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(54) Title: FOOTWEAR CLOSURE SYSTEM

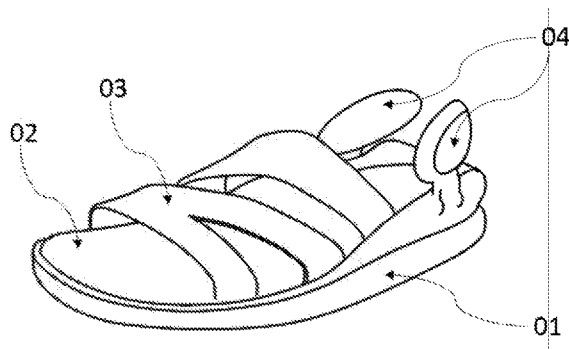


Fig. 1

(57) Abstract: A shoe comprising a sole having an insole configured to support a user's foot, an upper, and a lateral holding mechanism configured to perform an easy hands-free fast entry in the shoe, to hold the user's foot in the shoe, and to perform an easy hands-free fast escape from the shoe, wherein the holding mechanism has side parts moveably positioned on the left and right side of the user's foot and connected by a bridge, side parts providing an entry position and a holding position, wherein the bridge is covered by the insole and wherein the movement axes of the side part are pivotally fixed in the left and right side of the sole and substantially oriented parallel to the longitudinal axis of the shoe, and wherein the movement of side parts from the entry position to the holding position is performed by forcing down the insole and thereby the bridge.



DESCRIPTION

FIELD OF THE INVENTION

Footwear Closure System

The present invention relates to an easy-entry easy-exit shoe having a holding mechanism configured to hold the user's foot in the shoe.

BACKGROUND OF THE INVENTION

Normally, shoes have securing mechanisms like ropes, zippers, hook and loop fasteners, buttons, and shoelaces to secure and hold the shoes on the feet of a person. Each of these fasteners usually requires use of one's hand for the fastening operation. If the wearer has to operate the fasteners itself, it will require a certain degree of dexterity and physical flexibility. This may be a problem for persons who are handicapped or disabled. Also, many ordinary persons would like to avoid bending forward and to be able to easily and quickly fasten and unfasten the shoes by a hands-free operation. Such shoes are also interesting for many persons working in specific areas, where it is necessary to change shoes between different areas and avoiding contamination possibly caused by hand-shoe contact. A normal step-in shoe does not grip around the foot in a proper way.

STATE OF THE ART

A rapid-entry shoe, that may be rapidly entered and readied for wearing by the user by a hands-free operation is disclosed in US2012/0317839. The shoe facilitates a hands-free rapid-entry but no practical hands-free rapid-escape.

WO2012/033549 discloses a hands-free fastening mechanism for releasably securing a user's foot to footwear. The fastening mechanism comprises at least one pivotable strap which is coupled to a hinge mechanism.

The last-mentioned disclosure also exemplifies for all shoes of the state of the art in the field of rapid-entry shoes and easy-entry shoes respectively, the need of at least one feature to surround the heel and to secure the user's foot behind an Achilles tendon of the foot.

All known and disclosed shoes in the state of the art in this field of rapid-entry, fast-entry, or easy-entry shoes are providing features, in particular mechanisms, to enhance a rapid-entry of the user's foot into the shoe, comprising parts which are configured to surround the heel of the user's foot, and in most cases having a hinge to operate the heel cup or rear part of the shoe, wherein the axis of the hinge is perpendicular to the longitudinal axis of the shoe. This bisection of the shoe sole increased the wear and failure, and degrade the comfort of the shoe. In addition, all known and disclosed shoes in the state of the art in the field of rapid-entry shoes are providing features which make it difficult to practically perform a hands-free rapid-escape, fast-escape, or easy-escape.

