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(54) **TOPLESS SHOE**

SCHUH OHNE OBERSEITE

CHAUSSURE SANS DESSUS

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(56) References cited:
WO-A1-03/001938
CA-A1- 2 079 929
GB-A- 1 245 975
US-A- 2 677 201
US-A1- 2005 066 543
US-S1- D 475 180
US-S1- D 558 964

- **Radhika Seth: "TechCracks | ToplessShoes Concept by Zhao Xiaoliang, Han Like, Liu Peng, Meng Qingbao, Ren Mingjun, Yang Xiao, Chen Xuan & Lin Lin", , 1 March 2012 (2012-03-01), XP055250001, Retrieved from the Internet: URL:http://techcracks.com/2012/03/toplesssshoes-concept-by-zhao-xiaoliang-han-like-liu-peng-meng-qingbao-ren-mingjun-yang-xiao-chen-xuan-lin-lin/ [retrieved on 2016-02-15]**

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EP 2 804 501 B1

Description

FIELD

[0001] The invention relates to a topless shoe configured to be conveniently put on.

BACKGROUND

[0002] The basic parts of most footwear articles, regardless of their specific type, are a sole and a top part. The sole protects the wearer's foot from direct contact with the ground, while the top part keeps the foot secured to the shoe when the foot is lifted off the ground. In what is often referred to as "closed shoes", the top part covers a substantial portion of the foot, and is normally connected to the sole by a strip of material called a "welt". Sometimes, the welt and the top part are combined. In so-called "open shoes", such as flip-flops or sandals, there is often only minimal structure holding onto the foot or parts thereof from the top. Strings and straps of various types are common examples.

[0003] An extreme case of "open shoes" is what is commonly known as "stick on sandals", "stick on flip-flops", etc., in which a sole is attached to the foot solely by adhesive forces. The top surface of these soles exhibits adhesive properties, sufficient to remain clung to the sole of the foot under relatively relaxed walking conditions. A further variation of such sandals is the type which clings to the foot using various suction elements instead of an adhesive.

[0004] A recent design concept by students at Zhejiang University, China, suggested shoes with an elastic layer (termed "muscle") which parts under the force of the foot, and then folds back to enclose the foot.

[0005] GB 1 245 975 discloses a shoe or sandal consisting of a sole and heel unit which is held on the wearer's foot by clips, the clips being of metal or plastics or similar material of a slightly springy nature, attached to or forming part of the sole, protruding upwards and curved inwards to grip the edge of the foot, with the top ends curved slightly away from the foot to facilitate the foot entering the shoe or sandal. The clips may be positioned at the toe and/or heel of the shoe and may be covered with a soft substance for comfort.

[0006] US 2 677 201 discloses a shoe made of thin gauge resilient sheet metal comprising two substantially duplicate but oppositely opening shell-like halves joined together along a line lengthwise of the show, and together forming the toe, heel, and sole portions thereof.

SUMMARY

[0007] There is provided, according to some embodiments, a shoe comprising: a concave body defined by an erecting circumferential rim having one or more foot securing areas along at least a portion of the circumference of said rim, wherein said one or more foot securing areas are normally inwardly-protruding, so as to secure a foot in said concave body when said shoe is worn, and wherein said one or more foot securing areas have an elasticity which enables said one or more foot securing areas to be pushed outwardly to receive the foot.

[0008] In some embodiments, inwardly-protruding comprises said one or more foot securing areas having a vertical-axis differential of approximately 0.1-2 centimeters between an inwards-most area and an outwards most area of said rim.

[0009] In some embodiments, said one or more foot securing areas extend along at least 50% of the circumference of said rim.

[0010] In some embodiments, said one or more foot securing areas extend along at least 70% of the circumference of said rim.

[0011] In some embodiments, said concave body comprises: a first layer serving as an insole; and a second layer disposed on an outer surface of said first layer.

[0012] In some embodiments, said second layer serves as an outsole.

[0013] In some embodiments, said second layer serves as a midsole, and wherein the shoe further comprises a third layer serving as an outsole and being disposed on an outer surface of said second layer.

[0014] In some embodiments, said first layer is made at least partially of silicone.

[0015] In some embodiments, said first layer is made at least partially of polyethylene foam.

[0016] In some embodiments, said second layer is made at least partially of acrylonitrile butadiene styrene (ABS).

[0017] In some embodiments, said third layer is made at least partially of silicone.

[0018] In some embodiments, said third layer is made at least partially of high-density polyurethane.

[0019] There is further provided, according to some embodiments, a shoe comprising a sole-shaped surface having one or more elastic, polymeric foot securing areas along at least 50%) of a circumference of said sole-shaped surface, wherein each of said one or more foot securing areas is inwardly-protruding, such that a vertical-axis differential of approximately 0.1-2 centimeters exists between an inwards-most area and an outwards most area of said each of said one or more foot securing areas, and wherein said one or more foot securing areas are configured to be pushed outwardly when receiving the foot.

[0020] In some embodiments, said one or more foot securing areas extend along at least 70%) of the circumference of said sole-shaped surface.

[0021] In some embodiments, said one or more foot securing areas extend along at least 90% of the circumference of said sole-shaped surface.

[0022] In some embodiments, said sole-shaped surface and said one or more foot securing areas are integrally formed and consist of a unitary piece of material.

[0023] In some embodiments, each of said sole-

shaped surface and said one or more foot securing areas is made of at least one polymeric material selected from the group consisting of: silicone, polyethylene foam, acrylonitrile butadiene styrene (ABS) and high-density polyurethane.

BRIEF DESCRIPTION OF THE FIGURES

[0024] Exemplary embodiments are illustrated in referenced figures. Dimensions of components and features shown in the figures are generally chosen for convenience and clarity of presentation and are not necessarily shown to scale. The figures are listed below.

Fig. 1 shows a front isometric view of a shoe, according to some embodiments;
Fig. 2 shows a back isometric view of a shoe, according to some embodiments;
Fig. 3 shows a front planar view of a shoe, according to some embodiments;
Fig. 4 shows a back planar view of a shoe, according to some embodiments;
Fig. 5 shows a left planar view of a shoe, according to some embodiments;
Fig. 6 shows a right planar view of a shoe, according to some embodiments;
Fig. 7 shows a top planar view of a shoe, according to some embodiments;
Fig. 8 shows a bottom planar view of a shoe, according to some embodiments;
Fig. 9 shows a longitudinal cross sectional view of a shoe, according to some embodiments; and
Fig. 10 shows a latitudinal cross sectional view of a shoe, according to some embodiments.

