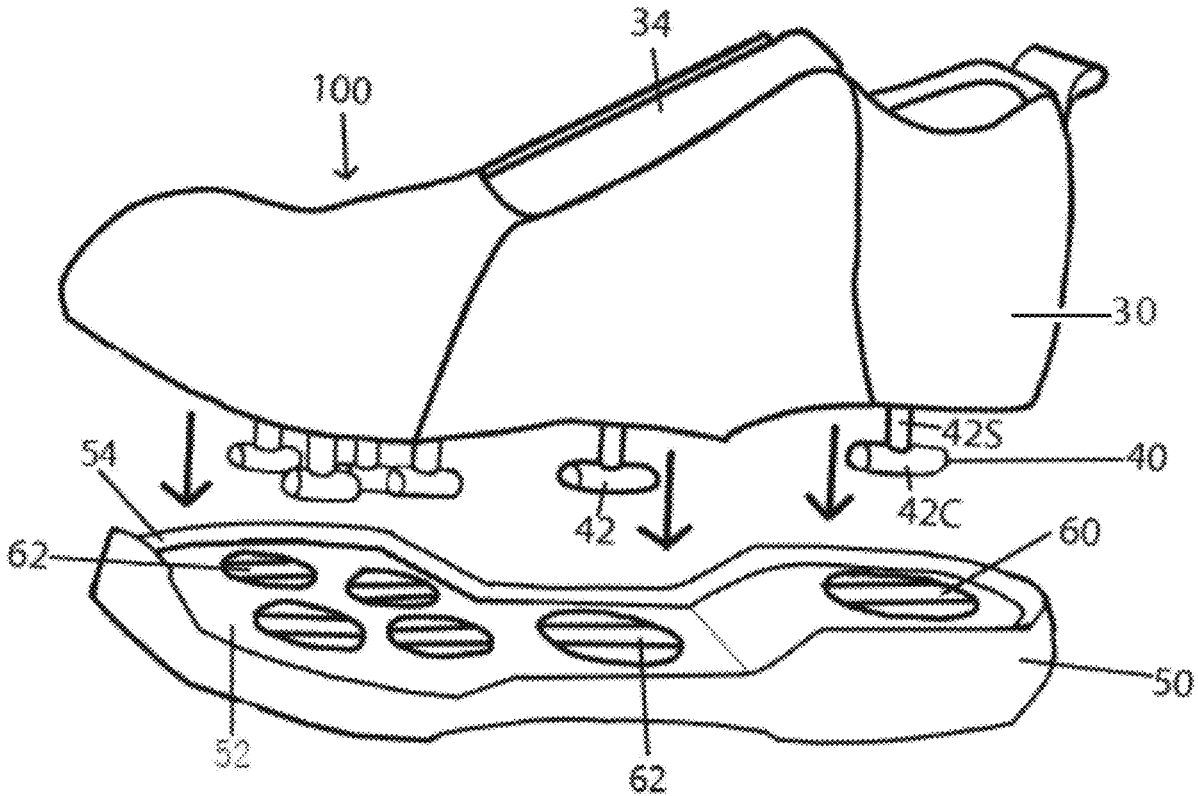




US 20220304418A1

(19) **United States**(12) **Patent Application Publication**
KAILA(10) **Pub. No.: US 2022/0304418 A1**(43) **Pub. Date: Sep. 29, 2022**(54) **MODULAR, CUSTOMIZABLE FOOTWEAR
SYSTEM WITH INTERCHANGEABLE
COMPONENTS**(57) **ABSTRACT**(71) Applicant: **VIJAY KAILA**, Houston, TX (US)(72) Inventor: **VIJAY KAILA**, Houston, TX (US)(21) Appl. No.: **17/209,385**(22) Filed: **Mar. 23, 2021****Publication Classification**(51) **Int. Cl.***A43B 13/36* (2006.01)*A43B 3/24* (2006.01)(52) **U.S. Cl.**CPC *A43B 13/36* (2013.01); *A43B 3/246*
(2013.01)

A modular, customizable shoe assembly comprises a shoe shell including a shell attachment mechanism on a lower portion of the shoe shell and a pair of engagement members on an upper medial region of the shoe shell. The shoe assembly includes at least two different types of shoe soles which can be releasably connected alternatively to the shoe shell. Each of the shoe soles have a sole attachment mechanism adapted for releasable connection to the shell attachment mechanism. At least two different types of securement assemblies which can be releasably connected alternately to the shoe shell are provided and each of the securement assemblies are adapted for releasable connection to the pair of engagement members. The securement assemblies are arranged and designed to aid in securing the shoe to a wearer's foot. The shoe shell may also include a back heel mechanism on the rear of the shoe shell. A detachable loop piece having an upper loop is arranged and designed to detachably connect to the back heel mechanism.



