral portion **208**. It will be understood that first side peripheral portion **210** and second side peripheral portion **212** are intended to characterize opposing side portions of midsole **112**. In at least one embodiment, it may be seen that first side peripheral portion **210** is associated with lateral side **16** of article of footwear **100**, while second side peripheral portion **212** is associated with medial side **18** of article of footwear **100**.

[0029] As shown in FIG. 2, midsole **112** may include a cavity **230** that is configured to receive one or more inserts from set of inserts **150**. Generally, cavity **130** of midsole **112** may be disposed in top portion **202** of midsole **112**. In some embodiments, cavity **230** may extend through forefoot portion **10**, midfoot portion **12** and/or heel portion **14** of midsole **112**. In an exemplary embodiment, cavity **230** extends from forefoot portion **10** through midfoot portion **12** and to heel portion **14** of midsole **112**.

[0030] FIG. 2 includes an enlarged cross-sectional view of a portion of midsole **112** in forefoot portion **10**, as well as an enlarged cross-sectional view of a portion of midsole **112** in heel portion **14**. These enlarged cross-sectional views are intended to illustrate the details of cavity **230**. Referring to FIG. 2, especially the enlarged cross-sectional views of forefoot portion **10** and heel portion **14**, cavity **230** may include a first cavity sidewall **232** that is associated with first side peripheral portion **210** of midsole **112**. In addition, cavity **230** may include a second cavity sidewall **234** that is associated with second side peripheral portion **212** of midsole **112**. In addition, cavity **230** may include a lower cavity surface **236** that is associated with bottom portion **204** of midsole **112**. In some embodiments, lower cavity surface **236** could be approximately parallel with a ground contacting surface of sole structure **110**, such as, for example, an outer surface **115** of outsole **114** (see FIG. 6).

[0031] In different embodiments, the number of inserts comprising set of inserts **150** may vary. In some embodiments, set of inserts **150** may comprise a single insert that may be used with article of footwear **100**. In other embodiments, set of inserts **150** may comprise two inserts that may be

removably inserted into article of footwear **100**. In still other embodiments, set of inserts **150** could comprise three or more inserts that may be removably inserted into article of footwear **100**.

[0032] FIG. 3 is a schematic isometric view of first removable insert **152** including two enlarged cross-sectional views. FIG. 4 is a schematic isometric view of set of inserts **150**, in which the bottom sides of the inserts are visible. Referring now to FIGS. 1 and 4, set of inserts **150** may further comprise a first removable insert **152** and a second removable insert **154**. Each insert comprise of a top portion, a bottom portion and various peripheral sidewalls. For example, first removable insert **152** may comprise top portion **160** (FIG. 1) and bottom portion **162** (FIG. 4). In addition, as best seen in FIG. 3, first removable insert **152** may include first insert sidewall **164** and second insert sidewall **166**. Here, it may be understood that first insert sidewall **164** is disposed on an opposite side of second insert sidewall **166**. As clearly shown in FIG. 3, first insert sidewall **164** and second insert sidewall **166** connect an outer periphery **170** of top portion **160** to an outer periphery **172** of bottom portion **162**. In other words, first insert sidewall **164** and second insert sidewall **166** are associated with the outermost boundary of first removable insert **152**.

[0033] In the embodiment of FIGS. 1 and 4, first removable insert **152** and second removable insert **154** may be full length inserts. In particular, first removable insert **152** and second removable insert **154** may each extend through forefoot portion **10**, midfoot portion **12** and heel portion **14** of midsole **112** when inserted within midsole **112** (see FIG. 1). However, in other embodiments, one or more inserts of a set of inserts **150** could be partial length inserts, including insets that extend through any combination of forefoot portion **10**, midfoot portion **12** and/or heel portion **14** of midsole **112**.