DETAILED DESCRIPTION

[0025] A topless shoe configured to be conveniently put on is disclosed herein. In some embodiments thereof, the shoe is, essentially, a generally sole-shaped concave body, configured, on its own, to secure a wearer's foot inside it. Advantageously, this securing is achieved without any substantial structure to hold on to the foot from above. Instead, the concave body is comprised of a sole defined by an erecting circumferential rim. The rim has one or more areas (hereinafter "foot securing areas") where it is slightly inwards-protruding, so as to provide a structurally-minimal but nonetheless effective means of securing the foot in the vertical axis.

[0026] The shoe is structured with these foot securing areas being normally in an inwards-protruding position, while still having a sufficient elasticity to enable them to be pushed outwardly by the foot when the shoe is put on. In a typical scenario, a person wishing to put on the shoe may position his or her foot over it and approximately in alignment with the sole shape of the shoe's body, and then simply push down the foot into the shoe. When the circumferential rim of the shoe is engaged by the descending foot, its foot securing areas are pushed outwards, essentially expanding the circumferential rim and allowing the foot to enter the concave body of the shoe. As the foot passes over the foot securing areas and its lateral pushing of these areas decreases, the areas start to return to their normal, inwards-protruding position. The foot securing areas finally reach their normal, inwards-protruding position approximately when the foot is fully down the concave body of the shoe.

[0027] When the person starts walking and lifts the foot off the ground, the normally inwards-protruding foot securing areas prevent the shoe from falling off the foot. Still, the elasticity of these foot securing areas allows for voluntary removal of the shoe, by application for force stronger than the typical downwards force exerted on the shoe naturally when walking. The degree of elasticity of these foot securing areas is carefully designed to this end.

[0028] Reference is now made to Figs. 1-2, which show isometric views of an exemplary topless shoe (hereinafter "shoe") **100** from the front and back, respectively. Reference is also made to Figs. 3-8, which show planar views of shoe **100** from the front, back, left, right, top and bottom, respectively, as well as to Figs. 9-10 which show longitudinal (A) and latitudinal (B) cross-sections of the shoe, respectively. For reasons of simplicity, the figures depict a right shoe, but are naturally intended to apply also to a left shoe, mutatis mutandis.

[0029] As shown in the figures, shoe **100** includes three layers: a first layer, serving as an insole **102;** a second layer, serving as a midsole **104;** and a third layer, serving as an outsole **106.** In a further embodiment (not shown), a shoe may include two layers, while having a shape similar to that of the embodiment of the figures. In yet another embodiment (not shown), a shoe may include four or more layers, while a shape similar to that of the embodiment of the figures. Those of skill in the art will recognize, based on the former and following discussions, that all of the aforementioned, non-showed embodiments have multiple configurational aspects in common, despite being structured with a different number of layers and/or parts. Exemplary aspects are the one or more foot securing areas which only minimally protrude inwardly. Such aspects endow these embodiments with advantageous qualities, such as the ability to secure a foot without any substantial structure to hold on to the foot from above, as discussed.

[0030] Returning to the figures, insole **102** may have a generally sole-shaped concave body, made of at least a sole-shaped part (or "surface") **106** and an erecting circumferential rim **108** which defines the concave body. Rim **108** may be divided, up to at least a portion of its height, into tabs, such as tabs **112a-c.** Sole-shaped part **106** and rim **108** may be integrally-formed, such as by injection molding, or be two separate parts attached together. Rim **108** may be structured as a circumferential wall encompassing sole-shaped part **106.** Rim **108** is intended, inter alia, to provide lateral support to the foot,

somewhat similar to a welt of a conventional shoe. However, in contrast to many conventional shoes, rim **108** is additionally configured, advantageously, to secure the foot vertically, without the need for substantial structures such as straps or strings that cover parts of the foot from above. This may be achieved by virtue of one or more foot securing areas, such as a representative foot securing area **110a,** shown encircled in Fig. 1 for demonstration reasons. Foot securing area **110a** is, essentially, an inwards-protruding area of tab **112a;** rim **108** may be divided, across at least a portion of its height, into multiple tabs, such as tabs **112a-c** and the like. By having one or more foot securing areas, such as **110a-c,** inwardly protruding relative to lower areas of their associated tabs, such as tabs **112a-c,** the sides of the foot may snugly fit into these lower areas of the tabs and at the same time be secured from above using the inwards protrusion of the foot securing areas. Foot securing areas of a shoe, such as shoe **100,** optionally extend along a substantial portion of the circumference of the shoe, such as at least 50%, 70% or 90%, of the circumference. The degree of securing is usually a factor of the circumferential portion occupied by foot securing areas, versus the amount of inwards protrusion of these areas. Generally, the more protruding these areas are, the less of them is required, and vice versa. Advantageously, the present foot securing areas, in accordance with some embodiments, are only minimally inwardly protruding (to a degree which makes the present shoe essentially "topless"), and therefore extend along a substantial portion of the shoe's circumference, as discussed above.

[0031] In some embodiments, there is a vertical-axis differential between one or more of the foot securing areas **110a-c** and their associated lower parts of tabs **112a-c.** For better illustration, the cross section in Fig. 9 shows two points: a innermost point **114** of foot securing area **112c,** and an outermost point **116** of a lower area of tab **112c** (which may simply be referred to as the outermost point of the tab). A vertical-axis differential *D* is marked between a vertical axis **114a** on which innermost point **114** resides, and between a vertical axis **116a** on which outermost point **116** resides. *D* may have different measurements at different circumferential areas of rim **108,** to fit the foot's anatomy. This may both enhance the comfort of shoe **100** to its wearer, and enhance the shoe's securing of the foot. Generally, frontal parts of the foot, such as its dorsal surface, which are farther away from the foot's connection to the leg, may require securing using a larger *D* since they have a substantial lateral curvature. In contrast, posterior parts of the foot, such as around the heel bone, may generally require securing using a smaller *D*; in some persons, however, parts surrounding the heel bone may sometimes lack a substantial lateral curvature, so that D may be very small or even zero. Furthermore, in some embodiments, some areas of rim may extend higher up than others, to match the natural curvature of the foot's sides.