The present invention solves the above-mentioned problems of the prior art and it is an objective of the present invention to provide a shoe without a hinge, without a split sole, without the need to secure the foot around the heel of the user's foot, with a mechanism configured to perform a completely hands-free easy-entry of the foot into the shoe, a hold of the user's foot in the shoe, and a completely hands-free easy-escape out of the shoe. The present invention also provides, contrary to the state of the art, a shoe always ready for the hands-free easy-entry, without the need of a pretreatment.

SUMMARY

A shoe comprising a sole, an insole configured to support a user's foot, an upper, and a lateral holding mechanism configured to perform a hands-free easy-entry in the shoe, to hold the user's foot in the shoe, and to perform a hands-free easy-escape out of the shoe. Wherein the holding mechanism has side parts moveably positioned on the left and right side of the shoe and the user's foot, respectively, connected by a bridge, side parts providing an entry position and a holding position. Wherein the bridge is covered by the insole and wherein the movement axes of the side parts are pivotally fixed in the left and right side of the sole and substantially oriented parallel to the longitudinal axis of the shoe, and wherein the movement of the side parts from the entry position to the holding position is performed by forcing down the insole and thereby the bridge.

DISCRIPTION OF THE INVENTION

The invention relates to a hands-free easy-entry easy-escape shoe, wherein the shoe has either an entry position (Fig. 6) or a holding position (Fig. 7), an open or a closed position, respectively. The functionality of the present invention and shoe respectively, is explained below using preferred, but not limited to, embodiments of the present invention. Side parts (04) moveably positioned on the left and right side of the shoe and the user's foot, respectively, are providing the entry position and the holding position, respectively, by moving the user's foot out of the shoe and in the shoe respectively (Fig. 8). The moving of the user's foot into and out of the shoe triggers a simple mechanism, connected to the side parts and positioned between the shoe sole and the partially up and down moveable rear part of the shoe insole, leading to the movement of the side parts between the entry position and the holding position. (Fig. 6, 7, 8) The movement from the entry position - the foot is not(yet) in the shoe - to the holding position - the foot is completely in the shoe - is triggered by moving the foot into the shoe and forcing down the partially up and down moveable rear part of the shoe insole and the side parts connecting bridge (06). The movement from the holding position - the foot is completely in the shoe - to the entry position - the foot is no (longer) in the shoe - is triggered by moving the foot backwards out of the shoe and pushing apart the side parts by the wider forefoot. (Fig. 8)

BRIEF DISCRIPTION OF THE DRAWINGS

The following descriptions of the Figs. will describe embodiments and the mechanism of the present invention in more detail. It is obvious that the shoe of the present invention, comprising the holding mechanism, may have many forms and shapes and is not limited to the following embodiments and mechanism described in the Figs. Considering a good performance of the invention it is also preferred, but not limited to, to use a rocker sole.

Figs. 1 shows an embodiment of a complete shoe of the present invention, having a sole (01), an insole (02), an upper (03), and side parts (04) of the holding mechanism. The visualized shoe is a lightweight embodiment of the present invention. The holding mechanism is arranged in the rear part of the shoe, where the left and right side parts in the holding position are slightly pressed against the left and right side of the user's foot, short under the ankle and short above the footbed of the user's foot, to latch and hold the shoe on the user's foot. The same function can also be obtained on the dorsal

midfoot. The sole, insole and upper can be made from almost any material used in shoe manufacturing, for example, leather, rubber, EVA, and other natural and synthetic materials, and the holding mechanism can be made of a single piece of a homogeneous material, for example with 3D printing of a plastic material, for example an ABS-synthetic material.

Fig. 2 shows an embodiment similar to the embodiment from Fig.1, but the side parts of the holding mechanism have an elongated form and are fixed at the upper.

Fig. 3 shows the shoe and the holding mechanism, respectively, in a simple form in a cross-section view from behind the shoe, showing the holding position and a sole (01), insole (02), and the side parts of the holding mechanism. Wherein the holding mechanism is pivotably fixed along the axes (05) in the shoe sole and the side parts are connected via the bridge (06) which performs the snatching transition. Such a simple embodiment of the mechanism consisting of the side parts (04), the axes (05), and the bridge (06) can be made of a single piece of a homogeneous material, for example with 3D printing of a plastic material, for example an ABS-synthetic material.