[0034] As seen in FIG. 4, some embodiments can include inserts with different materials, material characteristics and/or components. For example, while first removable insert **152** and second removable insert **154** may both have cavity gripping portions (namely, first cavity gripping portion **302** and second cavity gripping portion **304**), they may differ in some other respects. First removable insert **152** may have a smooth base portion **306** that extends through heel portion **14**, midfoot portion **12** and into forefoot portion **10**. In contrast, smooth base portion **308** of second removable insert **154** may primarily extend through heel portion **14** and midfoot portion **12**. Instead, second removable insert **154** may include a surface pattern **312** that may enhance engagement between forefoot portion **10** and a portion of a cavity. Additionally, in at least some embodiments, first removable insert **152** may be configured with a cushioning device **310**. In some cases, cushioning device **310** could be an air-filled bladder embedded within forefoot portion **10** of first insert **152**.

[0035] It will be understood that each insert of set of inserts **150** could vary in any manner, including variations in materials and/or material characteristics. For example, embodiments can differ in rigidity, flexibility, cushioning, support, weight as well as in other ways. Embodiments can include inserts made of any materials including, but not limited to: plastics, foams, woven and/or non-woven fabrics, composite materials as well as other kinds of inserts. In some embodiments, first removable insert **152** and second removable insert **154** may each be made of a foam material. In at least some embodiments, each insert may comprise a different foam material with different rigidities and/or cushioning proper-

ties. Moreover, it will be understood that in some embodiments, the materials used for one or more inserts may be complementary to the materials used in constructing midsole 112. In particular, in some embodiments, at least some portions of either first removable insert 152 and/or second removable insert 154 may comprise substantially similar materials to those used for making midsole 112.

[0036] Varying the properties of each insert allows for a customizable experience. In particular, a user may select an insert that achieves desired functionality from two or more inserts in a set of inserts. Thus, different inserts can be used to achieve different degrees of support, cushioning, rigidity, energy return, weight reduction, as well as possibly other features.

[0037] Embodiments can include provisions to facilitate improved support for a foot using an insert. In some embodiments, an insert and corresponding cavity of the midsole may have geometries that enhance support for the foot. In an exemplary embodiment, an insert and corresponding midsole cavity can have tapered geometries that enhance support for the foot during some kinds of maneuvers, such as cutting, backpedaling, foot strikes or other maneuvers where forces are applied by the foot to the insert and midsole.

[0038] Referring now to FIG. 3, first removable insert 152 may have one or more tapered portions, including sidewalls, portions and/or surfaces. In some embodiments, first insert sidewall 164 may have a tapered geometry. Also, in some embodiments, second insert sidewall 166 may have a tapered geometry. In the embodiment of FIG. 1, both first insert sidewall 164 and second insert sidewall 166 have tapered geometries.

[0039] The term “tapered” as used herein refers to the angled or sloped configuration of each sidewall. In some embodiments, each sidewall may be tapered in an approximately linear manner. Specifically, each sidewall may be an approximately straight surface that forms non-right angles with respect to a top portion and/or a bottom portion of the insert. In other embodiments, each sidewall could be tapered in a non-linear manner. Specifically, each sidewall could be contoured in a convex and/or concave manner, or could be comprised of a combination of convex and/or concave contours.

[0040] As seen in the enlarged cross-sectional view of FIG. 1 taken at forefoot portion 10 of first removable insert 152, first insert sidewall 164 and second insert sidewall 166 may be angled with respect to top portion 160 and bottom portion 162 of midsole 112. In this exemplary configuration, first insert sidewall 164 forms a first angle 191 with bottom portion 162 and first insert sidewall 164 forms a second angle 192 with top portion 160. Likewise, second insert sidewall 166 forms a third angle 193 with bottom portion 162 and second insert sidewall 166 forms a fourth angle 194 with top portion 160.

[0041] In different embodiments, the value of first angle 191, second angle 192, third angle 193 and fourth angle 194 can vary. In some embodiments, first angle 191 and third angle 193 may both have values approximately in the range between 90 degrees and 150 degrees. In other words, in some embodiments, first angle 191 and third angle 193 may be obtuse angles. In some embodiments, second angle 192 and fourth angle 194 may both have values approximately in the range between 20 degrees and 90 degrees. In other words, in some embodiments, second angle 192 and fourth angle 194 may be acute angles. In some embodiments, the acute angles

of first removable insert 152 may be substantially less than 75 degrees, while the obtuse angles may be substantially greater than 105 degrees.

