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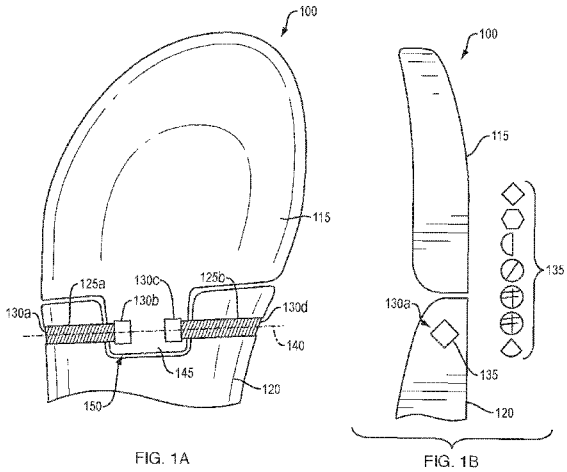

FIG. 1A FIG. 1B

(57) Abstract: Footwear having a pivotable bottom portion are generally described. For example, the footwear may include a sole having a first portion and a second portion pivotally coupled to one another. The first portion may include a tongue and the second portion may include a recess for receiving the tongue. A rod may be arranged to extend across a width of the sole and through the tongue for pivotally coupling the first portion to the second portion. In various aspects, the footwear may further include a stopper coupled to any of the tongue and the second portion proximate to the recess for limiting relative pivotal motion of the first and second portions.

PIVOTABLE FOOTWEAR DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 62/240,292, entitled "Pivotable Footwear Device" and filed on October 12, 2015, and U.S. Provisional Application No. 62/240,426, entitled "Pivotable Footwear Device" and filed on October 12, 2015, the contents of both of which are incorporated by reference in their entirety as if fully set forth herein.

FIELD OF INVENTION

[0002] The present invention is generally directed to footwear and, in particular, to footwear having a pivotable bottom portion.

INTRODUCTION

[0003] An objective of footwear design is to create products that are comfortable to wear and that have a visual aesthetic that will be attractive to consumers. For certain types of footwear, such as sandals, increased flexibility in the sole portion of the footwear is a desired characteristic as this may increase the comfort-level of the wearer. However, conventional footwear with increased flexibility often does not provide adequate support for the foot, for instance, because the additional flexibility is achieved through the use of thin or weak materials. Accordingly, consumers would benefit from footwear that would achieve increased flexibility while simultaneously providing adequate support to a foot of a wearer.

SUMMARY

[0004] Devices and methods in accordance with the applicant's present teachings provide for footwear having a pivotable bottom portion. In accordance with one aspect, certain embodiments of the applicant's teachings relate to footwear that includes a sole having a first portion and a second portion pivotally coupled to one another, the first portion

comprising a tongue and the second portion comprising a recess for receiving the tongue, and a rod extending across a width of the sole and through the tongue for pivotally coupling the first portion to the second portion. In various aspects, the footwear may further include a stopper coupled to any of the tongue and the second portion proximate to the recess for limiting relative pivotal motion of the first and second portions. In accordance with the applicant's teachings, the rod may include one or more projections configured to prevent, reduce, and/or eliminate movement of the rod within the footwear. In some embodiments, the rod may include at least one projection configured to prevent at least one of lateral movement and rotational movement. In some embodiments, the front portion and/or the back portion may include cavities for receiving the projections to prevent movement of the rod within the footwear.

[0005] In various aspects, the first portion may be a front portion and the second portion may be a back portion of the sole. In some embodiments, the first portion may be a back portion and the second portion may be a front portion of the sole. In accordance with one aspect, the tongue may include a channel for receiving the rod. In various aspects, the second portion may include a channel aligned with the channel formed in the tongue for receiving the rod such that the rod extends across a width of the sole through the tongue portion. In some embodiments, at least one recess may be arranged around an opening providing access to the channel of the second portion. In various aspects, the at least one recess is configured to receive a head portion of the rod. In some embodiments, the head portion may be configured to engage a sidewall of the at least one recess in an interference fit, thereby inhibiting movement of the rod. In some embodiments, the rod and/or the stopper, or a portion thereof, may be formed of metal. In some embodiments, at least one spike projection may be arranged on a head of the rod. In various aspects, the at least one

spike projection may be configured to penetrate into the second portion to prevent movement of the rod when the rod is installed in the footwear.

[0006] In some embodiments, the footwear in accordance with the applicant's teachings may further include a first retaining element opening arranged within the first portion, and a first retaining element disposed within the first retaining element opening, the retaining element being configured to retain a foot of a wearer of the footwear. In some embodiments, the retaining element may be or may include a strap. In some embodiments, the footwear in accordance with the applicant's teachings may further include a second retaining element opening arranged within the second portion, and a second retaining element disposed within the second retaining element opening, the retaining element being configured to retain a foot of a wearer of the footwear.

[0007] In accordance with the applicant's teachings, footwear having a pivotable bottom portion may include a first bottom portion and a second bottom portion coupled by two independent rods. In various aspects, the first bottom portion and the second bottom portion may be configured to pivot about an axis formed by the two independent rods.

[0008] In various aspects, footwear having a pivotable bottom portion in accordance with the applicant's teachings may include a first portion having a tongue and a stopper portion, a second portion having a recess configured to receive the tongue, and at least one rod configured to be arranged within the tongue and the second portion to pivotably connect the first portion to the second portion. In various aspects, the first portion and the second portion may be configured to pivot about an axis formed by the rod. In various aspects, the stopper may be configured to engage the second portion to prevent rotation of the first portion.

[0009] In various aspects, a method of manufacturing footwear may include providing a sole having a first portion and a second portion pivotally coupled to one another

in which the first portion includes a tongue and the second portion includes a recess for receiving the tongue, and extending a rod across a width of the sole and through the tongue for pivotally coupling the first portion to the second portion. In some embodiments, the method of manufacturing footwear may include forming a stopper coupled to any of the tongue and the second portion proximate to the recess for limiting relative pivotal motion of the first and second portions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIGS. 1A and 1B schematically depict footwear having a pivotable bottom portion in accordance with an embodiment of the present teachings.

[0011] FIGS. 2A-2E schematically depict multiple views of footwear having a pivotable bottom portion in accordance with an embodiment of the present teachings.

[0012] FIGS. 3A-3E schematically depict multiple views of a rod for connecting portions of footwear in accordance with a first embodiment of the present teachings.

[0013] FIG. 3F schematically depicts multiple views of a rod for connecting portions of footwear in accordance with a second embodiment of the present teachings.

[0014] FIG. 3G schematically depicts a rod for connecting portions of footwear arranged within a channel formed in the footwear in accordance with a second embodiment of the present teachings.

[0015] FIG. 4A-4F schematically depicts multiple views of a portion of footwear in accordance with an embodiment of the present teachings.

[0016] FIGS. 5A-5E depict images of multiple views of footwear having a pivotable bottom portion in accordance with an embodiment of the present teachings.

[0017] FIGS. 6A-6F schematically depict multiple views of a front portion of footwear in accordance with an embodiment of the present teachings.

[0018] FIGS. 6G-6M schematically depict multiple views of a back portion of footwear in accordance with an embodiment of the present teachings.

[0019] FIGS. 7A-7I schematically depict multiple views of footwear in accordance with an embodiment of the present teachings.

[0020] FIGS. 8A and 8B schematically depict a rod for connecting portions of footwear, where the rod can be disposed within a channel formed in the footwear and fixated to the footwear via a plurality of spike-like protrusions in accordance with a third embodiment of the present teachings.

[0021] FIGS. 9A and 9B schematically depict multiple views of a portion of footwear in accordance with an embodiment of the present teachings.

DETAILED DESCRIPTION

[0022] The present invention is generally directed to footwear having a pivotable bottom portion, such as the sole, outsole, platform, or other bottom portion of a shoe configured to contact the ground during a walking motion of a wearer. In some embodiments, the pivotable bottom portion may be configured to pivot about an axis. In some embodiments, the axis may be perpendicular or substantially perpendicular to a longitudinal axis of the footwear. Non-limiting examples of footwear include shoes, sandals, tennis shoes, sneakers, high heel shoes, pumps, slingbacks, flats, clogs, or any other type of footwear capable of being configured according to some embodiments.

[0023] FIGS. 1A and 1B schematically depict footwear having a pivotable bottom portion (or sole) in accordance with an embodiment of the present teachings. FIG. 1A depicts a bottom view of a bottom portion of an item of footwear and FIG. 1B depicts a side view of a bottom portion of the item of footwear. As shown in FIG. 1A, the bottom portion **100** may include a front portion **115** and a back portion **120**. In some embodiments, the front portion **115** may generally include a portion of the bottom portion **100** where the toes and ball

of the foot of a wearer of the footwear would be located inside or on the footwear. In some embodiments, the back portion **120** may generally include the portion of the bottom portion where the arch, or at least a portion thereof, instep, and heel of the foot of a wearer, of the footwear would be located inside or on the footwear.

[0024] The front portion **115** and the back portion **120** may be connected via two rods **125a-b**. The front portion **115** may include a tongue **145** configured to fit within a recess **150** of the back portion **120** to facilitate the relative articulation of the front and the back portions, as discussed in more detail below. Specifically, each rod **125a-b** extends from one side of the back portion **120** into the tongue **145** and may be connected on one side to the front portion **115** and on another side to the back portion **120**. In this embodiment, neither rod **125a** nor rod **125b** extends across the full width of the footwear, or even across the full width of the tongue **145**. In other words, each rod **125a-b** extends partially across a width of the footwear to couple the front portion **115** to the back portion **120**.