Fig. 4 shows another embodiment of the holding mechanism of the present invention. In this embodiment, it is possible to adjust the holding force / clamping force and or the width of the holding mechanism and side parts, respectively, to the user's foot and or need using an adjusting screw (07) to change the distance between the pivotally fixed axes (05) of the single homogeneous material comprising the side parts (04), axes (05), and bridge (06). Wherein the holding force increases and the width decreases if the adjusting screw (07) is operated in such a manner that the axes (05) come closer to each other, and vice versa.

Fig. 5 shows how the adjusting screw mechanism is fixed in, respectively is part of, the sole (01). More precisely, in the visualized embodiment of Fig. 5 the axes (05) are pivotably fixed in the shoe sole and a (inner) part of the shoe sole is adjustable in the width by the adjusting screw (07), synonymous with the adjusting of the distance between the axes of the holding mechanism, and the holding force / clamping force and or the width of the holding mechanism and side parts, respectively, to the user's foot and or need.

Fig. 6 shows the shoe in the entry position, respectively the open position in a cross-section view from behind the shoe. In this entry position the bridge (06) and the insole (02) are in an upturned position and the side parts (04) are in an outwards position. Fig. 7 shows the shoe and the user's foot (09) in the holding position, respectively the closed position in a cross-section view from behind the shoe. In this closed position, the bridge (06) is in a downturned position, the insole (02) is in a normal position and the side parts (04) are in an inwards position.

Based on the open position the user moves the foot into the shoe and by moving down the heel (08), the insole and thereby the bridge is forced down. After exceeding a certain force, the bridge (06) snatches from the upturned position in the downturned position, the insole (02) from the upturned position in a normal position and the side parts (04) from the outwards position in an inwards position to latch and hold the user's foot (09) in the shoe.

Since the ligament (06), the bridge (06) respectively, between the axes is longer than the distance between the axes, there are only two possible positions the bridge can take. The position shown in Fig. 6, the upturned position, and the position shown in Fig. 7, the downturned position. Since there is no stable position in between, is the transition between the two positions a snatching transition.

Fig. 8 shows the movement of the user's foot (09) and the side parts (04) when the shoe is removed from the user's foot and the open position is provided at the same time. The user pulls the foot backwards out of the shoe. Due to the wider forefoot, the side parts (04) will be pressed outwards under this movement. Simultaneously, the bridge (06) is snatching and thereby the bridge and the insole (02) are moving in the upturned position and leaving the shoe in the entry, respectively open position, ready to move into the shoe again as in the steps aforementioned.

The snatching transition is preferred in, but not indispensable for, all embodiments. Other embodiments are independent of the snatching mechanism and of the axes fixed in shoe sole. In this context and generally, it should be said that it is not necessary that the holding mechanism or parts of the holding mechanism, like side parts or the bridge, are made of a single piece of material. The parts may be made of single pieces of different material and professionally interconnected.

Fig. 9 shows that the movement between the upturned and downturned position can not only be obtained by a compression of the bridge during the movement, but also by flexing the bearing (10) of the bridge axes, e.g. by a small piece of rubber (10) between the parts in one end.

Fig. 10 shows an example, in which the bridge comprises a piece of rubber, which can i.a. absorb compression in longitudinal direction.

And it is also not excluded that the invention comprises additional features, which can improve the performance of the holding mechanism in some cases. Fig. 11 shows an example with an additional connector (12) of the side parts. Such an additional connection can lead to an additional force to secure the holding.

REFERENZ NUMBER LIST

- (01) sole
- (02) insole
- (03) upper
- (04) side parts
- (05) axis
- (06) bridge
- (07) adjusting screw
- (08) user's heel
- (09) user's foot
- (10) flexing of bearing /rubber
- (11) rubber piece
- (12) connector - example for additional piece

CLAIMS

1) A shoe comprising a sole (01), an insole (02), and an upper (03)

characterized in that the shoe has a mechanism

- providing an entry position and a holding position and
- comprising a) side parts (04) pivotally fixed on the left and right side of the shoe, wherein the rotation axes (05) of the pivoted side parts (04) are located in the left and right side of the shoe and oriented substantially parallel to the longitudinal axis of the shoe, b) a bridge (06) connecting the side parts and covered by the insole (02).