[0042] In some embodiments, first angle 191 and second angle 193 could be approximately similar, however, in other embodiments first angle 191 and second angle 193 could have different values. Likewise, in some embodiments, second angle 192 and fourth angle 194 could be approximately similar, however in other embodiments second angle 192 and fourth angle 194 could have different values. In at least some embodiments, for example, the degree of tapering, slope, or slanting, of first insert sidewall 164 could be different from the degree of tapering, slope, or slanting of second insert sidewall 166. In such embodiments, the differences in tapering, slope or slanting results in different values of first angle 191 and third angle 193, as well as different values of second angle 192 and fourth angle 194. Differences in tapering between first insert sidewall 164 and second insert sidewall 166 could provide variations in support when leaning towards one side (e.g., a lateral side) or towards another side (e.g., a medial side).

[0043] In some embodiments, the degree of tapering of one or more insert sidewalls could vary over the length of an insert. For example, as indicated in FIG. 1, first removable insert 152 may have a first cross-sectional area 140 at a forefoot portion 10 of first removable insert 152 and a second cross-sectional area 142 at a heel portion 14 of first removable insert 152. In some embodiments, first cross-sectional area 140 and second cross-sectional area 142 could be substantially similar. In other embodiments, first cross-sectional area 140 and second cross-sectional area 142 could be substantially different. In the embodiment of FIG. 1, first cross-sectional area 140 and second cross-sectional area 142 are substantially different. More specifically, first insert sidewall 164 and second insert sidewall 166 may have a steeper tapering. For purposes of reference, first insert sidewall 164 and bottom portion 162 form first angle 191 in forefoot portion 10, and first insert sidewall 164 and bottom portion 162 form seventh angle 197 in heel portion 14. Here, seventh angle 197 may be a smaller angle than first angle 191. Additionally, first insert sidewall 164 and top portion 160 form second angle 192 in forefoot portion 10, and first insert sidewall 164 and top portion 160 form eighth angle 198 in heel portion 14. Here, eighth angle 198 may be larger than third angle 193. In a similar manner, sixth angle 196 (formed between top portion 160 and second insert sidewall 166 in heel portion 14) may be greater than fourth angle 194. Also, fifth angle 195 (formed between bottom portion 162 and second insert sidewall 166 in heel portion 14) may be greater than angle third angle 193.

[0044] Although the illustrated embodiments show top portion 160 and bottom portion 162 as approximately flat, in other embodiments top portion 160 and/or bottom portion 162 could have any other geometry. For example, it is contemplated that in some other embodiments, top portion 160 and/or bottom portion 162 could be contoured, with both convex and/or concave portions.

[0045] In different embodiments, the cross-sectional geometry of first removable insert 152 could vary. In some embodiments, the cross-sectional geometry could comprise any approximate geometry, including, but not limited to: a rounded geometry, a rectilinear geometry as well as any other kind of geometry. In an exemplary embodiment, first removable insert 152 may have an approximately trapezoidal cross-

sectional geometry resulting from the approximately parallel arrangement of top portion 160 and bottom portion 162, and the acute/obtuse orientations of first insert sidewall 164 and second insert sidewall 166. As discussed in further detail below, this approximately trapezoidal cross-sectional geometry may result in a wedge-like configuration for first removable insert 152 that may act to expand midsole 112 in a widthwise direction as vertical forces are applied to first removable insert 152 by a foot.

[0046] For purposes of clarity, the geometry of first removable insert 152 is discussed in detail and shown in the figures. However, it should be appreciated that other inserts, including second removable insert 154, may have substantially similar geometries to first removable insert 152. Using a common geometry (and size) for each insert in set of inserts, may allow multiple inserts to be interchangeably received within cavity 230 of midsole 112.

[0047] Referring now to FIG. 2, the geometry of cavity 230 may vary in different embodiments. In some embodiments, the geometry of cavity 230 may be configured to accommodate removable inserts from set of inserts 150. In particular, in some embodiments, the geometry of cavity 230 may be configured to receive the tapered insert sidewalls of, for example, first removable insert 152.

[0048] In some embodiments, first cavity sidewall 232 may have a tapered geometry. Also, in some embodiments, second cavity sidewall 234 may have a tapered geometry. In the embodiment of FIG. 2, both first cavity sidewall 232 and second cavity sidewall 234 have tapered geometries.