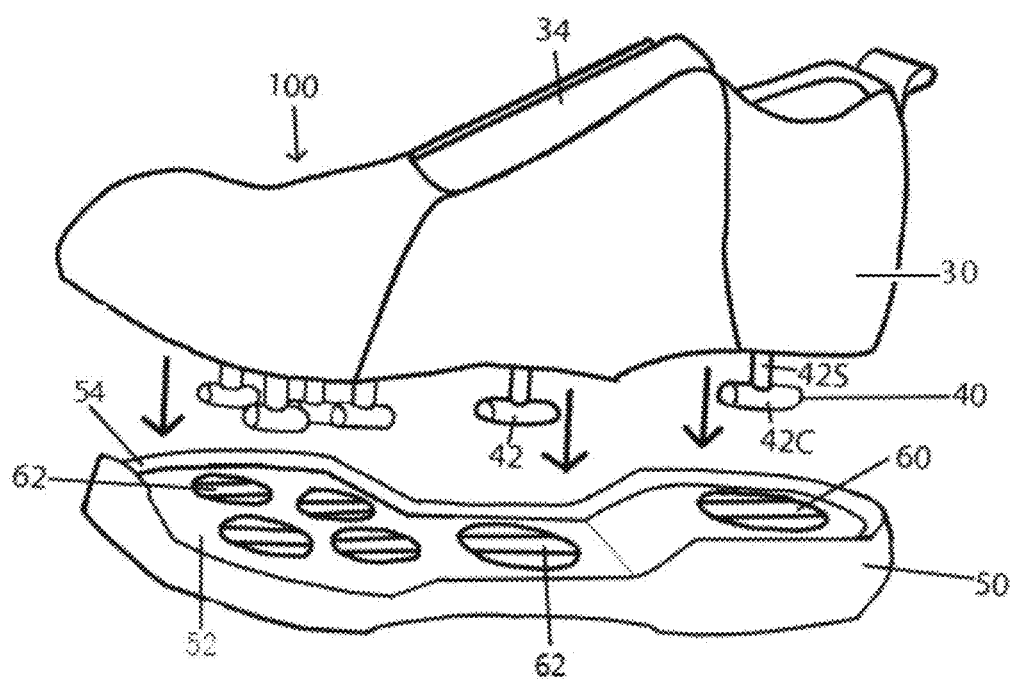


FIGURE 1

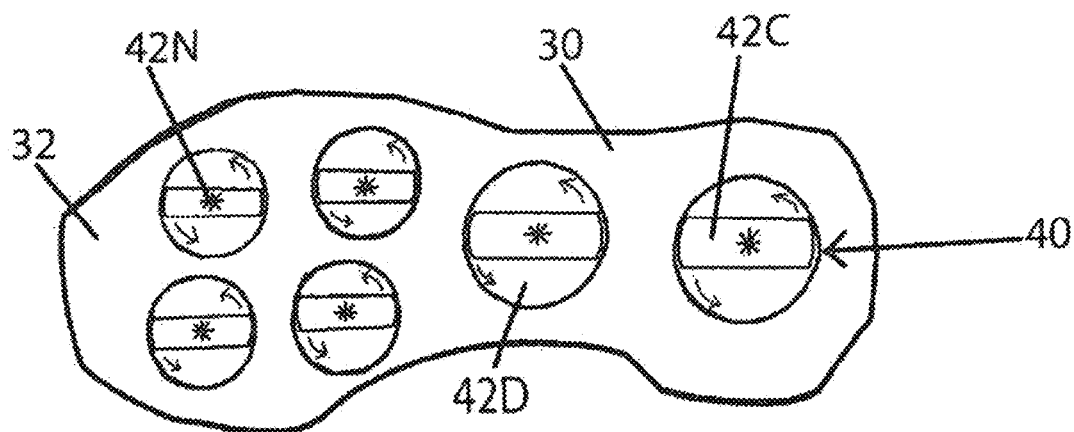


FIGURE 1A

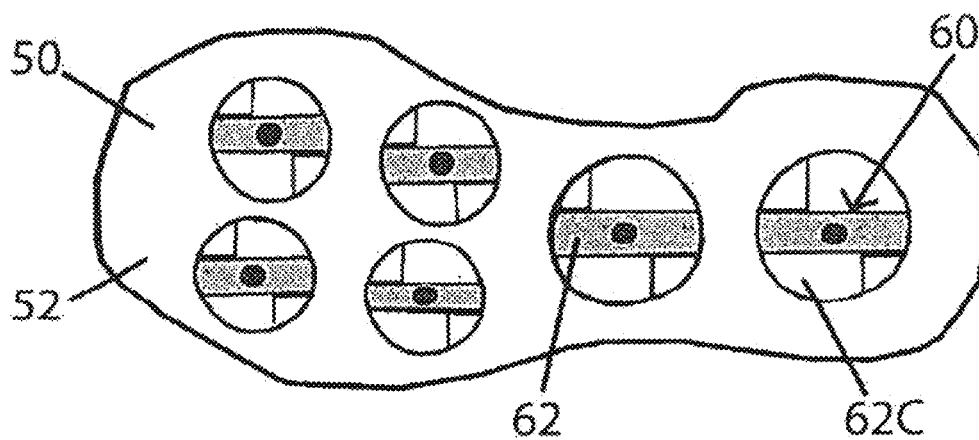


FIGURE 1B

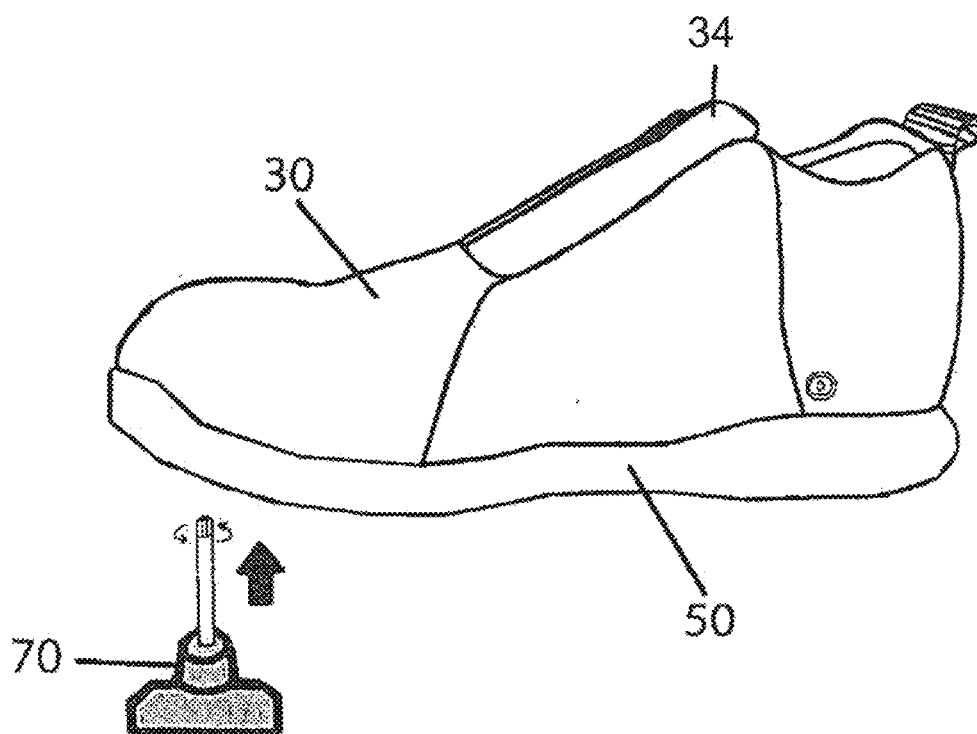


FIGURE 1C

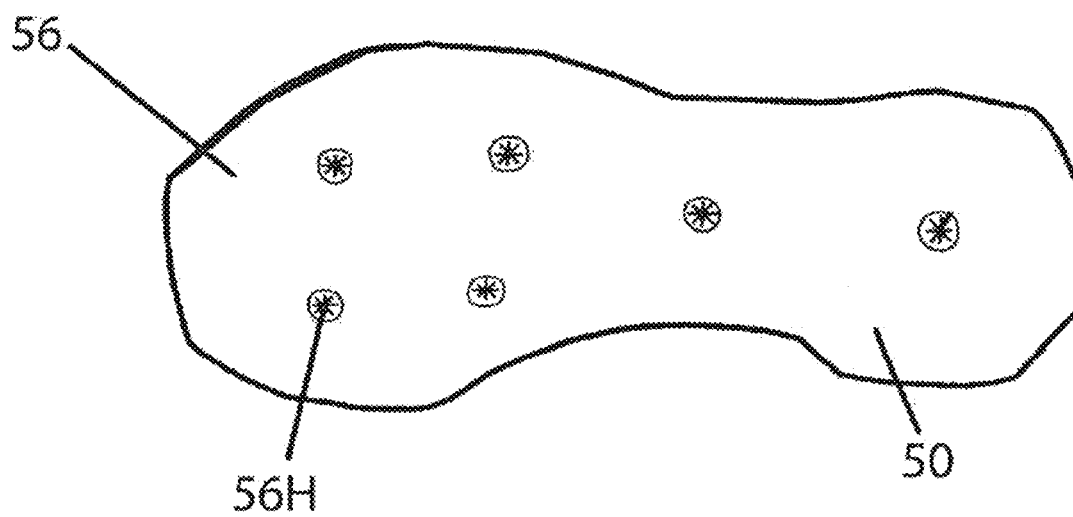


FIGURE 1D

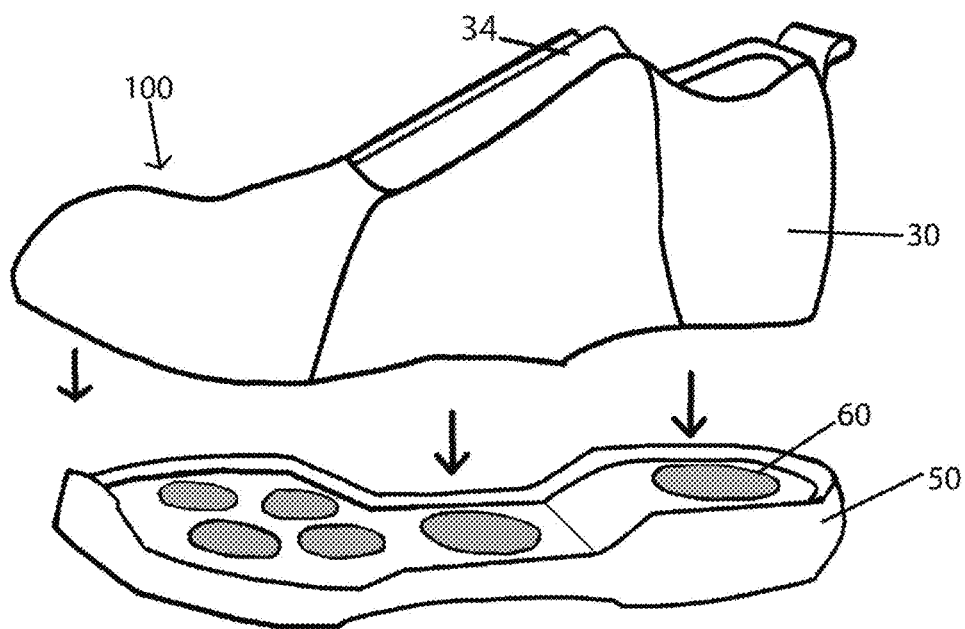


FIGURE 2

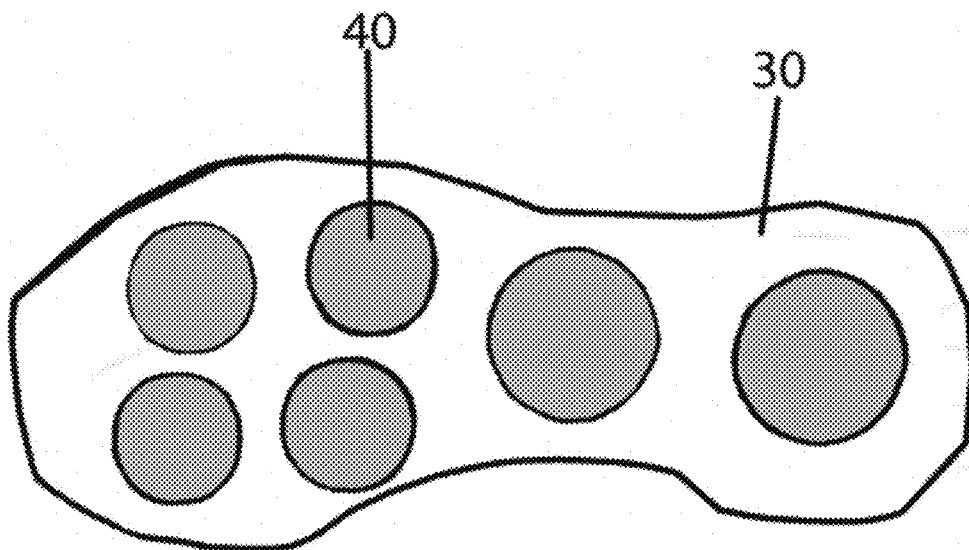


FIGURE 2A

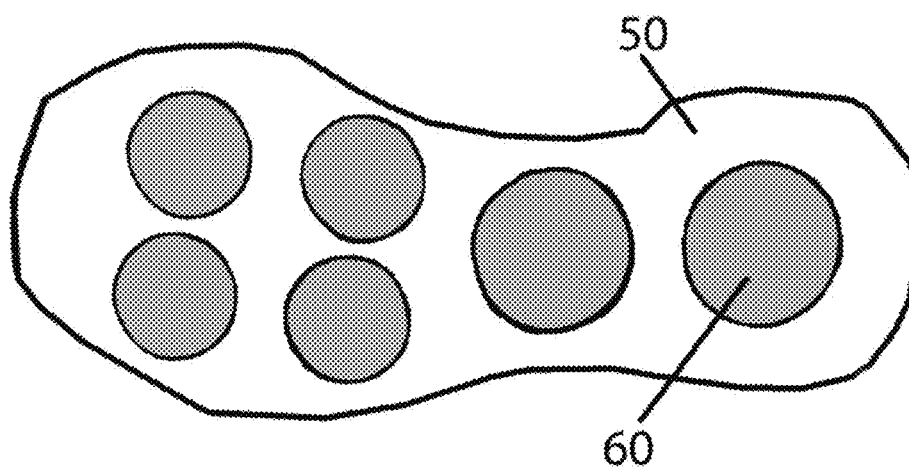


FIGURE 2B

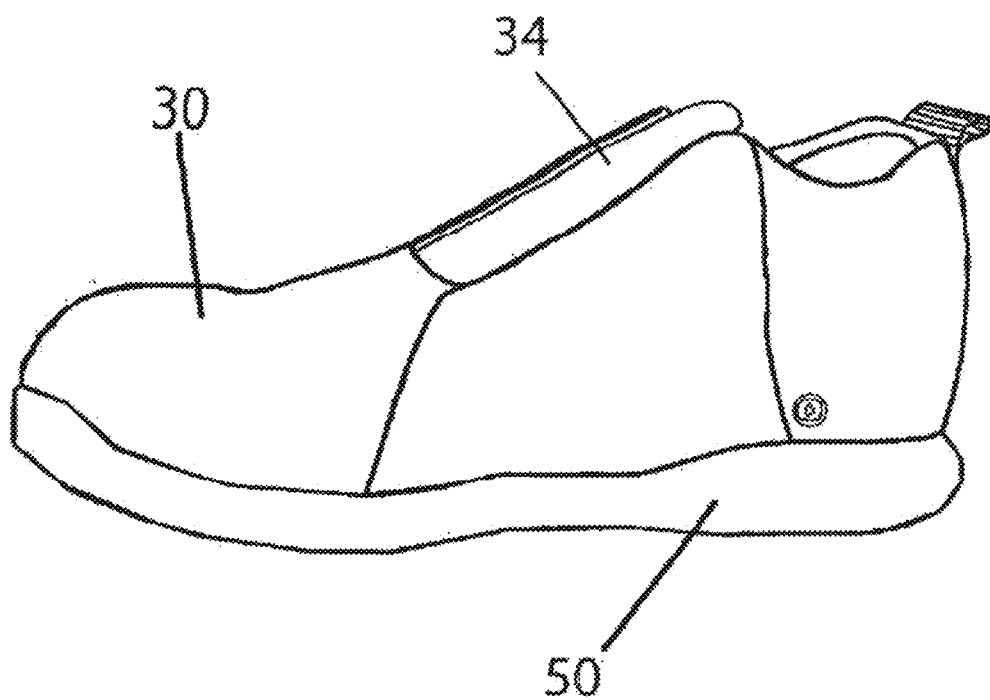


FIGURE 2C

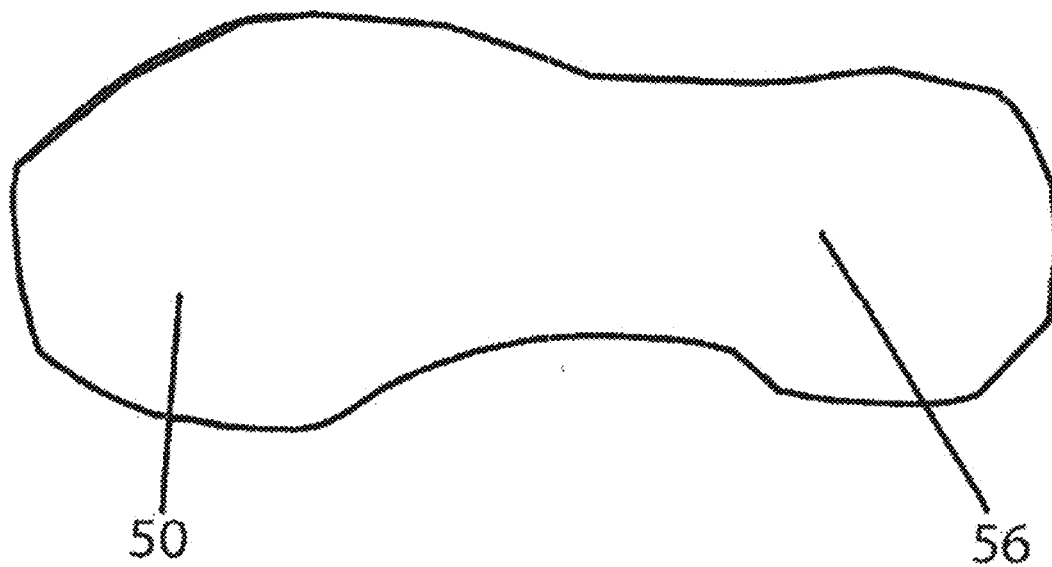


FIGURE 2D

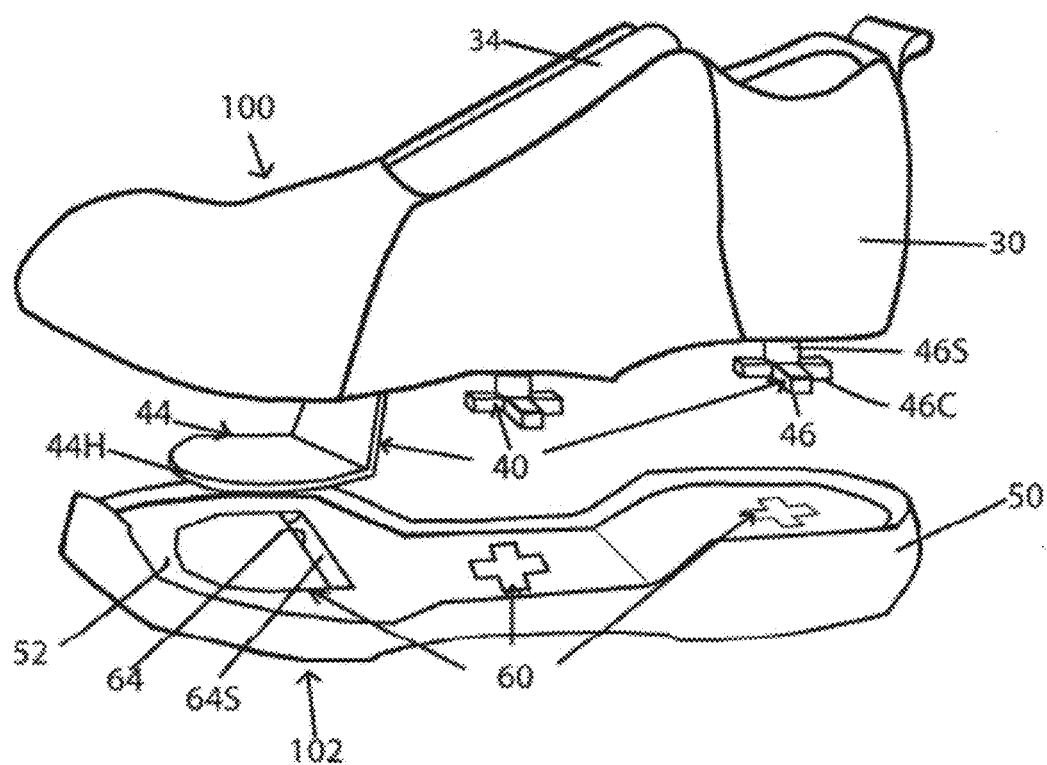


FIGURE 3

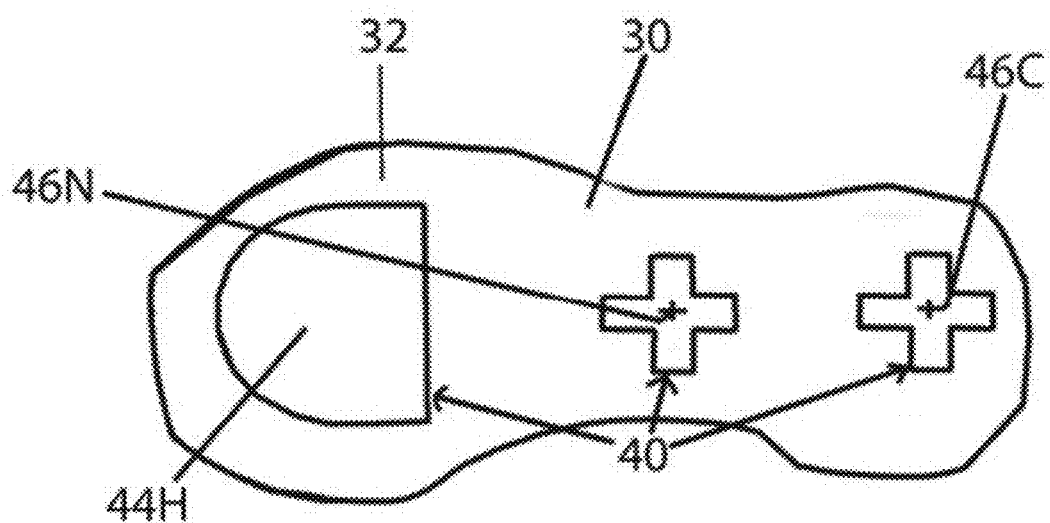