[0025] In some embodiments, the front portion **115** and the back portion **120** may be connected via one rod (not shown, see FIGS. 2A-2D). For example, a single rod may extend along the axis **140** from a first side of the front portion **115**, through the tongue **145**, and through a second side of the front portion opposite the first side.

[0026] Fasteners **130a-d** may be used to connect the rods **125a-b** to the front portion **115** and the back portion **120**. The fasteners **130a-d** may include any type of fastener capable of operating according to some embodiments, including rivets, screws, pins, or the like. In some embodiments, the fasteners **130a-d** may be configured to fasten the rods **125a-b** to or within the front portion **115** and the back portion **120** such that the rods **125a-b** may facilitate the pivoting of the front portion **115** and the back portion **120** relative to one another. In some embodiments, the rods **125a-b** may be embedded within the front portion **115** and the back portion **120** such that they do not contact the foot of a wearer and/or the

ground during a walking motion by a wearer. The rods **125a-b** may be configured as part of a hinge that allows the bottom portion **100** to pivot about an axis **140** perpendicular or substantially perpendicular to the longitudinal axis of the bottom portion **100**, for example, in a plane into and out of the page for FIG. 1A. As shown in FIG. 1B, externally visible portions of the fasteners may be covered by various aesthetic elements **135**.

[0027] FIGS. 2A-2E schematically depict multiple views of footwear having a pivotable bottom portion (or sole) in accordance with an embodiment of the present teachings. FIG. 2A depicts a side view of a bottom portion of footwear **200** having a back portion **215** and a front portion **220**. The bottom **B** of the footwear **200** is generally a side configured to engage the ground when being worn by a wearer. The top **T** of the footwear **200** is generally a side configured to engage the bottom of a foot of a wearer. In some embodiments, the front portion **220** may generally include a portion of the footwear **200** where the toes and ball of the foot of a wearer of the footwear would be located inside or on the footwear. In some embodiments, the back portion **215** may generally include a portion of footwear **200** where the arch, or at least a portion thereof, instep, and heel of the foot of a wearer of the footwear would be located inside or on the footwear. Although not depicted in FIG. 2A, one or more retaining elements may be arranged on and/or connected to the front portion **220** and/or a back portion **215** to retain a foot within and/or on the footwear **200**, such as straps, laces, or the like. In some embodiments, the front portion **220** and/or a back portion **215** may include openings **270** (for example, "retainer openings") configured to receive such retaining elements (see, for example, FIG. 5A). For example, a first strap may extend through an opening **270** of the front portion **220** and a second strap may extend through an opening of the back portion **215**.

[0028] The front portion **220** may include a tongue **245** configured to fit within a recess **250** of the back portion **215** to facilitate the relative articulation of the front and the

back portions. The front portion **220** and the back portion **215** may be connected via a rod (not shown, see FIGS. 2B-2E and 3A-3E) fastened to at least a portion of the footwear **200** using a fastener **230**. In some embodiments, the rod may be arranged within the back portion **215** at the position of the fastener **230**, extending through the tongue **245** and at least a portion of the opposite side of the back portion.

[0029] Although FIGS. 2A-2E depict the tongue **245** being arranged on the front portion **220** to engage a recess **250** of the back portion **215**, embodiments are not so limited, as the tongue may be arranged on the back portion and the recess may be arranged in the front portion.

[0030] FIGS. 2B and 2C depict a bottom view and a side view, respectively, of the front portion **220**. As shown in FIG. 2B, the tongue **245** may include one or more stopper portions **260** configured to engage a portion of the back portion **215** to prevent, reduce, or otherwise limit rotation, pivoting, or other movement of the back portion and/or the front portion **220**. In reference to FIG. 2D, the stopper portion **260** may be configured to engage an area of the back portion **215** adjacent to the recess **250**, such as an area bounded by the dotted lines **285**. In reference to FIG. 2A, the stopper portion **260** may be configured to engage a portion of the back portion **215** to limit rotation of the front portion **220** in the direction indicated by arrow **295** ("downward"). In some embodiments, the stopper portion **260** may be configured to engage a portion of the back portion **215** to limit rotation of the front portion **220** in the direction indicated by arrow **290** ("upward"). In some embodiments, the stopper portion **260** may be configured to engage a portion of the back portion **215** to limit rotation of the front portion **220** in the direction indicated by arrow **290** and arrow **295** (for instance, a portion of the stopper may be arranged within a cavity disposed within the back portion). In some embodiments, the footwear **200** may include a plurality of stopper portions **260** configured to engage various portions of the footwear and/or to limit rotation of

portions of the footwear (for instance, the back portion **215** and/or the front portion **220**) as described herein. In this manner, the rotation or other movement of the portions of the footwear **200** may be controlled to prevent, for instance, over-rotation of the front portion **220** and/or the back portion **215** which may lead, for example, to discomfort for a wearer of the footwear.

[0031] Although FIGS. 2B and 2C depict the stopper portion **260** as being arranged on the tongue **245**, embodiments are not so limited. For instance, a stopper portion **260** may be arranged or may also be arranged on an area adjacent to the recess **250**, for example, area **285** depicted in FIG. 2D, such that the stopper portion may project out into the recess to engage the tongue **245**. In addition, the stopper portion **260** may be arranged in various areas on the tongue **245** and/or recess **250**, such as on one or more sides of the tongue and/or recess.

[0032] As shown in FIG. 2C, an opening **280** may be disposed within at least a portion of the tongue **245**. The opening **280** may be configured to receive at least a portion of the rod. In some embodiments, the rod may be arranged within the tongue **245** in the area or substantially in the area indicated by dotted lines **270** corresponding, for example, with the position of the opening **280** through the tongue. The opening **280**, may provide access to a channel extending through the tongue that is configured to receive and support the rod within the footwear **200**.

[0033] FIGS. 2D and 2E depict a bottom view and a side view, respectively, of the back portion **215**. As shown in FIG. 2E, the back portion **215** may include openings **280** arranged on both sides of the recess **250**. The openings **280** may be configured to receive at least a portion of the rod. In some embodiments, the rod may be arranged within the back portion **215** in the area or substantially in the area indicated by dotted lines **275** corresponding, for example, with the position of the openings **280** through the back portion.

Accordingly, the rod may be arranged within a first side of the back portion **215** on a first side of the recess **250**, through the tongue **245** of the front portion **220**, and through a second side of the back portion located opposite the first side. In this manner, the rod may be pivotally or rotatably connected to the back portion **215** and the front portion **220**. When the rod is arranged within the openings **280**, the back portion **215** and the front portion **220** may pivot around an axis formed by the rod, for instance, around an axis in the overlapping area of lines **270** and lines **275**.

[0034] FIGS. 3A-3E schematically depict multiple views of a rod for connecting portions of footwear in accordance with an embodiment of the present teachings. As shown in FIG. 3A, a rod **300** may include a rod body **305** having a first end **310** and a second end **315**. The rod **300** may include an opening **325** configured to receive a fastener **330**. In some embodiments, the rod **300** may include an opening **325** at both the first end **310** and the second end **315**. In some embodiments, the rod **300** may include an opening at only one end, such as, for example, the second end **315**.

[0035] The rod **300** may be arranged within the openings **280** of the back portion **215** and the tongue **245**. In some embodiments, the rod **300** may include a head **320** fixedly arranged at an end thereof, such as the first end **310**. The head **320** may include a flange having a dimension (for example, a diameter) that is configured to be larger than a cross-sectional dimension (for example, a diameter) of the opening **280** such that the head cannot enter the opening. In this manner, the rod **300** may be prevented from moving into the opening **280** in a direction opposite the head once the head has engaged a surface of the front portion. When the rod **300** is arranged within the openings **280**, the opening **325** may be located adjacent to an opening **280** located opposite the head **320** (for instance, on an opposite side of the front portion **215**). A fastener **330** may be coupled to the rod **300**, such as through a stem **335** configured to fixedly engage the opening **325**. The fastener **330** may

include a flange having a dimension (for example, a diameter) that is configured to be larger than a cross-sectional dimension (for example, a diameter) of the opening **280** such that the fastener cannot enter the opening. In this manner, the rod **300** may be fixedly arranged within the openings **280** of the back portion **215** and the tongue **245**, allowing the front portion **220** and the back portion to pivot about the rod.

[0036] Portions of the rod **300** and/or the fastener **330** may have various dimensions. For example, the rod **300** may have a height **A** of about 88.8 millimeters (mm) and a width **B** of about 8.5 mm. The fastener **330** (and/or head **320**) may have a width (for instance, a diameter) of about 18.0 mm and an upper portion thereof may have a height **D** of about 2.0 mm.

[0037] As shown in FIG. 3F, the rod **300** may include one or more projections **350** in accordance with an embodiment of the present teachings. The projection **350** may be configured to prevent, reduce, or completely eliminate movement of the rod **300** when installed in the footwear (i.e., to "lock in" the rod within the footwear). For example, the projection **350** may prevent lateral movement, rotational movement, axial movement, or any other type of movement of the rod **300** within the footwear while still allowing the front and/or back portions of the footwear to pivot about the rod in accordance with embodiments of the present teachings. In some embodiments, the front and/or back portions of the footwear may include cavities configured to receive a projection **350**.

[0038] Although the projection **350** is depicted as being arranged on the first end **310** of the rod **300**, embodiments are not so limited as a projection may be located at any location along the rod. In some embodiments, the rod **300** may include a plurality of projections **350**. In some embodiments, the plurality of projections **350** may be spaced along a length of the rod. In some embodiments, the plurality of projections **350** may be arranged at the first end **310** and the second end **315**. The projections **350** may have various shapes

and sizes in accordance with embodiments of the present teachings. For instance, the projections **350** may be square, rectangular, cylindrical, conical, cuboid-shaped, tetrahedron-shaped, or the like.

