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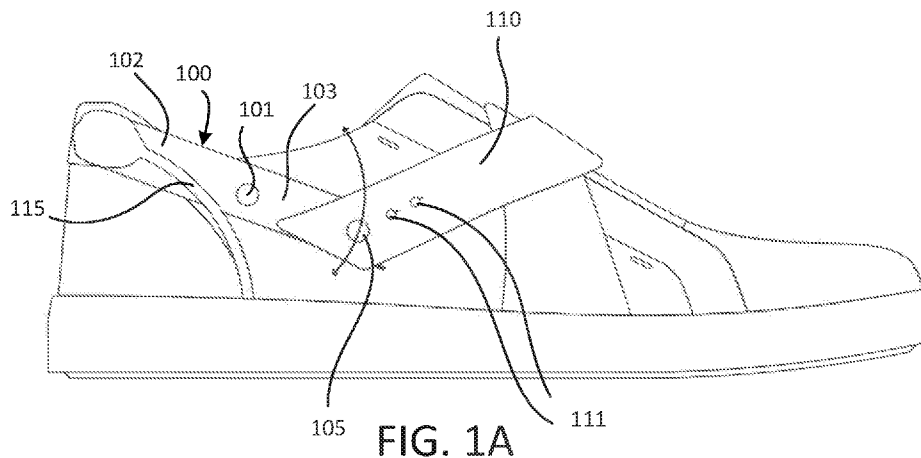


FIG. 1A

(57) Abstract: A rapid-entry shoe includes an actuator arm, having a pivot point, and a closure system. Movement of the actuator arm from an uncollapsed position to a collapsed position opens the closure system and movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure system, according to various embodiments.



TITLE: RAPID-ENTRY FOOTWEAR HAVING AN ACTUATOR ARM

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CROSS-REFERENCE TO RELATED APPLICATIONS

5 [0001] This application claims the benefit of U.S. Provisional Patent Application No. 62/755,123, filed November 2, 2018 entitled "RAPID-ENTRY FOOTWEAR HAVING AN ACTUATOR ARM," and U.S. Provisional Patent Application No. 62/691,201, filed June 28, 2018 entitled "RAPID-ENTRY FOOTWEAR HAVING AN ACTUATOR ARM," both of which are incorporated herein by reference in their entireties.

10 BACKGROUND

[0002] 1. Field

[0003] The present disclosure relates to rapid-entry footwear having an actuator arm.

[0004] 2. Description of the Related Art

[0005] Whether due to inconvenience or inability, donning shoes, including tying or
15 otherwise securing the same, may present difficulties to some individuals. The present disclosure addresses this need.

SUMMARY

[0006] Disclosed herein, according to various embodiments, is a rapid-entry shoe comprising an actuator arm, having a pivot point, and a closure system. Movement of the
20 actuator arm from an uncollapsed position to a collapsed position opens the closure system and movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure system, according to various embodiments.

[0007] The forgoing features and elements may be combined in various combinations without exclusivity, unless expressly indicated herein otherwise. These features and elements

as well as the operation of the disclosed embodiments will become more apparent in light of the following description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The accompanying drawings are included to provide a further understanding of
5 the present disclosure and are incorporated in, and constitute a part of, this specification, illustrate various embodiments, and together with the description, serve to explain the principles of the disclosure.

[0009] Figures 1A and 1B illustrate an example embodiment of a rapid-entry shoe having closure straps extending between actuator arms and the shoe upper or outsole, in
10 uncollapsed and collapsed positions, respectively;

[0010] Figures 2A and 2B illustrate an example embodiment of a rapid-entry shoe having different closure systems, in uncollapsed and collapsed positions, respectively;

[0011] Figures 3A and 3B illustrate an example embodiment of a rapid-entry shoe having closure straps extending between actuator arms, in uncollapsed and collapsed positions,
15 respectively;

[0012] Figures 4A and 4B illustrate an example embodiment of a rapid-entry shoe wherein the actuator arm is the heel or a heel cap, heel counter or the like, in uncollapsed and collapsed positions, respectively;

[0013] Figures 5A and 5B illustrate an example embodiment of a rapid-entry shoe
20 having an angled, bi-stable actuator arm, in uncollapsed and collapsed positions, respectively;

[0014] Figures 6A and 6B illustrate another example embodiment of a rapid-entry shoe having an angled, bi-stable actuator arm, in uncollapsed and collapsed positions, respectively;

[0015] Figure 7A illustrates an example embodiment of a rapid-entry shoe not comprising a closure strap;

[0016] Figures 7B, 7C and 7D illustrate example embodiments of rapid-entry shoes similar to those shown in Figures 2B, 1B and 3B, respectively, but not comprising deformable elements and showing a biasing member disposed below a coupling point;

[0017] Figures 8A and 8B illustrate an example embodiment of a rapid-entry shoe
5 having a living hinge, in uncollapsed and collapsed positions, respectively;

[0018] Figures 9A and 9B illustrate an example embodiment of a rapid-entry shoe having multiple links extending from an actuator arm, in uncollapsed and collapsed positions, respectively; and

[0019] Figures 10A, 10B, 10C, 10D, and 10E illustrate example embodiments of a
10 rapid-entry shoe having a collapsible rear support.

DETAILED DESCRIPTION

[0020] The detailed description of various embodiments herein makes reference to the accompanying drawings, which show various embodiments by way of illustration. While these various embodiments are described in sufficient detail to enable those skilled in the art to
15 practice the disclosure, it should be understood that other embodiments may be realized and that logical, chemical, mechanical and structural changes may be made without departing from the spirit and scope of the disclosure. Thus, the detailed description herein is presented for purposes of illustration only and not of limitation. Like numerals may refer to like components.

[0021] For example, the steps recited in any of the method or process descriptions may
20 be executed in any order and are not necessarily limited to the order presented. Furthermore, any reference to singular includes plural embodiments, and any reference to more than one component or step may include a singular embodiment or step. Also, any reference to attached, fixed, connected, coupled or the like may include permanent (e.g., integral), removable, temporary, partial, full, and/or any other possible attachment option. Any of the components

may be coupled to each other via bolts, dowels, glue, stitching, welding, soldering, brazing, sleeves, brackets, clips or other means known in the art or hereinafter developed. Additionally, any reference to without contact (or similar phrases) may also include reduced contact or minimal contact.

5 [0022] As used herein, a shoe is any footwear including but not limited to a formal shoe, a dress shoe, a heel, a sports/athletic shoe (e.g., a tennis shoe, a golf shoe, a bowling shoe, a running shoe, a basketball shoe, a soccer shoe, a ballet shoe, etc.), a walking shoe, a sandal, a flip flop, a boot, a high top style boot, or other suitable type of shoe.

[0023] Example embodiments of the present disclosure comprise a shoe having an
10 uncollapsed configuration (Figure 1A) and a collapsed configuration with a wider opening to receive the foot of an individual wearing the shoe (Figure 1B). With reference to Figures 1A and 1B, example embodiments of the present disclosure comprise an actuator arm 100 extending from a rear portion of the shoe (e.g., connected to the heel or a heel cap, heel counter or the like) and located on a medial and/or lateral side of the shoe. In various embodiments,
15 the rapid-entry shoe also includes a closure system 110 coupled to the actuator arm 100. The actuator arm 100 may include a pivot point 101, and the actuator arm 100 may be generally configured to pivot about the pivot point 101. This pivoting motion of the actuator arm 100 may facilitate switching the shoe between the collapsed position and the uncollapsed position. That is, a user may press downward on the collar of the shoe, causing the actuator arm 100 to
20 collapse, thereby causing the closure system 110 to open (e.g., the foot opening defined by the shoe to increase in size) and facilitating foot insertion. Thus, the actuator arm 100 may be in an uncollapsed position (Figure 1A) or a collapsed position (Figure 1B). Accordingly, the terms “collapsed position” or “collapsed configuration” refer to an open state of the shoe in which the rear portion of the shoe is deformed downward (e.g., the rear portion of the actuator
25 arm pivots downward) and the foot opening defined by the shoe is enlarged to allow easier

insertion of a foot of the user. Correspondingly, as used herein, the terms “uncollapsed position” or “uncollapsed configuration” refer to a closed state of the shoe in which the rear portion of the shoe is not deformed and is thus upward (relative to the collapsed position) and the foot opening defined by the shoe is sufficiently small to retain a foot within the shoe.

5 [0024] Example embodiments comprise a shoe having two actuator arms, each extending from a rear portion of the shoe (e.g., connected to the heel or a heel cap, heel counter or the like) and located on an opposing medial or lateral side of the shoe. In some embodiments, the actuator arms are coupled to one another around the rear portion of the shoe, while in other
10 embodiments, the actuator arms are independent of each other. While much of the present disclosure will reference a single actuator arm for simplicity, persons skilled in the art will appreciate that two actuator arms, located on an opposing medial or lateral side of the shoe, will be used in various of the embodiments.

[0025] In example embodiments, the actuator arm is comprised of a material resistant to deformation, even elastic deformation, e.g., a rigid or hard polymer. In this regard, however,
15 the actuator arm can comprise an overmold or other polymer or textile covering (including the shoe upper or a portion thereof) to minimize discomfort experienced by an individual wearing the shoe. In various embodiments, the actuator arm 100 includes a rear segment 102 and a forward segment 103, with the pivot point 101 disposed therebetween. That is, the portion of the actuator arm 100 behind the pivot point 101 is referred to as the rear segment 102 and the
20 portion of the actuator arm 100 forward of the pivot point 101 is referred to as the forward segment 103, according to various embodiments.