[0032] In some embodiments, *D* may measure between approximately 0.1-3 centimeters, depending on the foot part, as discussed above. In some other embodiments, *D* may measure between approximately 0.1-2 cm, 0.2-2 cm, 0.3-2 cm, 0.4-2 cm, 0.5-2 cm, 0.6-2 cm, 0.7-2 cm, 0.8-2 cm, 0.9-2 cm, 1-2 cm, 1.1-2 cm, 1.2-2 cm, 1.3-2 cm, 1.4-2 cm, 1.5-2 cm, 1.6-2 cm, 1.7-2 cm, 1.8-2 cm or 1.9-2 cm, for example depending on the foot part, the shoe size and/or the like. In further embodiments, *D* may exceed the aforementioned measurements.

[0033] The division of rim **108** into tabs, such as tabs **112a-c,** is optional. Tabs **112a-c** may purposely weaken rim **108** structurally, so it may be conveniently pushed outwards by the foot when shoe **100** is put on. Generally, using more rigid materials for a rim, an insole and/or a midsole, may necessitate more tabs, while little or no tabs may be needed when more elastic materials are used - since the material elasticity, on its own, may be sufficient to allow the rim to widen to receive the foot. In present embodiments, *D* and the rigidity/elasticity of the materials, have been carefully chosen and correlated in order to provide a functionally-beneficial tradeoff between a size of a top structure of shoe **100,** which is desired to be minimal, and the ability of such structure to secure the foot sufficiently.

[0034] Midsole **104** may be attached to insole **102** externally, such as by glue, melting and/or the like, and the interface between the two may follow the same (or a similar) curvature and shape along a substantial part of their area or even its entirety. Hence, the above discussion of insole **102** applies, mutatis mutandis, to midsole **104.** It is intended that similarly-shaped elements of midsole **104** shall be referred to using the same terminology of their respective elements in insole **102.** In the exemplary embodiment of the figures, an insole plus midsole structure is adopted in order to combine comfort characteristics of insole **102** with more technical-functional characteristics of midsole **104.**

[0035] The structure of midsole **104** may depart from that of insole **102** in some parts thereof. One of the differences between insole **102** and midsole **104** may be, for example, their manufacturing from different materials. While insole **102,** which comes in contact with the wearer's foot, may be made of a comfortable, soft and/or antimicrobial material(s), midsole **104** may be made of a more rigid material(s). By way of example, insole **102** may be made at least partially of one or more of silicone, polyethylene foam, another polymeric material, a non-polymeric material or any combination thereof. The thickness of insole **102** or parts thereof, according to some embodiments, may be in the range of 0.2 cm to 1.5 cm. In other embodiments, the thickness of insole **102** or parts thereof may be higher than 1.5 cm.

[0036] Midsole **104** may be made, for instance, at least partially of one or more of acrylonitrile butadiene styrene (ABS), another polymeric material, a non-polymeric material or any combination thereof. The thickness of midsole **104** or parts thereof, according to some embodi-

ments, may be in the range of 0.2 cm to 1.5 cm. In other embodiments, the thickness of midsole **104** or parts thereof may be higher than 1.5 cm.

[0037] As a further example, insole **102** and midsole **104** may differ in the configuration of a top area of their rims. With reference to the cross section of Fig. 9, tab **110c** (and optionally other tabs) of insole **102** may include a top area **118c** above foot securing area **112c.** Top area **118c** extends between innermost point **114** and an edge **118,** wherein the edge is disposed outwardly relative to innermost point **114.** Rim **108** essentially becomes wider above innermost point **114.** This widening allows for easy entry of the foot into shoe **100.** When the foot contacts top area **118c** and continues to be pushed down, tab **112c** is pushed outwards. Optionally, edge **118** is vertically-aligned, exactly or approximately, with outermost point **116.** Since the location of outermost point **116** is set to accommodate the foot's width, edge **118** has to be positioned at least on the same vertical axis as the outermost point, if not farther outwardly, in order for it to be wide enough to receive the foot.

[0038] Yet another example is that the division of rim **108** of insole **102** into tabs does not necessarily correspond to a similar division of midsole **104.** For example, two or more adjacent tabs of insole **102** may extend over a single tab of midsole 104, or vice versa. Namely, the structural weakening of shoe **100** using tab division may be performed in only part of the layers of the shoe, and only in certain area(s).

[0039] As to midsole **104,** a top area **120c** thereof does not, in some embodiments, need to come in contact with the foot when shoe **100** is put on. Therefore, top area **120c** may be structured in such a way that it just supports top area **118c** of inner sole **102.** Top area **120c** may be structured, for example, as an outwards-curling part, which reinforces top area **118c** from outside.

[0040] Sole-shaped part **106** of insole **102,** and that of midsole **104,** may have different thicknesses across different parts thereof, in order to match the natural curvature of the foot's plantar surface. For example, greater thickness may be provided beneath the arches of the foot, and lower thickness may be disposed beneath the heel bone and the forefoot.

[0041] A frontal part of shoe **100,** which is generally referenced as **122,** optionally lacks foot securing areas. Instead, frontal part **122** may be shaped as a toe protector, covering the toes or a part thereof. Frontal part **122** is optionally made of an extension of insole **102.** Since the toes are flexible, as opposed to other parts of the foot, a foot securing area in front of the toes is usually inefficient - the toes can easily escape it. Therefore, toe protection may be provided by frontal part **122,** or, in other embodiments (not shown), a frontal part of a shoe may lack such a cover altogether. Even if a cover exists, it may be structured and positioned such that there is a vertical gap between it and the toes when the shoe is worn; namely, it may not serve to secure the foot in place.