[0039] As shown in FIG. 3G, the rod **300** may be arranged within a channel **360** arranged within one or more portions of the footwear (such as a channel accessible through openings **280** and extending through a portion of the back portion **215** and the front portion **220** as depicted in FIGS. 2A-2E). The channel **360** may include a recess configured to receive a projection **350** of the rod **300**. The engagement of the projection **350** within the recess **360** may operate to prevent, reduce, or completely eliminate movement of the rod **300** when installed in the footwear (i.e., to "lock in" the rod within the footwear) as described according to some embodiments herein.

[0040] FIGS. 4A-4F schematically depict multiple views of a front portion **420** of footwear having a tongue **445** with openings **480** in accordance with an embodiment of the present teachings. In particular, various views are depicted of the front portion **420** according to an outside view in FIG. 4A, a bottom view in FIG. 4B, an inside view in FIG. 4C, a view through section A-A1 in FIG. 4D, a top view in FIG. 4E, and a view through section B-B1 in FIG. 4F. FIGS. 4G-4M schematically depict multiple views of a back portion **415** of footwear having a recess **450** with openings **480** in accordance with an embodiment of the present teachings. In particular, various views are depicted of the back portion **415** according to an outside view in FIG. 4G, a bottom view in FIG. 4H, an inside view in FIG. 4I, a view through section C-C1 in FIG. 4J, a top view in FIG. 4K, a view through section D-D1 in FIG. 4L, and a view through section E-E1 in FIG. 4M.

[0041] FIGS. 5A-5E depict images of multiple views of footwear **500** having a pivotable bottom portion in accordance with an embodiment of the present teachings. In

particular, FIGS. 5A and 5B depict side views of the footwear **500** and FIGS. 5C-5E depict bottom views of the footwear **500**.

[0042] FIGS. 6A-6F schematically depict multiple views of a front portion **620** of footwear in accordance with an embodiment of the present teachings. In particular, various views are depicted of the front portion **620** according to a medial view in FIG. 6A, a bottom view in FIG. 6B, a lateral view in FIG. 6C, a view through section A-A' in FIG. 6D, a top view in FIG. 6E, and a view through section B-B' in FIG. 6E. FIGS. 6G-6M schematically depict multiple views of a back portion **615** of footwear in accordance with an embodiment of the present teachings. In particular, various views are depicted of the front portion **615** according to a medial view in FIG. 6G, a bottom view in FIG. 6H, a lateral view in FIG. 6I, a view through section E-E' in FIG. 6J, a top view in FIG. 6K, a view through section C-C' in FIG. 6L, and a view through section D-D' in FIG. 6M.

[0043] FIGS. 7A-7I schematically depict multiple views of footwear in accordance with an embodiment of the present teachings. The footwear includes a front portion **720** of footwear having a retaining element opening **770** and a tongue **745** that includes a stopper **760** portion, and a back portion **715** having a retaining element opening **770** and a recess **750**. In addition, as shown in FIGS. 7A, 7C, and 7D, a rod **775** is arranged within a portion of the front portion **720** and the back portion **715** in accordance with an embodiment of the present teachings. In particular, various views are depicted of the footwear according to a medial view in FIG. 7A, a bottom view in FIG. 7B, a lateral view in FIG. 7C, a view through section A-A' in FIG. 7D, a top view in FIG. 7E, a view through section B-B' in FIG. 7F, a view through section C-C' in FIG. 7G, a view through section D-D' in FIG. 7H, and a view through section E-E' in FIG. 7I.

[0044] FIGS. 8A and 8B schematically depict a rod for connecting portions of footwear arranged within a channel formed in the footwear in accordance with a third

embodiment of the present teachings. As shown in FIG. 8A, in some embodiments, a rod **805** may include a head **810** from which a plurality of protrusions **825a**, **825b** extend. In some embodiments, the protrusions **825a**, **825b** may be in the form of spikes, for example, extending from a base attached to a shoulder portion of the head **810** to a tip. As shown in FIG. 8B, the spikes **825a**, **825b** may be configured to penetrate into the body of the sole of the footwear (e.g., the back portion **815** of the footwear) when the rod **805** is installed in the channel **875** so as to pivotally couple the front and the back portions of the footwear, thereby inhibiting the rod from moving as a person wearing the footwear moves (e.g., walks or runs). For example, the spikes **825a**, **825b** can inhibit an axial movement of the rod, thereby preventing its dislodgement from the channel X as the wearer moves. Further, the spikes **825a**, **825b** can inhibit rotational movement of the rod within the channel (or other types of movement) while still allowing the front and the back portions of the sole to pivot relative to one another. In some embodiments, the spikes **825a**, **825b** may be used in combinations with other projections, such as projections **350** depicted in FIG. 3F.

[0045] FIGS. 9A and 9B schematically depict multiple views of a portion of footwear in accordance with an embodiment of the present teachings. As shown in FIG. 9A, in some embodiments, a portion of the sole of the footwear (i.e., the back portion **915**) may include a channel **975** for receiving a rod (e.g., rod **805** of FIG. 8A). In an area adjacent to the openings providing access to the channel **975**, the back portion **915** may include a recess **980** on each side (only one recess is shown in FIGS. 9A and 9B). In some embodiments, each recess **980** may be configured for housing a head portion of the rod therein when the rod is installed within the channel. In some embodiments, the recess **980** may have a diameter of about 3 millimeters to about 4 millimeters. For example, with reference to FIG. 9B, an interference fit (i.e., a friction fit) between the head portion **910** of the rod and the side wall **905** of the recess **980** can inhibit, reduce, and/or eliminate the movement of the rod, including

axial movement, lateral movement, rotational movement, or other movement, as a person wearing the footwear moves. In some embodiments, the recess **980** may be configured to cover or hide any rotation or other movement of the rod that may occur, for example, during movement by the wearer of the footwear.

[0046] The section headings used herein are for organizational purposes only and are not to be construed as limiting. While the applicant's teachings are described in conjunction with various embodiments, it is not intended that the applicant's teachings be limited to such embodiments. On the contrary, the applicant's teachings encompass various alternatives, modifications, and equivalents, as will be appreciated by those of skill in the art.

CLAIMS

What is claimed is:

1. Footwear, comprising:

a sole having a first portion and a second portion pivotally coupled to one another, the first portion comprising a tongue and the second portion comprising a recess for receiving the tongue;

a rod extending across a width of the sole and through the tongue for pivotally coupling the first portion to the second portion; and

a stopper coupled to any of the tongue and the second portion proximate to the recess for limiting relative pivotal motion of the first and second portions.

2. The footwear of claim 1, wherein the first portion is a front portion and the second portion is a back portion of the sole.

3. The footwear of claim 1, wherein the first portion is back portion and the second portion is a front portion of the sole.

4. The footwear of claim 1, wherein the tongue comprises a channel for receiving the rod.

5. The footwear of claim 4, wherein the second portion comprises a channel aligned with the channel formed in the tongue for receiving the rod such that the rod extends across a width of the sole through the tongue portion.

6. The footwear of claim 5, further comprising at least one recess arranged around an opening providing access to the channel of the second portion, the at least one recess being configured to receive a head portion of the rod.

7. The footwear of claim 6, wherein the head portion is configured to engage a sidewall of the at least one recess in an interference fit, thereby inhibiting movement of the rod.

8. The footwear of claim 1, wherein the rod comprises an opening at each end thereof for receiving a fastener.

9. The footwear of claim 8, wherein the fastener facilitates securing the rod within the channel of the second portion.

10. The footwear of claim 1, further comprising:

a first retaining element opening arranged within the first portion; and

a first retaining element disposed within the first retaining element opening, the retaining element being configured to retain a foot of a wearer of the footwear.

11. The footwear of claim 1, further comprising at least one spike projection arranged on a head of the rod.

12. The footwear of claim 11, wherein the at least one spike projection is configured to penetrate into the second portion to prevent movement of the rod when the rod is installed in the footwear.

13. Footwear having a pivotable bottom portion, comprising:

a first portion having a tongue and a stopper portion;

a second portion having a recess configured to receive the tongue; and

at least one rod configured to be arranged within the tongue and the second portion to pivotably connect the first portion to the second portion,

wherein the first portion and the second portion are configured to pivot about an axis formed by the rod,

wherein the stopper is configured to engage the second portion to prevent rotation of the first portion.

14. The footwear of claim 13, wherein the first portion is a front portion and the second portion is a back portion of the sole.

15. The footwear of claim 13, wherein the first portion is back portion and the second portion is a front portion of the sole.

16. The footwear of claim 13, wherein the tongue comprises a channel for receiving the rod.

17. The footwear of claim 16, wherein the second portion comprises a channel aligned with the channel formed in the tongue for receiving the rod such that the rod extends across a width of the sole through the tongue portion.

18. The footwear of claim 17, further comprising at least one recess arranged around an opening providing access to the channel of the second portion, the at least one recess being configured to receive a head portion of the rod.

19. The footwear of claim 18, wherein the head portion is configured to engage a sidewall of the at least one recess in an interference fit, thereby inhibiting movement of the rod.

20. The footwear of claim 13, wherein the rod comprises an opening at each end thereof for receiving a fastener.

21. The footwear of claim 20, wherein the fastener facilitates securing the rod within the channel of the second portion..

22. The footwear of claim 13, further comprising:

a first retaining element opening arranged within the first portion; and

a first retaining element disposed within the first retaining element opening, the retaining element being configured to retain a foot of a wearer of the footwear.

23. The footwear of claim 1, further comprising at least one spike projection arranged on a head of the at least one rod.

24. The footwear of claim 23, wherein the at least one spike projection is configured to penetrate into the second portion to prevent movement of the at least one rod when the at least one rod is installed in the footwear.

