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(54) Sub-assembly for incorporation into a shoe having an adjustable heel

(57) The invention pertains to a sub-assembly (1) for incorporation into a shoe, in particular a ladies shoe, comprising a base (2, 8) having at least an arch portion and a heel portion, and a heel (9), which is adjustable between a first, relatively low position and a second, relatively high position. The heel (9) is at least partially detachable from the base (2, 8) and, once at least partially detached, is freely rotatable or rotatable about a pivot (25) that is movable with respect to the base (2, 8).

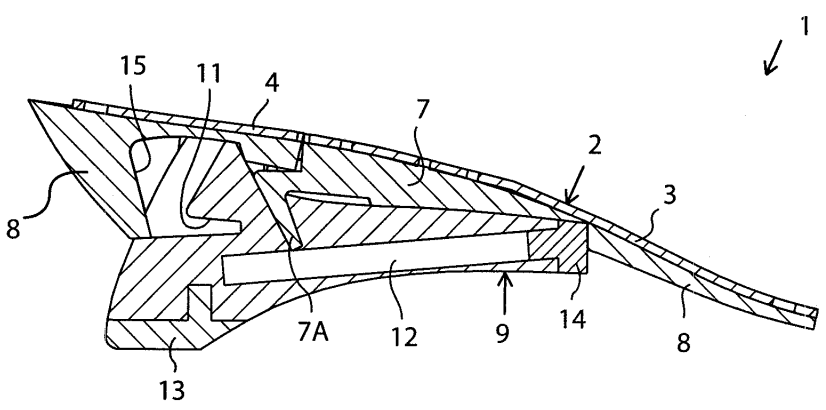

Fig. 1A

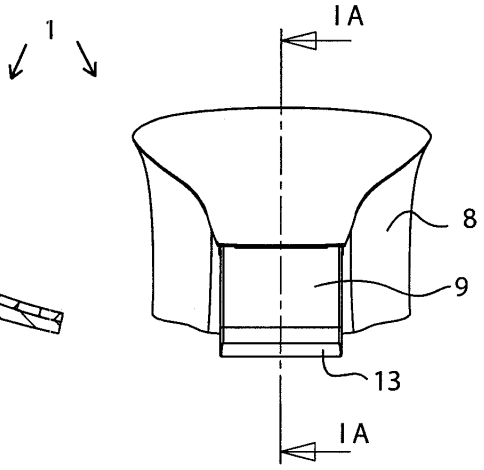

Fig. 1B

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Description

[0001] The invention relates to a sub-assembly for incorporation into a shoe, in particular a ladies shoe, comprising, a base having at least an arch portion and a heel portion, and a heel, which is adjustable between a first, relatively low position and a second, relatively high position. Further, the invention relates to a shoe comprising an upper and said sub-assembly.

[0002] WO 01/78543 relates to a shoe having a flexible member, which, by itself, is capable of a variety of configurations. A heel incorporates a stiffening member which mechanically interlocks with the flexible member to both shape it and provide it with sufficient rigidy to support a foot. The heel can be detached from the flexible member to allow the replacement of one heel with a different heel.

[0003] US 5,309,651 relates to transformable shoe frames, wherein the heel of the shoe can be extended downwardly in a high heel position or converted to a low heel position.

[0004] WO 2006/113574 relates to a shoe (denoted by numeral 10 in the Figures of said document) which has a sole (12) with a toe portion (14), a heel portion (16) and an arch portion (18) located between them. The shoe further has a low heel block (22) attached to the heel portion of the sole. A high heel extension piece (24) is attached to the low heel block. As shown in Figures 11 and 12 of WO 2006/113574, the high heel extension piece (24) is axially movable up and down relative to the low heel block (22). The high heel extension piece (24) can also be pivotally moved relative to the low heel block (22) and the sole (12). Thus, when it is desired to move the high heel extension piece (24) from the high heel position as shown in Figure 11 to the low heel position (Figure 13), the high heel extension piece (24) is first pulled downwardly as shown in Figure 12. It is then pivoted forwardly toward the sole (12) and beneath the arch (18) and substantially parallel to the ground. After the high heel extension piece (24) is pivoted forwardly into proper position, it is moved axially rearwardly.