[0042] A further difference between insole **102** and midsole **104** may be, for example, the extension of tabs of the midsole further down from tabs **112a-c** of the insole. This is best depicted in Fig. 8, which shows shoe **100** from a bottom view. This depiction relates to the invention, in which midsole **104** is actually made up of a plurality of separate U-shaped elements, such as elements **124-136,** wherein the walls of the U are the erecting circumferential rim of the midsole, and the bottom of the U is the sole-shaped part of the midsole. Optionally, at least the bottoms of at least some of the U-shaped elements of midsole **104,** such as elements **124-136,** are separated and attached to insole **102** in such locations, that the spaces formed between the elements match the dynamics of the foot when walking. This, as opposed to many conventional shoes in which the soles are only minimally-flexible and usually have the same degree of flexibility along their areas. When the bottoms of at least some of elements **124-136** are separated, as shown in the figure, shoe **100** in general gives its wearer a feeling close to the feeling of walking barefoot. The natural, dynamic motion of different parts of the foot is only minimally affected due to the separation. The specific shapes and separation of elements **124-136** depicted in Fig. 8, have been experimentally tested and verified to correspond to the dynamic motion of different parts of the foot. However, this is only one of multiple embodiments of the invention, and other shapes and separation of elements are intended within the framework of different embodiments. In contrast to the separation of U-shaped elements, in other embodiments (not shown), a midsole or parts thereof may be integrally formed.

[0043] Outsole **106,** which is also an optional layer, may include pieces, such as pieces **138-150,** attached to elements **124-136,** respectively, externally. Outsole **106** may be made of a highly-durable material, allowing it to last throughout prolonged use. One example of a suitable material is high-density polyurethane, but other materials are possible as well. In other embodiments (not shown) a shoe may lack an outsole, and a midsole may be made of a material(s) suitable both for supporting an insole and durably interfacing with the ground.

Claims

1. A shoe (100) comprising:

a concave body defined by an erecting circumferential rim (108) having one or more foot securing areas (110) along at least a portion of the circumference of said rim,

wherein said one or more foot securing areas are inwardly-protruding, so as to secure a foot in said concave body when said shoe is worn, and

wherein said one or more foot securing areas have an elasticity which enables said one or more foot securing areas to be pushed outward-

ly to receive the foot;

said shoe being **characterized in that** the concave body comprises:

a first layer (102) constituting an insole and comprising a sole-shaped part (106) and a first, inner portion of the erecting circumferential rim; and
a second layer (104) comprising a plurality of separate U-shaped elements (124-136), wherein walls of the U-shaped elements constitute second, outer portions of the erecting circumferential rim, and bottoms of the U-shaped elements constitute a sole-shaped part of the second layer, wherein at least some of said bottoms are attached to said first layer.

2. The shoe (100) according to claim 1, said one or more foot securing areas (110) having a vertical-axis differential of approximately 0.1-2 centimeters between an inwards-most area and an outwards most area of said rim.

3. The shoe (100) according to claim 2, wherein said one or more foot securing areas (110) extend along at least 50% of the circumference of said rim.

4. The shoe (100) according to claim 3, wherein said one or more foot securing areas (110) extend along at least 70% of the circumference of said rim.

5. The shoe (100) according to claim 4, wherein said one or more foot securing areas (110) extend along at least 90% of the circumference of said rim.

6. The shoe (100) according to claim 1, wherein said concave body consists of a unitary piece of material.

7. The shoe (100) according to claim 1, said second layer constituting a midsole, and wherein said concave body further comprises a third layer constituting an outsole and being disposed on an outer surface of said second layer.

8. The shoe (100) according to claim 7, wherein said first layer is made at least partially of silicone or wherein said first layer is made at least partially of polyethylene foam or wherein said second layer is made at least partially of acrylonitrile butadiene styrene (ABS).

9. The shoe (100) according to claim 7 or 8, wherein said third layer is made at least partially of silicone.

10. The shoe (100) according to claim 7 or 8, wherein said third layer is made at least partially of high-density polyurethane.

11. The shoe (100) according to any one of the preceding claims, wherein said U-shaped (124-136) elements are spaced from one another so as to match dynamics of a foot contained therein when walking.

Patentansprüche

1. Schuh (100), aufweisend:

einen konkaven Körper, der durch einen aufrechten Umfangsrand (108) definiert ist, welcher einen oder mehrere Fußsicherungsbereiche (110) entlang mindestens eines Teils des Umfangs des Randes aufweist;
wobei der eine oder die mehreren Fußsicherungsbereiche nach innen vorstehend sind, um einen Fuß in dem konkaven Körper zu sichern, wenn der Schuh getragen wird; und
wobei der eine oder die mehreren Fußsicherungsbereiche eine Elastizität aufweisen, welche es ermöglicht, dass der eine oder die mehreren Fußsicherungsbereiche nach außen drückbar sind, um den Fuß aufzunehmen;
wobei der Schuh **dadurch gekennzeichnet ist, dass** der konkave Körper aufweist:

eine erste Schicht (102), welche eine Innensohle bildet und einen sohle-förmigen Teil (106) und einen ersten, inneren Teil des aufrechten Umfangsrandes aufweist; und
eine zweite Schicht (104), welche eine Mehrzahl von separaten U-förmige Elementen (124 - 136) aufweist, wobei die Wände der U-förmigen Elemente zweite, äußere Teile des aufrechten Umfangsrandes bilden und die unteren Teile der U-förmigen Elemente einen sohle-förmigen Teil der zweiten Schicht bilden; wobei
mindestens einige der unteren Teile an der ersten Schicht angeordnet sind.

2. Schuh (100) nach Anspruch 1, wobei der eine oder die mehreren Fußsicherungsbereiche (110) einen Vertikalachsenunterschied von etwa 0,1 - 2 Zentimeter zwischen einem innersten Bereich und einem äußersten Bereich des Randes haben.

3. Schuh (100) nach Anspruch 2, wobei der eine oder die mehreren Fußsicherungsbereiche (110) sich mindestens entlang 50% des Umfangs des Randes erstrecken.

4. Schuh (100) nach Anspruch 3, wobei der eine oder die mehreren Fußsicherungsbereiche (110) sich mindestens entlang 70% des Umfangs des Randes erstrecken.

5. Schuh (100) nach Anspruch 4, wobei der eine oder die mehreren Fußsicherungsbereiche (110) sich mindestens entlang 90% des Umfangs des Randes erstrecken.

6. Schuh (100) nach Anspruch 1, wobei der konkave Körper aus einem einstückigen Material besteht.

7. Schuh (100) nach Anspruch 1, wobei die zweite Schicht eine Zwischensohle bildet und wobei der konkave Körper weiterhin eine dritte Schicht aufweist, welche eine Außensohle bildet und auf einer äußeren Oberfläche der zweiten Schicht angeordnet ist.