[0049] The term “tapered” as used herein refers to the angled or sloped configuration of each sidewall. In some embodiments, each sidewall may be tapered in an approximately linear manner. Specifically, each sidewall may be an approximately straight surface that forms non-right angles with respect to a top portion and/or a bottom portion of the insert. In other embodiments, each sidewall could be tapered in a non-linear manner. Specifically, each sidewall could be contoured in a convex and/or concave manner, or could be comprised of a combination of convex and/or concave contours.

[0050] As seen in the enlarged cross-sectional views of FIG. 2, first cavity sidewall 232 and second cavity sidewall 234 may be angled with respect to lower cavity surface 236 of cavity 230. In this exemplary configuration, first cavity sidewall 232 forms an angle 290 with lower cavity surface 236. Likewise, second cavity sidewall 234 forms an angle 291 with lower cavity surface 236.

[0051] In different embodiments, the value of angle 290 and angle 291 can vary. In some embodiments, angle 290 and angle 291 may both have values approximately in the range between 90 degrees and 150 degrees. In other words, in some embodiments, angle 290 and angle 291 may be obtuse angles. In at least some embodiments, angle 290 and angle 291 may both be substantially greater than 105 degrees.

[0052] In some embodiments, angle 290 and angle 291 could be approximately similar, however, in other embodiments angle 290 and angle 291 could have different values. In at least some embodiments, for example, the degree of tapering, slope, or slanting, of first cavity sidewall 232 could be different from the degree of tapering, slope, or slanting of second cavity sidewall 234. In such embodiments, the differences in tapering, slope or slanting results in different values of angle 290 and angle 291. Differences in tapering between first cavity sidewall 232 and second cavity sidewall 234 could

provide variations in support when leaning towards one side (e.g., a lateral side) or towards another side (e.g., a medial side).

[0053] In embodiments where an insert has sidewalls that vary in geometry (for example, in slope or length) over the length of the insert, cavity 230 can include cavity sidewalls that vary in a corresponding manner. For example, as seen in FIG. 2, first cavity sidewall 232 forms an angle 294 with lower cavity surface 236 in heel portion 14 that is generally smaller than angle 290 that is formed between first cavity sidewall 232 and lower cavity surface 236 in forefoot portion 10. Similarly, second cavity sidewall 234 forms an angle 293 with lower cavity surface 236 in heel portion 14 that is general smaller than angle 291 that is formed between second cavity sidewall 234 and lower cavity surface 236 in forefoot portion 10. In other embodiments, these angles could vary in any other manner and may generally be selected to accommodate the angles formed by sidewalls of a corresponding insert.

[0054] In the embodiment depicted in FIG. 2, lower cavity surface 236 is seen to be generally flat. In particular, the approximate depth of lower cavity surface 236, indicated schematically as depth 239, may be approximately constant between first cavity sidewall 232 and second cavity sidewall 234 (in a lateral direction). However, in other embodiments, lower cavity surface 236 could be a contoured surface, including convex and/or concave portions. In such other embodiments, the approximate depth of lower cavity surface 236 could be variable. Of course, as seen by comparing depth 239 of cavity 230 in forefoot portion 10 with depth 237 of cavity 230 in heel portion 14, it will be understood that the depth of cavity 230 may vary in the longitudinal direction of midsole 112.

[0055] In different embodiments, the cross-sectional geometry of cavity 230 could vary. In some embodiments, the cross-sectional geometry could comprise any approximate geometry, including, but not limited to: a rounded geometry, a rectilinear geometry as well as any other kind of geometry. In an exemplary embodiment, cavity 230 may have an approximately trapezoidal cross-sectional geometry resulting from angled arrangement of first cavity sidewall 232 with lower cavity surface 236 and of second cavity sidewall 234 with lower cavity surface 236. Moreover, as with first removable insert 152, cavity 230 can have a cross-sectional geometry that varies over its length. In particular, cavity 230 may have a first cross-sectional geometry 240 in forefoot portion 10 and a second cross-sectional geometry 242 in heel portion 14.