FIGURE 3A

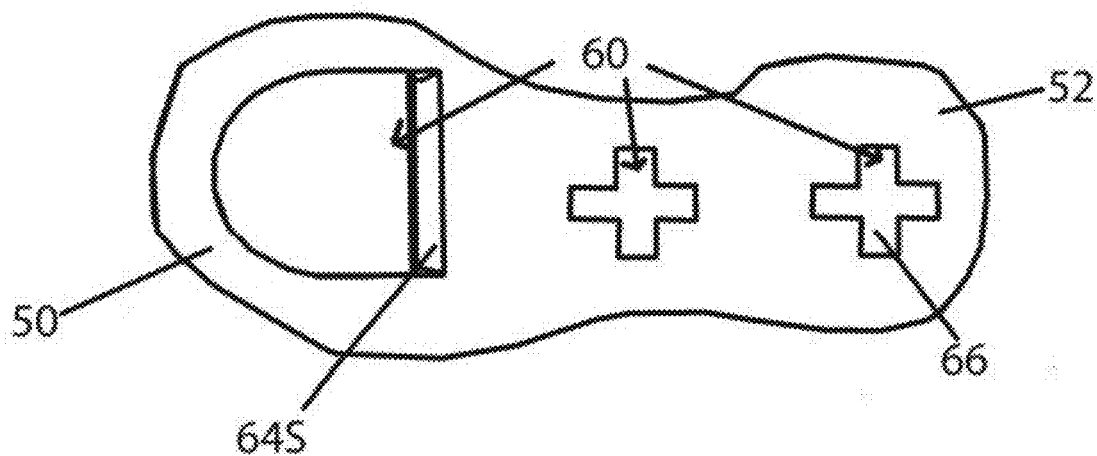


FIGURE 3B

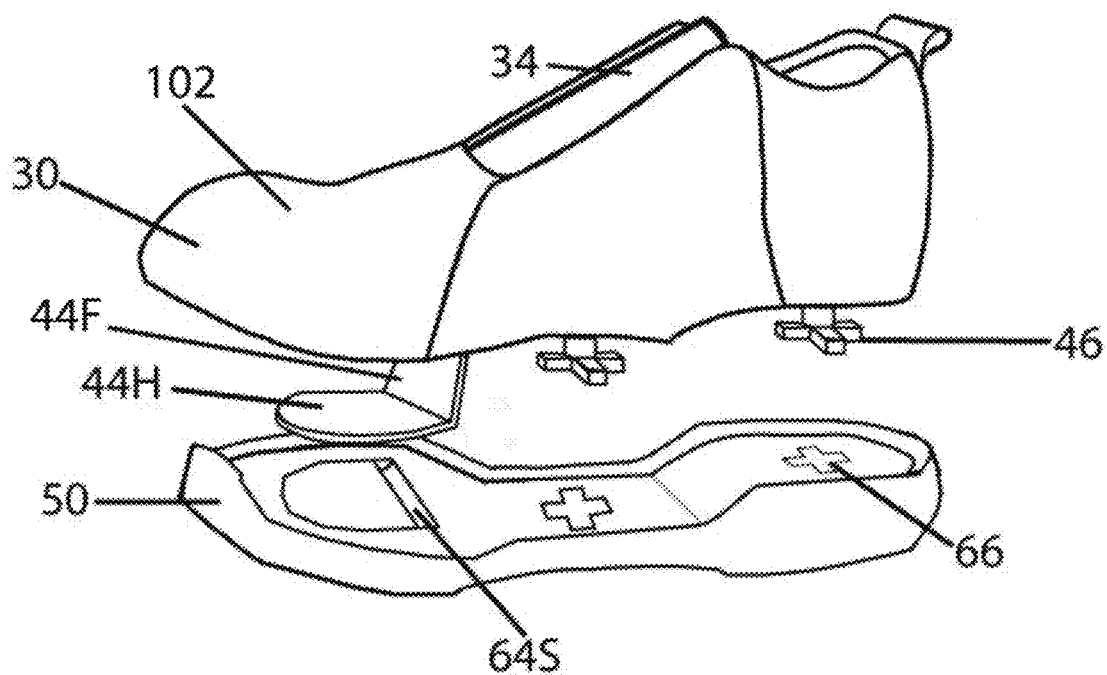


FIGURE 3C

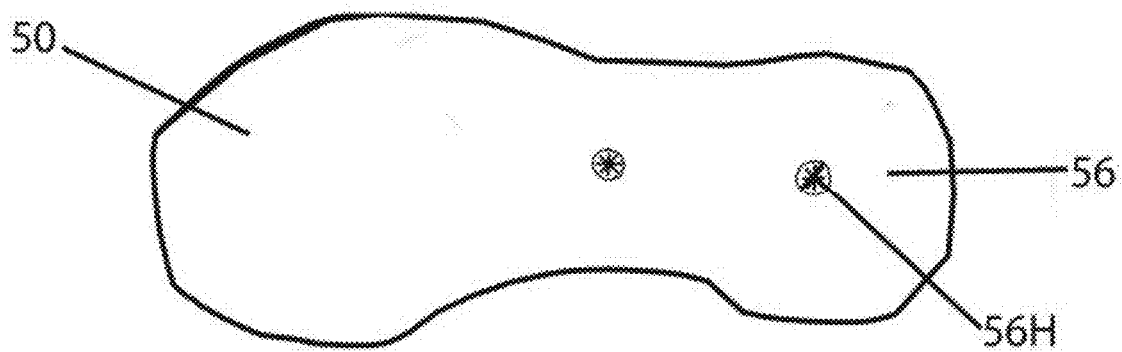


FIGURE 3D

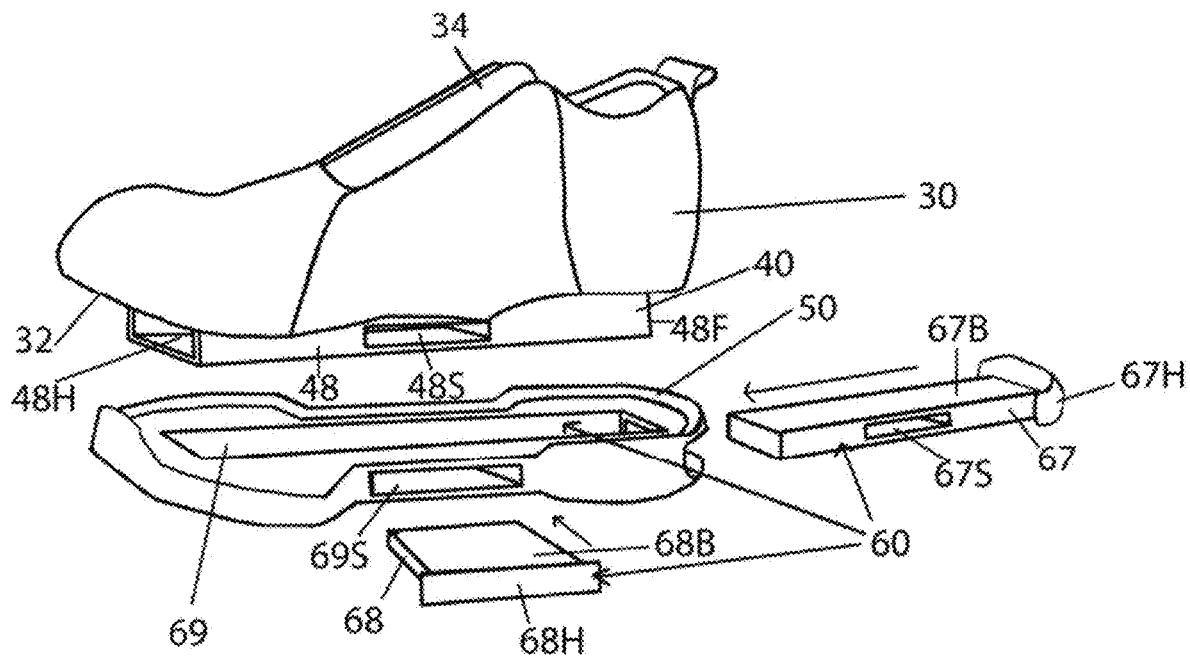


FIGURE 4

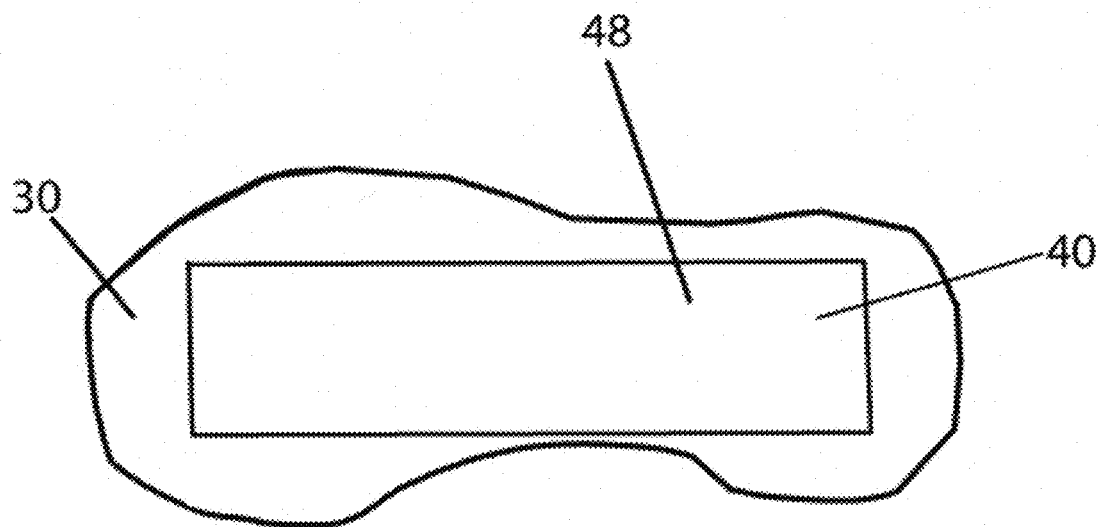


FIGURE 4A

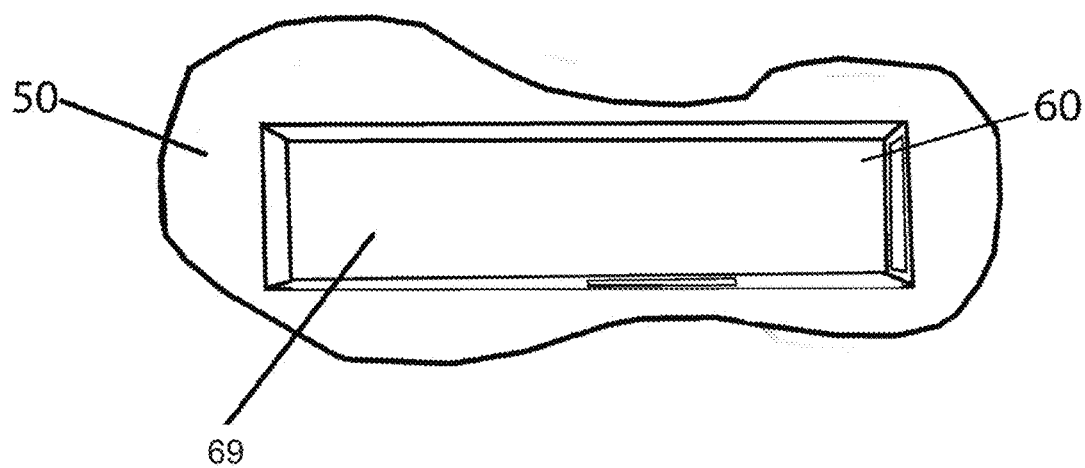


FIGURE 4B

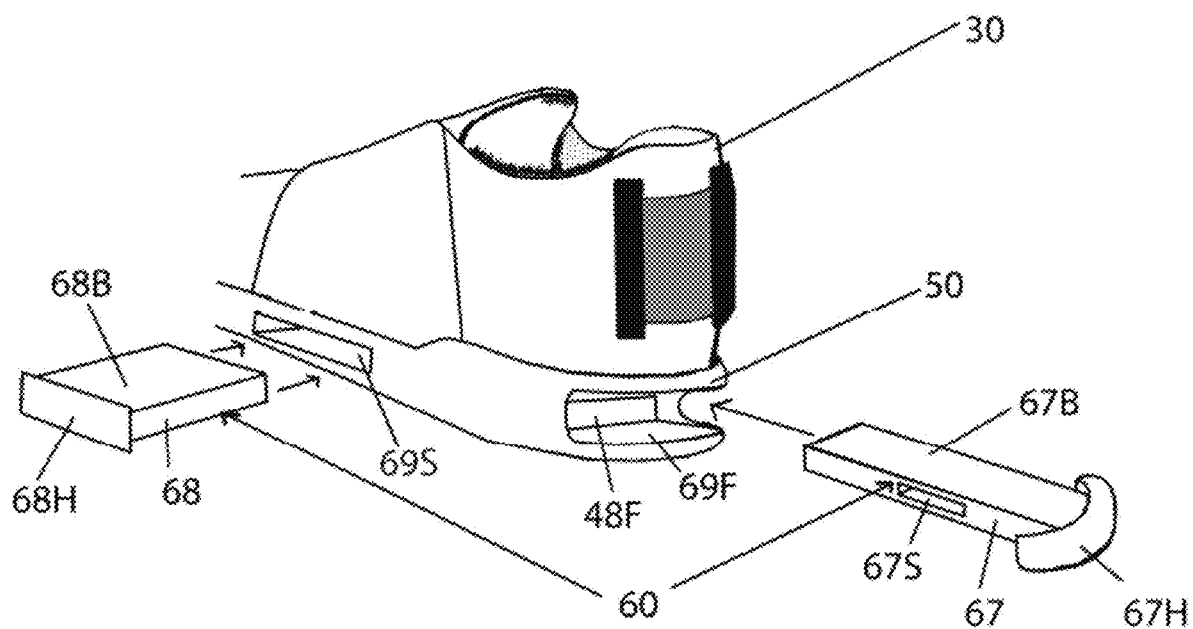


FIGURE 4C

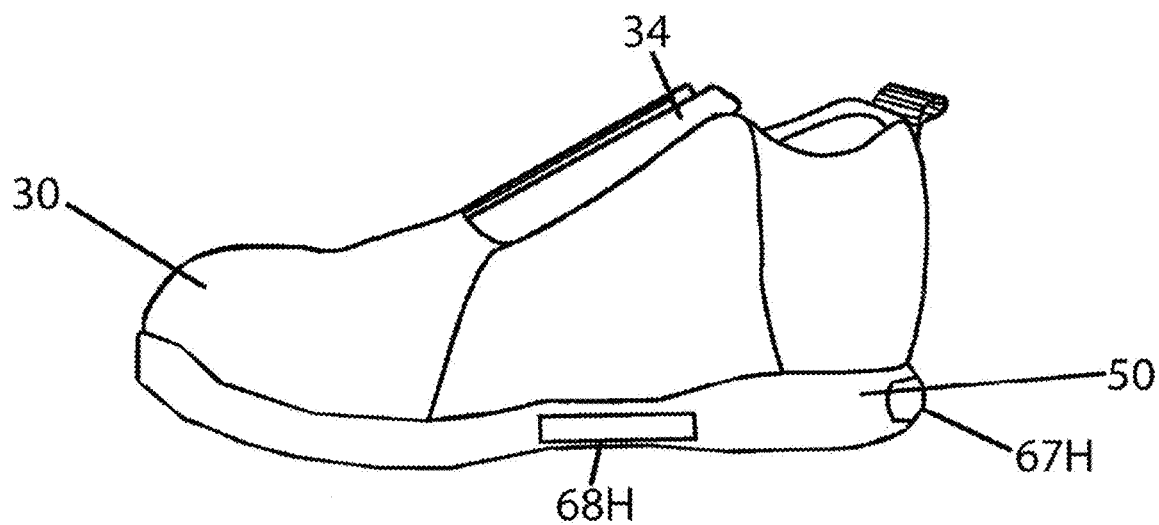


FIGURE 4D

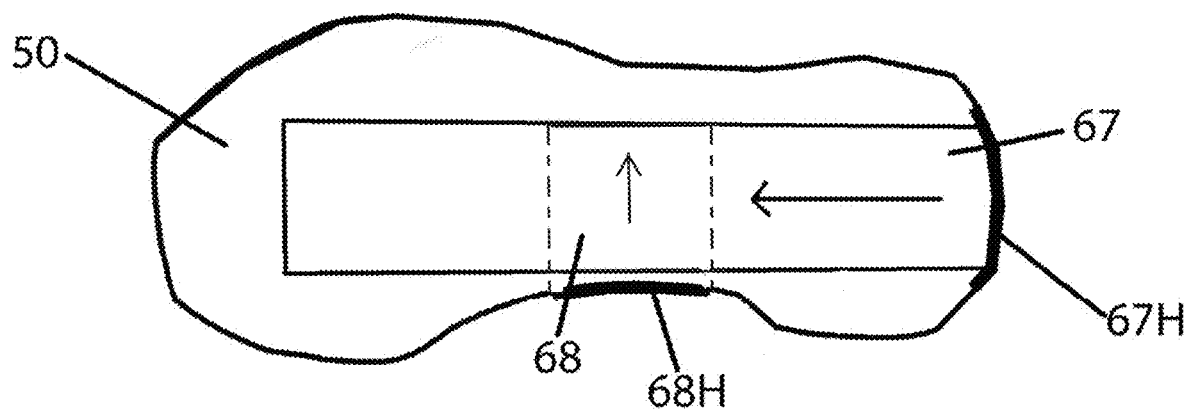


FIGURE 4E

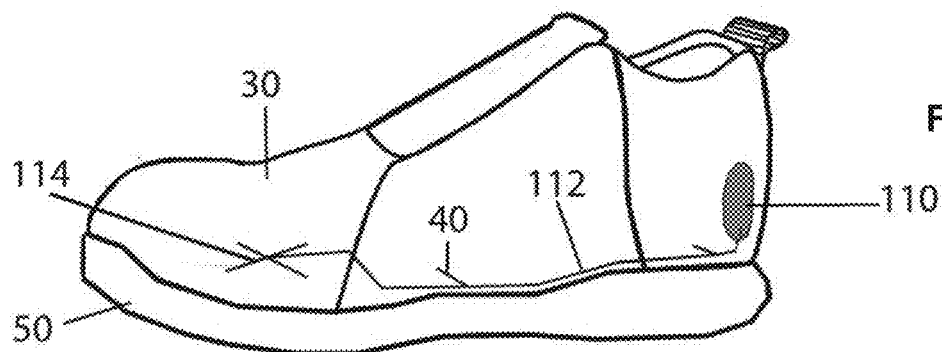


FIGURE 5

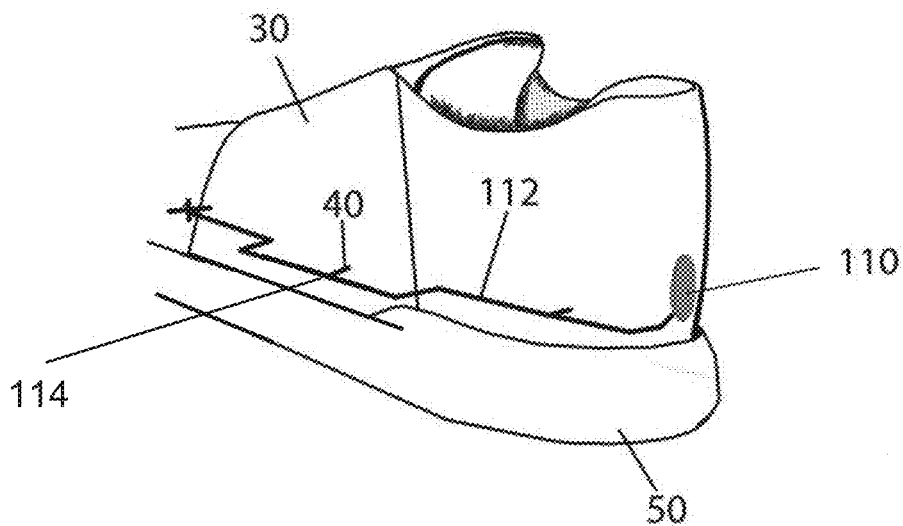


FIGURE 6