2) Shoe according claim 1, wherein the movement of the side parts (04) from the entry position to the holding position is performed by forcing down the insole (02) and thereby the bridge (06) performed by the user's foot (09) sliding into the shoe.

3) Shoe according claim 1 and 2, wherein the movement of the side parts (04) from the entry position to the holding position is a snatching transition.

4) Shoe according claim 1, wherein the movement of the side parts (04) from the holding position to the entry position is performed by pushing apart the side parts (04) performed by pulling the foot (09) backwards out of the shoe and pushing apart the side parts (04) by the wider forefoot.

5) Shoe according claim 1 and 4, wherein the movement of the side parts (04) from the holding position to the entry position is a snatching transition.

6) Shoe according to any of the proceeding claims, wherein the distance between the side parts (04), and thereby the holding force and pressure, respectively, is adjustable.

7) Shoe according to claim 6, wherein the adjustment is performed by variation of the sole (01) width using adjustment means (07).

8) Shoe according to any of the preceding claims, comprising at least one additional downlocks.

9) Shoe according to any of the preceding claims, wherein the holding mechanism consists of a single homogeneous one-material component arranged between the sole and the inner sole.

10) Shoe according to any one of the preceding claims, wherein the holding mechanism's bridge is configured either to be formed upturned (Fig. 6) in the entry position (Fig. 6) or to be formed downturned (Fig. 7) in the holding position (Fig. 7).

11) Shoe according to any one of the preceding claims, wherein the holding mechanism is configured to perform a hands-free easy-entry into the shoe, to hold the user's foot (09) in the shoe, and to perform a hands-free easy-escape out of the shoe.