8. Schuh (100) nach Anspruch 7, wobei die erste Schicht mindestens teilweise aus Silikon besteht oder wobei die erste Schicht mindestens teilweise aus PolyethylenSchaum besteht oder wobei die zweite Schicht mindestens teilweise aus Acrylnitril-Butadien-Styrol (ABS) besteht.

9. Schuh (100) nach Anspruch 7 oder 8, wobei die dritte Schicht mindestens teilweise aus Silikon besteht.

10. Schuh (100) nach Anspruch 7 oder 8, wobei die dritte Schicht mindestens teilweise aus Polyurethan mit hoher Dichte besteht.

11. Schuh (100) nach einem der vorhergehenden Ansprüche, wobei die U-förmigen Elemente (124 - 136) voneinander beabstandet sind, um an die Dynamik eines darin enthaltenen Fußes beim Gehen angepasst zu sein.

Revendications

1. Chaussure (100) comprenant :

un corps concave défini par un bord périphérique redressé (108) ayant au moins une zone de fixation d'un pied (110) s'étendant le long d'au moins une partie de la périphérie de ce bord,
cette zone de fixation d'un pied étant en saillie vers l'intérieur de façon à fixer un pied dans le corps concave lorsque la chaussure est portée, et
la zone de fixation d'un pied ayant une élasticité lui permettant d'être repoussée vers l'extérieur pour recevoir un pied,
cette chaussure étant **caractérisée en ce que** le corps concave comprend :

une première couche (102) constituant une première intérieure et comprenant une partie en forme de semelle (106) et une première partie, interne, du bord périphérique redressé, et
une seconde couche (104) comprenant un ensemble d'éléments en forme de U (124, 136) séparés, les branches périphériques de ces éléments en forme de U constituant des secondes parties, externes, du bord périphérique redressé, et les bases des éléments en forme de U constituant une partie en forme de semelle de la seconde couche, au moins certaines des bases étant fixées à la première couche.

2. Chaussure (100) conforme à la revendication 1, dans laquelle la zone de fixation d'un pied (110) a un différentiel d'axe vertical égal à environ 0,1-2 centimètres entre la zone la plus interne et la zone la plus externe du bord.

3. Chaussure (100) conforme à la revendication 2, dans laquelle la zone de fixation d'un pied (110) s'étend le long d'au moins 50% de la périphérie du bord.

4. Chaussure (100) conforme à la revendication 3, dans laquelle la zone de fixation d'un pied (110) s'étend le long d'au moins 70% de la périphérie du bord.

5. Chaussure (100) conforme à la revendication 4, dans laquelle la zone de fixation d'un pied (110) s'étend le long d'au moins 90% de la périphérie du bord.

6. Chaussure (100) conforme à la revendication 1, dans laquelle le corps concave est constitué par une pièce de matériau unitaire.

7. Chaussure (100) conforme à la revendication 1, dans laquelle la seconde couche constitue une semelle intermédiaire et le corps concave comprend en outre une troisième couche constituant une semelle d'usure et située sur la surface externe de la seconde couche.

8. Chaussure (100) conforme à la revendication 7, dans laquelle la première couche est réalisée au moins partiellement en silicone ou la première couche est réalisée au moins partiellement en mousse de polyéthylène ou la seconde couche est réalisée au moins partiellement en copolymère acrylonitrile butadiène styrène (ABS).

9. Chaussure (100) conforme à la revendication 7 ou 8, dans laquelle la troisième couche est réalisée au moins partiellement en silicone.

10. Chaussure (100) conforme à la revendication 7 ou 8, dans laquelle la troisième couche est réalisée au

moins partiellement en polyuréthane haute densité.

11. Chaussure (100) conforme à l'une quelconque des revendications précédentes,
dans laquelle les éléments en forme de U (124-136) sont situés à distance les uns des autres de façon à pouvoir s'adapter à la dynamique d'un pied contenu dans la chaussure au cours de la marche.