[0005] WO 2006/113574 recognises a need for a shoe with adjustable heel height that is easy and convenient for a woman to utilize but which is strong and stable enough to provide adequate support.

[0006] It is an object of the present invention to provide a sub-assembly, which, when incorporated into a shoe, renders it stable in both positions (low and high) and allows closer resemblance, in both positions, to a non-adjustable shoe.

[0007] To this end, the sub-assembly according to the present invention is characterised in that the heel is at least partially detachable from the base and, once at least partially detached, is freely rotatable or rotatable about a pivot that is movable with respect to the base.

[0008] As the heel is thus rotatable about an axis not fixed with respect to the base, the interdependence between the low and high positions of the heel, which interdependence is a given in case of a fixed axis of rotation, is reduced. In other words, the location of the heel, in, in particular, the longitudinal direction of the shoe, when the heel is in the low (respectively high) position can be selected more freely to meet the requirements, both in terms of construction and in terms of appearance, of that position, with only limited or no detrimental effect on the design freedom to meet the requirements in the high (respectively low) position.

[0009] In one embodiment, the heel is detachable from the base, the base comprises a protrusion or a recess, and the heel comprises two recesses or protrusions, respectively, to connect the heel to the base in either the first, relatively low position or the second, relatively high position.

[0010] In a further embodiment, the heel comprises two heeltips, a first heeltip to contact the ground when the heel is in its first position and a second heeltip to contact the ground when the heel is in its second position. The recess or protrusion in or on the heel corresponding to the first, relatively low position is closer to the second heeltip than the recess or protrusion corresponding to the second, relatively high position.

[0011] Thus, when the heel is adjusted to its relatively low position, it will inherently shift rearwards. This in turn enables the appearance of the shoe to more closely resemble that of a non-adjustable low heeled shoe and will reduce the size of the recess (space) required to stow the heel in its respective positions. Further, ergonomics are improved in that the forces resulting from the weight of the wearer are transmitted more directly to the ground below.

[0012] In another embodiment, the heel is connected to an arm, which in turn is rotatably or flexibly connected to the base, thus reducing the risk of loosing the heel, increasing the frictional forces that keep the heel in place, and facilitating the switching from one position to the other.

[0013] The invention also relates to a shoe, in particular a ladies shoe, in accordance with claim 9.

[0014] It is preferred that the shoe comprises an upper having at least three parts connected, respectively, to the toe portion (if present), the arch portion, and the heel portion of the base and wherein the part connected to the toe portion and/or the part connected to the heel portion is moveable with respect to the part connected to the arch portion, at least when the shoe is adjusted from its relatively low position to its relatively high position or *vice versa*.

[0015] To provide a more complete insight into background art, it is noted that US 3,464,126 relates to a shoe provided with a hinged mechanically adjustable heel.

[0016] WO2006/054157 relates to footwear comprising sole means (11) and heel means comprising a first heel portion (13) fixed to said sole means (11), said heel means comprising a second heel portion (14), rotatable around hinge means (15).

[0017] NL 1029372 relates to a shoe having a heel

rotatable about an inclined axis. WO 2006/037143 relates to a shoe having a pivotable heel.

[0018] Within the framework of the present invention the term "shoe" includes any relevant form of footwear, such as e.g. sandals, pumps, closed upper shoes, and boots.

[0019] The invention will now be explained in more detail with reference to the Figures, which schematically show several presently preferred embodiments.

[0020] Figures 1A and 1B are a cross-sectional side view and a rear view of a first embodiment of the sub-assembly according to the present invention, with its heel in a relatively low position.

[0021] Figures 2A and 2B are a cross-sectional side view and a rear view of the first embodiment in a relatively high position.

[0022] Figures 3A and 3B are exploded bottom and top views of the first embodiment in a low and a high position, respectively.

[0023] Figures 4 and 5 show an example of a means to lock the heel in place.

[0024] Figures 6 and 7 show an example of a shank for use in a sub-assembly according to the present invention.

[0025] Figures 8A to 8D are cross-sectional side views and a rear view of a second embodiment of the sub-assembly according to the present invention, with its heel in a relatively low position.

[0026] Figures 9A to 9D are cross-sectional side views and a rear view of the second embodiment in a relatively high position.

[0027] Figure 10 is an exploded top view of the second embodiment in a high position.