[0056] In some embodiments, the configuration of cavity 230 provides first side peripheral portion 210 and second side peripheral portion 212 of midsole 112 with variable thicknesses. In particular, the thicknesses of each side peripheral portion may vary at different vertical positions (i.e., positions along a direction between top portion 202 and bottom portion 204 of midsole 112). In the embodiment depicted in FIG. 2, for example, second side peripheral portion 212 has a first lateral thickness 280 at top portion 202 of midsole 112. Further, second side peripheral portion 212 has a second lateral thickness 282 between top portion 202 and lower cavity surface 236. Also, second side peripheral portion 212 has a third lateral thickness 284 at lower cavity surface 236. Moreover, third lateral thickness 284 is greater than second lateral thickness 282. Also, second lateral thickness 282 is greater than first lateral thickness 280.

[0057] It will be understood that the thicknesses may vary in this manner due to the difference in geometries of the recess sidewalls and corresponding outer sidewalls of midsole 112. For example, while first recess sidewall 232 is tapered (or sloped with respect to a vertical direction), first outer sidewall 270 of midsole 112 is approximately vertical (i.e., forms approximately right angles with top portion 202 and bottom portion 204 of midsole 112). Similarly, while second recess sidewall 234 is tapered, second outer sidewall 272 of midsole 112 is approximately vertical.

[0058] FIG. 5 illustrates a schematic view of an embodiment where first removable insert 152 is being inserted into opening 120 of article of footwear 100. FIG. 6 illustrates a configuration of article of footwear 100 with first removable insert 152 disposed within cavity 230. Referring to FIG. 6, one or more portions of first removable insert 152 may be in contact with portions interior to article of footwear 100. In some embodiments, portions of upper 102 may extend into cavity 230 and may therefore contact first insert sidewall 164, second insert sidewall 166 and/or bottom portion 162 of first removable insert 152. In this exemplary embodiment, for example, a first lower peripheral portion 512 of upper 102 may contact first insert sidewall 164 and a second lower peripheral portion 514 of upper 102 may contact second insert sidewall 166. Additionally, in some embodiments, a lower portion 516 of upper 102 may be disposed between bottom portion 162 of first removable insert 152 and lower cavity surface 236 of cavity 230. In other embodiments, however, portions of upper 102 may not extend into cavity 230, and/or may only partially extend into cavity 230. Thus, in some other embodiments, first insert sidewall 164 could be in contact with first cavity sidewall 232. Also, in some embodiments, second insert sidewall 166 could be in contact with second cavity sidewall 234. Still further, in some embodiments, bottom portion 162 of first removable insert 152 could be in contact with lower cavity surface 236 of cavity 230.

[0059] In still other embodiments, rather than a portion of upper 102 extending beneath bottom portion 162 of first removable insert 152, a sockliner or strobe sock may be disposed between bottom portion 162 and lower cavity surface 236.

[0060] FIGS. 7 and 8 are schematic views illustrating the change in configuration of first removable insert 152 and article of footwear 100 between a static configuration (FIG. 7) and a dynamic configuration (FIG. 8), according to an embodiment. Referring first to FIG. 7, when a wearer 600 is at rest, standing, or walking with relatively low impact forces being applied to first removable insert 152, first removable insert 152 rests within cavity 230 of midsole 112 as described above and shown in FIG. 6. In this configuration, a foot 602 rests on top portion 160 of first removable insert 152. Moreover, in this case, top portion 160 of first removable insert is disposed a distance 702 above lower cavity surface 236. In this case, distance 702 approximately corresponds to the thickness of first removable insert 152 in the static configuration of FIG. 7.