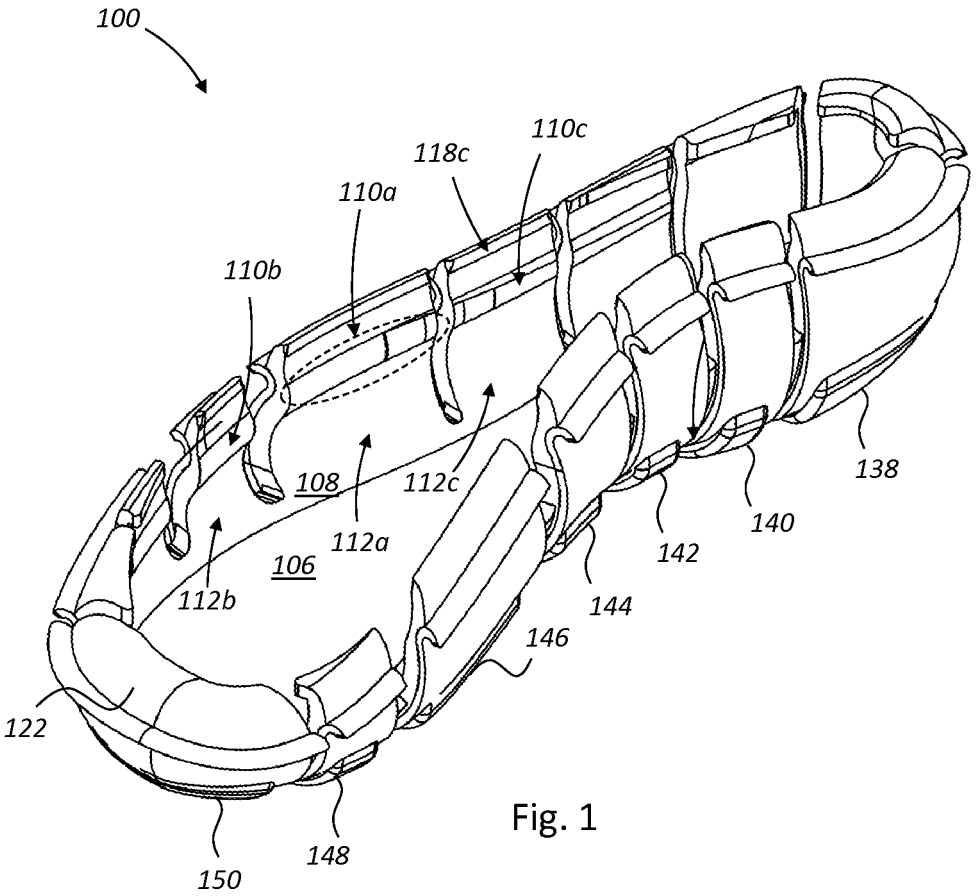

100
110c
118c
110a
110b
108
112c
112a
106
112b
140
142
144
146
138
122
148
150

Fig. 1

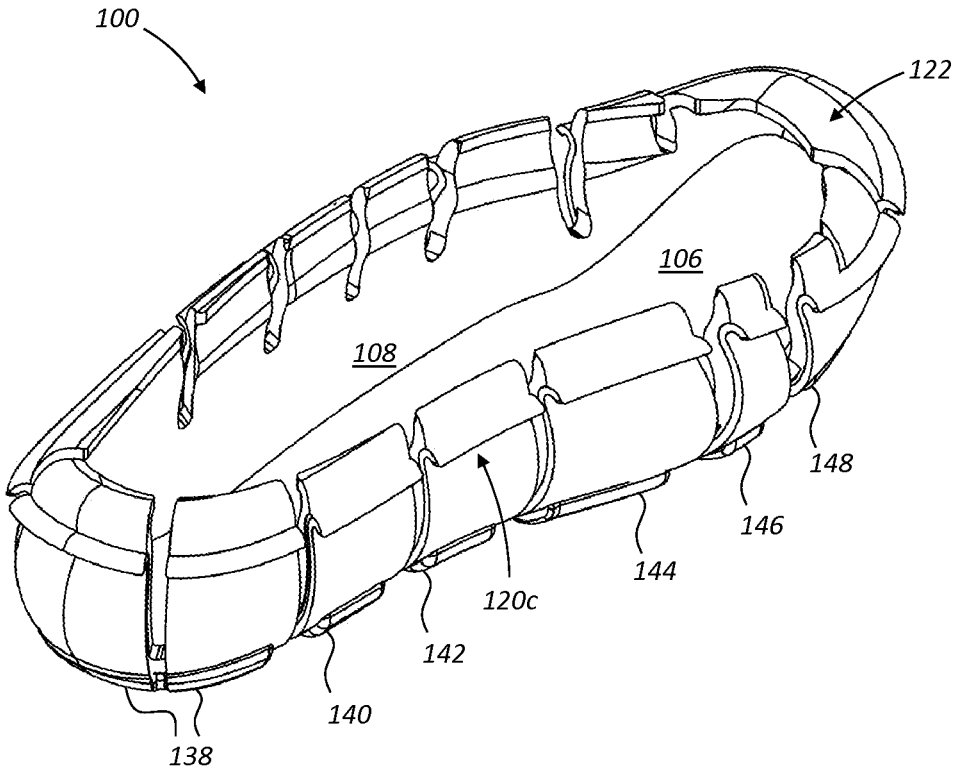


Fig. 2

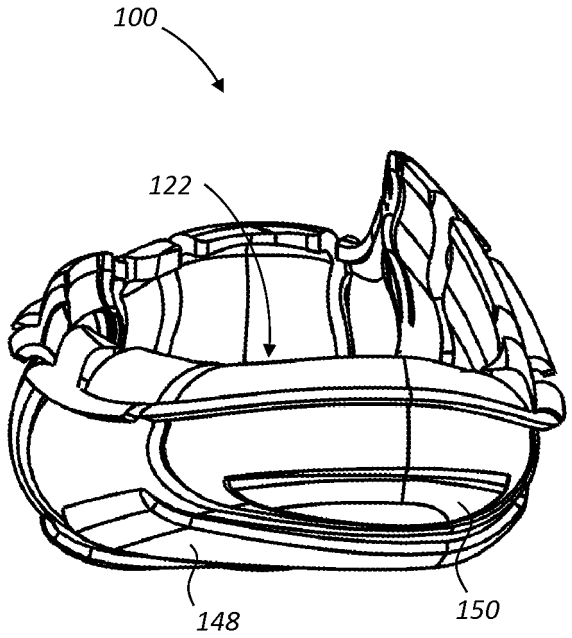


Fig. 3

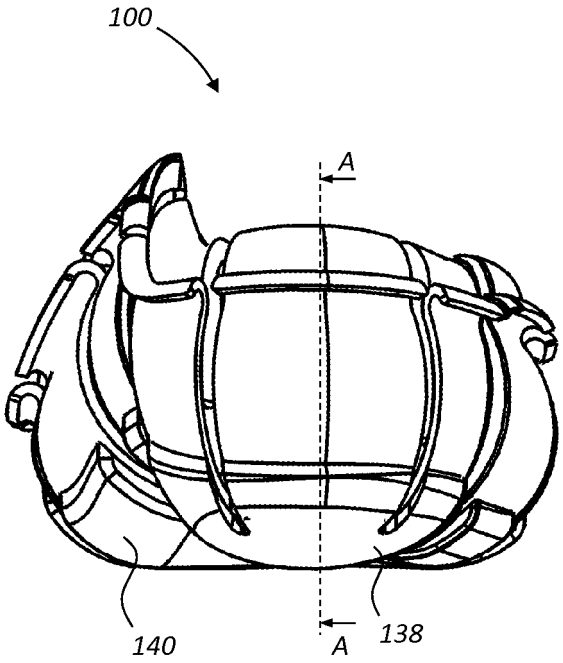


Fig. 4