25. A method of manufacturing footwear, comprising:

providing a sole having a first portion and a second portion pivotally coupled to one another, the first portion comprising a tongue and the second portion comprising a recess for receiving the tongue; and

extending a rod across a width of the sole and through the tongue for pivotally coupling the first portion to the second portion,

26. The method of claim 25, further comprising forming a stopper coupled to any of the tongue and the second portion proximate to the recess for limiting relative pivotal motion of the first and second portions.

27. The method of claim 25, wherein the first portion is a front portion and the second portion is a back portion of the sole.

28. The method of claim 25, wherein the first portion is back portion and the second portion is a front portion of the sole.

29. The method of claim 25, further comprising forming a first channel within the tongue comprises for receiving the rod.

30. The method of claim 29, further comprising:

forming a second channel within the second portion that is aligned with the channel formed in the tongue for receiving the rod; and

inserting the rod through the first channel and the second channel such that the rod extends across a width of the sole through the tongue portion.

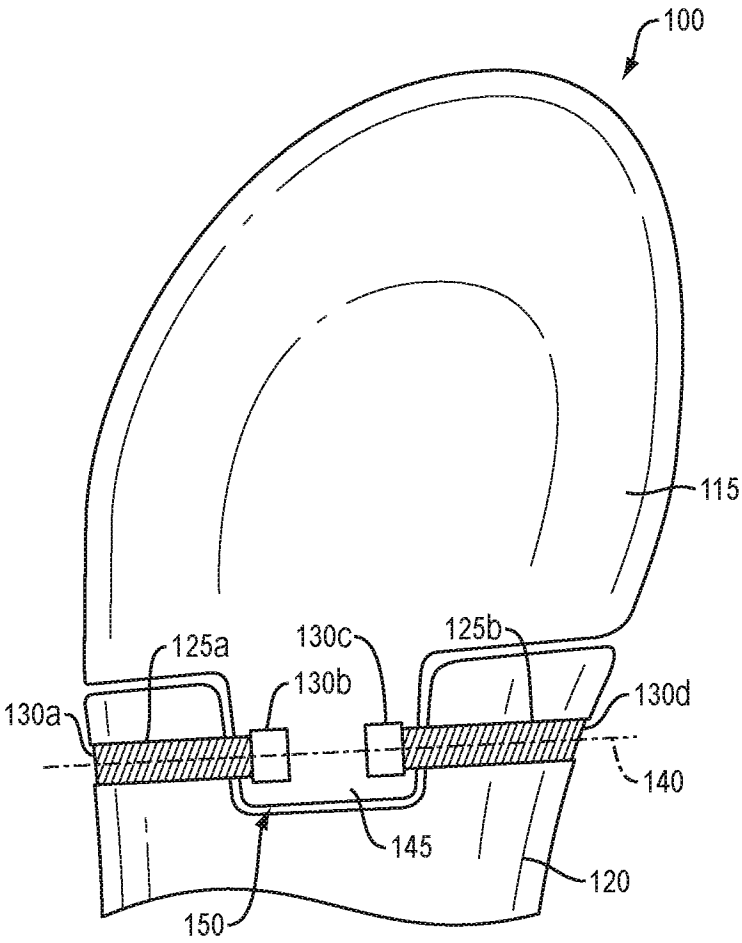
100
115
125a
130c
125b
130a
130b
130d
140
145
120
150