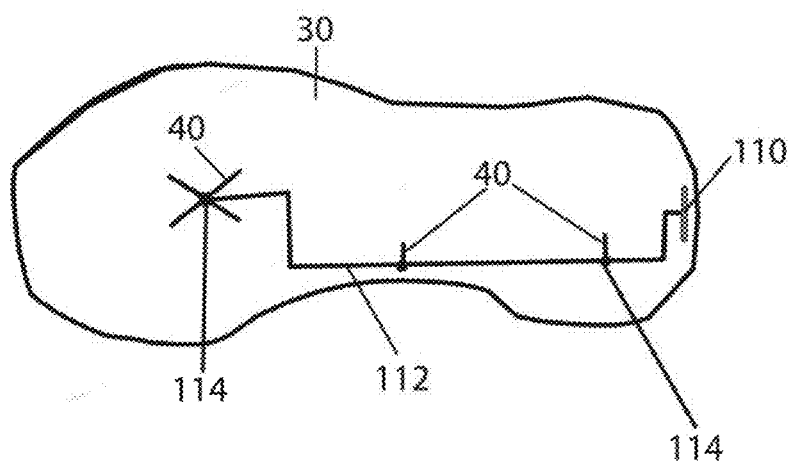


FIGURE 7

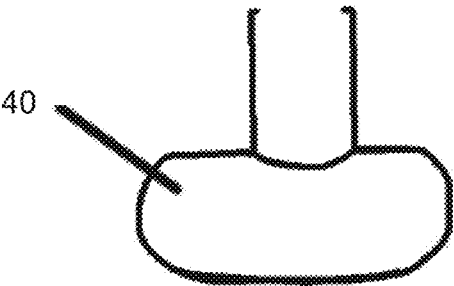


FIGURE 8A

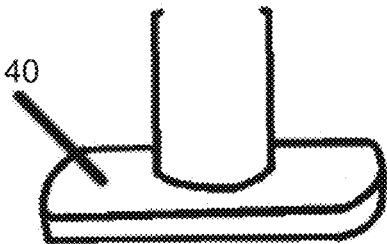


FIGURE 8B

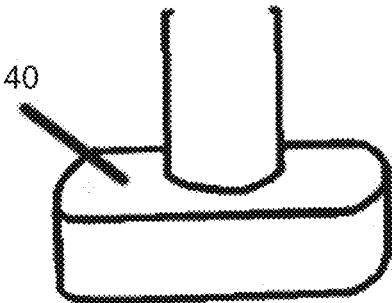


FIGURE 8C

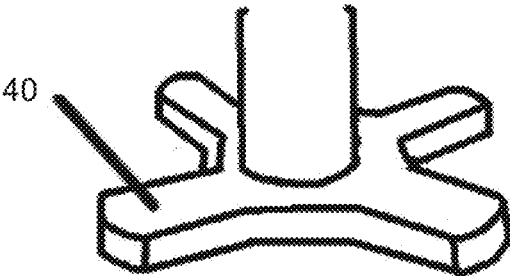


FIGURE 8D

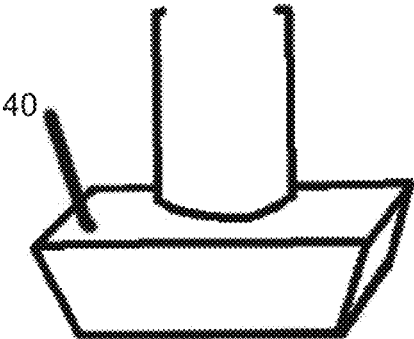


FIGURE 8E

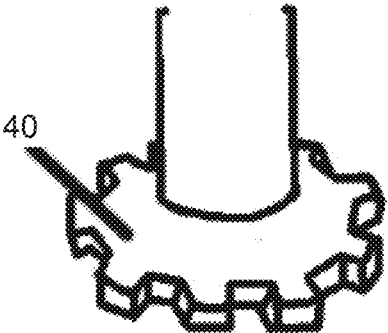


FIGURE 8F

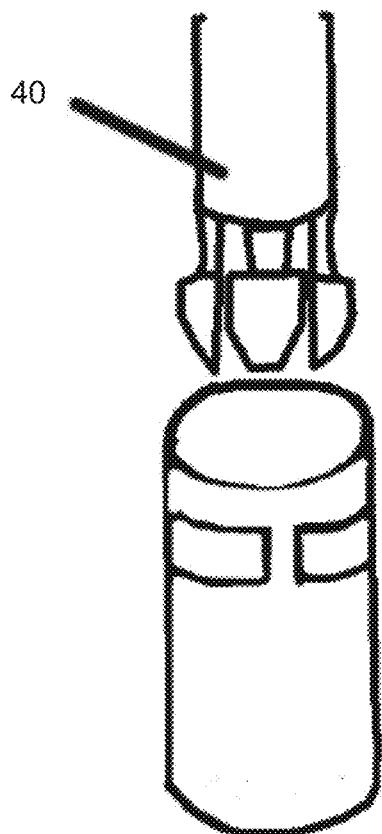


FIGURE 8G

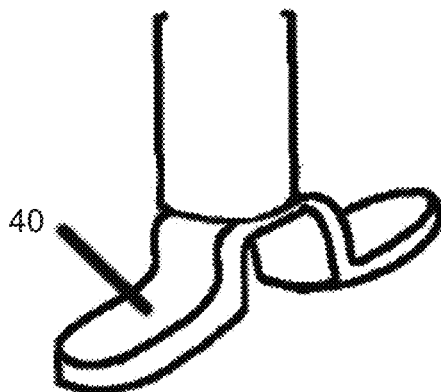


FIGURE 8H

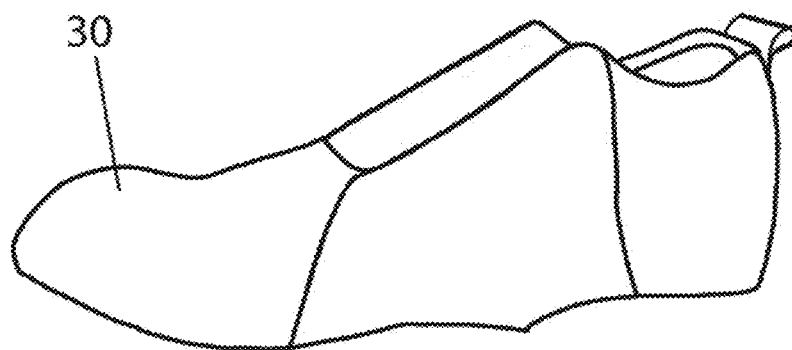


FIGURE 9

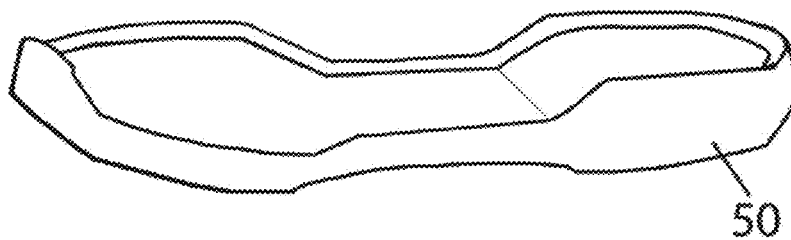


FIGURE 9A

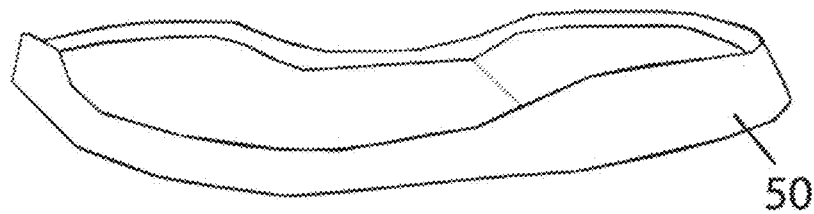


FIGURE 9B