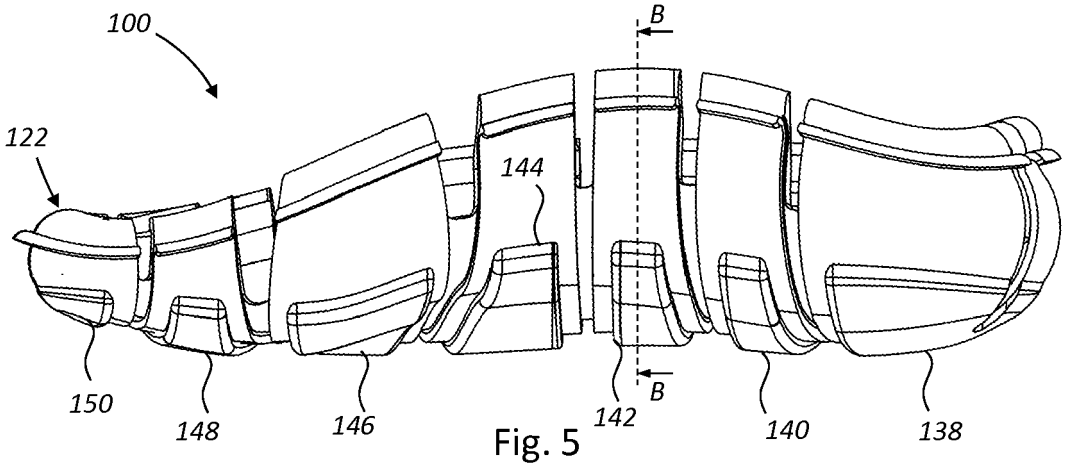

100
B
122
144
150
148
146
142
B
140
138

Fig. 5

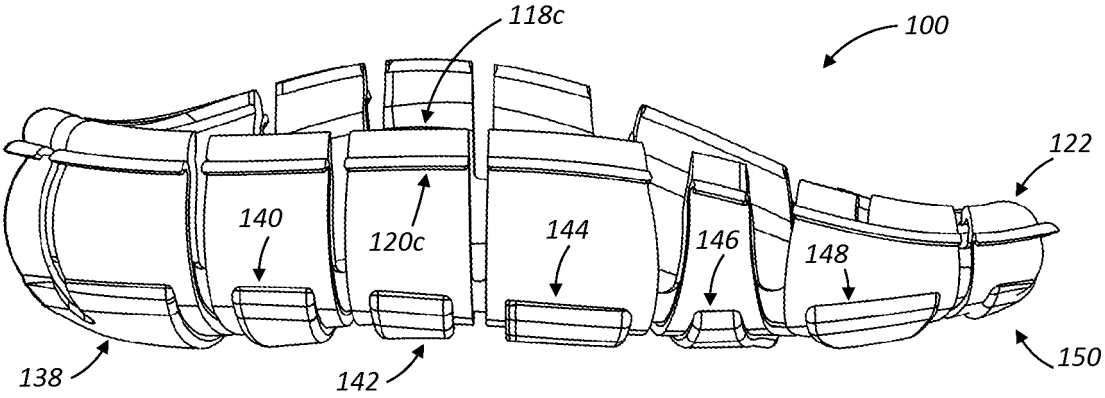

118c
100
122
140
120c
144
146
148
138
142
150

Fig. 6

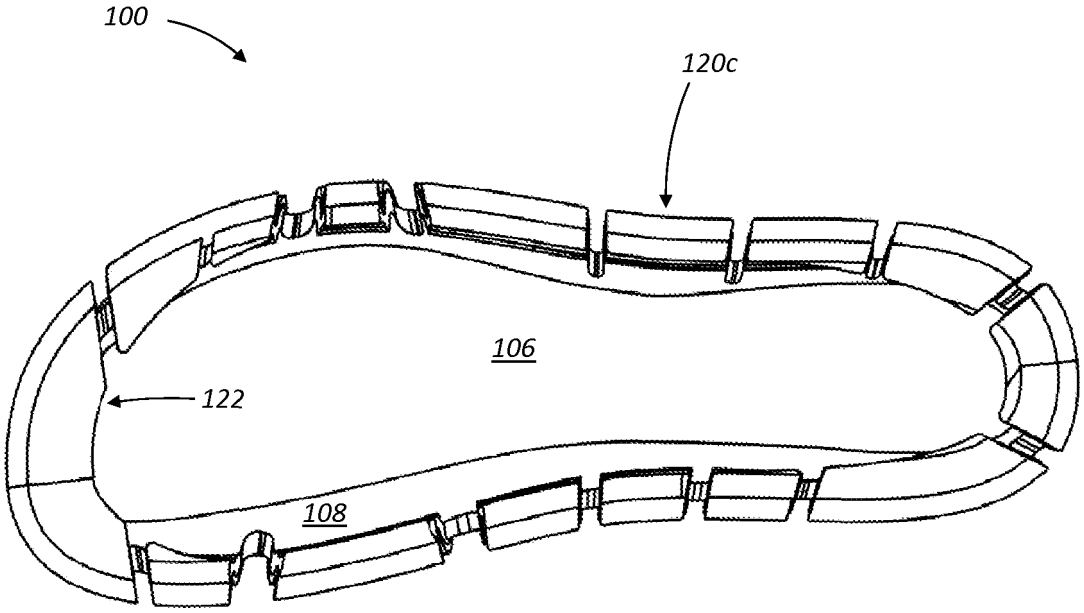


Fig. 7

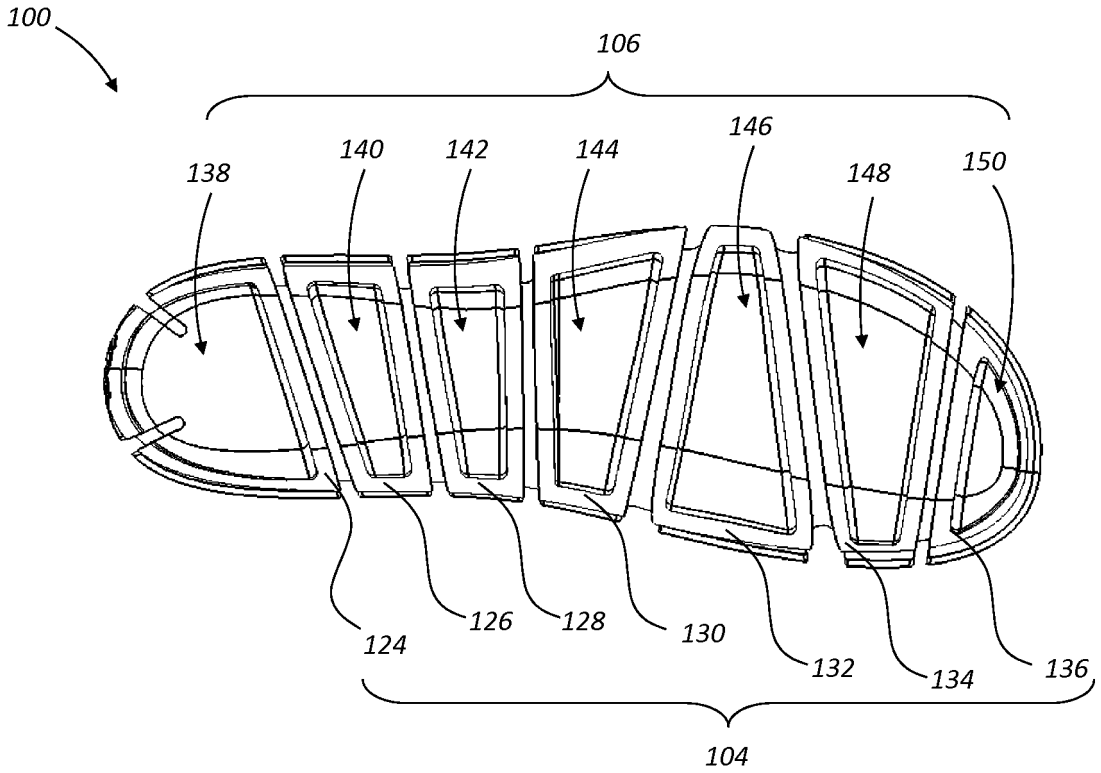

100
106
138
140
142
144
146
148
150