[0026] In various embodiments, pivot point 101 is positioned away from the rear portion of the shoe, and is a fixed point around which the actuator arm 100 pivots. For example, in an uncollapsed position, the actuator arm may be oriented downward in the direction away
25 from the rear portion of the shoe, while in a collapsed position, the actuator arm may be oriented

level or upward in the direction away from the rear portion of the shoe. The actuator arm may be moved from the uncollapsed position to the collapsed position upon an individual's heel applying a downward force to the rear portion of the shoe upon entry. In various embodiments, movement of the actuator arm 100 from the uncollapsed position to the collapsed position (e.g.,
5 transitioning from Figure 1A to 1B) comprises downward rotational movement of the rear segment 102 and upward rotational movement of the forward segment 103. Correspondingly, movement of the actuator arm 100 from the collapsed position to the uncollapsed position (e.g., transitioning from Figure 1B to 1A) comprises upward rotational movement of the rear segment 102 and downward rotational movement of the forward segment 103. Thus, the pivot point
10 101 may be a fulcrum of the actuator arm.

[0027] The pivot point may be located between the footbed and topline of the shoe. In various embodiments, the pivot point is below the footbed. The pivot point may comprise a rivet, pin, snap or other structure between the actuator arm and the shoe upper or outsole to provide for rotation there between. In example embodiments, and with momentary reference
15 to Figures 6A and 6B, a rigid support 612 may be located below the pivot point 601. The rigid support may be included to prevent collapse of the shoe upper during transition from the uncollapsed position to the collapsed position. For example, the pivot point may be mounted to the rigid support 612. The rigid support 612 may form part of the upper of the shoe, or may be an extension of the outsole or trims. In various embodiments, the pivot point may be fixed
20 and thus may not move relative to the shoe. In various embodiments, the pivot point may be fixed vertically (e.g., may not move upward or downward), but the pivot point may have some play in the forward and rear directions.

[0028] In various embodiments, the closure system 110 may be coupled to the forward segment 103 of the actuator arm 100 (e.g., at coupling point 105). Said differently, the actuator
25 arm 100, in accordance with various embodiments, comprises a coupling point 105 positioned

further away from the rear portion of the shoe than the pivot point 101, and the coupling point 105 may enable relative rotation between the actuator arm and the closure system. At the coupling point 105, the actuator arm can be coupled to the closure system 110. In various embodiments, the coupling point 105 may be located between the footbed and topline of the shoe. As mentioned below, the coupling point 105 may be nearer to the footbed than the pivot point 101 in the uncollapsed position, but the pivot point 101 may be nearer to the footbed than the coupling point 105 in the collapsed position.

[0029] As used herein, the term closure system refers generally to a feature of the shoe that is coupled to the actuator arm at the coupling point. The pivoting movement of the actuator arm is perpetuated by the closure system to enlarge and decrease the foot opening defined by the shoe. In various embodiments, and with reference to Figure 2A, closure system may be a link 210A (e.g., an additional actuator arm) that extends from the forward segment 203 (e.g., from the coupling point 205) of the actuator arm 100 and is coupled to an upper forward portion of the shoe. In various embodiments, and with reference to Figure 2B, the closure system is a tongue, closure strap 210B, or other feature of the shoe upper. In such embodiments, downward force on the rear segment 202 of the actuator arm 200 causes the actuator arm 200 to pivot about the pivot point 201, thereby causing the forward segment 203 to move upward, causing a corresponding forward and/or upward movement of the closure system 210A, 210B. In various embodiments, in the uncollapsed position the coupling point 205 is closer to a footbed of the rapid-entry shoe than the pivot point 201, and in the collapsed position the coupling point 205 is farther above the footbed than the pivot point 201. In various embodiments, and with momentary reference to Figures 8A and 8B, the actuator arm and closure system could be made of a single part, such that the coupling point could be a living hinge. Additional details pertaining to the living hinge are included below with reference to Figures 8A and 8B.

[0030] In accordance with example embodiments of the present disclosure, and with momentary reference to Figures 5A, 5B, 6A, and 6B, actuator arm 500, 600 may have one or more bends or angles along its axis. That is, instead of the actuator arm being linear when viewed from a lateral or medial side of the rapid entry shoe (see, e.g., Figures 1A, 1B, 2A, 2B, 5 3A, and 3B), the actuator arm may be non-linear (once again, when viewed from a lateral or medial side of the rapid-entry shoe). For example, an angle may be defined between the rear segment 502, 602 and the forward segment 503, 603 of the actuator arm 500, 600, and this angle may be less than 180 degrees. The one or more bends or angles can, in turn, follow the topline of the shoe and/or provide for stability in both the uncollapsed position as well as the 10 collapsed position, depending on where the actuator arm is positioned relative to the rotation center point.

[0031] In various embodiments, and with reference to Figures 4A and 4B, instead of the actuator arm being connected to the heel, heel cap, heel counter, or the like, the actuator arm 400 is the heel, heel cap, heel counter, or the like. Thus, in the collapsed configuration, 15 the heel or a heel cap, heel counter or the like may be located below the footbed as illustrated in Figure 4B. The actuator arm in such embodiments may be moved from the uncollapsed position to the collapsed position upon an individual's heel applying a downward force to the footbed of the shoe upon entry.

[0032] In various embodiments, and with continued reference to Figures 4A and 4B, a 20 bend axis 406 may be defined as an axis, perpendicular to a longitudinal axis of the shoe from a heel portion to a toe portion, that extends along an intersection of the closure system 410 and an upper forward portion of the rapid-entry shoe or the shoe upper. An alignment line 407 extending through the pivot point 401 and the bend axis 406 may be farther above a footbed of the rapid-entry shoe than the coupling point 405 in both the collapsed and uncollapsed 25 positions. However, in various embodiments, and with reference to Figures 5A and 5B, the

alignment line 507 extending through the pivot point 501 and the bend axis 506 is closer to the footbed than the coupling point 505 in the collapsed position. That is, the alignment line 507 may be disposed between the footbed of the shoe and the coupling point 505, at least in the collapsed position. Such a configuration may enable bi-stability of the rapid-entry shoe. That is, the shoe in the uncollapsed position is not biased toward the collapsed position, and the shoe in the collapsed position is not biased toward the uncollapsed position. Additional details pertaining to biasing are included below.

[0033] A closure system 110, as mentioned above, may include comprise a closure strap. In some embodiments, as illustrated in Figure 1A, a first closure strap extends around the shoe upper between a first actuator arm on a medial side and the shoe upper or outsole on a lateral side, and a second closure strap extends around the shoe upper between a second actuator arm on a lateral side and the shoe upper or outsole on a medial side. In other embodiments, a closure strap extends around the shoe upper between a first actuator arm on a medial side and a second actuator arm on a lateral side as illustrated in Figures 3A and 3B. Persons skilled in the art will appreciate that the first and second actuator arms may be coupled to one another around the rear portion of the shoe, or the actuator arms may be independent of each other, or a single actuator arm may extend around the rear portion of the shoe and have respective pivot points on the medial and lateral side of the shoe.

[0034] In example embodiments, and returning to reference Figure 1A, the closure system may be coupled to the tongue. In other example embodiments, the closure strap is coupled to the shoe upper at the vamp where it has a natural pivot point. In yet other example embodiments, the closure strap has multiple attachment points 111 to the actuator arm at the coupling point, e.g., to provide for adjustability.

[0035] In general, movement of the actuator arm from the uncollapsed position to the collapsed position can open the closure system (e.g., raise the tongue and/or closure strap away

from the shoe upper), while movement of the actuator arm from the collapsed position to the uncollapsed position can close the closure system (e.g., lower the tongue and/or closure strap toward the shoe upper). As the actuator arm rotates it moves the closure system (and whatever it is coupled to) upward and away from the quarters and throat of the upper, making the opening
5 wider.

[0036] In some embodiments, movement of the actuator arm from the collapsed position to the uncollapsed position can be facilitated by one or more resiliently deformable elements 115, e.g., extending from below the footbed of the shoe to the rear portion of the shoe, e.g., as described in U.S. Patent No. 9,820,527, which is incorporated herein by reference for
10 all purposes. The resiliently deformable element(s) 115 may provide a rebounding action to return the heel of the shoe to the closed position (uncollapsed position). The resiliently deformable element may be coupled to and may extend from below a footbed of the rapid-entry shoe.

[0037] In other example embodiments, and with momentary reference to Figures 7A,
15 7B, 7C and 7D, movement of actuator arm 700A, 700B, 700C, 700D from the collapsed position to the uncollapsed position can be facilitated by the inclusion of a biasing member 713A, 713B, 713C, 713D, such as an elastic gore or other material, located below the coupling point. The biasing member may exert a downward force to at least one of the forward segment 703A, 703B, 703C, 703D of the actuator arm 700A, 700B, 700C, 700D and the closure system
20 710A, 710B, 710C, 710D. Accordingly, because each of the embodiments depicted in Figures 7A, 7B, 7C, and 7D is shown in the collapsed position, the biasing member 713A, 713B, 713C, 713D in each of these figures may be in an elongated state, thereby resulting in an increased bias to return to the shoe to the uncollapsed state.

[0038] With reference now to Figures 8A and 8B, an additional embodiment is
25 disclosed of a rapid-entry shoe, also having an uncollapsed configuration (Figure 8A) and a

collapsed configuration with a wider opening to receive the foot of an individual wearing the shoe (Figure 8B). The shoe can comprise an actuator arm 800 and a closure system 810 (e.g., a closure trap or tongue). Actuator arm 800 and/or closure system 810 can extend between medial and lateral sides of the shoe, as previously mentioned. Both the actuator arm 800 and the closure system 810 may include respective pivot points 801, 804 (e.g., a first pivot point 801 and a second pivot point 804). In various embodiments, the actuator arm 800 and the closure system 810 are integrally formed of the same material (e.g., form a unitary, monolithic structure).

[0039] The shoe can comprise one or more pivot points 801 and 804, each on the medial and/or lateral side of the shoe, which in turn can comprise one or more of a rivet, pin, snap or other structure to provide for relative rotation. Pivot points 801 and 804 can be attached to a base, whether directly or indirectly. For example, pivot point 801 can provide for relative rotation between actuator arm 800 and a base. Similarly, pivot point 804 can provide for relative rotation between closure system 810 and a base. Optionally, one or more pivot points 801 and 804 can also anchor actuator arm 800 and/or closure system 810 relative to a base. As used herein, a “base” may refer to a stable base plate in the shoe, an outsole or portions thereof, a midsole or portions thereof, an insole or portions thereof, a wedge or portions thereof, the upper or portions thereof (e.g., a heel counter), or other suitable structure disposed between and/or adjacent to foregoing.