FIG. 1A

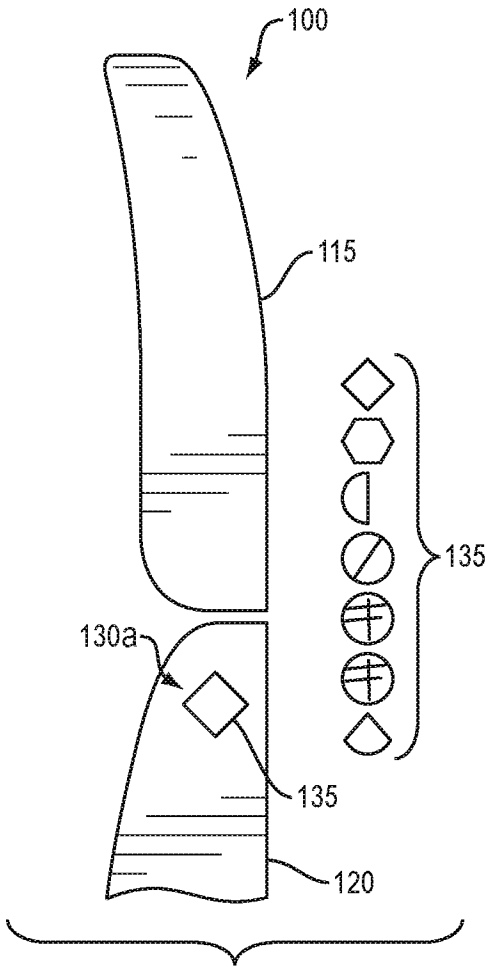
100
115
135
130a
135
120

FIG. 1B

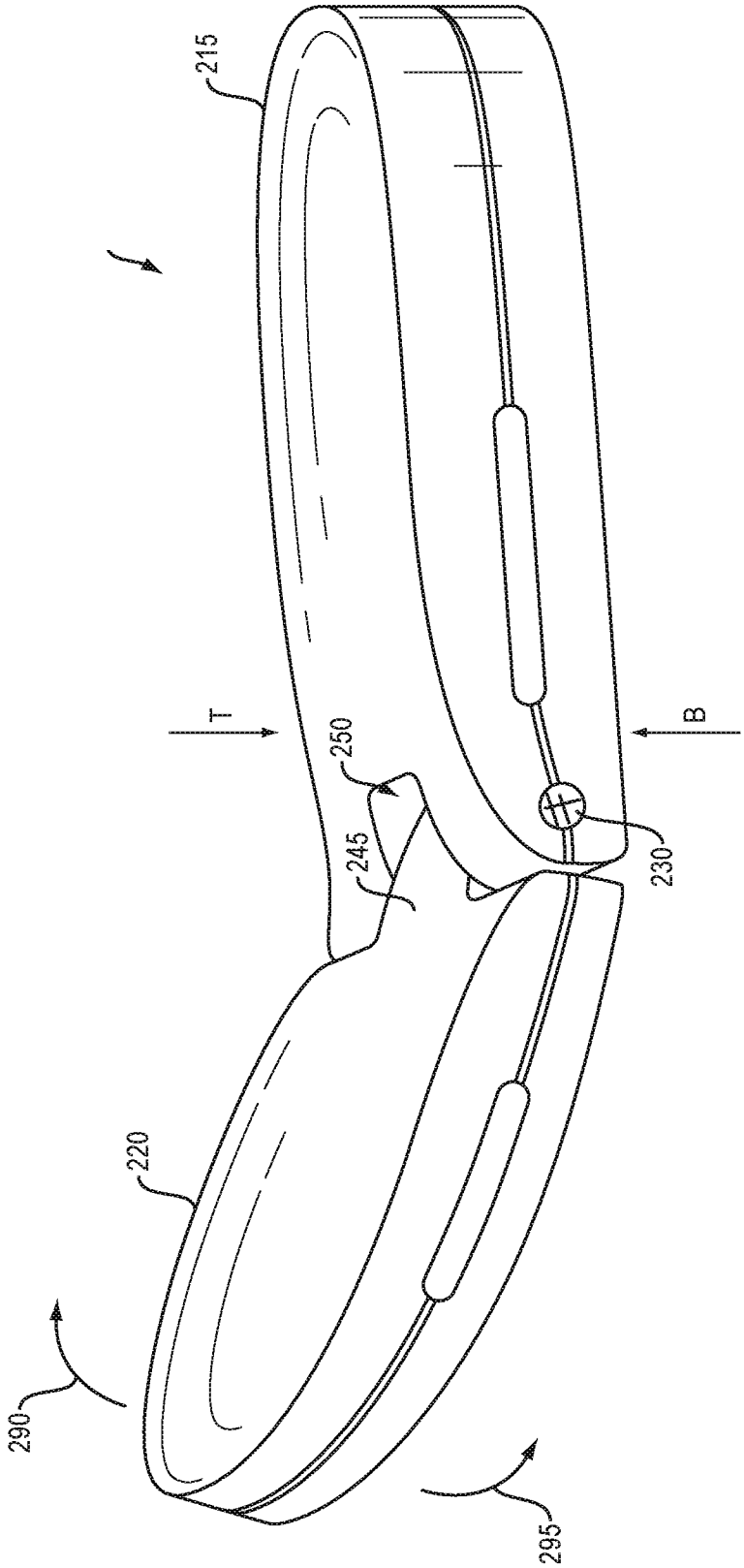

FIG. 2A

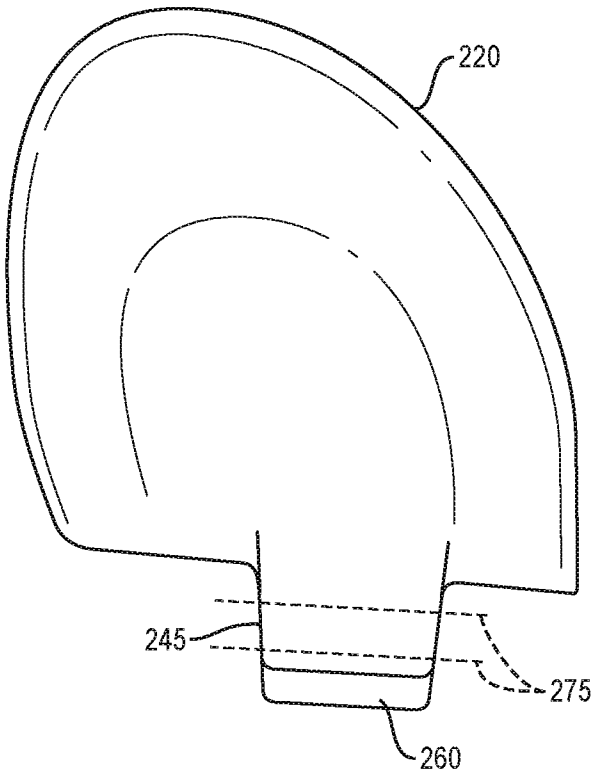

FIG. 2B

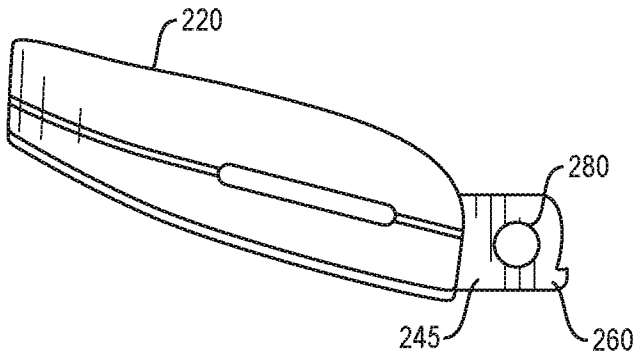

FIG. 2C

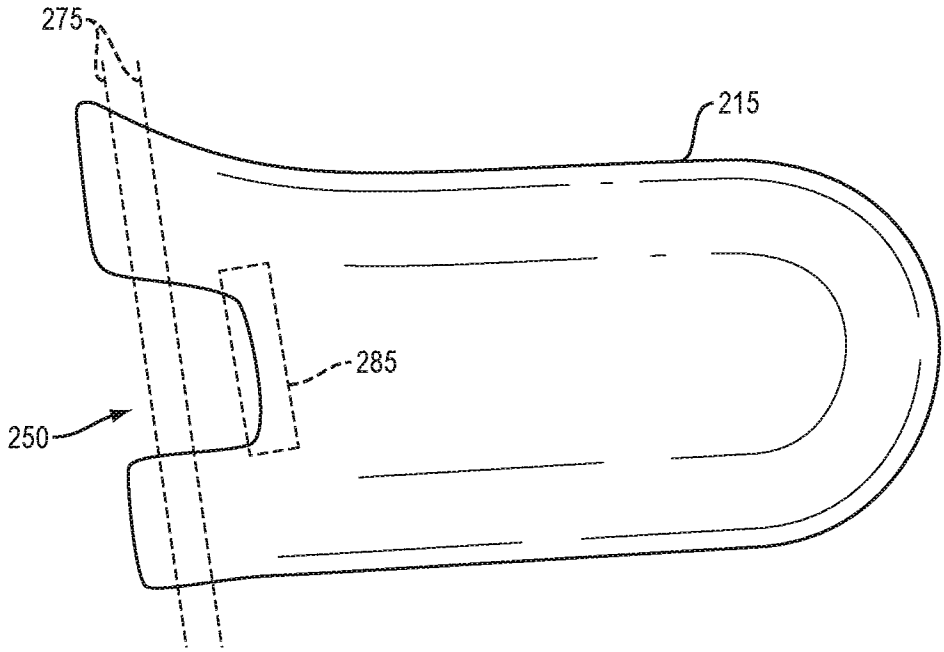

FIG. 2D

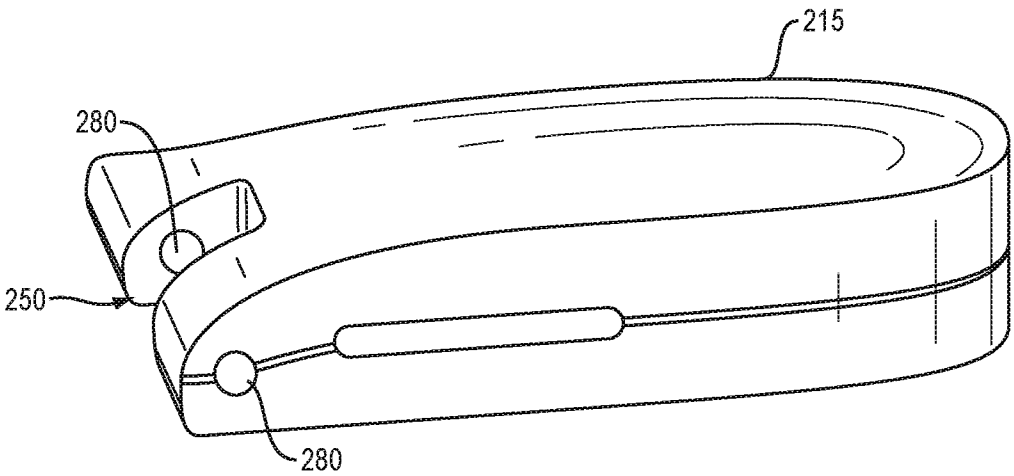

FIG. 2E

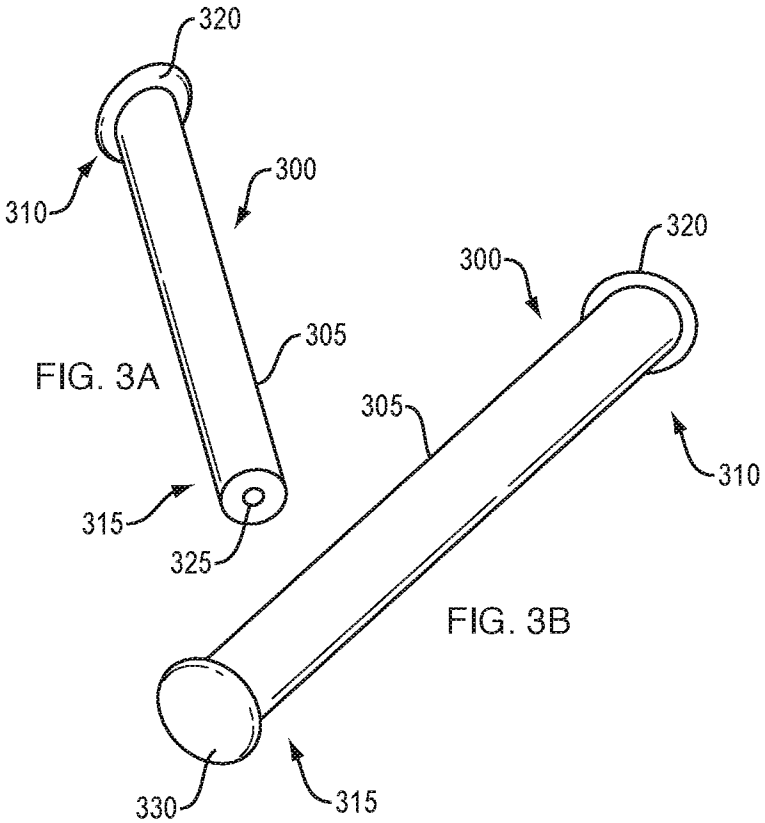

FIG. 3A

FIG. 3B

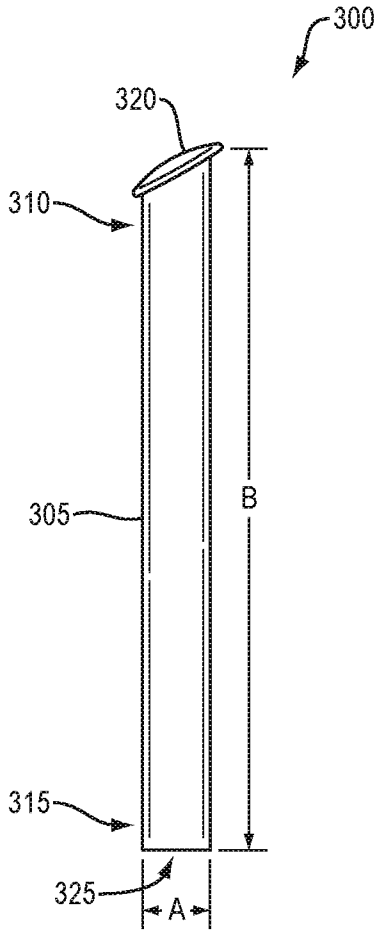

FIG. 3C

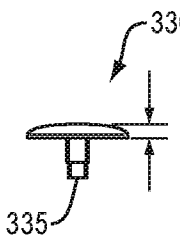

FIG. 3D

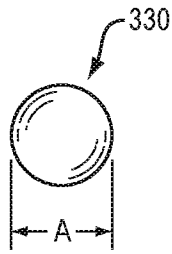

FIG. 3E

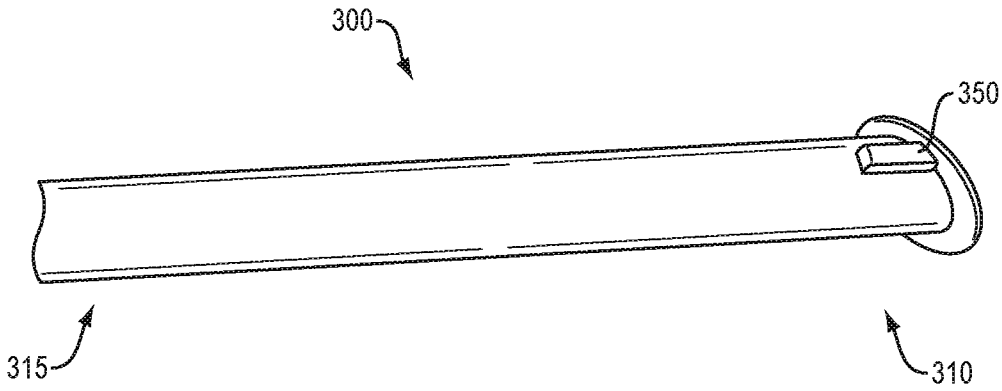

FIG. 3F

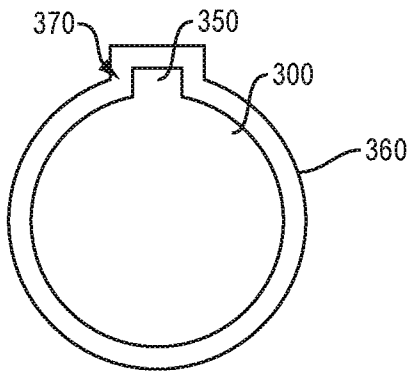

FIG. 3G

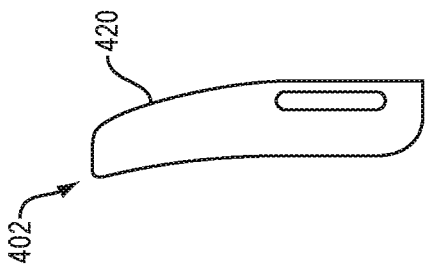

FIG. 4A

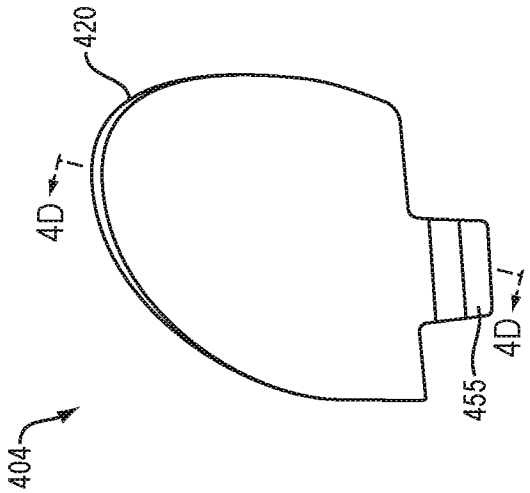

FIG. 4B

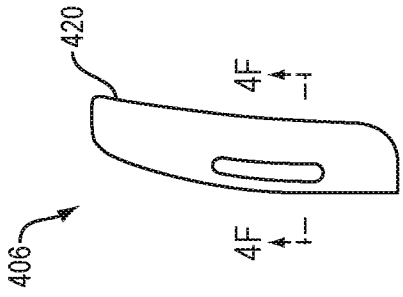

FIG. 4C

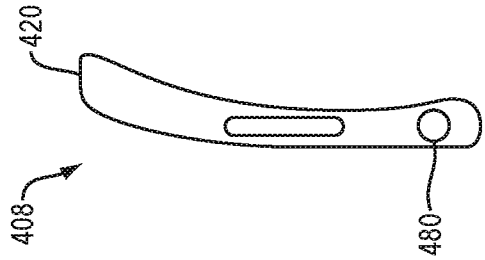

FIG. 4D

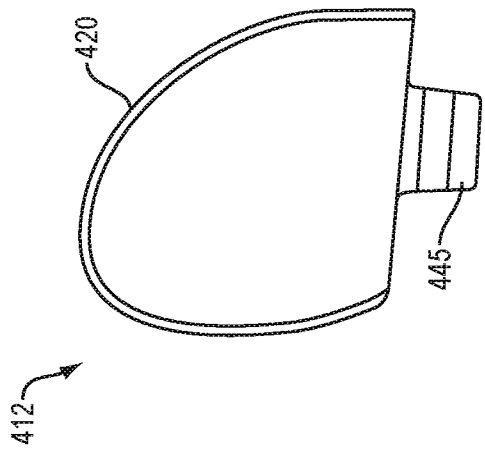

FIG. 4E

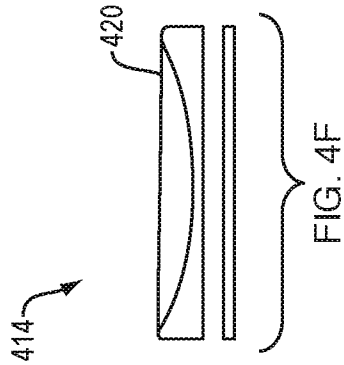

FIG. 4F