124
126
128
130
132
134
136
104

Fig. 8

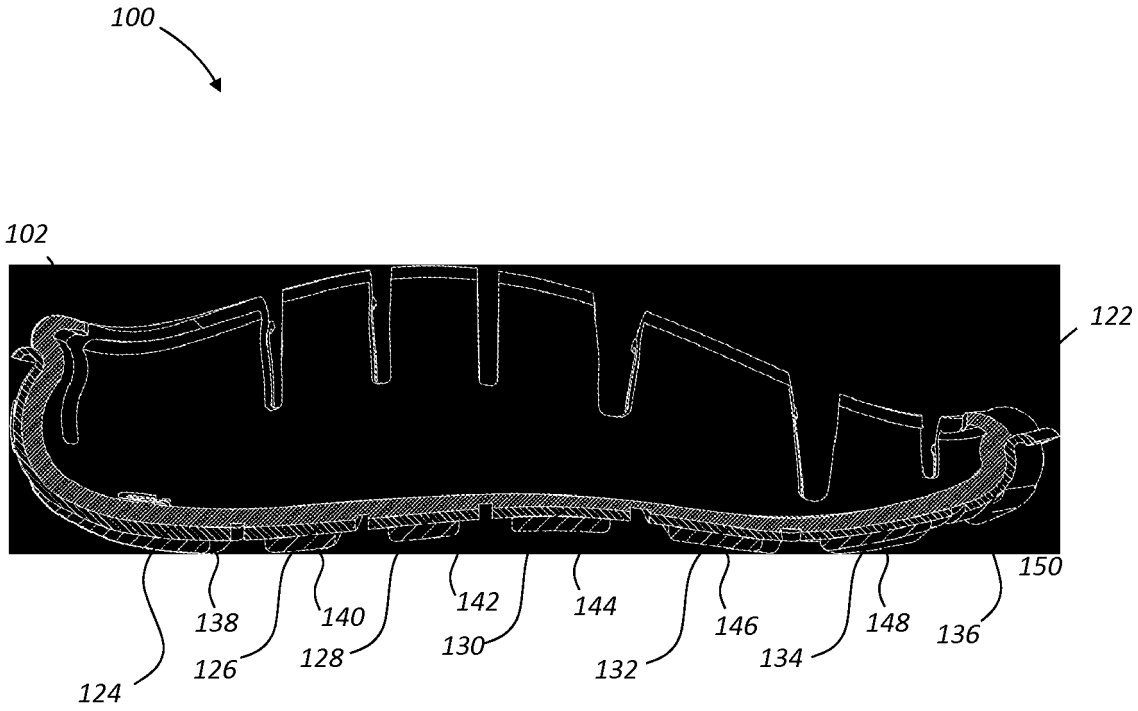

100
102
122
150
124
126
128
130
132
134
136
138
140
142
144
146
148

Fig. 9

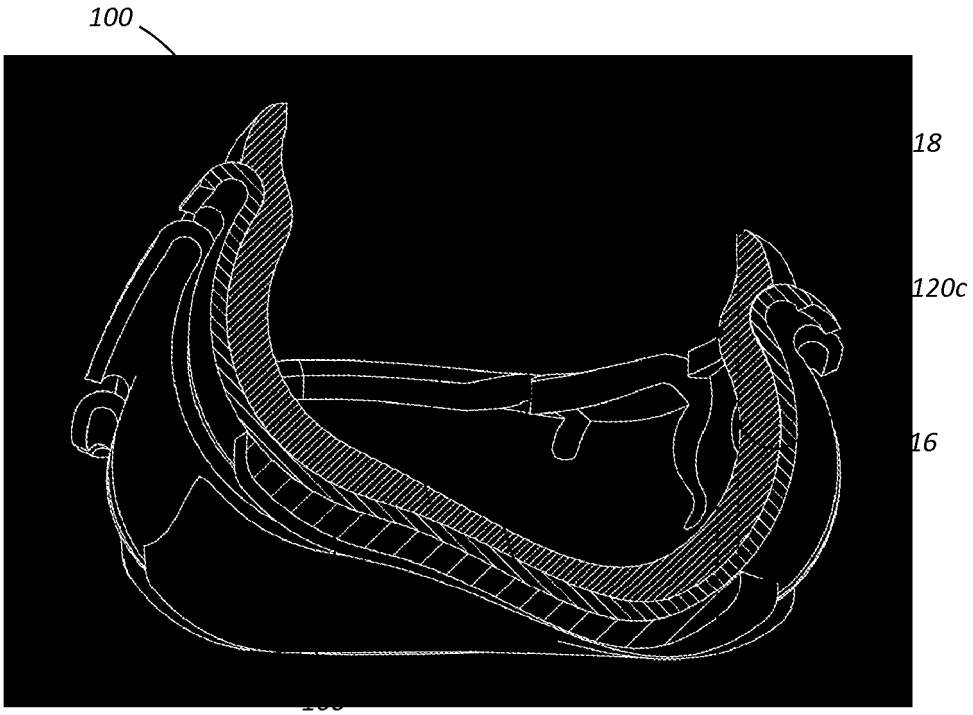


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 1245975 A **[0005]**
- US 2677201 A **[0006]**