[0040] In various embodiments, a living hinge is formed between the actuator arm and the closure system. That is, the hinge may be made from the same material as and/or integral with the two pieces it connects. The living hinge may facilitate relative movement of the actuator arm and the closure system. That is, movement of the actuator arm from an uncollapsed position to a collapsed position opens the closure system, and wherein movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure

system. In various embodiments, the living hinge 807 is formed in part by a narrowed strip of the forward segment of the actuator arm 800 includes. The narrowed strip of material, which may be resiliently flexible, transitions from the actuator arm 800 to the closure system 810. An edge of the closure system may have a rounded edge, such that the narrowed strip of material extends adjacent to the rounded edge (e.g., extending forward and under the rounded edge of closure system 810). A slit may be defined between the rounded edge and the narrowed strip of material, wherein a dimension of the slit is greater in the collapsed position than in the uncollapsed position. In various embodiments, the narrowed strip of material extends from a forward edge of the closure system.

10 [0041] Actuator arm 800 and closure system 810 can be coupled to each other at a coupling point, as described supra, on the medial and/or lateral side of the shoe. In the illustrated embodiment, however, actuator arm 800 and closure system 810 are coupled to each other with a living hinge 807, on the medial and/or lateral side of the shoe.

[0042] As illustrated in the progression from an uncollapsed configuration (Figure 8A) to a collapsed configuration (Figure 8B), moving actuator arm 800 or closure system 810 in a first direction will move the other in a second direction, opposite the first, via hinge 807. Such movement of actuator arm 800 or closure system 810 in a first direction can be accomplished by a pushing or pulling motion exerted thereto, whether directly or indirectly, by an individual wearing the shoe. This embodiment may be particularly advantageous in connection with a high top style boot. The actuator arms can be returned to their original positions by lestatic or deformable elements positioned to pull or push the arms back into place.

[0043] In various embodiments, and with reference to Figures 9A and 9B, the closure system may include a link 910 coupled to the forward segment 903 of the actuator arm 900 at the coupling point 905. The link 910 may extend from the coupling point 905 and may be coupled to or form a first part of a forward upper portion of the rapid-entry shoe. The link 910

may be a first link, and the closure system may further include a second link also coupled to the forward segment 903 of the actuator arm 900 at the coupling point 905. The second link may extend from the coupling point and may be coupled to or form a second part of the forward upper portion of the rapid-entry shoe. The second link may include a first section 916A and a
5 second section 916B.

[0044] In various embodiments, and with reference to Figures 10A, 10B, 10C, 10D, and 10E, the rapid entry shoe includes a rear support portion 1030 extending between the rear segment 1002 and a base of the rapid-entry shoe. The rear support portion 1030 may be configured to bias the rapid-entry shoe toward the uncollapsed position, but can be momentarily deflected to allow the rear support portion 1030 to collapse to transition from the
10 uncollapsed position to the collapsed position. The rear support portion 1030 may include horizontal and vertical grooves, thereby allowing bending in two directions, but only a single direction at a time.

[0045] It will be apparent to those skilled in the art that various modifications and variations can be made in the present disclosure without departing from the spirit or scope of
15 the disclosure. Thus, it is intended that the embodiments described herein cover the modifications and variations of this disclosure provided they come within the scope of the appended claims and their equivalents.

[0046] Numerous characteristics and advantages have been set forth in the preceding
20 description, including various alternatives together with details of the structure and function of the devices and/or methods. The disclosure is intended as illustrative only and as such is not intended to be exhaustive. It will be evident to those skilled in the art that various modifications can be made, especially in matters of structure, materials, elements, components, shape, size and arrangement of parts including combinations within the principles of the invention, to the
25 full extent indicated by the broad, general meaning of the terms in which the appended claims

are expressed. To the extent that these various modifications do not depart from the spirit and scope of the appended claims, they are intended to be encompassed therein.

[0047] Benefits, other advantages, and solutions to problems have been described herein with regard to specific embodiments. Furthermore, the connecting lines shown in the
5 various figures contained herein are intended to represent exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in a practical system. However, the benefits, advantages, solutions to problems, and any elements that may cause any benefit, advantage, or solution to occur or become more pronounced are
10 not to be construed as critical, required, or essential features or elements of the disclosure.

[0048] The steps recited in any of the method or process descriptions may be executed in any order and are not necessarily limited to the order presented. Furthermore, any reference to singular includes plural embodiments, and any reference to more than one component or step may include a singular embodiment or step. Elements and steps in the figures are
15 illustrated for simplicity and clarity and have not necessarily been rendered according to any particular sequence. For example, steps that may be performed concurrently or in different order are illustrated in the figures to help to improve understanding of embodiments of the present disclosure.

[0049] Any reference to attached, fixed, connected or the like may include permanent,
20 removable, temporary, partial, full and/or any other possible attachment option. Additionally, any reference to without contact (or similar phrases) may also include reduced contact or minimal contact. Surface shading lines may be used throughout the figures to denote different parts or areas but not necessarily to denote the same or different materials. In some cases, reference coordinates may be specific to each figure.

[0050] Systems, methods and apparatus are provided herein. In the detailed description herein, references to “one embodiment”, “an embodiment”, “various embodiments”, etc., indicate that the embodiment described may include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular
5 feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is submitted that it is within the knowledge of one skilled in the art to affect such feature, structure, or characteristic in connection with other embodiments whether or not explicitly described. After reading the description, it will be
10 apparent to one skilled in the relevant art(s) how to implement the disclosure in alternative embodiments.

[0051] Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the claims. No claim element is intended to invoke
15 U.S.C. 112(f) unless the element is expressly recited using the phrase “means for.” As used herein, the terms “comprises”, “comprising”, or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus.

CLAIMS

What is claimed is:

1. A rapid-entry shoe comprising:
an actuator arm comprising a pivot point; and
a closure system coupled to the actuator arm;
wherein movement of the actuator arm from an uncollapsed position to a collapsed position opens the closure system, and wherein movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure system.
2. The rapid-entry shoe of claim 1, wherein the actuator arm comprises a rear segment and a forward segment, wherein the pivot point is disposed between the rear segment and the forward segment and the closure system is coupled to the forward segment of the actuator arm.
3. The rapid-entry shoe of claim 2, wherein movement of the actuator arm from the uncollapsed position to the collapsed position comprises downward rotational movement of the rear segment and upward rotational movement of the forward segment, and wherein movement of the actuator arm from the collapsed position to the uncollapsed position comprises upward rotational movement of the rear segment and downward rotational movement of the forward segment.
4. The rapid-entry shoe of claim 2, wherein a coupling point between the forward segment of the actuator arm and the closure system enables relative rotation of the actuator arm and the closure system.

5. The rapid-entry shoe of claim 4, wherein in the uncollapsed position the coupling point is closer to a footbed of the rapid-entry shoe than the pivot point, and wherein in the collapsed position the coupling point is farther above the footbed than the pivot point.
6. The rapid-entry shoe of claim 4, further comprising a bend axis between a forward end of the closure system and an upper forward portion of the rapid-entry shoe, wherein an alignment line extending through the pivot point and the bend axis is closer to a footbed of the rapid-entry shoe than the coupling point such that the alignment line is disposed between the coupling point and the footbed.
7. The rapid-entry shoe of claim 4, further comprising a bend axis between a forward end of the closure system and an upper forward portion of the rapid-entry shoe, wherein an alignment line extending through the pivot point and the bend axis is farther above a footbed of the rapid-entry shoe than the coupling point such that the coupling point is disposed between the alignment line and the footbed.
8. The rapid-entry shoe of claim 4, wherein the pivot point is disposed above a footbed of the rapid-entry shoe.
9. The rapid-entry shoe of claim 8, further comprising a rigid support, wherein the pivot point is mounted to the rigid support.
10. The rapid-entry shoe of claim 9, wherein the rigid support is at least one of a portion of an upper of the rapid-entry shoe or an extension of an outsole of the rapid-entry shoe.
11. The rapid-entry shoe of claim 10, wherein the rigid support prevents upward and downward movement of the pivot point.

12. The rapid-entry shoe of claim 4, wherein the closure system comprises a link coupled to the forward segment of the actuator arm at the coupling point, wherein the link extends from the coupling point and is coupled to or forms a first part of a forward upper portion of the rapid-entry shoe.
13. The rapid-entry shoe of claim 12, wherein the link is a first link, wherein the closure system further comprises a second link coupled to the forward segment of the actuator arm at the coupling point, wherein the second link extends from the coupling point and is coupled to or forms a second part of the forward upper portion of the rapid-entry shoe.
14. The rapid-entry shoe of claim 13, wherein the second link comprises a first section and a second section coupled together.
15. The rapid-entry shoe of claim 4, further comprising a biasing member disposed below the coupling point and configured to apply a downward force to at least one of the forward segment of the actuator arm and the closure system.
16. The rapid-entry shoe of claim 2, further comprising a rear support portion extending between the rear segment and a base of the rapid-entry shoe, wherein the rear support portion biases the rapid-entry shoe toward the uncollapsed position, but can be momentarily deflected to allow the rear support portion to collapse to transition from the uncollapsed position to the collapsed position.
17. The rapid-entry shoe of claim 1, further comprising a resiliently deformable element coupled to and extending from below a footbed of the rapid-entry shoe, wherein the resiliently deformable element extends toward a rear upper portion of the rapid-entry shoe, wherein the

resiliently deformable element facilitates rebounding the rapid-entry shoe from the collapsed position to the uncollapsed position.

18. The rapid-entry shoe of claim 1, wherein the actuator arm is bi-stable in that it is stable in both the uncollapsed position and the collapsed position.