[0061] Referring now to FIG. 8, as higher impact forces are applied by foot 602, the configuration of first removable insert 152 and article of footwear 100 may vary. Specifically, a generally downward force applied to first removable insert 152 by foot 602 results in the downward compression of first removable insert 152. Although first removable insert 152 is compressed vertically, in at least some embodiments, portions of first removable insert 152 may retain an approxi-

mately constant lateral width. As indicated in FIGS. 7 and 8, for example, top portion 160 of first removable insert 152 has a width 640 in the static configuration of FIG. 7 and in the dynamic configuration of FIG. 8. Because top portion 160 does not contract in the widthwise direction, as top portion 160 is pushed down by forces from foot 602, first insert sidewall 164 and second insert sidewall 166 apply an outward lateral force against first cavity sidewall 232 and second cavity sidewall 234, respectively. These laterally oriented forces, generated as first removable insert 152 “wedges” itself deeper into cavity 230 without substantial lateral compression, causes an outward bending of the peripheral sides of midsole 112. Specifically, as shown in FIG. 8, first side peripheral portion 210 and second side peripheral portion 212 are bent outwardly and away from the vertical direction, such that the lateral width of midsole 112 is momentarily increased in at least some portions.

[0062] As seen in FIG. 8, in this dynamic configuration, top portion 160 of first removable insert 152 is disposed a distance 704 from lower cavity surface 236. In this case, distance 704 is approximately equal to the thickness of first removable insert 152 in this configuration. It can be seen by comparing distance 702 in FIG. 7 with distance 704 in FIG. 8, that top portion 160 has receded further into cavity 230 as first removable insert 152 is compressed.

[0063] This outward bending of first side peripheral portion 210 and second side peripheral portion 212 may result in a temporary increase in the width of midsole 112, especially near top portion 202. For example, in the configuration shown in FIG. 7, top portion 202 of midsole 112 may have a width 680, as measured between first outer sidewall 270 and second outer sidewall 272. In the expanded configuration of FIG. 8, top portion 202 of midsole 112 may have width 682, which may be substantially greater than width 680.

[0064] As first side peripheral portion 210 and second side peripheral portion 212 are bent outwardly and away from their default vertical orientations, adjacent portions of upper 102 may likewise be pulled in a similar outward manner. As shown in FIG. 8, first lower peripheral portion 512, which may be permanently attached to first cavity sidewall 232, may be pulled outwardly (i.e., distally) as first side peripheral portion 210 bends outwardly. Likewise, second lower peripheral portion 514, which may be permanently attached to second cavity sidewall 234, may be pulled outwardly (i.e., distally) as second side peripheral portion 212 bends outwardly. This distal movement of first lower peripheral portion 514 and second lower peripheral portion 514 of upper 102 may result in a top portion 510 of upper 102 being pulled down closer to (and tighter against) foot 602. In at least some embodiments, top portion 510 acts to apply a momentary clamping force to foot 602 in order to increase support and stability for foot 602 during the maneuver depicted in FIG. 8.

[0065] It is contemplated that in some embodiments, the outward expansion of midsole 112 under loads applied to an insert could be varied according to the construction of the insert. For example, a more rigid top portion for the insert may limit any widthwise contraction of the insert and thus maximize outward expansion of the midsole. In contrast, using a less rigid top portion may allow for some widthwise expansion of the insert (at the top portion especially), thereby reducing the outward expansion of the midsole. Thus, it will be understood that the properties of an insert may be tuned to vary the effect described and shown in FIGS. 7 and 8.

[0066] 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.

What is claimed is:

1. An insert system with an article of footwear and a set of removable inserts, comprising:

an upper;

a sole structure comprising a midsole, the midsole having:

a front peripheral portion;

a rear peripheral portion;

a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion;

a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion, the second side peripheral portion being disposed on an opposing side of the midsole from the first side peripheral portion;

a bottom portion and a top portion;

a cavity;

wherein the cavity has a first cavity sidewall associated with the first side peripheral portion of the midsole and wherein the cavity has a second cavity sidewall associated with the second side peripheral portion of the midsole;

wherein the cavity has a lower cavity surface associated with the bottom portion of the midsole;

a removable insert from the set of removable inserts, the removable insert being configured to fit within the cavity of the midsole;

wherein the removable insert includes a first insert sidewall and a second insert sidewall, and wherein the removable insert includes an insert bottom portion;

wherein the first cavity sidewall is tapered and wherein the second cavity sidewall is tapered;

wherein the first insert sidewall is tapered and wherein the second insert sidewall is tapered; and

wherein the first cavity sidewall is associated with the first insert sidewall when the removable insert is disposed in the cavity, wherein the second cavity sidewall is associated with the second insert sidewall when the removable insert is disposed in the cavity and wherein the lower cavity surface is associated with the insert bottom portion when the removable insert is disposed in the cavity.