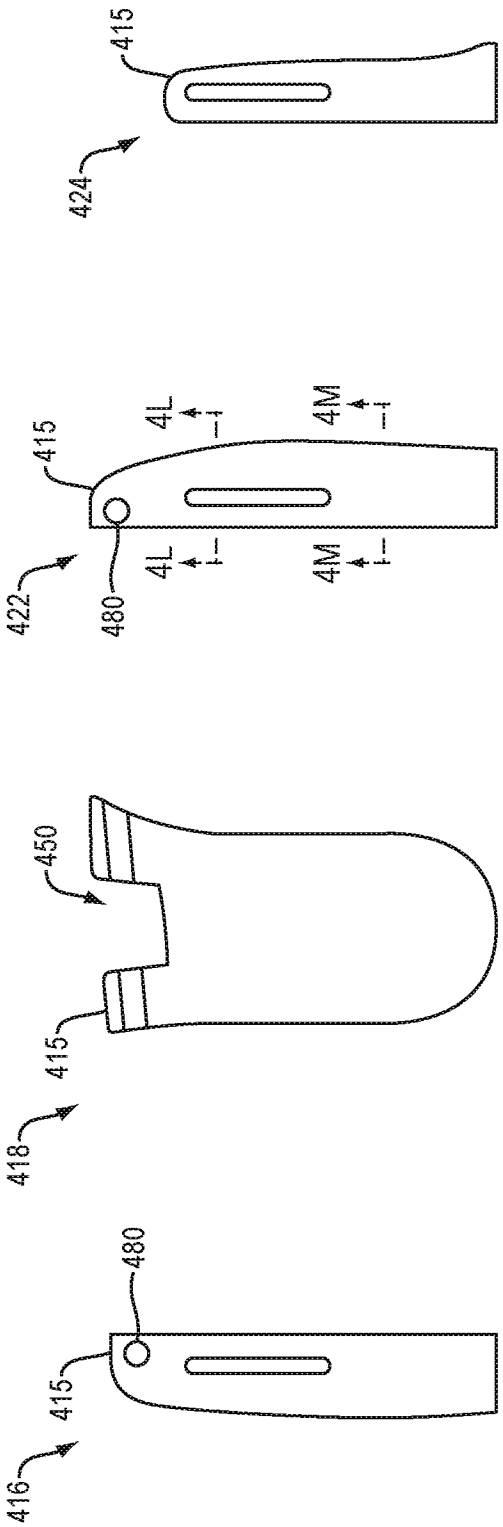

FIG. 4G

FIG. 4H

FIG. 4I

FIG. 4J

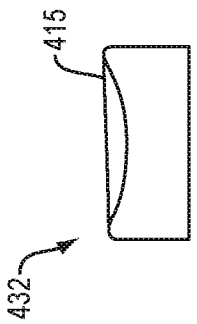

FIG. 4M

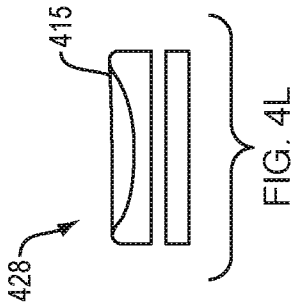

FIG. 4L

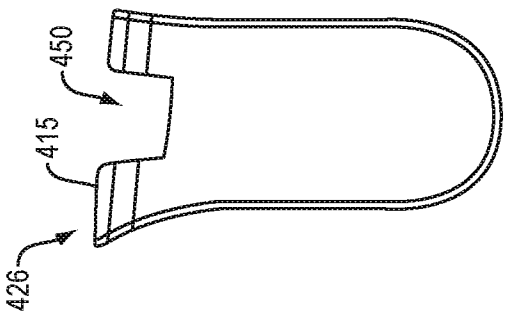

FIG. 4K

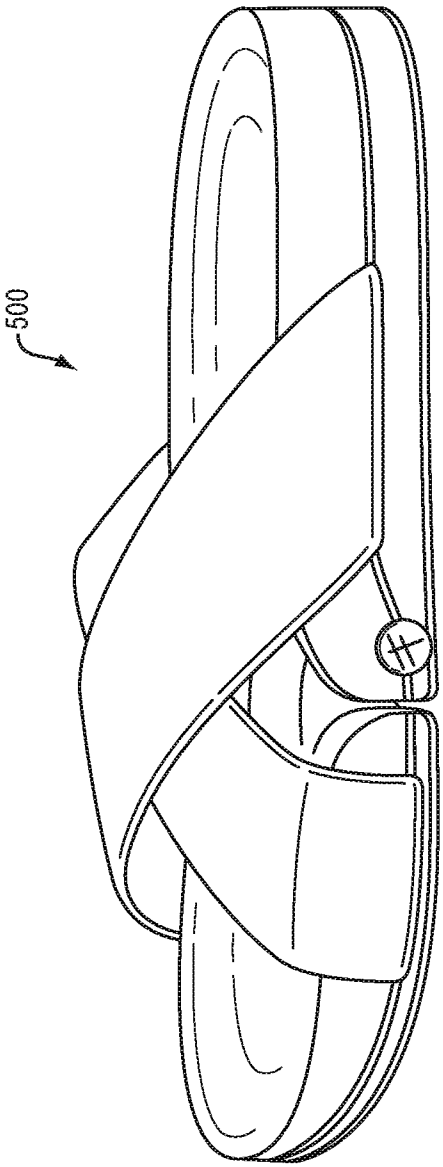

FIG. 5A

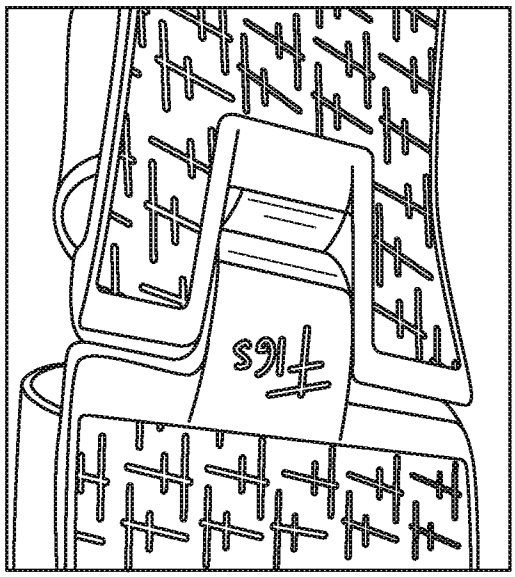

FIG. 5C

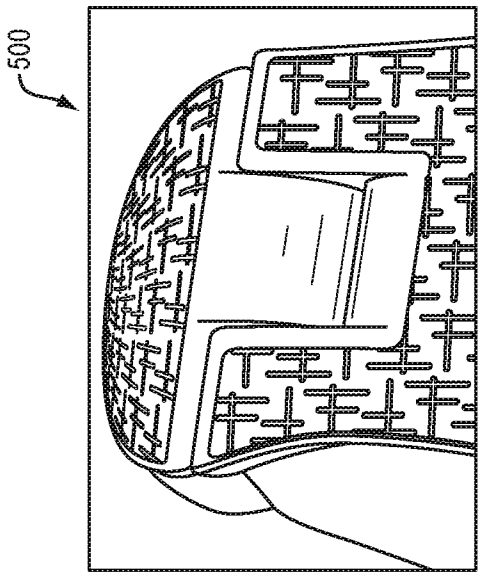

FIG. 5E

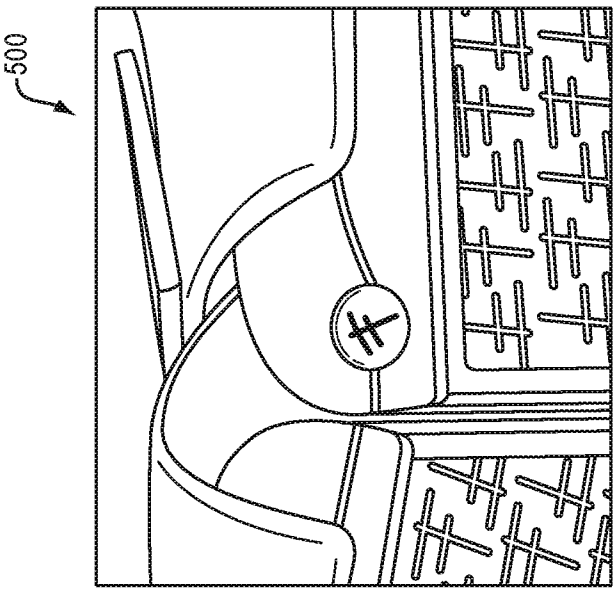

FIG. 5B

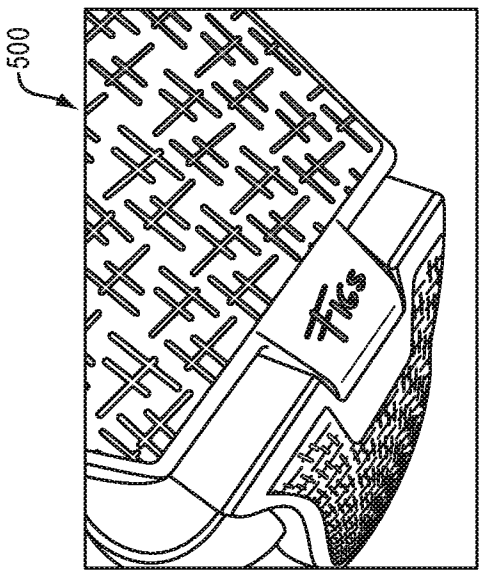

FIG. 5D

FIG. 6A

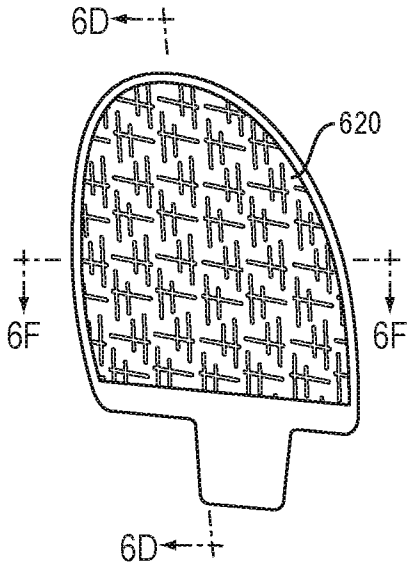

FIG. 6B

FIG. 6C

FIG. 6D

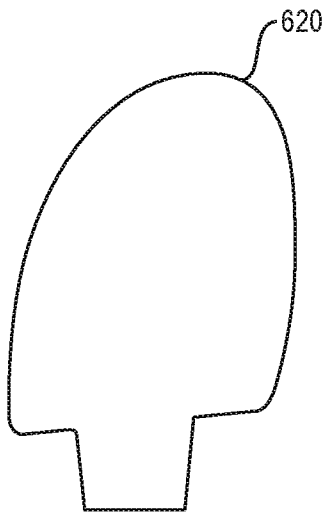

FIG. 6E

FIG. 6G

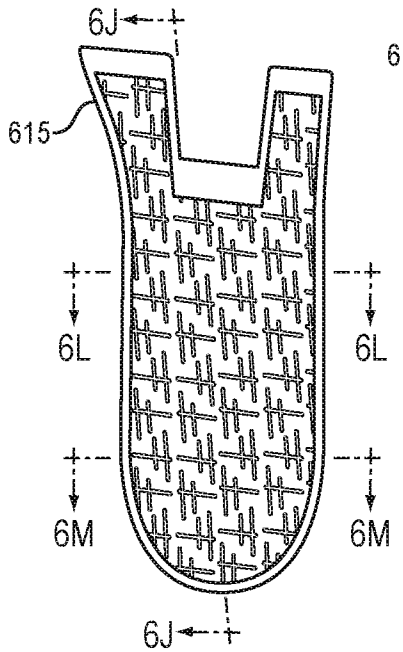

FIG. 6H

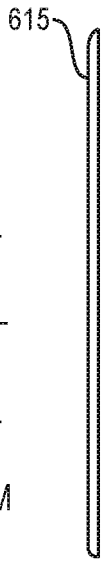

FIG. 6I

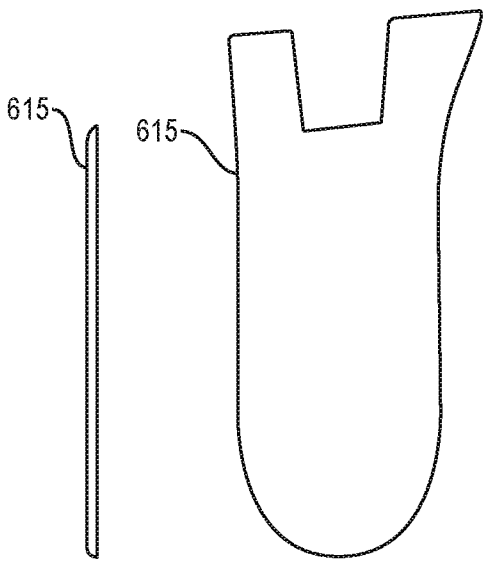

FIG. 6J

FIG. 6K

FIG. 6F

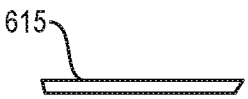

FIG. 6L

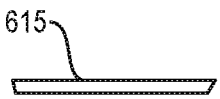

FIG. 6M

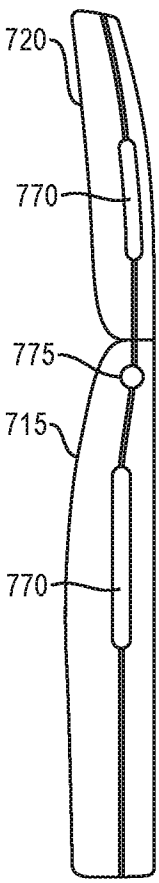

FIG. 7A

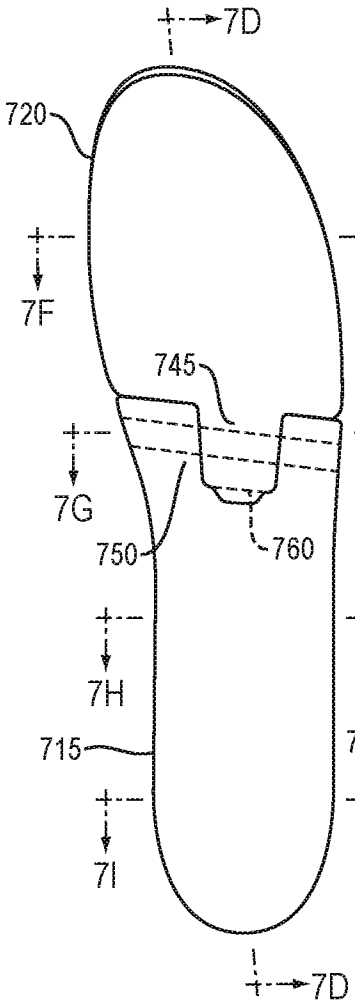

FIG. 7B