19. A rapid-entry shoe comprising:

an actuator arm comprising a rear segment, a pivot point, and a forward segment, wherein the pivot point is disposed between the rear segment and the forward segment; and

a closure system coupled to the forward segment of the actuator arm at a coupling point; wherein movement of the actuator arm from an uncollapsed position to a collapsed position opens the closure system and comprises downward rotational movement of the rear segment and upward rotational movement of the forward segment;

wherein movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure system comprises upward rotational movement of the rear segment and downward rotational movement of the forward segment.

20. A rapid-entry shoe comprising:

an actuator arm comprising a first pivot point; and
a closure system extending from the actuator arm and comprising a second pivot point; wherein the actuator arm and the closure system are integrally formed of the same material;

wherein a living hinge is formed between the actuator arm and the closure system, wherein the living hinge facilitates relative movement of the actuator arm and the closure system; and

wherein movement of the actuator arm from an uncollapsed position to a collapsed position opens the closure system, and wherein movement of the actuator arm from the collapsed position to the uncollapsed position closes the closure system.

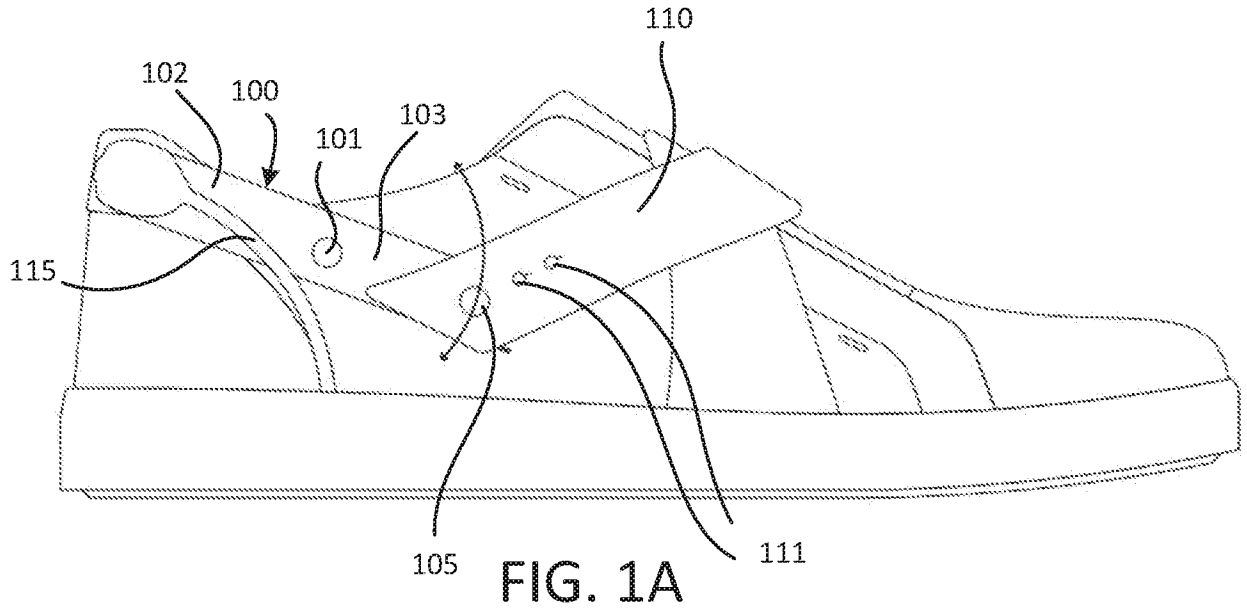


FIG. 1A

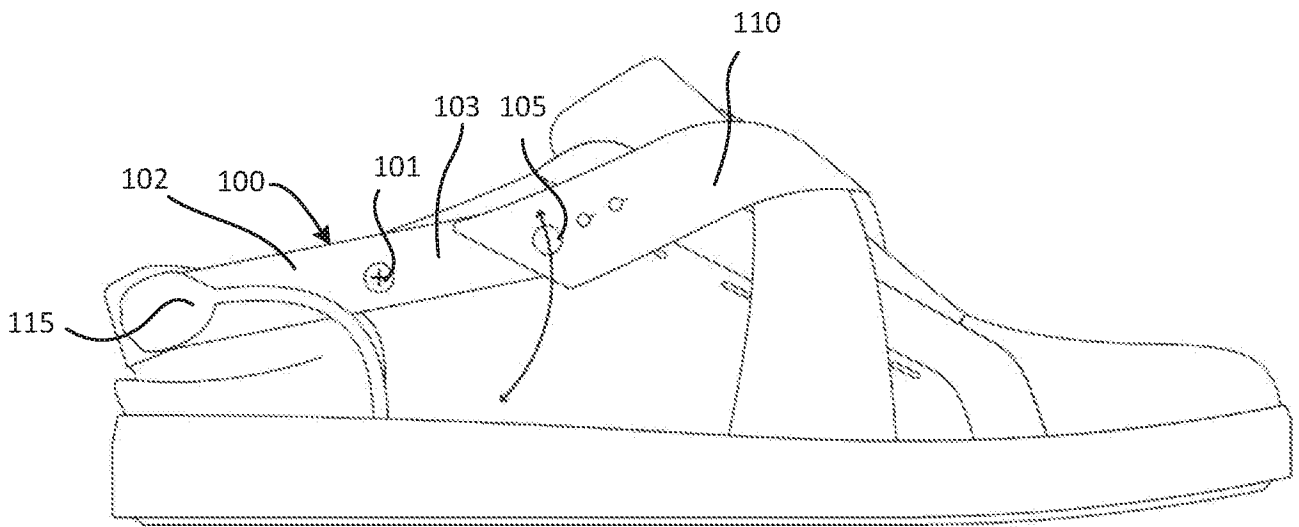


FIG. 1B

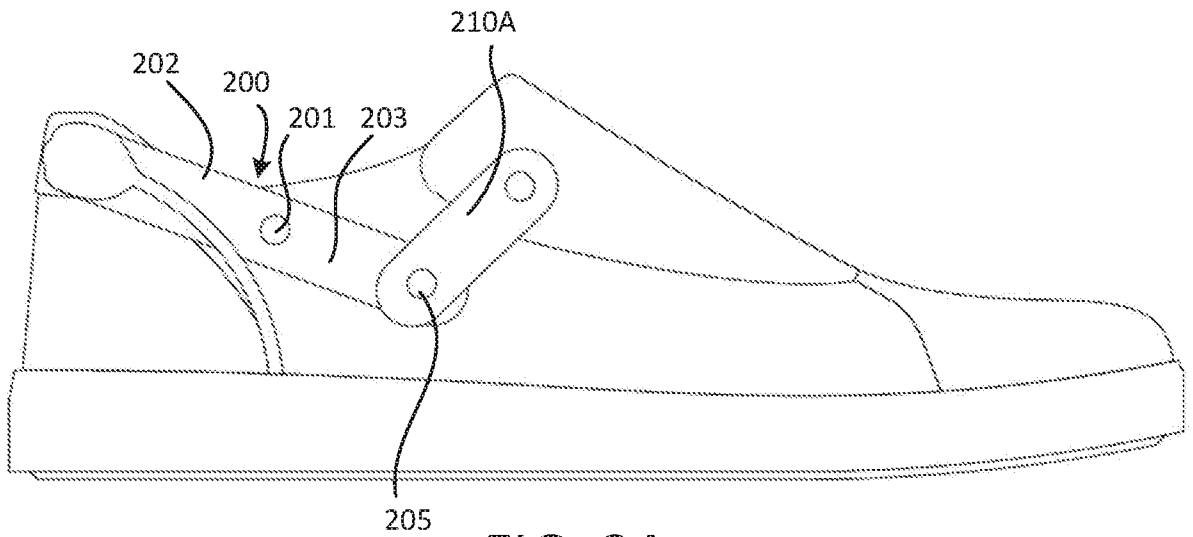


FIG. 2A

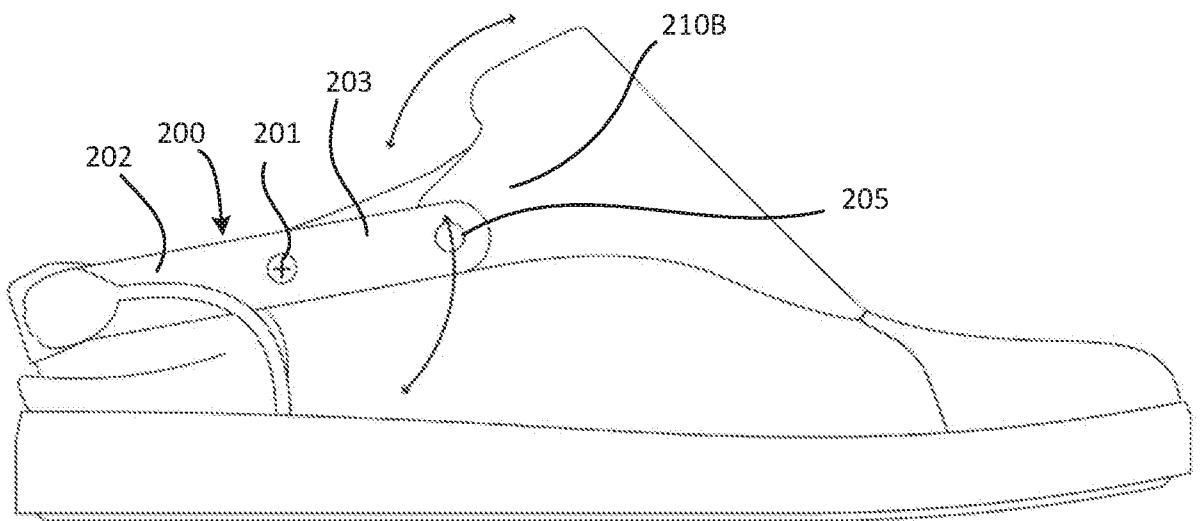


FIG. 2B

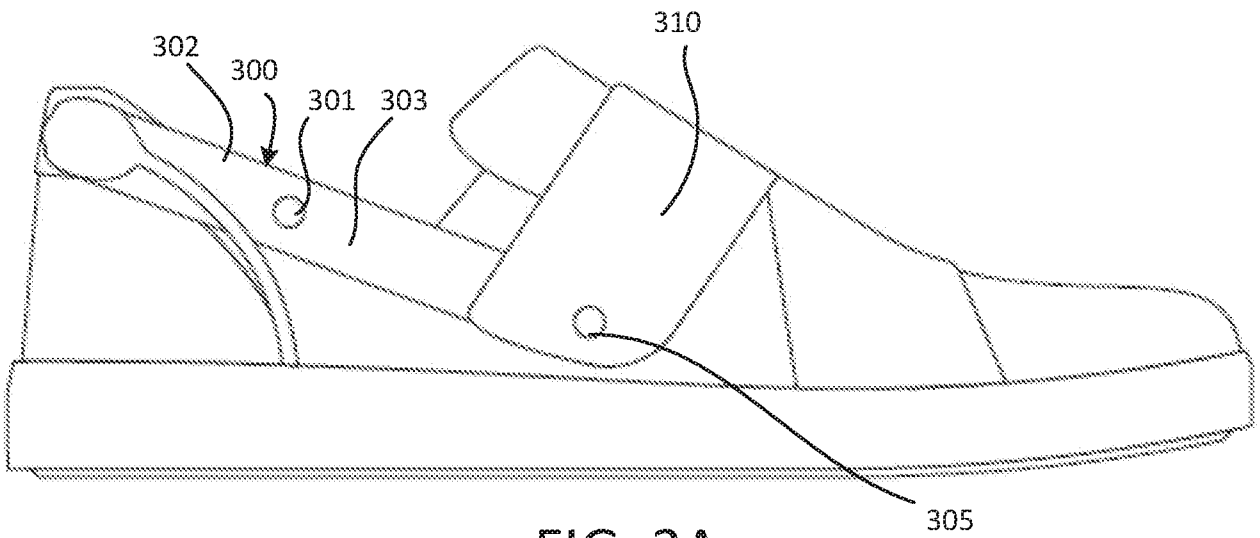


FIG. 3A

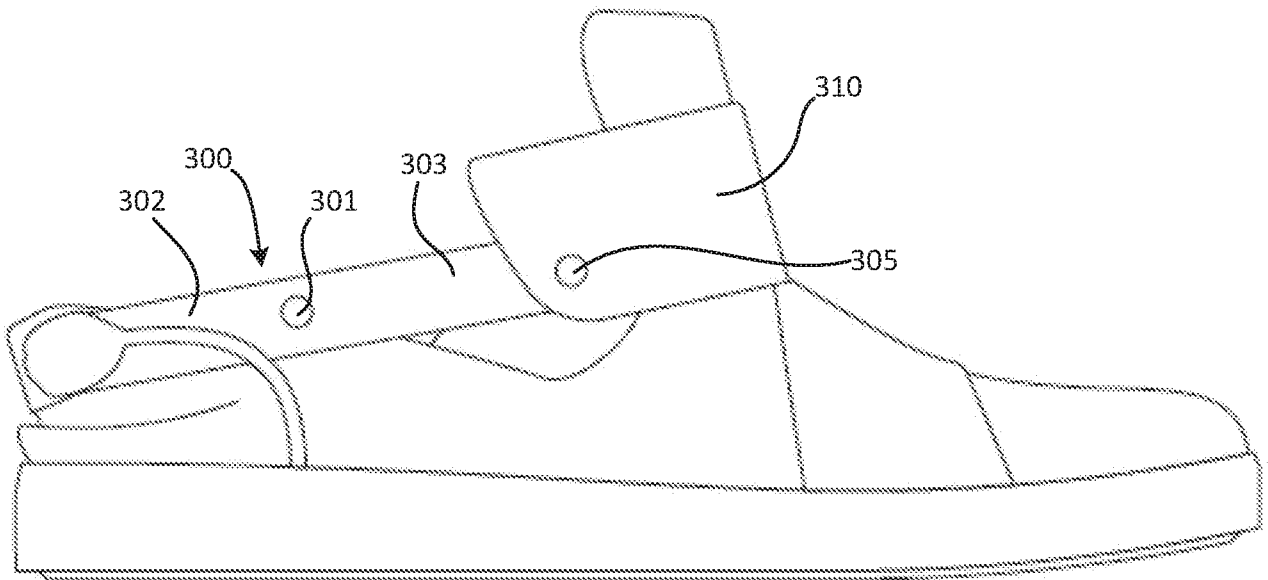


FIG. 3B