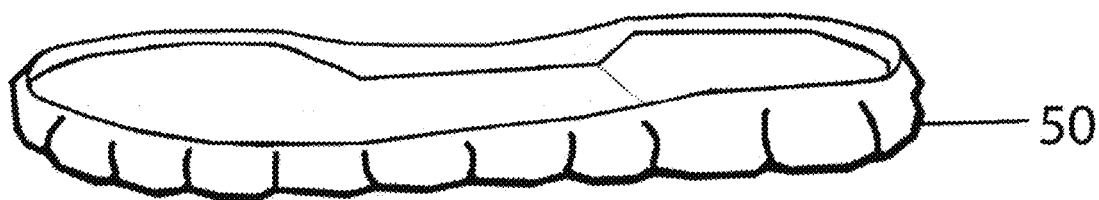


FIGURE 9C

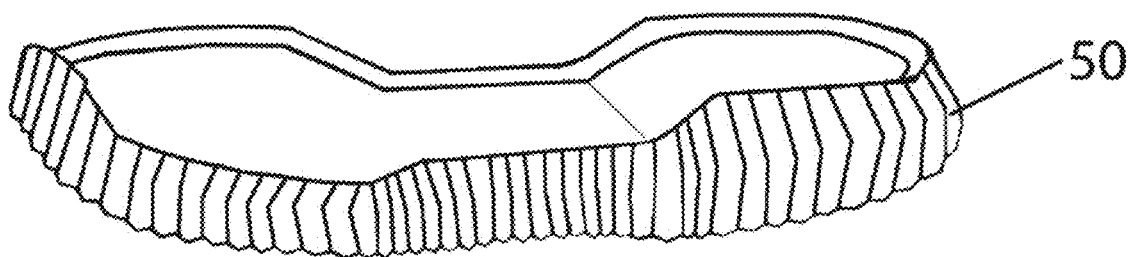


FIGURE 9D

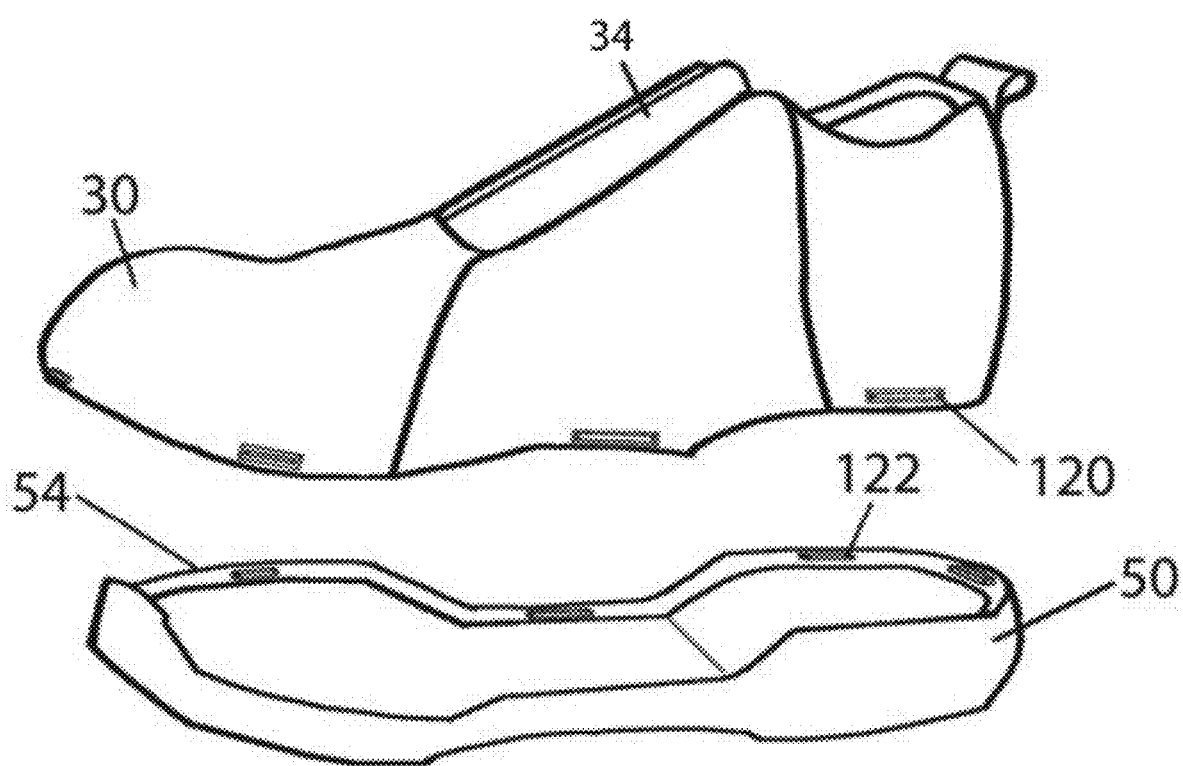


FIGURE 10

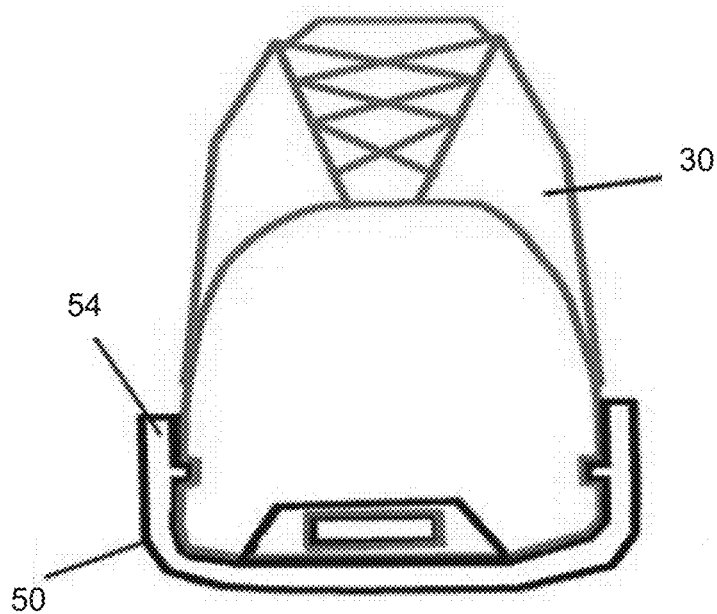


FIGURE 10A

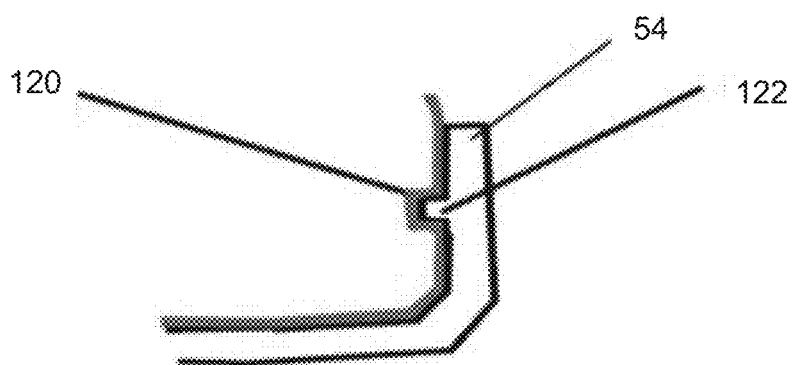


FIGURE 10B

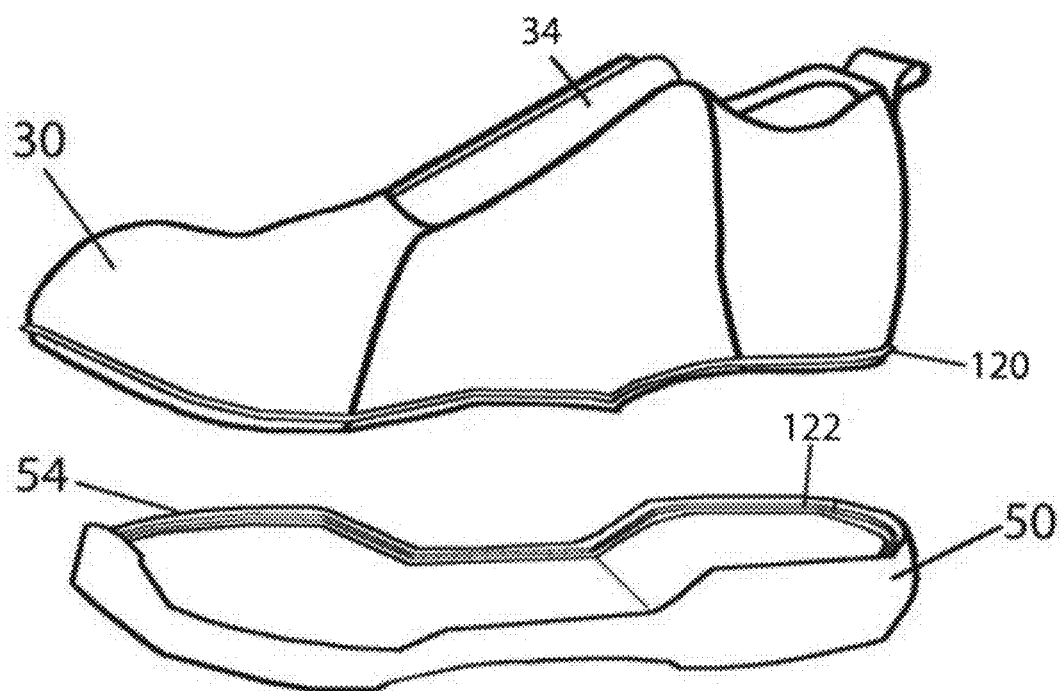


FIGURE 11

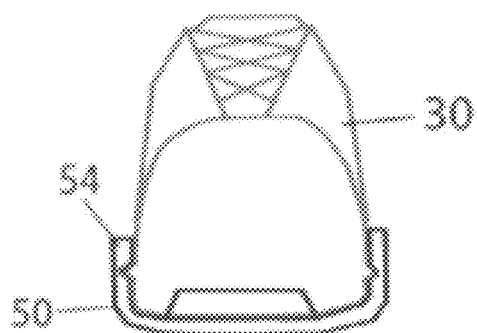


FIGURE 11A

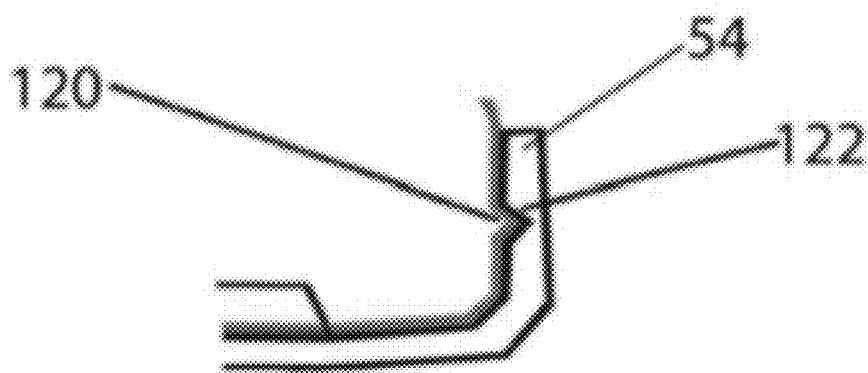
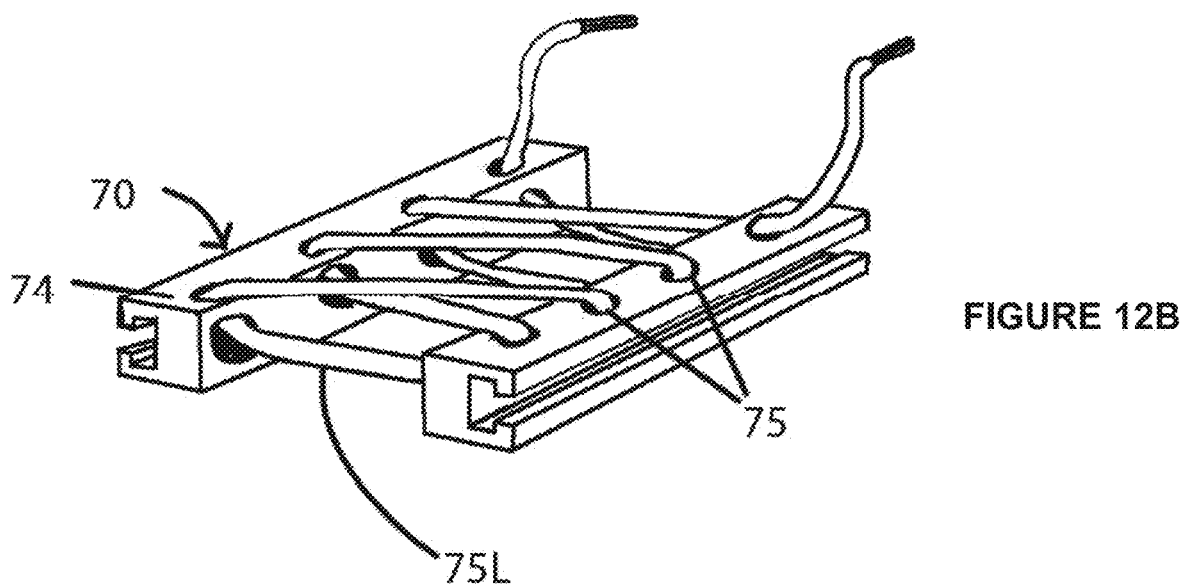
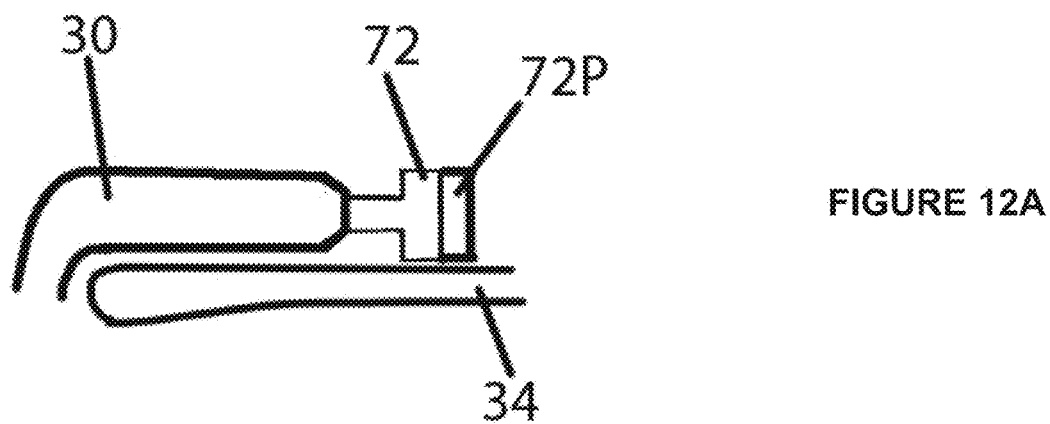
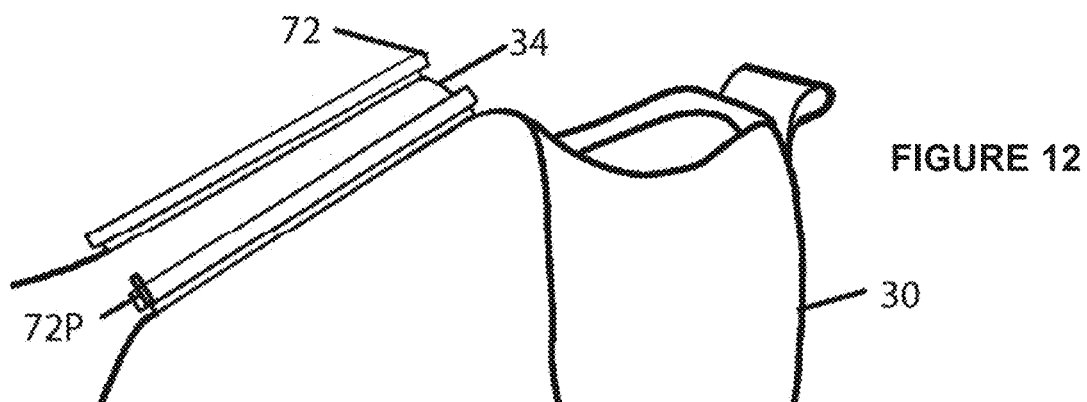
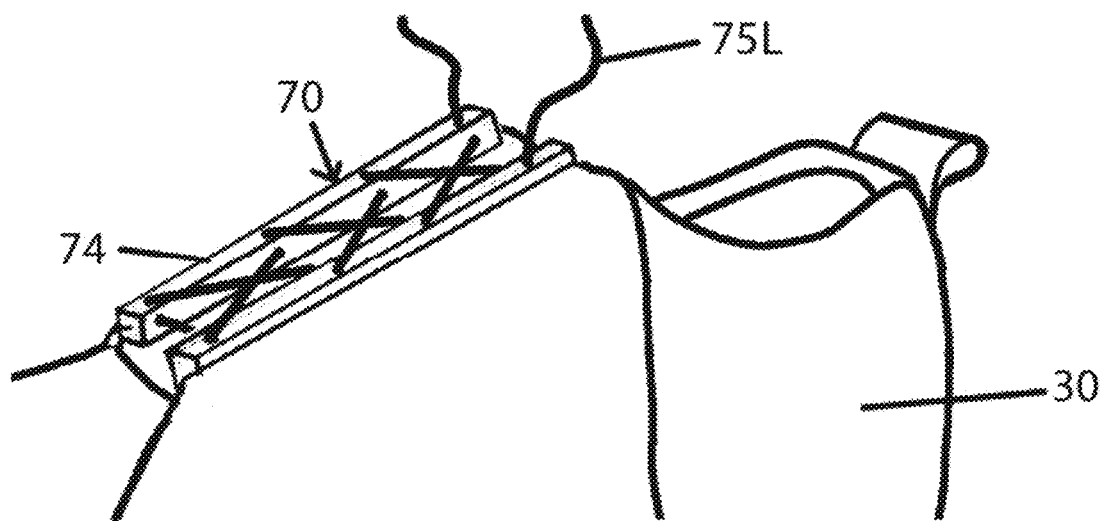
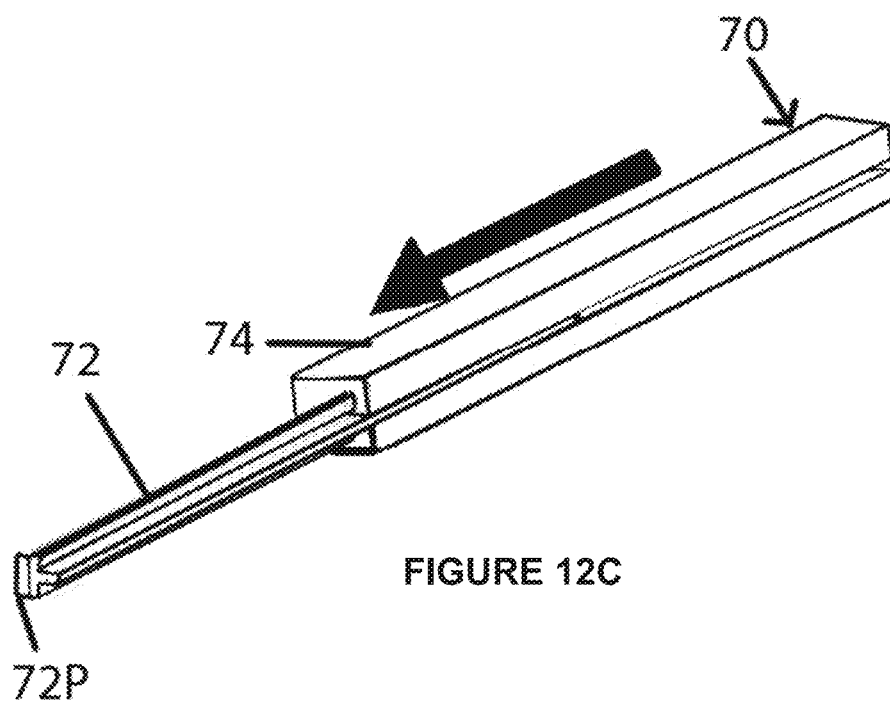