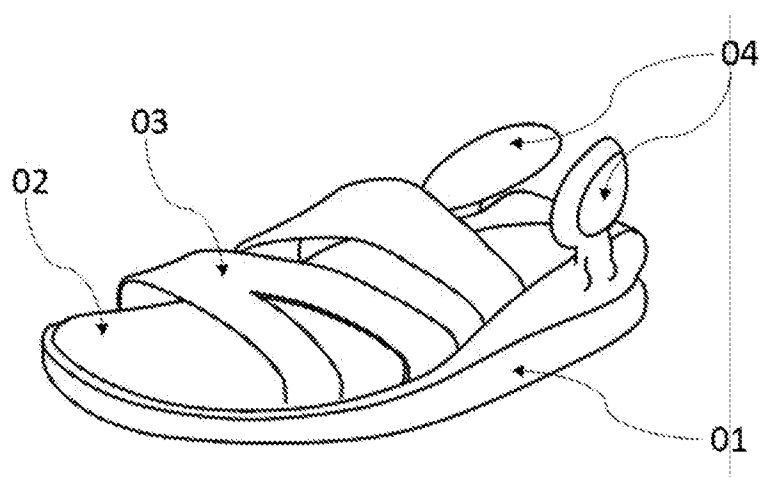


Fig. 1

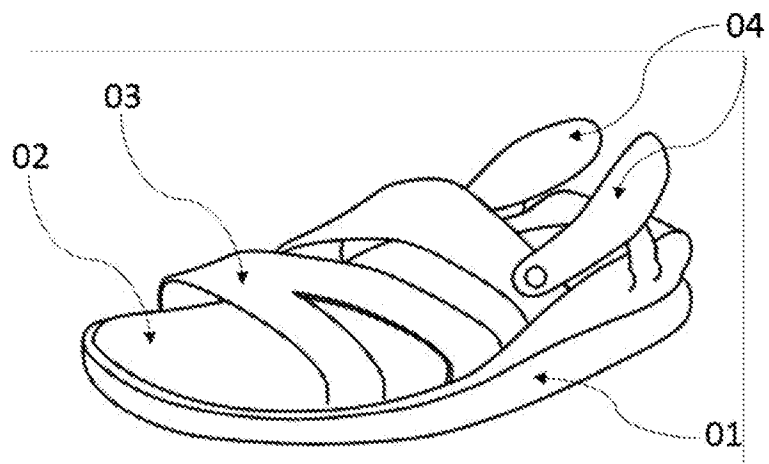
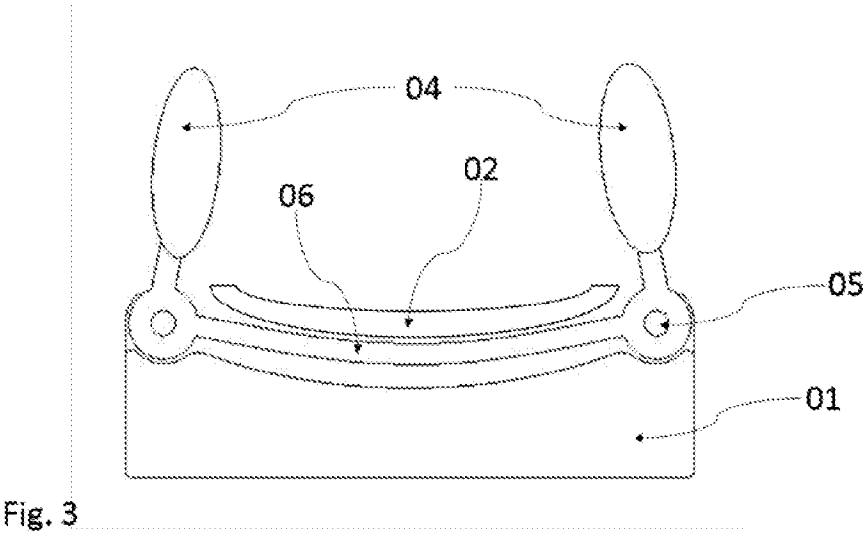