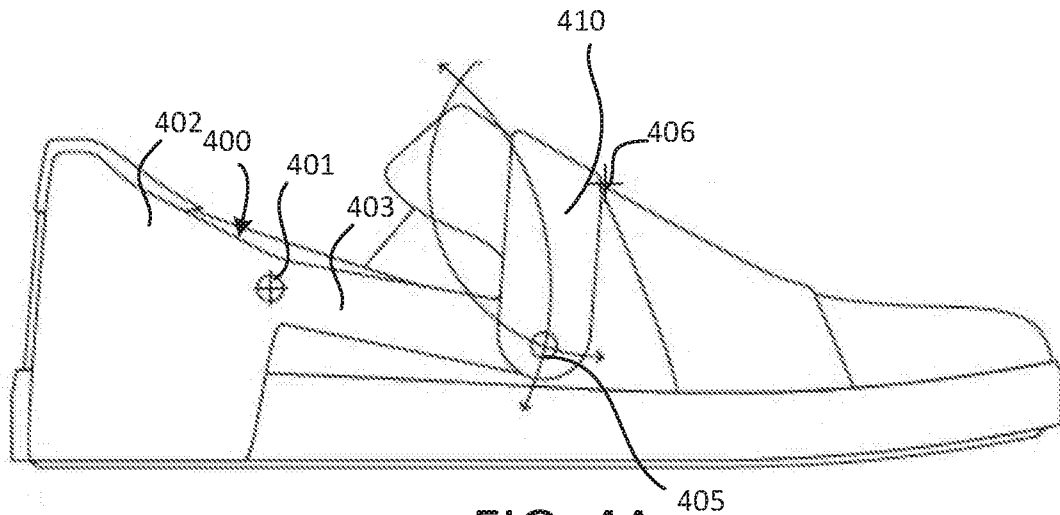


FIG. 4A

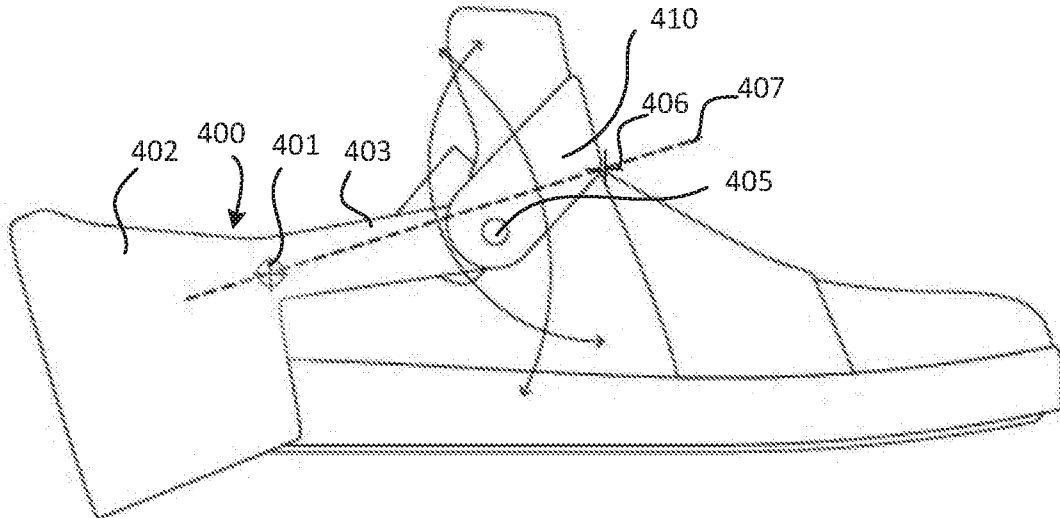


FIG. 4B

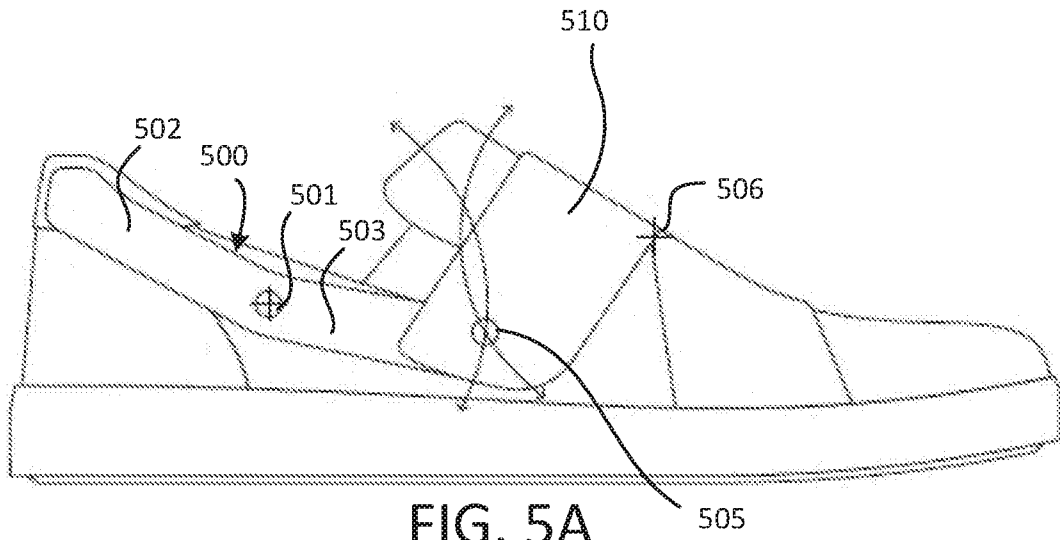


FIG. 5A

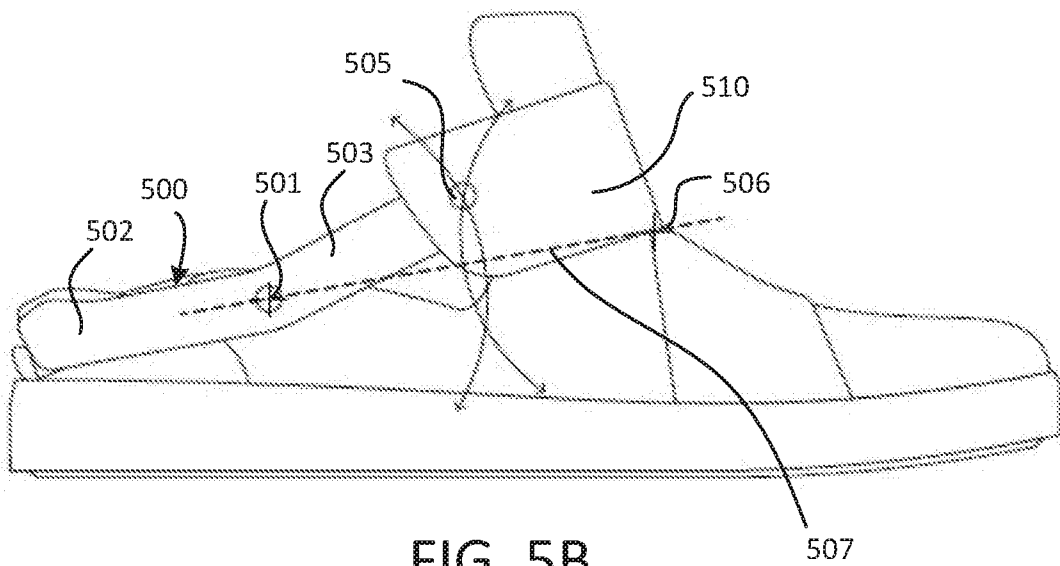


FIG. 5B

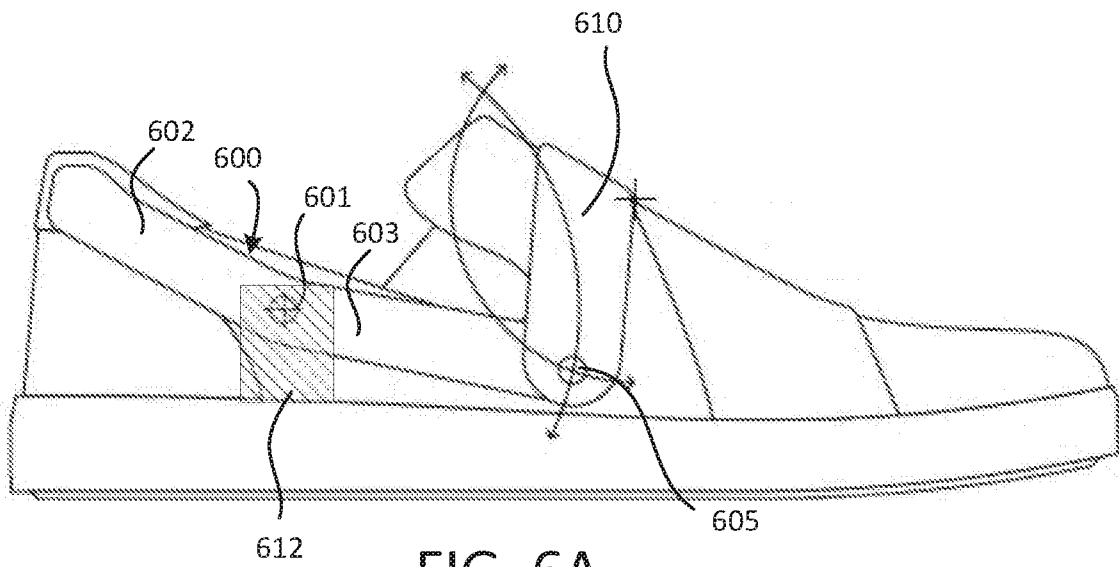


FIG. 6A

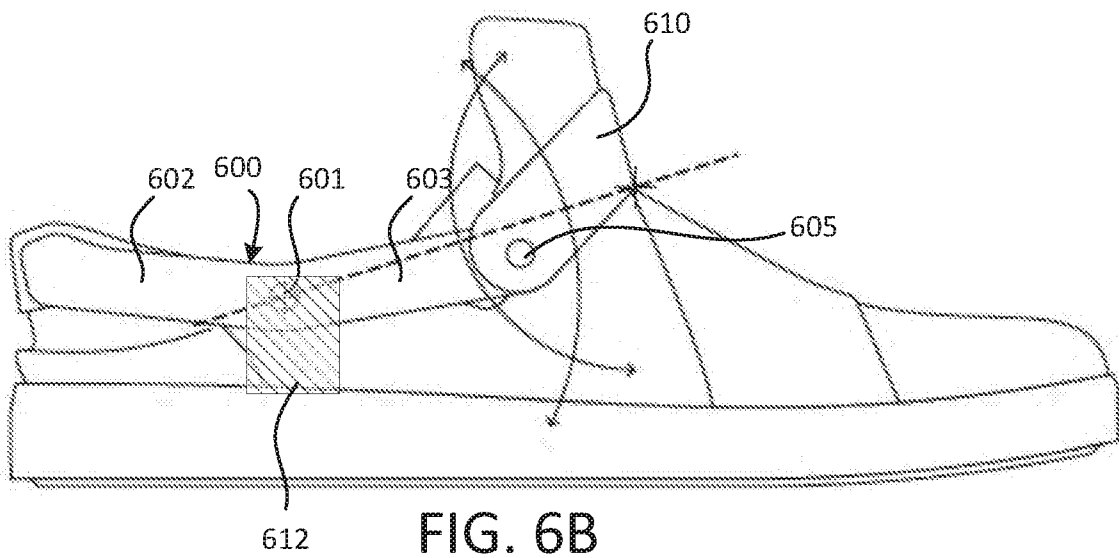


FIG. 6B

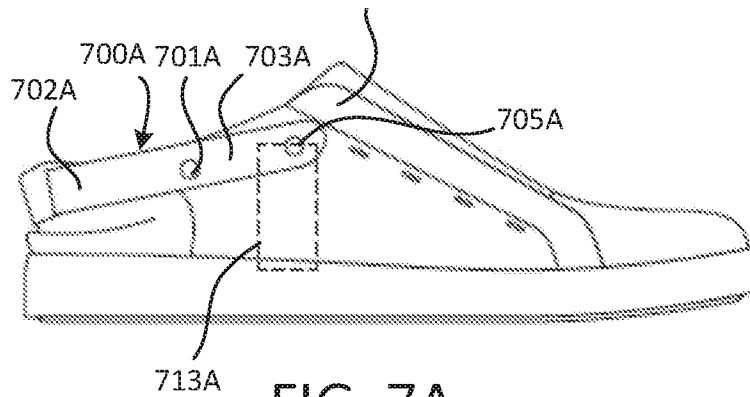


FIG. 7A

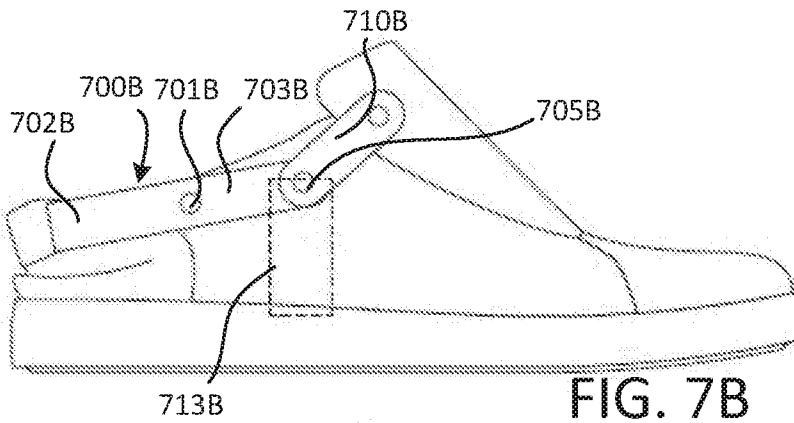


FIG. 7B

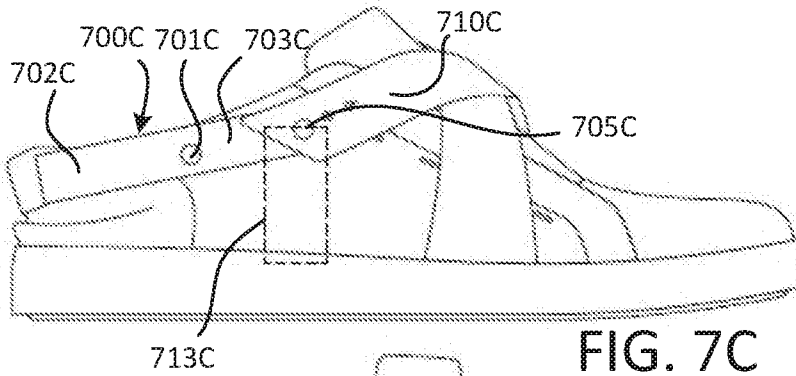


FIG. 7C

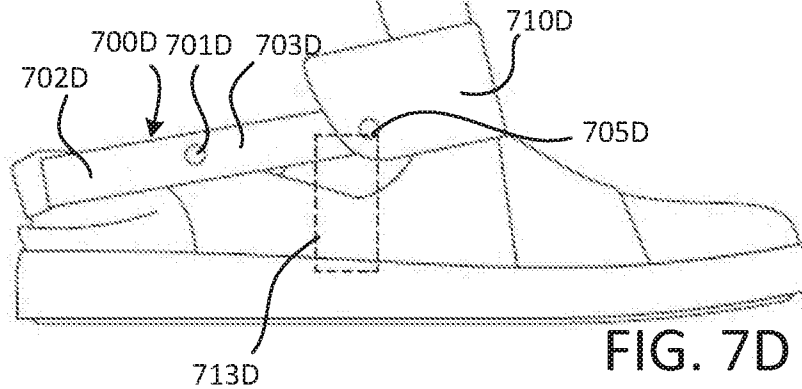
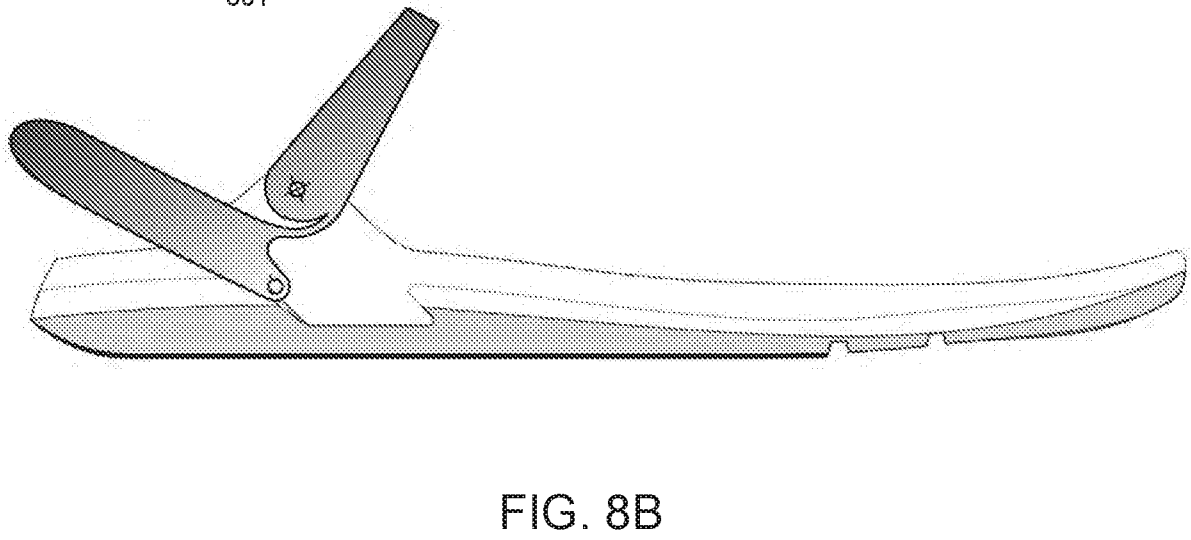
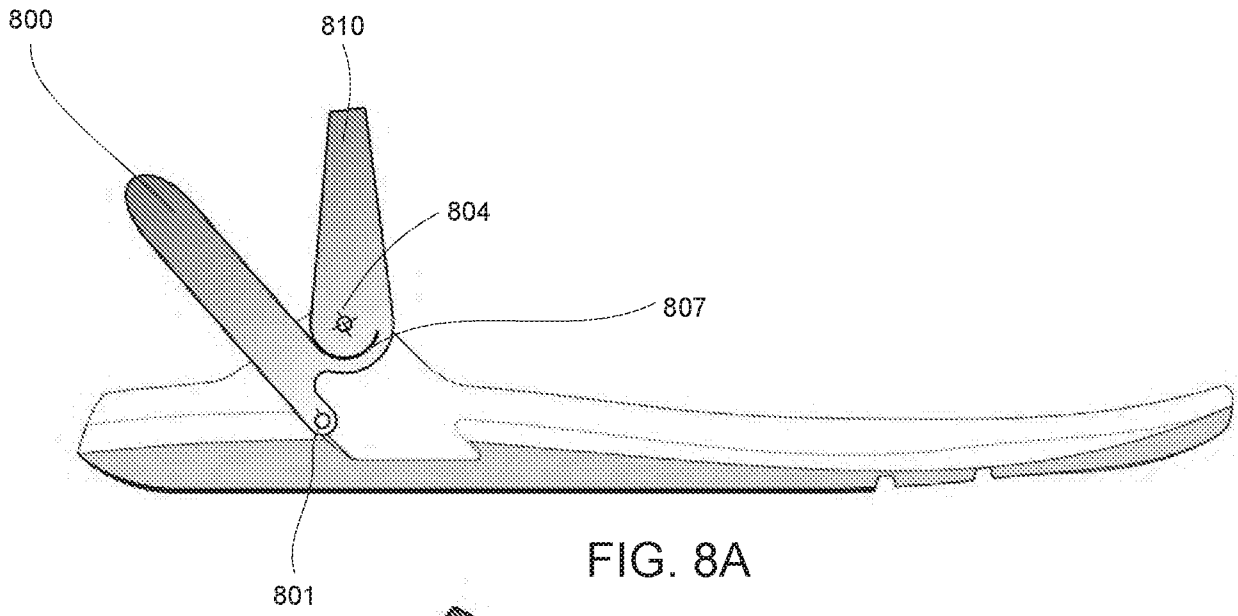