FIGURE 11B





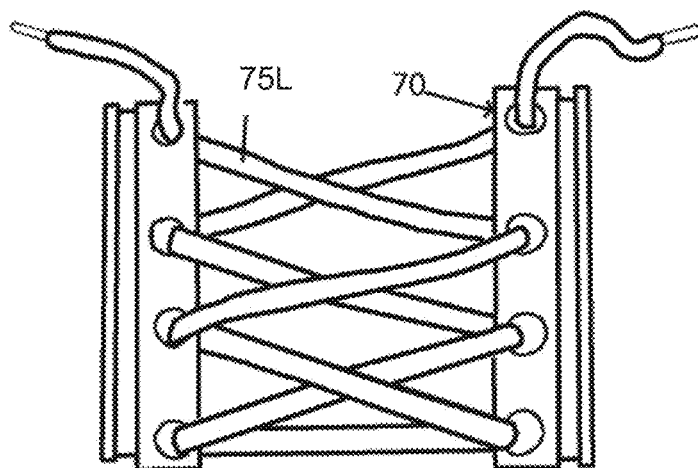


FIGURE 13A

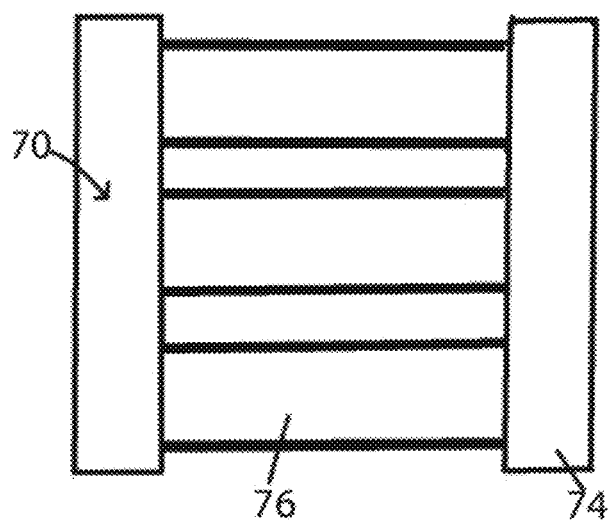


FIGURE 13B

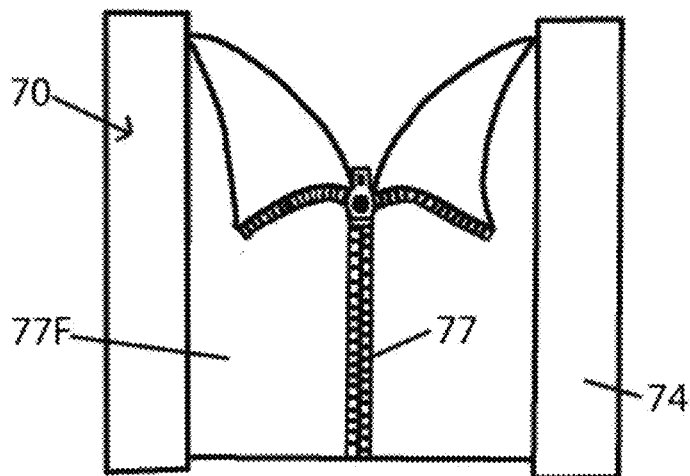


FIGURE 13C

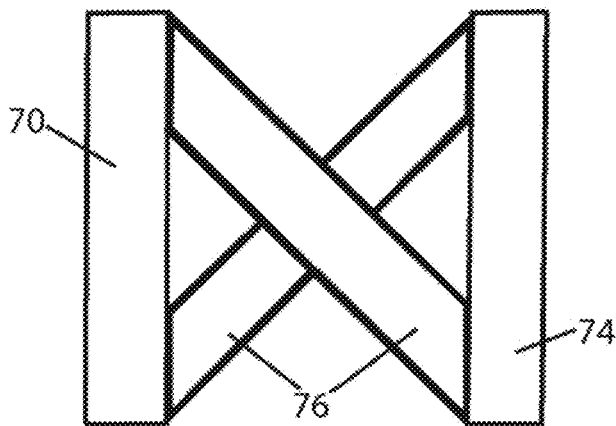


FIGURE 13D

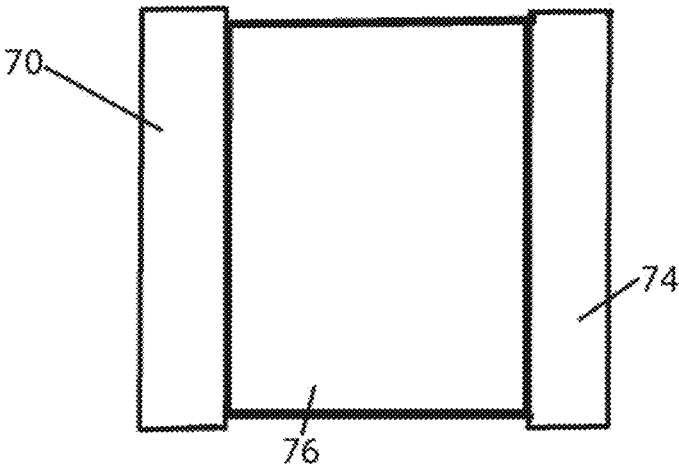


FIGURE 13E

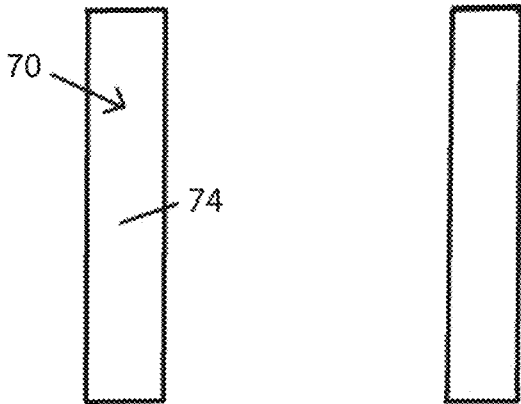


FIGURE 13F

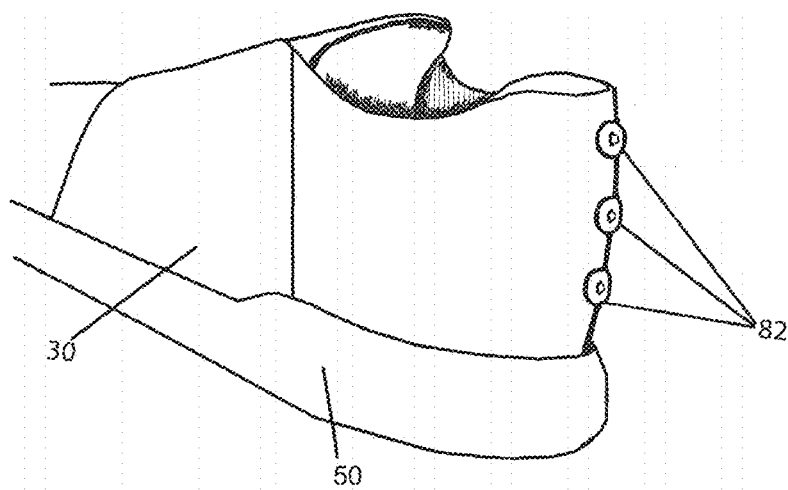


FIGURE 14A

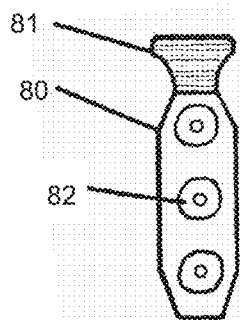


FIGURE 14B

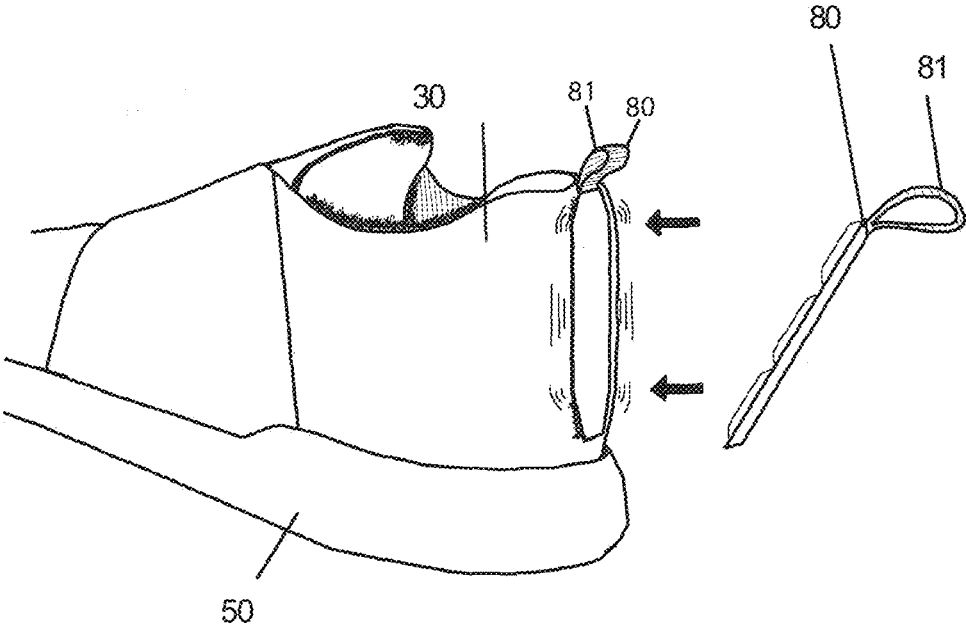


FIGURE 14C

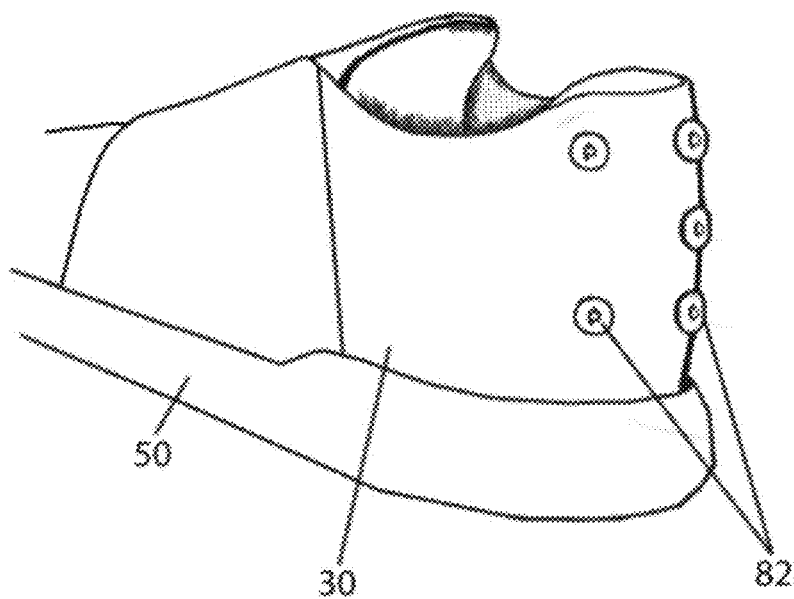


FIGURE 15A

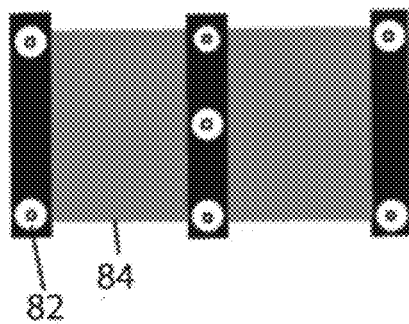


FIGURE 15B

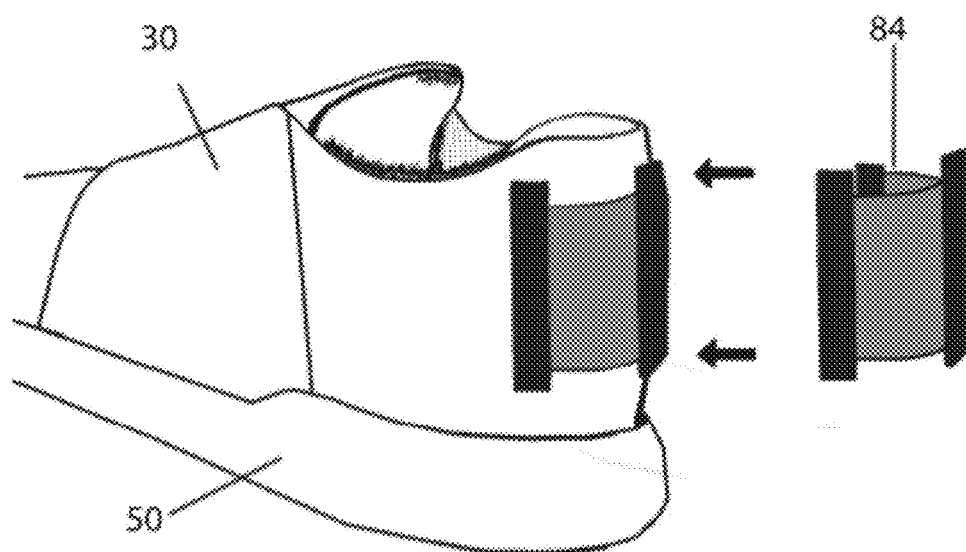


FIGURE 15C

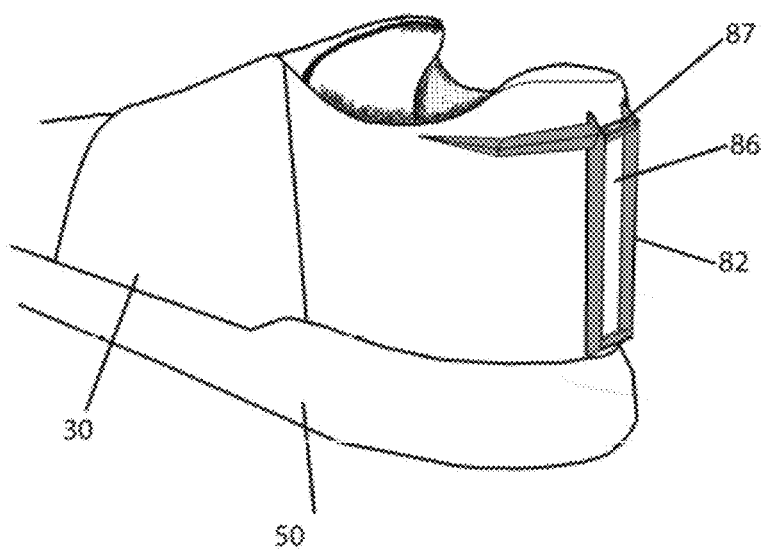
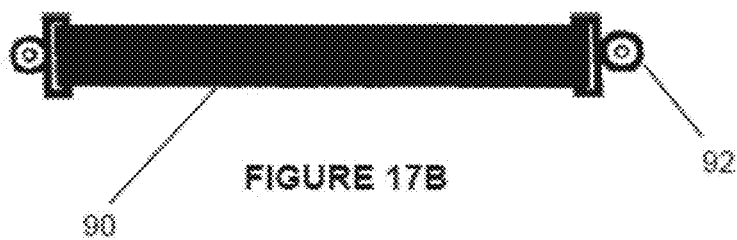
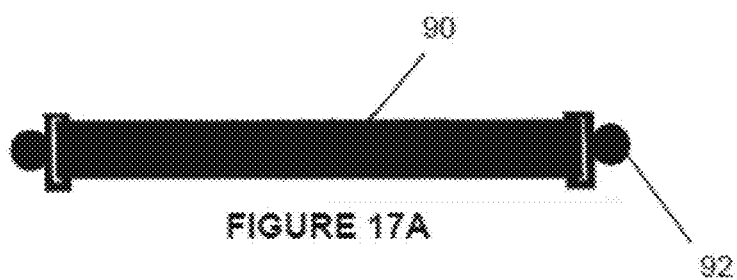
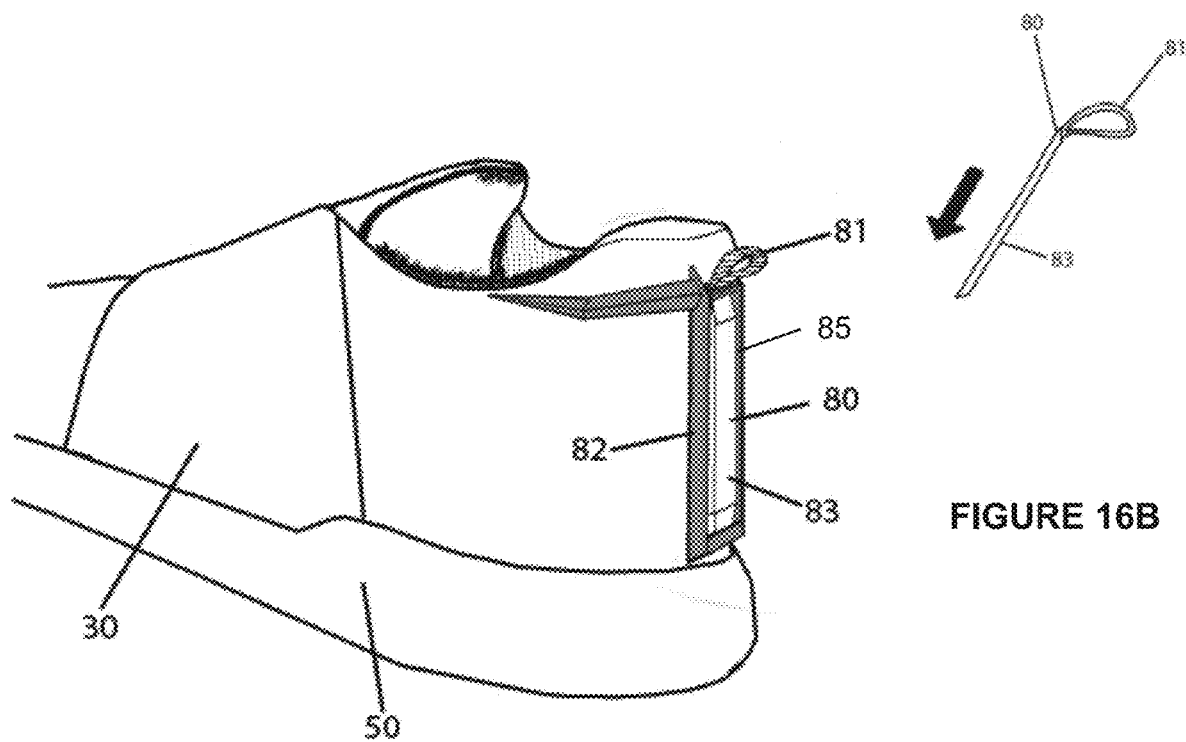


FIGURE 16A



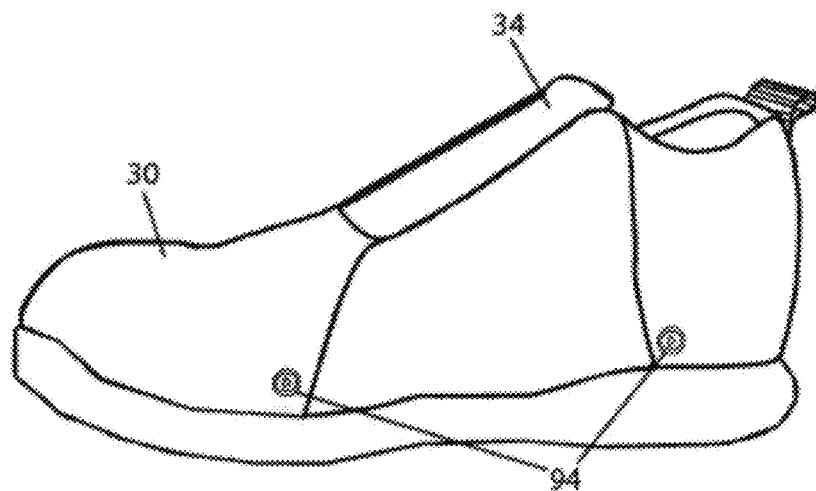


FIGURE 18A

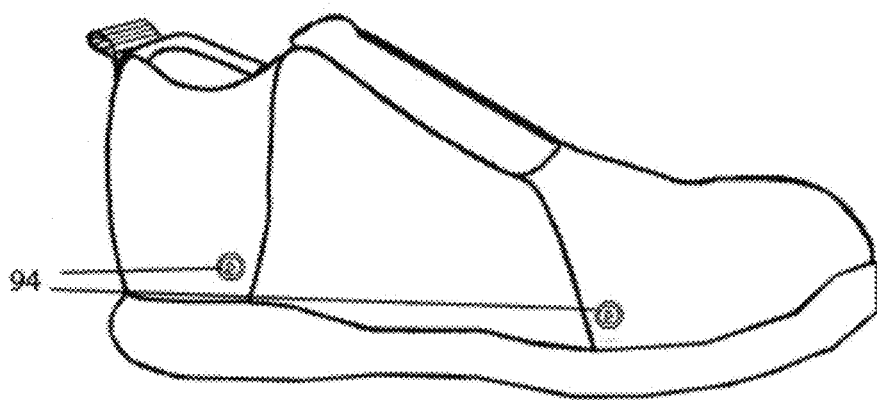


FIGURE 18B

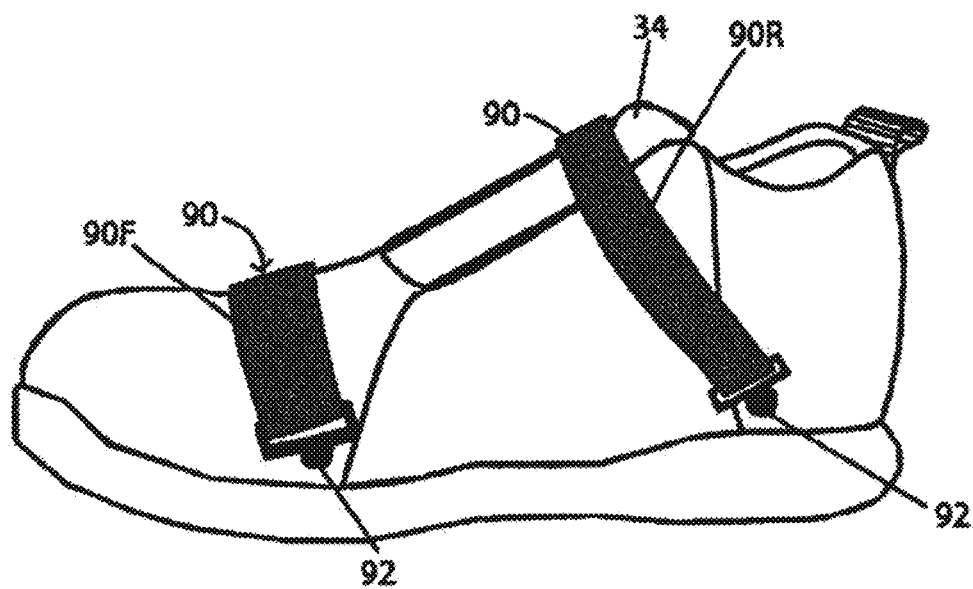


FIGURE 18C

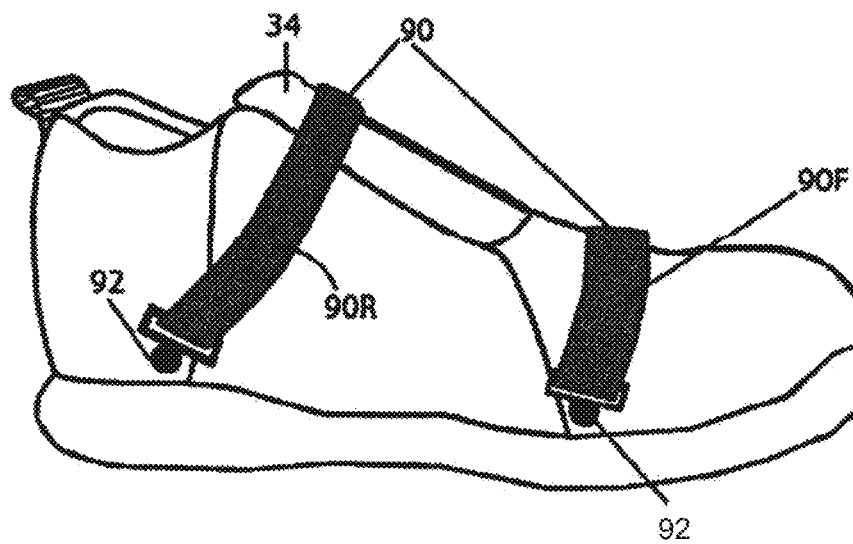


FIGURE 18D

MODULAR, CUSTOMIZABLE FOOTWEAR SYSTEM WITH INTERCHANGEABLE COMPONENTS

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to footwear, and more specifically, to customizable footwear having interchangeable components.

2. Description of the Related Art

[0002] Footwear comes in many different types, styles, shapes, and colors. Frequently, the consumer wants to coordinate the footwear with the rest of the clothing outfit. This can result in the consumer purchasing numerous pairs of shoes to go along with the consumer's many outfits for various occasions.

[0003] Certain shoe features may be more desirable, more functional, or more comfortable for certain activities and occasions. For example, there are times when it is desirable to quickly and easily remove and put on your shoe while at other times it is desirable to have shoes that remain snugly secured to your feet. Additionally or alternatively, there are times when you want your shoes to be lightweight and other times when you want your shoes to provide a soft, cushioned feel.

[0004] Oftentimes, one component of the footwear, for example the sole, receives greater wear than other components which results in the worn out footwear being discarded prematurely. This could be avoided if one or more of the footwear components could be replaceable or interchangeable to prolong the useful life of the footwear.

[0005] Additionally, the aesthetic look of footwear is affected by the type of securement to the foot, for example, shoe laces, stretchable slip on, etc. Also, the aesthetic look of footwear is affected by straps or tags attached to the upper portion of the footwear.

[0006] There have been several attempts at providing footwear with some interchangeability and/or customization. A few of them are:

[0007] U.S. Pat. No. 10,143,261 titled "Shoe with Magnetic Attachment Mechanism" to Perkins et al.;

[0008] U.S. Pat. No. 10,60,936 titled "Shoe with Interchangeable Sole" to Mulholland;

[0009] U.S. Pat. No. 7,984,569 titled "Modular Footwear System" to Chaney et al.; and

[0010] U.S. Pat. No. 6,345,454 titled "Shoe having a Removable Sole and Method of Use" to Cotton.

[0011] It is desirable to have a modular, customizable footwear system having interchangeable components that provides the consumer with a plurality of customizable options to alter or enhance the function, comfort and/or aesthetic look of the footwear. It is desirable to have a customizable footwear system having interchangeable components that extends the useful life of the footwear.