Fig. 2



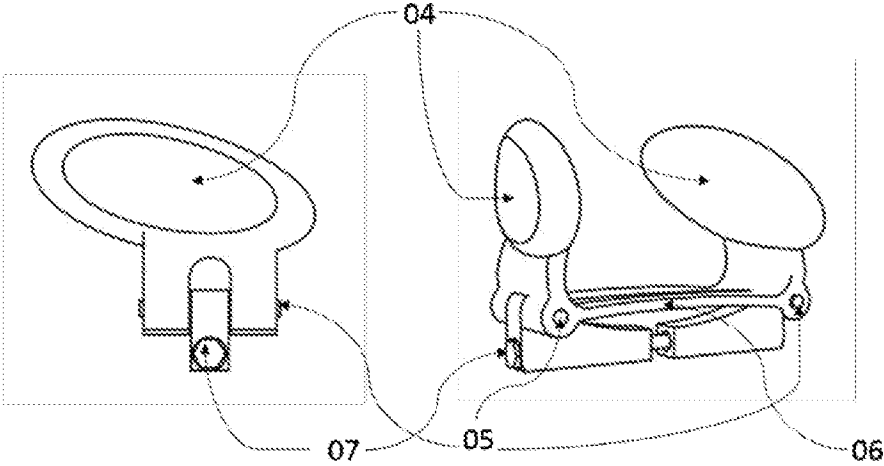


Fig. 4

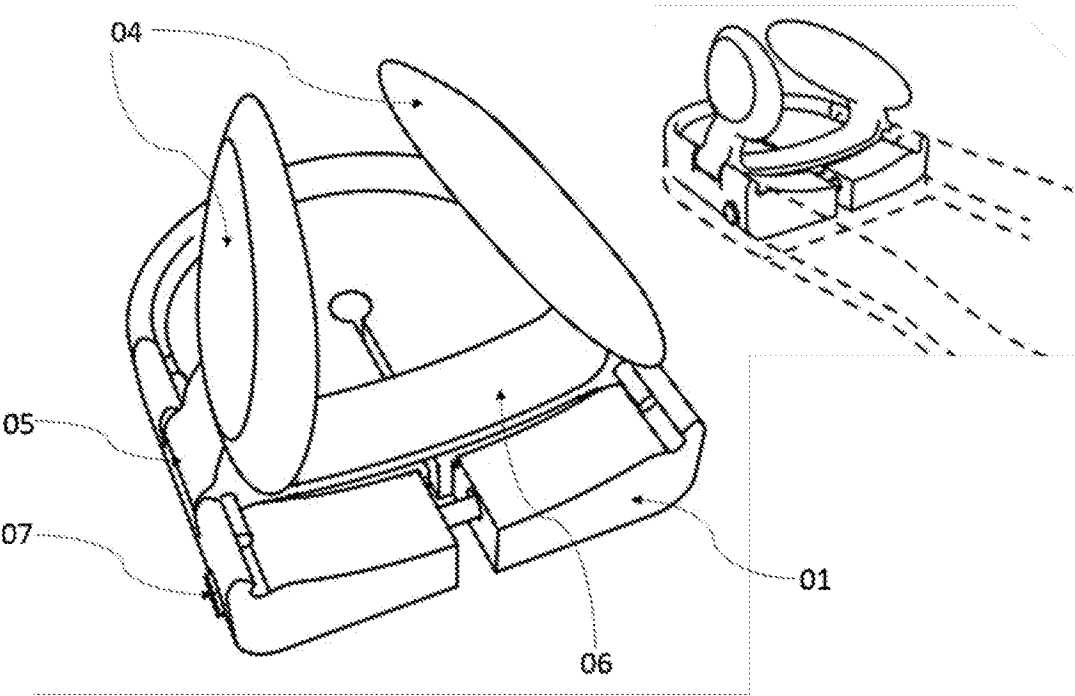


Fig. 5

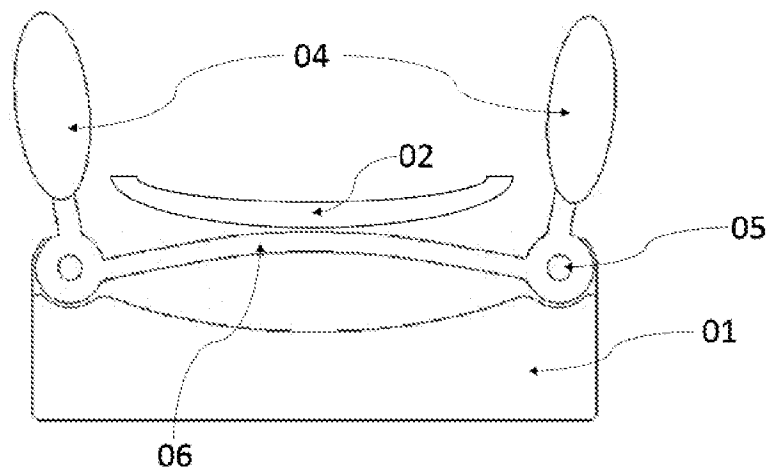
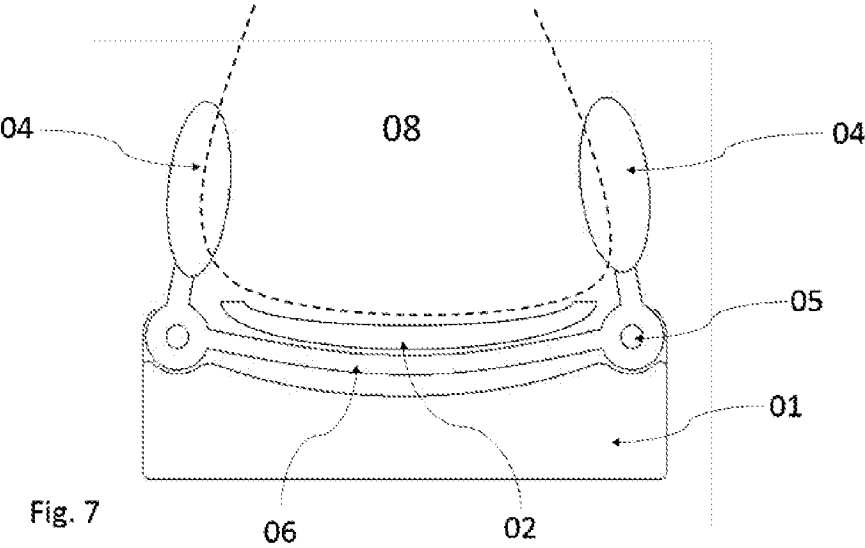