[0028] Figures 11 to 19 show examples of various means to maintain the heel in place.

[0029] Figures 20 and 21 show a flexible upper, in a low and a high position, respectively, for use in a shoe according to the present invention.

[0030] Identical elements and elements performing the same or substantially the same function will be denoted by same numeral. Also, elements that are not necessary for understanding the present invention may have been omitted. The words "lower", "upper", "rear", "front", and the like, refer to the orientation of the elements during normal use of shoes, i.e. with the sole on the ground and the nose pointing in the same direction as the anterior (front) portion of the wearer.

[0031] Figures 1A to 3B show a first sub-assembly 1 for incorporation into a ladies shoe (not shown), comprising a shank 2 having an arch segment 3 and a heel segment 4, e.g. divided by breaking points 5 (Fig. 3A) or connected by means of a leaf spring 6 (Figures 6 and 7) or a pivot. A heel mount 7 and a sole element 8 are fixedly attached to the lower side of the shank 2, e.g. by means of screws and/or by gluing. The sole element 8 is provided with at least one cut 8A, preferably two cuts 8A, one on either side, which facilitate(s) rotation or flexing of the arch portion and the heel portion of the base 2, 8 relative to each other, and with a cover 8B.

[0032] The heel mount 7, which is preferably made of a metal, such as aluminium, or a synthetic material, and is preferably obtained by extrusion, comprises a tapering hook 7A, which points downwards and (slightly) forwards.

[0033] The sub-assembly 1 further comprises a heel 9 having two recesses 10, 11 complementary in shape to the hook 7A. Thus, the heel 9 can be detachably connected to the hook 7A in either a first, relatively low position (Figs. 1A and 1B) or a second, relatively high position (Figs. 2A and 2B). The heel 9 further comprises a reinforcement, e.g. a metal post 12, and two heeltips, each provided with a heel cap 13, 14 made of a wear resistant material. The recess 10 in the heel 9 corresponding to the first, relatively low position is closer to the second end cap 14 than the recess 11 corresponding to the second, relatively high position.

[0034] The sole element 8 comprises a substantially longitudinal recess 15 to accommodate the heel 9 in both the low position and the high position. In the low position, the upper part of the heel 9 is almost entirely accommodated in the recess 15, supporting the shank 2 and the element 8 and hiding from view parts of the heel 9 that would otherwise interfere with the appearance of the shoe. The second recess 11 provides a surface 16 (Fig. 3A) that supports the heel portion of the shank 2 and of the sole element 8, when the heel 9 is in the low position.

[0035] In a shoe provided with this first embodiment, the heel and the curvature of the shoe can be adjusted from the first, relatively low position to the second, relatively high position or *vice versa* by pulling the heel downwards, thus detaching it from the base (shank plus sole element), rotating it freely to bring the other recess in alignment with the hook and pushing the heel onto the hook, where it is held in place by friction between the recess (10, 11) and the hook (7A) and between the heel (9) itself and the longitudinal recess (15) in the sole element (8).

[0036] Figures 4 and 5 show an example of means to latch the heel to the hook 7A. These latching means comprise one or more, e.g. two grooves 17 or indentations near the end of the hook 7A and a resilient, substantially U-shaped clamp 18 at the (widened) bottom of each of the recesses 10, 11. When the hook 7A is pushed into one of the recesses 10, 11, the end of the hook 7A pushes the arms of the clamp 18 apart, until these arms snap into the grooves 17 thus (further) securing the heel 9 to the base.

[0037] Figures 8A to 10 show a second sub-assembly 1 for incorporation into a ladies shoe, also comprising a shank 2 and a sole element 8 having a longitudinal recess 15 to accommodate the heel 9 in both the low position and the high position. In this embodiment, the heel 9 is connected to the shank 2 by means of a lever 20. I.e., one end of the lever 20, which, in this example, is made of metal and comprises two parallel arms 21, 22, connected via a web 23, is connected, by means of a first laterally extending pivot 24, to the shank 2 and the other

end of the lever 20 is connected, by means of a second laterally extending pivot 25, to the heel 9.

[0038] The effective length of the means connecting the heel to the base, which in this example equals the distance between the pivots (24, 25) of the lever (20), determines the freedom of movement of the (detached) heel relative to the base. It is generally preferred that this length is at least 3 cm, preferably at least 4 cm, and preferably less than 8 cm.