SUMMARY OF THE INVENTION

[0012] An embodiment of the present invention is a modular, customizable footwear system having interchangeable components that provides the consumer with a plurality of customizable options to alter or enhance the function, comfort and/or aesthetic look of the footwear. The modular,

customizable footwear system with interchangeable components additionally extends the useful life of the footwear.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0013] The invention is better understood by reading the detailed description of embodiments which follows and by examining the accompanying drawings, in which:

[0014] FIG. 1 is a side perspective exploded view of the customizable footwear according to one embodiment of the present invention, showing a shoe shell and a sole having one type of attachment mechanism;

[0015] FIG. 1A is a bottom view of the shoe shell of FIG. 1;

[0016] FIG. 1B is a top view of the shoe sole of FIG. 1;

[0017] FIG. 1C is a side perspective view of the shoe shell and sole of FIG. 1 being joined;

[0018] FIG. 1D is a bottom view of the shoe sole of FIG. 1;

[0019] FIG. 2 is a side perspective exploded view of the customizable footwear according to an embodiment of the present invention, showing the shoe shell and sole having another type of attachment mechanism;

[0020] FIG. 2A is a bottom view of the shoe shell of FIG. 2;

[0021] FIG. 2B is a top view of the shoe sole of FIG. 2;

[0022] FIG. 2C is a side perspective view of the shoe shell and sole of FIG. 2 joined;

[0023] FIG. 2D is a bottom view of the shoe sole of FIG. 2;

[0024] FIG. 3 is a side perspective exploded view of the customizable footwear according to an embodiment of the present invention, showing a shoe shell and a sole having two types of attachment mechanisms;

[0025] FIG. 3A is a bottom view of the shoe shell of FIG. 3;

[0026] FIG. 3B is a top view of the shoe sole of FIG. 3;

[0027] FIG. 3C is a side perspective view of the shoe shell and sole of FIG. 3 being joined;

[0028] FIG. 3D is a bottom view of the shoe sole of FIG. 3;

[0029] FIG. 4 is a side perspective exploded view of the customizable footwear according to an embodiment of the present invention, showing a shoe shell and a sole having another type of attachment mechanism;

[0030] FIG. 4A is a bottom view of the shoe shell of FIG. 4;

[0031] FIG. 4B is a top view of the shoe sole of FIG. 4;

[0032] FIG. 4C is a partial rear and side perspective view of the shoe shell and sole of FIG. 4 being joined;

[0033] FIG. 4D is a side perspective view of the shoe shell and sole of FIG. 4 joined;

[0034] FIG. 4E is a bottom view of the shoe sole of FIG. 4 and showing the sliding blocks received within the shoe sole in dashed lines;

[0035] FIGS. 5, 6 and 7 are schematic views of an alternative embodiment of a shoe sole and a shell having a power source and a wiring arrangement;

[0036] FIGS. 8A, 8B, 8C, 8D, 8E, 8F, 8G and 8H show some representative alternate types of clips for securing the shoe shell to the sole;

[0037] FIG. 9 is a side perspective view of a representative shoe shell, the shell being shown without a shell attachment mechanism;

[0038] FIGS. 9A, 9B, 9C and 9D are side perspective views of some representative alternate shapes and styles of shoe soles that can be attached to the shoe shell of FIG. 9, the shoe soles being shown without a sole attachment mechanism;

[0039] FIG. 10 is a side perspective exploded view of the customizable footwear according to an embodiment of the present invention, showing a shoe shell and a sole having one type of sealing arrangement;

[0040] FIG. 10A is a front view of the embodiment of FIG. 10, showing the sealing arrangement with a portion of the sole removed;

[0041] FIG. 10B is an enlarged cutaway view of a portion of the sealing arrangement shown in FIG. 10A;

[0042] FIG. 11 is a side perspective exploded view of the customizable footwear according to an embodiment of the present invention, showing a shoe shell and a sole having a second type of sealing arrangement;

[0043] FIG. 11A is a front view of the embodiment of FIG. 11, showing the sealing arrangement with a portion of the sole removed;

[0044] FIG. 11B is an enlarged cutaway view of a portion of the sealing arrangement shown in FIG. 11A;

[0045] FIG. 12 is a partial side perspective view of an embodiment of the customizable footwear showing the shoe shell with a pair of engagement members;

[0046] FIG. 12A is a view showing the engagement member of FIG. 12 attached to the shoe shell;

[0047] FIG. 12B is a perspective view of a lace-type of securement assembly;

[0048] FIG. 12C is a perspective view showing engagement of the securement assembly to the engagement member of FIG. 12;

[0049] FIG. 12D is a partial side perspective view of the customizable footwear showing the shoe shell with the securement assembly of FIG. 12B;

[0050] FIG. 13A is a top view of an alternate embodiment of a lace-type securement assembly;

[0051] FIGS. 13B, 13C, 13D, 13E and 13F are top views of additional securement assemblies;

[0052] FIG. 14A is a partial side and rear perspective view of the customizable footwear according to an embodiment showing a back heel mechanism;

[0053] FIG. 14B is a back view of a detachable loop piece;

[0054] FIG. 14C is an exploded view taken similar to FIG. 14A showing the detachable loop piece being attached to the shoe shell;

[0055] FIG. 15A is a partial side and rear perspective view of the customizable footwear according to another embodiment showing a back heel mechanism;

[0056] FIG. 15B is a back view of a detachable heel strap;

[0057] FIG. 15C is an exploded view taken similar to FIG. 15A showing the detachable heel strap being attached to the shoe shell;

[0058] FIG. 16A is a partial side and rear perspective view of the customizable footwear according to another embodiment showing a back heel mechanism;

[0059] FIG. 16B is an exploded view taken similar to FIG. 16A showing the detachable loop piece being attached to the shoe shell;

[0060] FIGS. 17A and 17B are front and back views, respectively, of a representative strap according to an embodiment of the invention;

[0061] FIGS. 18A and 18B are side perspective views of the left and right sides, respectively, of the customizable footwear according to an embodiment showing pairs of strap attachments; and

[0062] FIGS. 18C and 18D are views similar to FIGS. 18A and 18B, respectively, showing a front and rear strap connected to the pairs of strap attachments.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0063] It should be understood at the outset that although illustrative implementations of one or more embodiments are described below, the disclosed assemblies, systems and methods may be implemented using any number of techniques, whether currently known or not yet in existence. The disclosure should in no way be limited to the illustrative implementations, drawings, and techniques described below, but may be modified within the scope of the appended claims along with their full scope of equivalents.

[0064] The following brief definition of terms shall apply throughout the application:

[0065] The phrases “in one embodiment,” “according to one embodiment,” and the like generally mean that the particular feature, structure, or characteristic following the phrase may be included in at least one embodiment of the present invention, and may be included in more than one embodiment of the present invention (importantly, such phrases do not necessarily refer to the same embodiment;

[0066] If the specification describes something as “exemplary” or an “example,” it should be understood that refers to a non-exclusive example;

[0067] The terms “about” or “approximately” or the like, when used with a number, may mean that specific number, or alternatively, a range in proximity to the specific number, as understood by persons of skill in the field of the art;

[0068] If the specification states a component or feature “may,” “can,” “could,” “should,” “would,” “preferably,” “possibly,” “typically,” “optionally,” “for example,” “often,” or “might” (or other such language) be included or have a characteristic, that particular component or feature is not required to be included or to have the characteristic. Such component or feature may be optionally included in some embodiment, or it may be excluded.

[0069] Embodiments of the invention will now be described with reference to the figures, in which like numerals reflect like elements throughout. The terminology used in the description presented herein is not intended to be interpreted in any restrictive or limited way, simply because it is being utilized in conjunction with the detailed description of certain specific embodiments of the invention. Furthermore, embodiments of the invention may include several novel features, no single one of which is solely responsible for its desirable attributes or which is essential to practicing the invention described herein.

[0070] The present invention will now be described with reference to the several figures. One of the unique aspects of the invention is the interchangeability of several parts, components or features of a shoe to change the function, fit, feel and/or appearance of a shoe. Another unique aspect of the invention is to be able to combine two or more shoe shells with two or more soles as will be explained below.

[0071] Referring to FIG. 1, one embodiment of a customizable shoe 100 is shown having a shoe shell 30 positioned above a shoe sole 50. It is to be understood that the shoe

shell 30 may be releasably connected, or removably attached, to the sole 50 via a plurality of shell attachment mechanisms, generally referred to as 40, and sole attachment mechanisms, generally referred to as 60, as further illustrated in FIGS. 1A, 1B, 1C and 1D.

[0072] In one embodiment, a lower surface 32 of the shoe shell 30 will adjoin or contact an upper surface 52 of the sole 50. In one embodiment, the upper surface 52 includes a raised edge or lip 54, substantially around the upper periphery of the shoe sole 50, as shown in FIG. 1. The substantially peripheral raised edge 54 defines a slight recess in which the shoe shell 30 is received.

[0073] The shoe shell 30 will be attached or detached from the sole 50 through the use of the shell and sole attachment mechanisms 40 and 60, respectively. It is to be understood that various types of shell and sole attachment mechanisms 40 and 60, respectively, may be used. Referring to FIGS. 1 and 1A, the shell attachment mechanism 40 comprises a plurality of clips 42 extending generally perpendicularly from the lower surface 32 of the shoe shell 30. Each clip 42 is a generally inverted T-shape as viewed in FIG. 1 having a vertical stem 42S, preferably straight, and a transverse or cross-member 42C at an end of the stem 42S. Referring to FIG. 1A, preferably a notch 42N is formed in the the cross-member 42C in axial alignment with the stem 42S. In one embodiment, the clip 42 is allowed to partially rotate about the axis of the stem 42S. In one embodiment, the stem 42S may be mounted or attached to a disk 42D embedded or attached to the shoe shell 30 as shown in FIG. 1A. Preferably, the stem 42S is rotatably, or at least partially rotatably, connected to the disk 42D.

[0074] Referring to FIGS. 1 and 1B, the sole attachment mechanism 60 includes a plurality of slots 62 recessed in and below the upper surface 52 of the shoe sole 50. Preferably, the number of slots 62 is the same as the number of clips 42. The size of the slot 62 is at least as large as the cross-member 42C of the clip 42 to permit the cross-member 42C to extend into and pass through the slot 62. A lower end of the slot 62 opens into an enlarged cavity 62C between the upper surface 52 and a bottom surface 56 of the shoe sole 50. Preferably, the cavity 62C is sized and arranged to allow the clip 42 to rotate approximately 90 degrees. As shown in FIG. 1D, a hole 56H extends through the bottom surface 56 to the cavity 62C. The hole 56H is preferably aligned with the axis of the stem 42S of the clip 42.

[0075] Referring to FIG. 1, the shoe shell 30 may be attached to the sole 50 by orienting the cross-members 42C of the clips 42 with the slots 62 of the shoe sole 50 with the shell 30 aligned above the sole 50. The shell 30 and sole 50 are brought together and the cross-members 42C are inserted through the slots 62. A tool 70 may be inserted through the holes 56H to engage the notch 42N and partially rotate the clips 42, as for example a quarter turn, into a locked position to secure the shell 30 and sole 50 together, preventing release of the shell 30 from the sole 50. The releasable attachment of the shoe shell 30 to the shoe sole 50 allows for interchangeability with other shoe shells 30 and shoe soles 50. A single shoe sole 50 could be interchanged with multiple shoe shells 30, and vice versa, to give a consumer several different styles and/or colors of shoes. Additionally, as will be discussed in more detail below, several different shoe soles 50 may be interchanged with the single shoe shell 30 to provide different functions, fit and feel of the customizable footwear.

[0076] It is to be understood that in one embodiment, the sole attachment mechanism 60 may comprise a unitary assembly including the slot 62 and cavity 62C, and may also include the hole 56H. In this instance, the unitary assembly may be embedded or attached to the shoe sole 50.

[0077] FIGS. 2, 2A, 2B, 2C and 2D illustrate another embodiment of attaching the shoe shell 30 to the shoe sole 50 of the present invention. Preferably, one of the shell and sole attachment mechanisms 40, 60 includes magnets and the corresponding attachment mechanism 40, 60 includes a ferromagnetic material that is attracted to the magnet. In use, the attachment mechanism with the magnet magnetically attracts the other attachment mechanism so as to removably and releasably attach the shoe shell 30 to the shoe sole 50. As with the previous embodiment, the removable attachment of the shoe shell 30 to the shoe sole 50 allows for interchangeability with other shoe shells 30 and shoe soles 50. The magnetic attachment allows the consumer to quickly interchange shoe shells 30 and soles 50 without the need for any special tool. Additionally, no holes are needed through the bottom of the sole 50 as evidenced by FIG. 2D.

[0078] FIGS. 3, 3A, 3B, 3C and 3D illustrate another embodiment of attaching the shoe shell 30 to the shoe sole 50 of the present invention. This embodiment uses two types of attachment mechanisms. One type of attachment mechanism 40 on the shoe shell 30 comprises a cantilevered panel 44 having a first portion 44F extending downwardly from the lower surface 32 of the shoe shell 30 that transitions to a substantially horizontal panel portion 44H. The corresponding attachment mechanism 60 on the shoe sole 50 is a substantially horizontal cavity 64 having a slotted opening 64S in the upper surface 52 of the sole 50. It is to be understood that the substantially horizontal cavity 64 is sized to receive the substantially horizontal panel portion 44H and the slotted opening 64S is sized to receive the substantially horizontal panel portion 44H and the first portion 44F. Preferably, this type of attachment mechanism is provided at a frontal portion 102 of the customizable shoe 100.

[0079] The second type of attachment mechanism 40 of the shoe shell 30 in this embodiment comprises one or more clips 46 extending from the lower surface 32 of the shoe shell 30. Each clip 46 has a stem 46S and a cross-shaped member 46C, similar in appearance to a plus (“+”) sign. Referring to FIG. 1A, preferably a notch 46N is formed in the cross-shaped member 46C in axial alignment with the stem 46S. In one embodiment, the clip 46 is allowed to partially rotate about the axis of the stem 46S. In one embodiment, the stem 46S may be mounted or attached to a disk (not shown) embedded or attached to the shoe shell 30 (as shown in FIG. 1A).

[0080] Referring to FIGS. 3 and 3B, the sole attachment mechanism 60 for the clips 46 includes a cross-shaped slot 66 recessed in and below the upper surface 52 of the shoe sole 50. Preferably, the number of cross-shaped slots 66 is the same as the number of clips 46. The size of the cross-shaped slot 66 is at least as large as the cross-shaped member 46C of the clip 46 to permit the cross-shaped member 46C to extend into and pass through the slot 66. A lower end of the slot 66 opens into an enlarged cavity (not shown) between the upper surface 52 and the bottom surface 56 of the shoe sole 50. Preferably, the cavity is sized and arranged to allow the clip 46 to rotate approximately 45 degrees. As shown in FIG. 3D, a hole 56H extends through the bottom

surface 56 to the cavity. The hole 56H is preferably aligned with the axis of the stem 46S of the clip 46.

[0081] Referring to FIGS. 3 and 3C, the shoe shell 30 may be attached to the sole 50 by orienting the cross-shaped members 46C of the clips 46 with the slots 66 of the shoe sole 50 with the shell 30 substantially aligned above the sole 50. Preferably, the shoe shell 30 and sole 50 are angled towards each other so that the substantially horizontal panel portion 44H of the cantilevered panel 44 can be inserted into the slotted opening 64S in the upper surface 52 of the sole 50 and be received in the horizontal cavity 64. Preferably, as the panel portion 44H is being received in the horizontal cavity 64, the shell 30 and sole 50 are brought together and the cross-shaped members 46C are inserted through the slots 66. A tool 70 (as shown in FIG. 1C) may be inserted through the holes 56H to engage the notch 46N and rotate the clips 46 approximately 45 degrees into a locked position to secure the shell 30 and sole 50 together, preventing release of the shell 30 from the sole 50.

[0082] Yet another embodiment of attaching the shoe shell 30 to the shoe sole 50 of the present invention is shown in FIGS. 4, 4A, 4B, 4C, 4D and 4E. FIG. 4A shows a bottom view of the shoe shell 30 and the shell attachment mechanism 40. FIG. 4B is a top view of the shoe sole 50 and a portion of the sole attachment mechanism 60.

[0083] Referring to FIG. 4, the shell attachment mechanism 40 comprises a structure 48, preferably attached to the lower surface 32 of the shoe shell 30. Preferably, the structure 48 comprises a housing 48H, preferably a hollow, rectangular housing having first and second openings 48F and 48S, respectively.

[0084] The sole attachment mechanism 60 of this embodiment comprises a sole recess 69 extending along the length of the sole 50. The sole recess 69 is sized to receive the housing 48H. The sole recess 69 preferably includes first and second openings 69F and 69S in the periphery of the sole 50. The first and second openings 69F and 69S of the sole 50 are arranged and designed to align with the first and second openings 48F and 48S of the structure 48. The sole attachment mechanism 60 also comprises two sliding blocks 67 and 68 as shown in FIGS. 4 and 4C, preferably made of the same material as the sole 50. The first sliding block 67 preferably includes a head 67H and a body 67B and the second sliding block 68 preferably includes a head 68H and a body 68B. The first sliding block 67 also preferably includes a slot 67S extending transversely, or generally transversely, through the sliding block 67. The transverse slot 67S is sized and arranged to receive a portion of the second sliding block 68.

[0085] To assemble, the housing 48H is inserted into the sole recess 69 as shown in FIG. 4C. Upon insertion of the housing 48H into the sole recess 69, the body 67B of the first sliding block 67 is slid through the sole first opening 69F and into and through the housing first opening 48F until the head 67H of the first sliding block 67 is received in the sole first opening 69F as shown in FIG. 4D. When the first sliding block 67 is fully inserted, the transverse slot 67S is aligned with the housing second opening 48S and the sole second opening 69S. The body 68B of the second sliding block 68 is inserted through the sole second opening 69S and through the housing second opening 48S and into the transverse slot 67S of the first sliding block 67 until the head 68H contacts or abuts the sole 50 as shown in FIG. 4E. This results in the shoe shell 30 being securely attached to the sole 50.

[0086] It is to be understood that the previously described techniques of attaching the shell 30 to the sole 50, while discussed separately, could also be used in combination with each other. In addition to these options, a power source 110 may be connected to the shell attachment mechanism 40 via wiring 112 as shown in FIGS. 5, 6 and 7. Electric current from the power source 110 could power an actuation device 114, for example a motor, in a technique using clips to partially rotate the clips, as for example in FIG. 1, or activate magnets, as for example in FIG. 2. This allows the shell attachment mechanism 40 to connect to the sole attachment mechanism 60 electrically or electro-magnetically. Preferably, the power source 110 and actuation device 114 are mounted in the shoe shell 30.

[0087] The shell attachment mechanism 40 can comprise any one or more of a plurality of designs, including, but not limited to, those shown in FIGS. 8A, 8B, 8C, 8D, 8E, 8F, 8G and 8H. All of these techniques are designed for the user to easily change the shoe's sole 50 out for a different one in order to modify the customizable shoe's aesthetics and/or functionality. For purposes of illustration, FIG. 9 shows a representative shoe shell 30 and FIGS. 9A, 9B, 9C and 9D show representative alternate designs of soles 50, not intended to be limiting of the invention, that can be attached to the shoe shell 30. It is to be understood that sole designs have many purposes. Certain sole designs provide more cushion and comfort when standing on your feet during long periods of time, some have bottom surfaces designed to prevent slipping, while some are designed to minimize the weight of the shoe. Allowing the consumer to customize his/her shoes for the activities of the day is of great convenience, comfort and benefit!