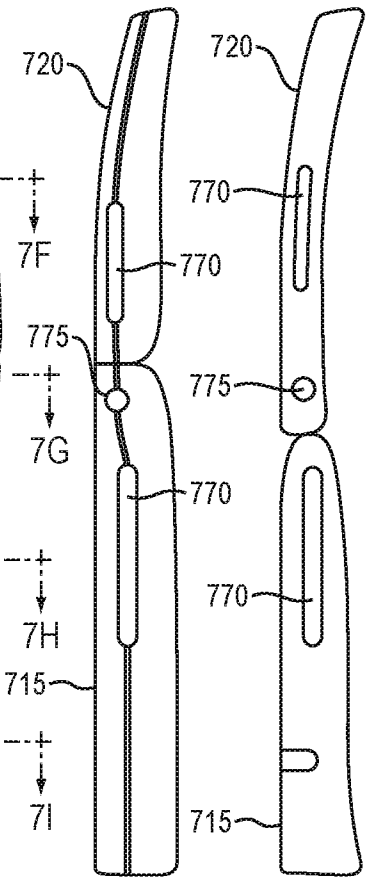

FIG. 7C

FIG. 7D

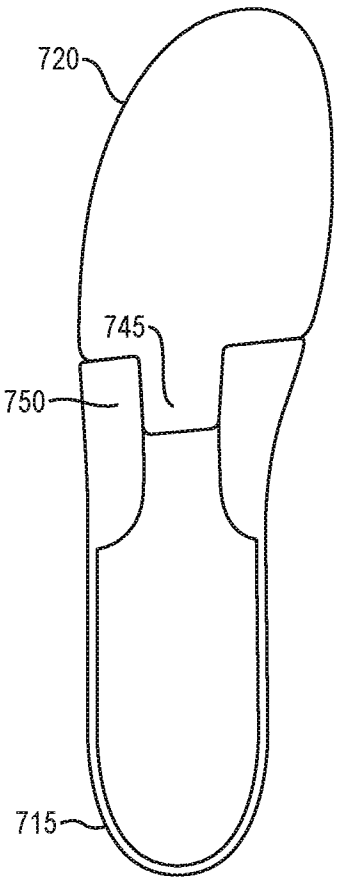

FIG. 7E

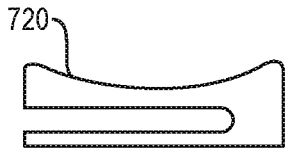

FIG. 7F

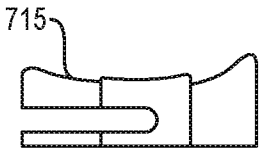

FIG. 7G

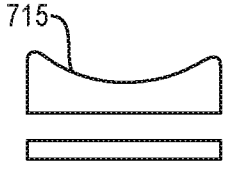

FIG. 7H

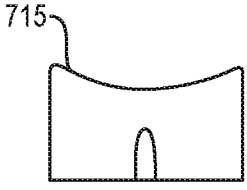

FIG. 7I

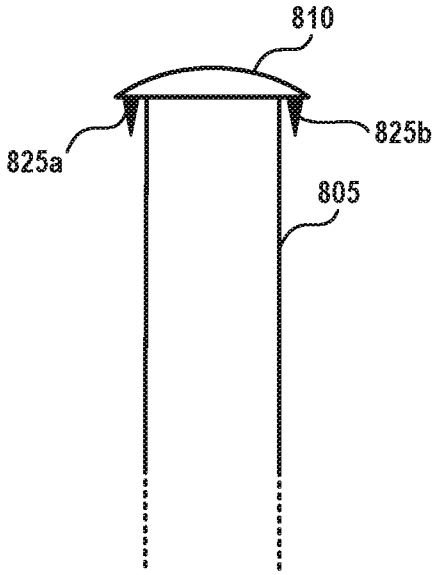

FIG. 8A

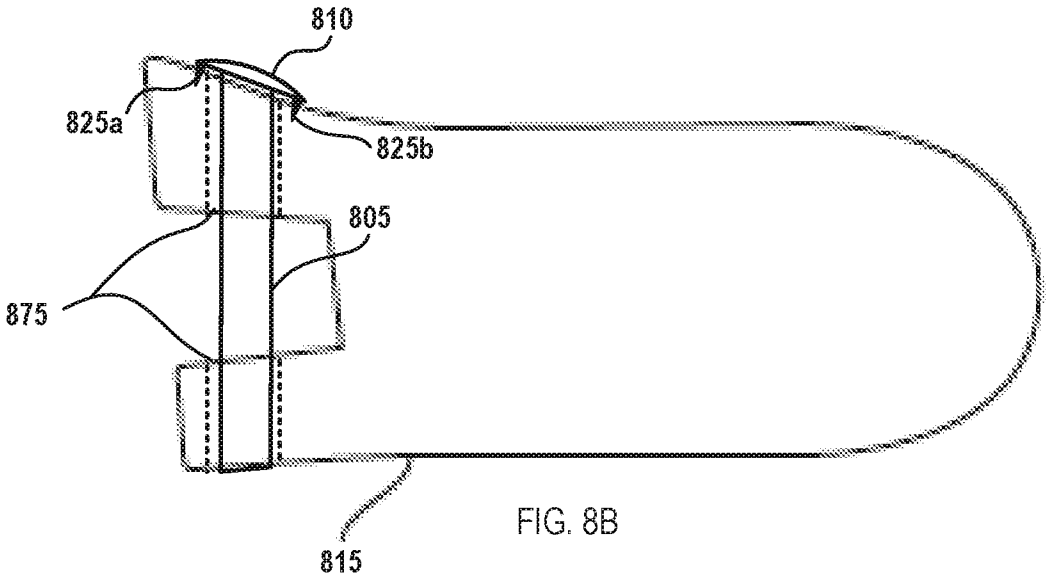

FIG. 8B

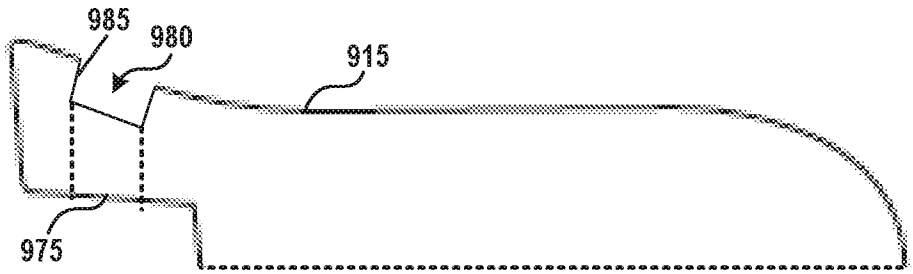

FIG. 9A

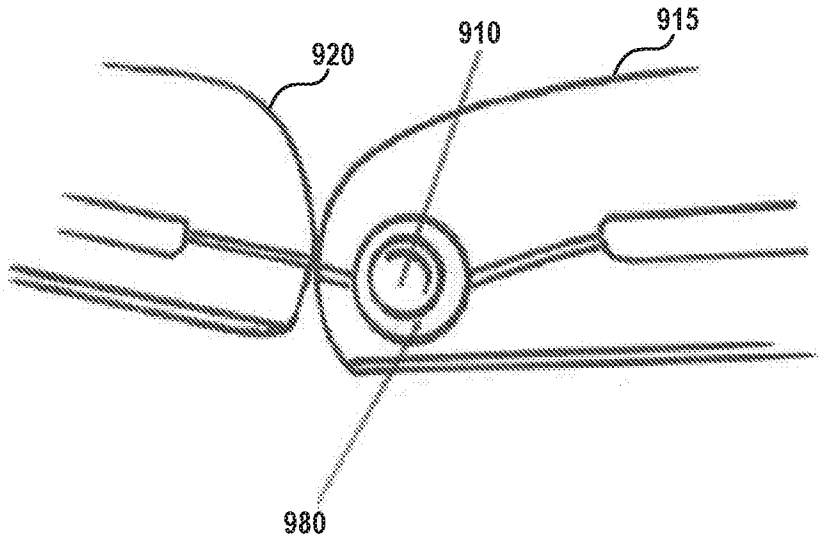

FIG. 9B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 16/56587

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A43B 13/00 (2016.01)
CPC - A43B 13/141
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8): A43B 13/00 (2016.01)
CPC: A43B 13/141

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8): A43 B13/00, A43B21/00 (2016.01)
USPC: 36/102, 36/103, 36/118.7 CPC: A43B 13/141, A43 B3/24 (keyword limited, terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google Scholar; Search terms used: Hinge, articulate, swivel, torque, joint, pivot, footwear, shoe, sneaker, slipper, loafer, boot, tongue, recess, sole, fastener, rod, end

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 7,448,148 B2 (MARTINEZ et al.) 11 November 2008 (11.11.2008), entire document, especially Fig. 2; col 5, ln 16-38; col 6, ln 51-64	1-5, 10, 13-17, 22 --- 11-12, 23-24
X --- Y	US 5,410,820 A (GOODMAN) 2 May 1995 (02.05.1995), entire document, especially Figs. 10A-10C, 11A-11C; col. 13, ln. 46-58	1-5, 13-17, 25-30 --- 6-12, 18-24
Y	US 1,774,695 A (BAYNES) 2 September 1930 (02.09.1930), entire document, especially Fig. 1; pg. 1, ln. 35-50	6-7, 18-19
Y	US 5,720,246 A (GRIFFIN et al.) 24 February 1998 (24.02.1998), entire document, especially Fig. 1, 6	8-9, 20-21
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☐ Further documents are listed in the continuation of Box C. ☐

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