[0039] Further, the position where said means are connected to the base on the one hand and the distances (A and B in Fig. 8B) between the axis of rotation of the heel, which in this example is determined by the position of the second laterally extending pivot (25), and the respective heeltips on the other hand, determine the location of the heel, in, in particular, the longitudinal direction of the shoe, with respect to the base.

[0040] In a shoe provided with this second embodiment, the heel and the curvature of the shoe can be adjusted from the first, relatively low position to the second, relatively high position (or *vice versa)* by

pulling the heel downwards and rotating it (counterclockwise or CCW in Figs. 8D and 9D) about the first pivot, thus partially detaching it from the base,
moving it sufficiently far away from the base for it to clear the (rear of) the sole element,
rotating it about the second pivot (CCW to the low position or CW to the high position) to bring the heel in alignment with the longitudinal recess, and
pushing the heel (CW about the first pivot) into the recess, where it is held in place by friction between the heel and the recess.

[0041] In the embodiments described above, the location of the heel relative to the base in both high and low positions is determined by the location of the recesses in the heel or the shape of the lever, respectively, and thus can be selected by varying the location of these recesses or the shape of the lever, respectively. Furthermore, these embodiments are less susceptible to play resulting from wear and there is no need to manipulate the base to release the heel.

[0042] Figures 11 and 12 show an example of means to latch the heel 9 to the shank 2, similar to those shown in Figures 4 and 5. These latching means comprise a protrusion 26 located on the lower surface of the shank 2 where it contacts the heel 9. One or more, e.g. two grooves 17 or indentations are provide near the end of the protrusion 26. Two recesses 27, 28 are provided in the heel 9, with a resilient, substantially U-shaped clamp 18 at the (widened) bottom of each of these recesses 27, 28. When the protrusion 26 is pushed into one of the recesses 27, 28 the end of the protrusion 26 pushes the arms of the clamp 18 apart, until these arms snap into the grooves 17 thus (further) securing the heel 9 to the base.

[0043] Figure 13 and 14 show similar latching means wherein the protrusion 26 is located on the shank 2 where it contacts the levers.

[0044] Figure 15 to 17 show latching means comprising, instead of a recess and a clamp, a cage 29 having an opening 30 corresponding in shape to the cross-section of the protrusion 26 and housing one or more, e.g. two resilient rods 31 to lock with the grooves in the protrusion.

[0045] Figures 18 and 19 show urging means comprising a coiled spring 32 urging the lever 20 towards the shank.

[0046] Figures 20 and 21 show an upper 40 having at least three parts 41, 42, 43, connected, respectively, to the toe portion, the arch portion, and the heel portion of the a base as described above. All three parts are moveable with respect to each other, enabling the upper to adjust to the low position and the high position.

[0047] The invention is not restricted to the above described embodiments, which can be varied in a number of ways within the scope of the claims. For instance, instead of a lever with two pivots, a resilient element, such as a leaf spring can be used to connect the heel to the base. Also, in addition to said two pivots, the lever can comprises two or more segments connected by a corresponding number of additional pivots. Further, the hook can be an integral part of the shank.

Claims

1. Sub-assembly (1) for incorporation into a shoe, in particular a ladies shoe, comprising

   a base (2, 8) having at least an arch portion and a heel portion, and
   a heel (9), which is adjustable between a first, relatively low position and a second, relatively high position,
   characterised in that
   the heel (9) is at least partially detachable from the base (2, 8) and, once at least partially detached, is freely rotatable or rotatable about a pivot (25) that is movable with respect to the base (2, 8).

2. Sub-assembly (1) according to claim 1, wherein the heel (9) is detachable from the base (2, 8), the base (2, 8) comprises a protrusion (7A) or a recess, and the heel (9) comprises two recesses (10, 11) or protrusions, respectively, to connect the heel (9) to the base (2, 8) a in either the first, relatively low position or the second, relatively high position.

3. Sub-assembly (1) according to claim 1 or 2, wherein heel (9) comprises two heeltips, a first heeltip to contact the ground when the heel (9) is in its first position and a second heeltip to contact the ground when the heel (9) is in its second position.