[0088] In preferred embodiments of the present invention, the shoe shell 30 and the sole 50 have a sealing arrangement to prevent debris or liquid from entering the space between the two as shown in FIGS. 10, 10A, 10B, 11, 11A and 11B. In addition to providing a better seal for the space between the shoe shell 30 and sole 50, it also provides some additional support for securing the sole 50 to the shoe shell 30. The shell attachment mechanism 40 and sole attachment mechanism 60 are not shown in FIGS. 10, 10A, 10B, 11, 11A and 11B for purposes of clarity; however, it is to be understood that they would be used in conjunction with the sealing arrangement. Preferably, the peripheral lip 54 of the sole 50 includes a sole seal 122 and the shoe shell 30 includes a shell seal 120. Preferably, the sole seal 122 and the shell seal 120 interact with or engage one another as the shell 30 is joined to the sole 50. The shell seal 120 sits inside the sole seal 122 or vice versa, depending on which is a better securing mechanism. The seal may be of any of a variety of types or configurations and is not limited by the types shown in the figures.

[0089] As shown in FIGS. 10, 10A and 10B, the peripheral lip 54 of the sole 50 includes a plurality of sole seals 122 comprising protruding elongate rectangular members that are received in a corresponding plurality of shell seals 120 comprising elongate rectangular recesses. In FIGS. 11, 11A and 11B, the shell seal 120 comprises a peripheral outwardly extending pointed ridge and the sole seal 122 is a peripheral inwardly extending recess for receiving the pointed ridge.

[0090] In one preferred embodiment of the invention, the customizable shoe 100 allows for interchangeability on a top medial region 104 of the shoe shell 30, typically where shoelace holes are present adjacent the sides of a tongue 34

of a lace-up shoe. In these embodiments, the shoe shell 30 includes a pair of engagement members 72 flanking the tongue 34 as shown in FIG. 12. As shown in FIG. 12A, the engagement members 72 are connected to the portions of the shoe shell 30, preferably permanently connected by stitching, gluing or other means, where the shoelace holes would normally be and are not connected to the tongue 34. Referring to FIGS. 12B, 12C and 12D, a securement assembly 70 is arranged and designed to cooperatively engage with the pair of engagement members 72. As shown in FIGS. 12A and 12C, the shown embodiment of the engagement member 72 comprises a generally T-shaped member and optionally having a stop plate 72P at one end of the engagement member 72. The securement assembly 70 shown in FIGS. 12B and 12C comprises a pair of generally channel or C-shaped members 74 for slidably engaging the engagement member 72 and securing the securement assembly 70 to shoe shell 30. The stop plate 72P provides a stop for stopping further sliding of the channel members 74. As shown in FIG. 12B, the securement assembly 70 includes a plurality of openings 75 arranged to receive a shoelace 75L for lacing up the customized shoe 100. Preferably, the engagement members 72 and the securement assembly 70 are made of flexible materials to allow some bending and flexing as would be expected during normal usage of shoes.

[0091] It is to be understood that the shape and configuration of the engagement members 72 and the securement assembly 70 may take on various shapes and configurations. Additionally, a male portion of the connector (i.e., the T-shaped portion) could be on the securement assembly 70 and the female portion (i.e., the C-shaped portion) on the engagement member 72. An example of this is shown in FIG. 13A.

[0092] It is to be further understood that with this embodiment of the engagement members 72 and replaceable securement assembly 70, alternatives to a laced up shoe are available. Various different securement assemblies 70 can be provided for the customizable shoe 100. FIGS. 13B, 13C, 13D, 13E and 13F are examples of some of the different securement assemblies 70, although this is not intended to be exhaustive of all of the possibilities. It is to be understood that in these figures (FIGS. 13B-13F) the securement assemblies 70 are shown having a pair of channel members 74, although this is not intended to be limiting of the invention. FIG. 13B shows a plurality of elastic bands 76 spanning between the channel members 74. FIG. 13C shows a zipper 77 attached to fabric 77F, preferably stretchable fabric, which is attached to the channel members 74. The zipper 74 can be partially unzipped to loosen the fit of the shoe on the wearer's foot. FIG. 13D shows a pair of crossed elastic bands 76 attached to the channel members 74. FIG. 13E shows a wide elastic band 76 spanning between the channel members 74 and FIG. 13F shows the securement assembly 70 comprising only a pair of channel members 74.

[0093] With this design, the act of switching between the various types will be very fast, therefore increasing the shoe's capacity to be customized to suit the wearer's desired degree of tightness, looseness and/or comfort to the foot for the specific occasion.

[0094] Another area of customization in certain embodiments involves the rear of the customizable shoe 100. Some shoes utilize a loop on the back of the shoe to help users slip on the shoe over the heel of their foot. In one embodiment of the present invention, a detachable loop piece 80 having

an upper loop 81 is provided. With reference to FIGS. 14A, 14B and 14C, the shoe shell 30 includes a back heel mechanism 82, which could be in the form of snap buttons. The detachable loop piece 80 has mating snap buttons 82 on the back side of the detachable loop piece 80. With this embodiment, the user can attach the loop piece 80 to the rear of the shoe shell 30 as shown in FIG. 14C by engaging the snap buttons 82 or leave the loop piece 80 off to change the function and aesthetic of the customizable shoe 100.

[0095] Alternatively or additionally to the previous embodiment shown in FIGS. 14A, 14B and 14C, the back heel mechanism 82 could comprise a plurality of vertical rows of snap buttons 82. Although only two vertical rows are shown in FIG. 15A, it is to be understood from a review of a heel strap 84 in FIG. 15B that the shoe shell 30 of FIG. 15A has three vertical rows of snap buttons 82 corresponding with the three vertical rows of snap buttons 82 on the heel strap 84. FIG. 15B shows the back side of the heel strap 84 with snap buttons 82 arranged to engage the snap buttons 82 on the shoe shell 30 as shown in FIG. 15C, if desired by the user. Alternatively, the user has the option to snap the detachable loop piece 80 of FIG. 14B on the center row of snap buttons 82, or the user has the option not to attach anything to the snap buttons 82 on the shoe shell 30 as shown in FIG. 15A. In one embodiment, the heel strap 84 includes a reflective color or material for high visibility, as for example when walking at night.

[0096] Another embodiment of the present invention having a detachable loop piece 80 with an upper loop 81 is shown in FIGS. 16A and 16B. With reference to FIGS. 16A and 16B, the shoe shell 30 includes a back heel mechanism 82, which could be in the form of a framework 85 defining a pocket window 86 and an upper opening 87. The detachable loop piece 80 has an elongate body 83 sized and shaped to be inserted through the upper opening 87 and be snugly received in the pocket window 86 as shown in FIG. 16B. When installed, the upper loop 81 is at or above the upper opening 87. Preferably, friction from the snug fit in the pocket window 86 maintains the detachable loop piece in position when pulling on the loop to put on the shoe, but does not prevent removal from the back heel mechanism 82 when the feature is not wanted or desired. It is to be understood that additionally or alternatively, the feature of a reflective color or material for high visibility, as for example when walking at night could be used on an elongate body 83 removably received within the pocket window 86 of the back heel mechanism 82.

[0097] In yet another embodiment, one or more removable straps 90 may be attached to the customizable shoe 100. These removable straps 90 may enhance the visibility of the shoe 100 and thus the wearer, enhance the aesthetics of the shoe 100, and/or enhance the fit of the shoe 100 to the wearer's foot. FIGS. 17A and 17B show the front and back of a representative removable strap 90. The strap 90 is preferably flexible and may be made out of fabric, vinyl, leather or plastic. The strap 90 preferably includes end connectors 92 for connecting to the shoe shell 30. The shoe shell 30 includes strap attachments 94, preferably in the form of buttons, snap buttons or even hooks. Preferably, one pair of strap attachments 94 are attached to the left and right rear side portions of the shoe shell 30 and a second pair of strap attachments 94 are attached to the left and right front side portions of the shoe shell 30 as shown in FIGS. 18A and 18B. A front strap 90F may be connected to one of the front

strap attachments **94** and stretched across the upper front portion of the shoe shell **30** and connected to the other front strap attachment **94** as shown in FIGS. **18C** and **18D**. Alternatively or additionally, a rear strap **90R** may be connected to one of the rear strap attachments **94** and stretched across the upper portion of the tongue **34** and connected to the other rear strap attachment **94**. In one example, the rear strap **90R** may be used in combination with one of the securement assemblies **70** described above, or in lieu of using a securement assembly **70** to secure the shoe **100** to the wearer's foot. Additionally or alternatively, the rear strap **90R** and/or front strap **90F** may be a reflective color or material for high visibility, as for example when walking at night.

[0098] Through the possibility of changing out different strap designs, the strap **90** can quickly change the look, visibility, and/or fit of the customizable shoe **100** at the user's discretion while still retaining the ability to return to a strapless design with minimal effort.

[0099] It is to be understood that some embodiments of the present invention include one or more of the features that can contribute to the safety, utility, ergonomic, versatility and aesthetics of the system.

NOMENCLATURE

[0100]	Shoe shell 30
[0101]	Lower surface 32
[0102]	Tongue 34
[0103]	Shell attachment mechanism 40
[0104]	Clip 42
[0105]	Cross-member 42C
[0106]	Disk 42D
[0107]	Notch 42N
[0108]	Stem 42S
[0109]	Cantilevered panel 44
[0110]	First portion 44F
[0111]	Substantially horizontal panel portion 44H
[0112]	Clips 46
[0113]	Cross-shaped member 46C
[0114]	Notch 46N
[0115]	Stem 46S
[0116]	Structure 48
[0117]	Housing 48H
[0118]	Sole 50
[0119]	Upper surface 52
[0120]	Edge 54
[0121]	Bottom surface 56
[0122]	Hole 56H
[0123]	Sole attachment mechanism 60
[0124]	Slot 62
[0125]	Cavity 62C
[0126]	Substantially horizontal cavity 64
[0127]	Slotted opening 64S
[0128]	Cross-shaped slot 66
[0129]	First sliding block 67
[0130]	Body 67B
[0131]	Head 67H
[0132]	Slot 67S
[0133]	Second sliding block 68
[0134]	Body 68B
[0135]	Head 68H
[0136]	Sole recess 69
[0137]	Sole first opening 69F
[0138]	Sole second opening 69S

[0139]	Securement assembly 70
[0140]	Engagement members 72
[0141]	Stop plate 72P
[0142]	Channel members 74
[0143]	Openings 75
[0144]	Shoelace 75L
[0145]	Elastic bands 76
[0146]	Zipper 77
[0147]	Fabric 77F
[0148]	Detachable loop piece 80
[0149]	Upper loop 81
[0150]	Back heel mechanism 82
[0151]	Elongate body 83
[0152]	Heel strap 84
[0153]	Framework 85
[0154]	Pocket window 86
[0155]	Upper opening 87
[0156]	Removable strap 90
[0157]	Front strap 90F
[0158]	Rear strap 90R
[0159]	End connector 92
[0160]	Strap attachment 94
[0161]	Customizable shoe 100
[0162]	Frontal portion 102
[0163]	Medial region 104
[0164]	Power source 110
[0165]	Wiring 112
[0166]	Actuation device 114
[0167]	Shell seal 120
[0168]	Sole seal 122

[0169] The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made without departing from the spirit of the invention. The present embodiment is, therefore, to be considered as merely illustrative and not restrictive, the scope of the invention being indicated by the claims rather than the foregoing description, and all changes which come within the meaning and range of equivalence of the claims are therefore intended to be embraced therein.

[0170] While the invention has been described in detail above with reference to specific embodiments, it will be understood that modifications and alterations in the embodiments disclosed may be made by those practiced in the art without departing from the spirit and scope of the invention. All such modifications and alterations are intended to be covered. In addition, all publications cited herein are indicative of the level of skill in the art and are hereby incorporated by reference in their entirety as if each had been individually incorporated by reference and fully set forth.

I claim:

1. A modular, customizable shoe assembly comprising:
a shoe shell having a shell attachment mechanism;
at least two shoe soles of different types and which can be releasably connected alternatively to the shoe shell, each of the shoe soles having a sole attachment mechanism adapted for releasable connection to the shell attachment mechanism.

2. The modular, customizable shoe assembly of claim 1, wherein at least one of the shoe soles comprises an upper surface and a raised peripheral lip extending substantially around a periphery of the shoe sole defining a recess in which the shoe shell is received.

3. The modular, customizable shoe assembly of claim 2, wherein

the peripheral lip includes a sole seal; and
the shoe shell includes a shell seal, the shell seal arranged and designed to engage the sole seal as the shoe shell is joined to the shoe sole.

4. The modular, customizable shoe assembly of claim 3, wherein one of the shell seal and sole seal is an elongate recess and the other of the shell seal and the sole seal is an elongate protrusion shaped to be received within the elongate recess.

5. The modular, customizable shoe assembly of claim 1, wherein

the shell attachment mechanism comprises a clip extending from a lower surface of the shoe shell, the clip comprising a stem extending generally perpendicularly from the lower surface and a transverse member transverse to the stem;

each of the shoe soles has an upper surface and a bottom surface, and the sole attachment mechanism comprises a slot recessed in the upper surface and opening into an enlarged cavity formed between the upper and bottom surfaces,

wherein the transverse member is arranged and designed to extend through the slot and into the enlarged cavity and is partially rotatable within the enlarged cavity to secure the shell attachment mechanism to the sole attachment mechanism.

6. The modular, customizable shoe assembly of claim 5, wherein the shell attachment mechanism comprises a disk attached to the shoe shell and the stem is at least partially rotatably connected to the disk.

7. The modular, customizable shoe assembly of claim 5, wherein

the shell attachment mechanism further comprises a cantilevered panel extending from the lower surface of the shoe shell; and

the sole attachment mechanism further comprises a panel cavity in the shoe sole having a slotted opening in the upper surface, wherein the slotted opening and the panel cavity are arranged and designed to receive the cantilevered panel.

8. The modular, customizable shoe assembly of claim 5, further comprising:

a power source connected to an actuation device, the power source and actuation device mounted in the shoe shell, the power source arranged and designed to power the actuation device to partially rotate the clip.

9. The modular, customizable shoe assembly of claim 1, wherein

the shell attachment mechanism comprises a structure attached to a lower surface of the shoe shell, the structure comprising a housing having first and second openings; and

the sole attachment mechanism of each of the at least two shoe soles comprises a sole recess in the shoe sole arranged and designed to receive the housing, the sole recess having first and second openings in a periphery of the shoe sole, and first and second sliding blocks,

wherein with the housing received within the sole recess, the housing first opening is aligned with the sole first opening and the housing second opening is aligned with the sole second opening, and

the shoe shell is secured to the shoe sole by positioning the first sliding block in the aligned sole and housing first openings and positioning the second sliding block in the aligned sole and housing second openings.

10. The modular, customizable shoe assembly of claim 9, wherein the first sliding block has a slot extending generally transversely through the first sliding block, and the generally transverse slot is arranged and designed to receive a portion of the second sliding block,

wherein the shoe shell is secured to the shoe sole by additionally positioning a portion of the second sliding block in the generally transverse slot.

11. The modular, customizable shoe assembly of claim 1, further comprising:

the shoe shell comprising a pair of engagement members on an upper medial region of the shoe shell; and

at least two securement assemblies of different types and which can be releasably connected alternately to the shoe shell, each of the securement assemblies adapted for releasable connection to the pair of engagement members.

12. The modular, customizable shoe assembly of claim 11, wherein

the shoe shell comprises a tongue having first and second sides and the pair of engagement members flank the first and second sides of the tongue; and

at least one securement assembly comprises a pair of securement members for slidably engaging the pair of engagement members and securing the securement assembly to the shoe shell.

13. The modular, customizable shoe assembly of claim 12, wherein each of the securement members have a plurality of openings arranged and designed to receive a shoe-lace for lacing up the shoe.

14. The modular, customizable shoe assembly of claim 12, wherein the pair of securement members have at least one piece of stretchable material attached between them to aid in securing the shoe to a wearer's foot.

15. The modular, customizable shoe assembly of claim 14, further comprising a zipper attached to the at least one piece of stretchable material, wherein the zipper can be partially unzipped to loosen the fit of the shoe on the wearer's foot.

16. The modular, customizable shoe assembly of claim 1, further comprising:

a back heel mechanism on a rear of the shoe shell; and
a detachable loop piece having an upper loop and arranged and designed to detachably connect to the back heel mechanism.

17. The modular, customizable shoe assembly of claim 1, further comprising:

a back heel mechanism on a rear of the shoe shell; and
a heel strap or elongate body arranged and designed to detachably connect to the back heel mechanism.

18. The modular, customizable shoe assembly of claim 17, wherein the heel strap or elongate body includes a reflective color or material for high visibility.

19. The modular, customizable shoe assembly of claim 1, further comprising:

a pair of strap attachments attached to left and right side portions of the shoe shell; and
a strap having end connectors for releasably connecting to the pair of strap attachments.

20. The modular, customizable shoe assembly of claim **19**, wherein the pair of strap attachments are attached to left and right side rear portions of the shoe shell, and

wherein when the strap is connected to the pair of strap attachments the strap is stretched across an upper portion of a tongue of the shoe shell.

21. A modular, customizable shoe assembly comprising:
a shoe shell comprising

a shell attachment mechanism; and

a pair of engagement members on an upper medial region of the shoe shell;

at least two shoe soles of different types and which can be releasably connected alternatively to the shoe shell, each of the shoe soles having a sole attachment mechanism adapted for releasable connection to the shell attachment mechanism; and

at least two securement assemblies of different types and which can be releasably connected alternately to the shoe shell, each of the securement assemblies adapted for releasable connection to the pair of engagement members, each of the securement assemblies arranged and designed to aid in securing the shoe to a wearer's foot.

22. The modular, customizable shoe assembly of claim **21**, further comprising:

a back heel mechanism on a rear of the shoe shell; and

a detachable loop piece having an upper loop and arranged and designed to detachably connect to the back heel mechanism.

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