2. The insert system according to claim 1, wherein the lower cavity surface is approximately parallel with a ground contacting surface of the article of footwear.

3. The insert system according to claim 1, wherein a first angle formed between the first cavity sidewall and the lower cavity surface is in a range between 100 and 150 degrees.

4. The insert system according to claim 1, wherein a first angle formed between the first insert sidewall and the insert bottom portion is in a range between 100 and 150 degrees.

5. The insert system according to claim 1, wherein the cavity has an approximately trapezoidal cross-sectional geometry at a longitudinal position of the midsole.

6. The insert system according to claim 5, wherein the insert has an approximately trapezoidal cross-sectional geometry corresponding to the cross-sectional geometry of the cavity.

7. An article of footwear configured to receive a removable insert, comprising:

an upper;

a sole structure comprising a midsole, the midsole having:

a front peripheral portion;

a rear peripheral portion;

a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion;

a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion, the second side peripheral portion being disposed on an opposing side of the midsole from the first side peripheral portion;

a top portion and a bottom portion;

a cavity;

wherein the cavity has a first cavity sidewall associated with the first side peripheral portion and wherein the cavity has a second cavity sidewall associated with the second side peripheral portion;

wherein the cavity has a lower cavity surface associated with the bottom portion; and

wherein the first cavity sidewall is tapered and wherein the second cavity sidewall is tapered.

8. The article of footwear according to claim 7, wherein the first side peripheral portion has a variable thickness along a direction extending from the bottom portion of the midsole to the top portion of the midsole.

9. The article of footwear according to claim 7, wherein the cavity has a constant depth along a lateral direction between the first cavity sidewall and the second cavity sidewall.

10. The article of footwear according to claim 7, wherein the first cavity sidewall is approximately linear in shape and wherein the second cavity sidewall is approximately linear in shape.

11. The article of footwear according to claim 7, wherein a first lower peripheral portion of the upper is attached to the first cavity sidewall.

12. The article of footwear according to claim 11, wherein a second lower peripheral portion of the upper is attached to the second cavity sidewall.

13. The article of footwear according to claim 7, wherein first side peripheral portion and the second side peripheral portion can bend away from their default configurations.

14. An article of footwear with a removable insert, comprising:

an upper;

a sole structure comprising a midsole, the midsole having:

a front peripheral portion;

a rear peripheral portion;

a first side peripheral portion extending between the front peripheral portion and the rear peripheral portion, the first side peripheral portion having a first outer sidewall;

a second side peripheral portion extending between the front peripheral portion and the rear peripheral portion, the second side peripheral portion being disposed on an opposing side of the midsole from the first side peripheral portion, the second side peripheral portion having a second outer sidewall;

a bottom portion and a top portion;
a cavity configured to receive the removable insert;
the midsole having a first configuration wherein the midsole has a first width measured between the first outer sidewall and the second outer sidewall;
the midsole having a second configuration wherein the midsole has a second width measured between the first outer sidewall and the second outer sidewall, the second width being greater than the first width; and
wherein the second configuration occurs when a force is applied to the top portion of the removable insert by a foot.

15. The article of footwear and the removable insert according to claim **14**, wherein a portion of the upper is pulled down tighter against the foot in the second configuration than in the first configuration.

16. The article of footwear and the removable insert according to claim **14**, wherein the first side peripheral por-

tion and the second side peripheral portion bend outwardly between the first configuration and the second configuration.

17. The article of footwear and the removable insert according to claim **14**, wherein the article of footwear and the insert return to the first configuration after the downward force applied by the foot has dissipated.

18. The article of footwear and the removable insert according to claim **14**, wherein the first width and the second width are measured at the top portion of the midsole.

19. The article of footwear and the removable insert according to claim **14**, wherein the top portion of the removable insert is disposed a first distance from the lower cavity surface in the first configuration and wherein the top portion of the removable insert is disposed a second distance from the lower cavity insert in the second configuration.

20. The article of footwear and the removable insert according to claim **19**, wherein the first distance is greater than the second distance.

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