Fig. 6



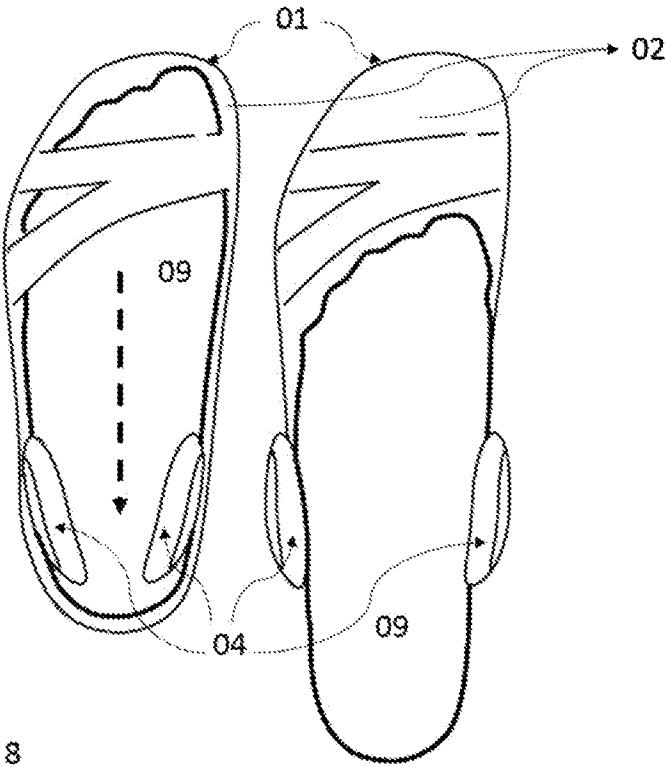


Fig. 8

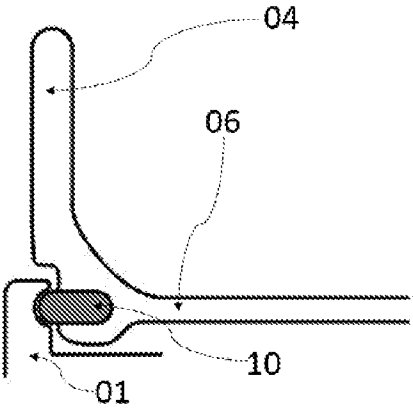


Fig. 9

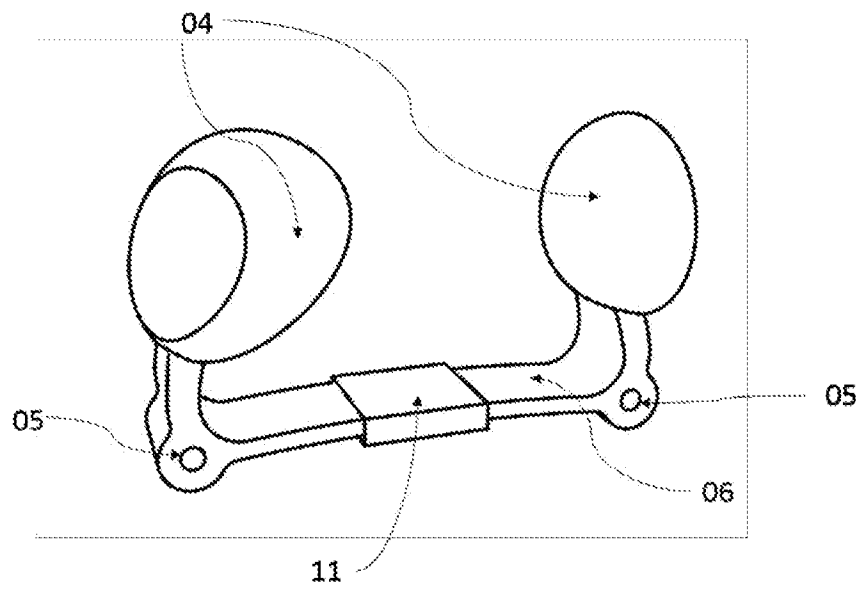
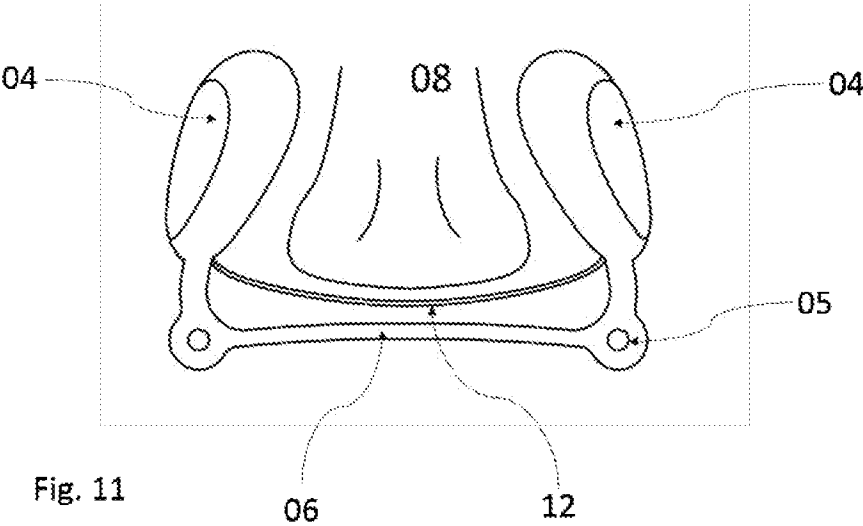


Fig. 10



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. A43B3/12 A43B3/24 A43B11/00 A43C11/00 A43C19/00 ADD.																	
According to International Patent Classification (IPC) or to both national classification and IPC																	
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A43B A43C Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X A</td> <td>DE 20 2017 106190 U1 (BATTAGLINI BENEDETTO [IT]) 8 November 2017 (2017-11-08) figures -----</td> <td>1-5,8,9, 11 6,7,10</td> </tr> <tr> <td>A</td> <td>DE 20 2009 005978 U1 (ROEMER NIELS [DE]) 17 September 2009 (2009-09-17) figures -----</td> <td>1-11</td> </tr> <tr> <td>A</td> <td>US 2 069 752 A (DORR OSCAR S) 9 February 1937 (1937-02-09) figures -----</td> <td>1-11</td> </tr> <tr> <td>A</td> <td>FR 2 938 158 A1 (MAHIEDDINE BENJAMIN [FR]) 14 May 2010 (2010-05-14) figures -----</td> <td>1-11</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X A	DE 20 2017 106190 U1 (BATTAGLINI BENEDETTO [IT]) 8 November 2017 (2017-11-08) figures -----	1-5,8,9, 11 6,7,10	A	DE 20 2009 005978 U1 (ROEMER NIELS [DE]) 17 September 2009 (2009-09-17) figures -----	1-11	A	US 2 069 752 A (DORR OSCAR S) 9 February 1937 (1937-02-09) figures -----	1-11	A	FR 2 938 158 A1 (MAHIEDDINE BENJAMIN [FR]) 14 May 2010 (2010-05-14) figures -----	1-11
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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