FIG. 7D



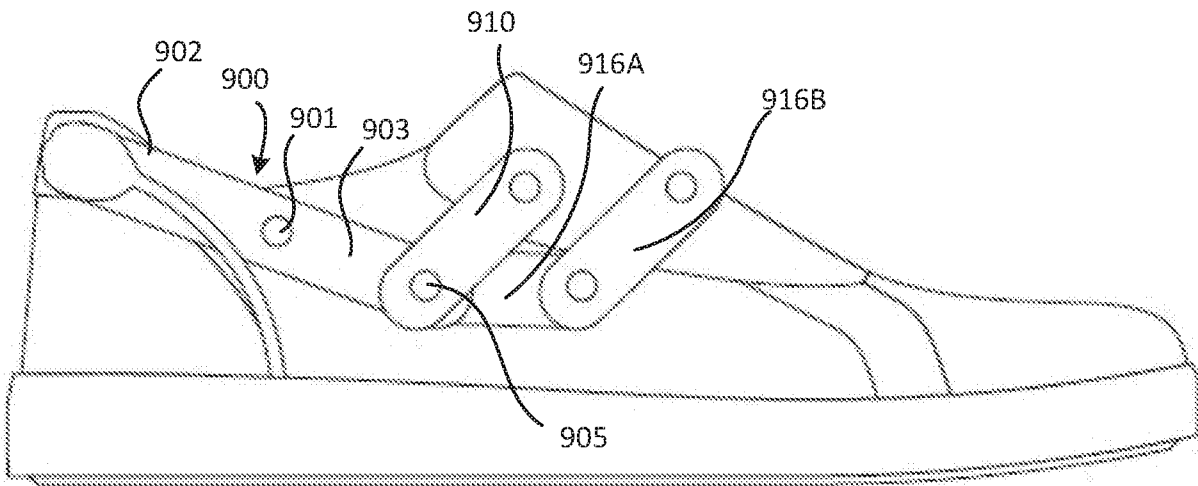


FIG. 9A

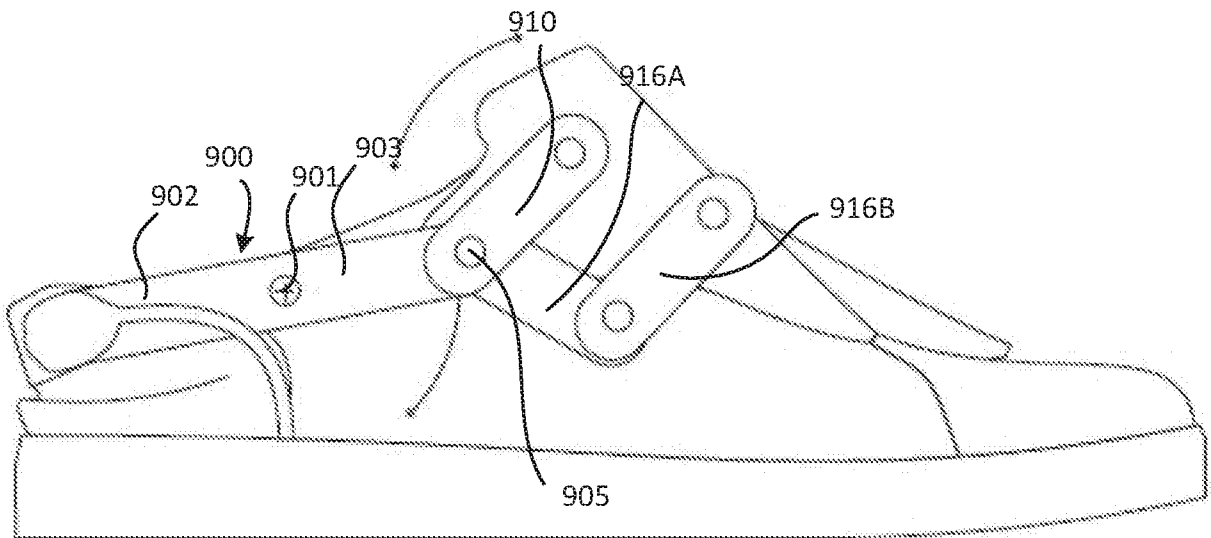


FIG. 9B

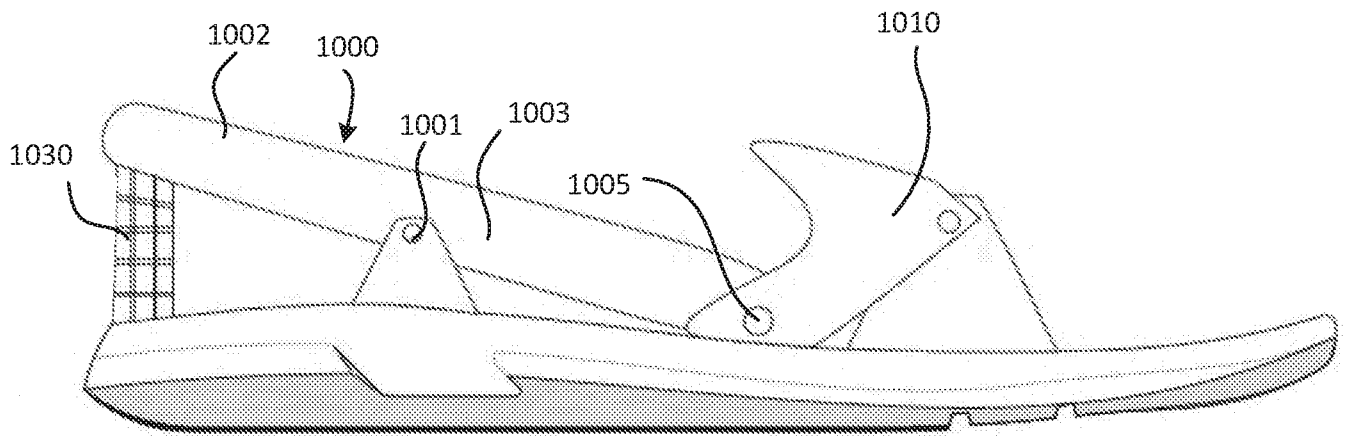


FIG. 10A

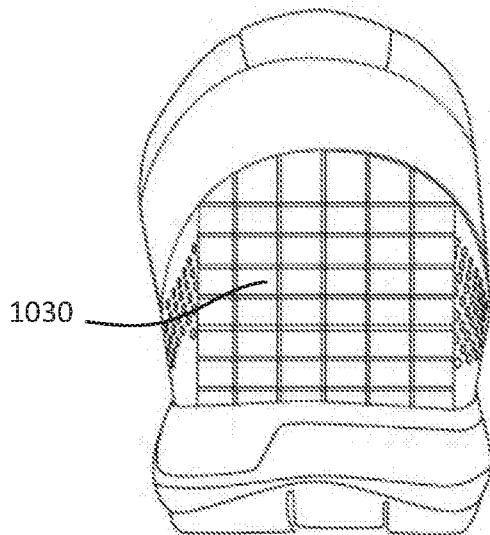


FIG. 10B

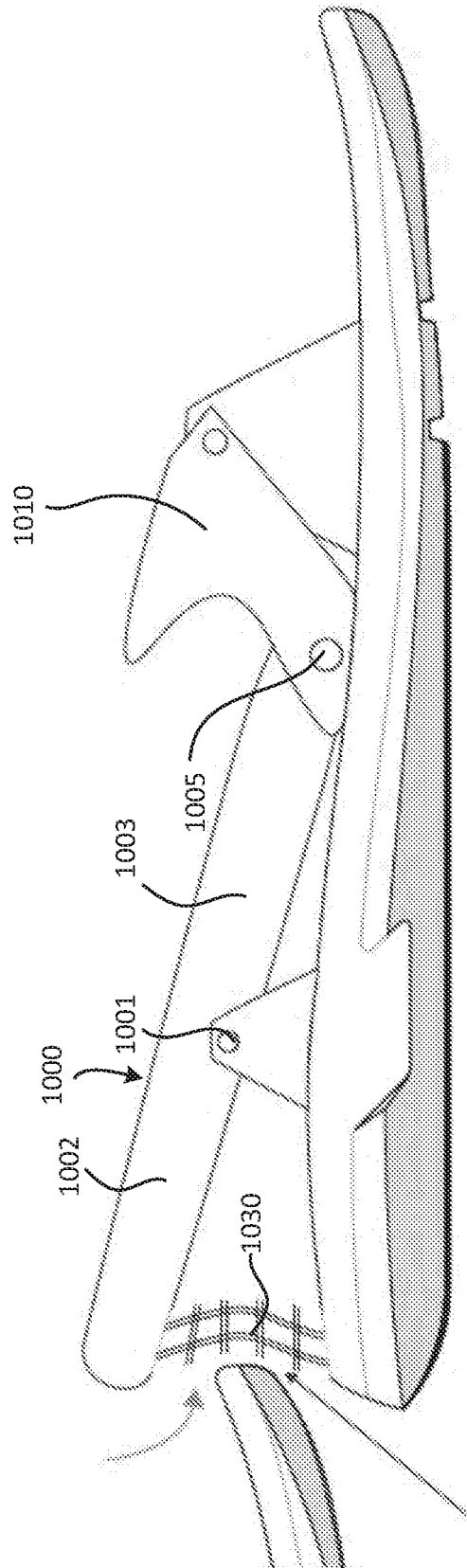


FIG. 10C

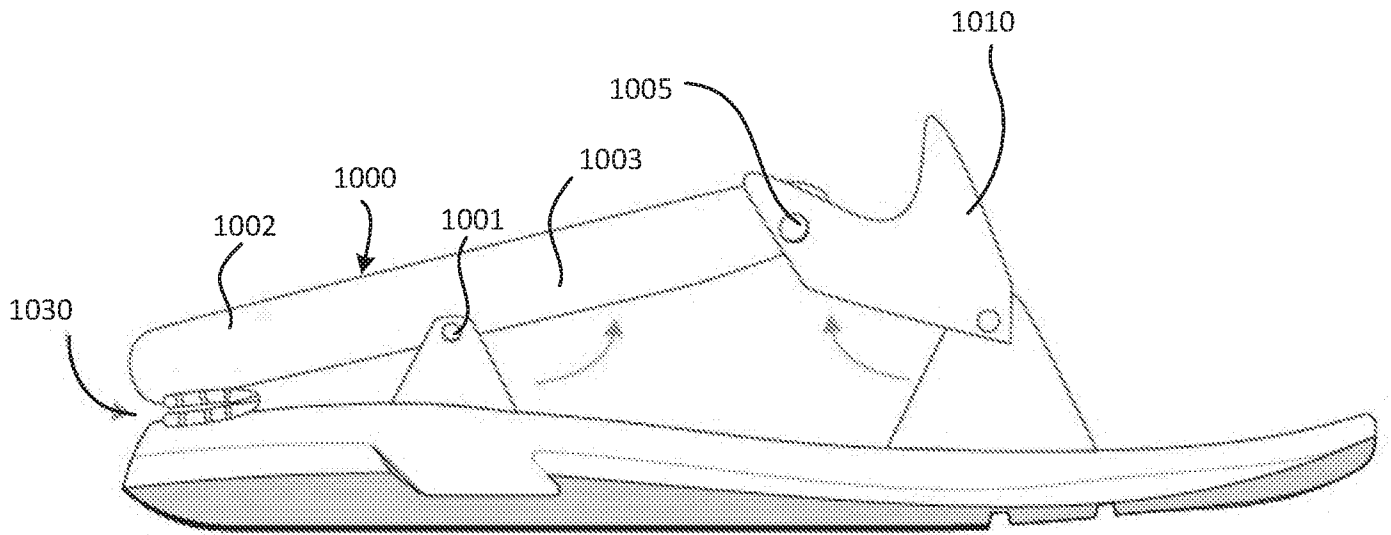


FIG. 10D

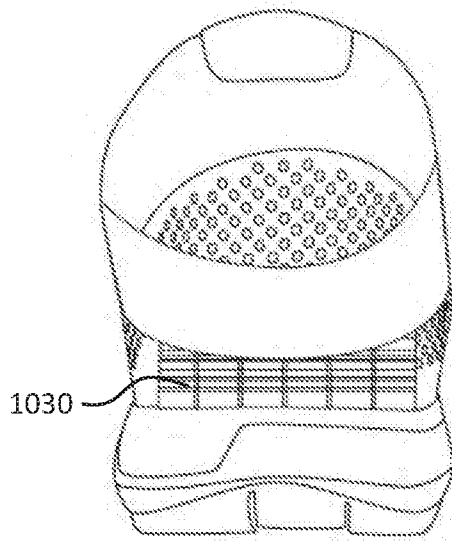


FIG. 10E

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 19/39944

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A43B 23/08; A43B 11/00; A43B 21/24; A43B 23/26; A43B 3/12; A43C 11/00 (2019.01)
CPC - A43B 23/08; A43B 21/00; A43B 11/00; A43B 21/24; A43B 23/02; A43B 23/26; A43B 3/12; A43B 23/28; A43B 3/24; A43B 21/36; A43C 11/00; A43C 11/008

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

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

See Search History Document

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

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2017/0360151 A1 (FAST IP, LLC) 21 December 2017 (21.12.2017); entire document, especially para [0053]-[0054], and Fig. 22-24.	1-3, 19
X	US 2011/0016751 A1 (SOMERVILLE) 27 January 2011 (27.01.2011); entire document, especially para [0042], [0057]-[0058], and Fig. 4-7 and 10.	1-2, 4, 8
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Y		20
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A		5-7, 9-15
X	US 2017/0360143 A1 (FAST IP, LLC) 21 December 2017 (21.12.2017); entire document, especially para [0027]-[0030], and Fig. 1A-B and 6A-C.	1-2, 16-18
Y	US 2018/0110287 A1 (NIKE, INC.) 26 April 2018 (26.04.2018); especially para [0070]-[0072], and Fig. 5-8.	20
A	US 7,823,299 B1 (BRIGHAM) 2 November 2010 (02.11.2010); especially col 10 ln 13-67, and Fig. 4C.	12-14
A	"Kizik Handsfree New York Shoe review" (SNEIDER) 27 June 2018 (27.06.2018); retrieved from the internet 15.08.2019; URL=https://the-gadgeteer.com/2018/06/27/kizik-handsfree-new-york-shoe-review/; entire document.	1-20
A	US 5,997,027 A (JUNGKIND) 7 December 1999 (07.12.1999); entire document.	1-20
A	US 4,924,605 A (SPADEMAN) 15 May 1990 (15.05.1990); entire document.	1-20

Further documents are listed in the continuation of Box C.

See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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

"&" document member of the same patent family

Date of the actual completion of the international search

20 August 2019

Date of mailing of the international search report

26 SEP 2019

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