4. Sub-assembly (1) according to claim 3, wherein the recess (10) or protrusion in or on the heel (9) corresponding to the first, relatively low position is closer to the second heeltip than the recess (11) or protrusion corresponding to the second, relatively high position.

5. Sub-assembly according to any one of the preceding claims, wherein the heel (9) is connected to an arm (20), which in turn is rotatably or flexibly connected to the base (2, 8).

6. Sub-assembly according to any one of the preceding claims, wherein the base (2, 8) comprises a shank (2) having two or more segments (3, 4) that are movable with respect to each other.

7. Sub-assembly according to any one of the preceding claims, wherein the base (2, 8) comprises a sole element (8) provided with at least one cut (8A), which facilitates rotation or flexing of the arch portion and the heel portion of the base (2, 8) relative to each other, and a cover (8B).

8. Sub-assembly according to any one of the preceding claims comprising a separate element (7), wherein the protrusion (7A) or recess is part of or attached to this element (7).

9. Shoe, in particular a ladies shoe, comprising an upper and sub-assembly, which in turn comprises

a base having a toe portion, an arch portion, and a heel portion, and
a heel, which is adjustable between a first, relatively low portion and a second, relatively high position,
characterised in that
the heel is at least partially detachable from the base and, once at least partially detached, is freely rotatable or rotatable about a pivot that is movable with respect to the base.

10. Shoe according to claim 9, comprising an upper having at least three parts connected, respectively, to the toe portion, the arch portion, and the heel portion of the base and wherein at least one of the part connected the toe portion and the part connected to the heel portion is moveable with respect to the part connected to the arch portion, at least when the shoe is adjusted from its relatively low position to its relatively high position or *vice versa*.

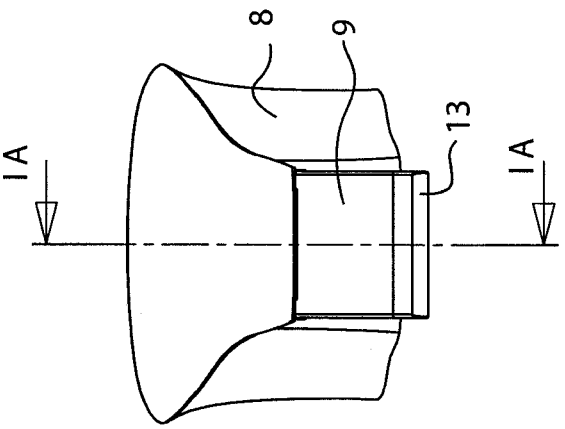

Fig. 1B

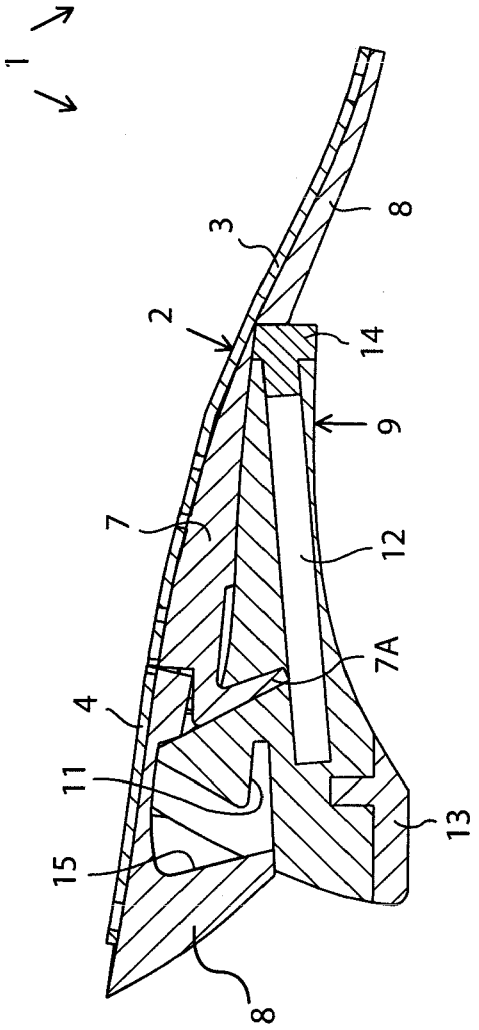

Fig. 1A

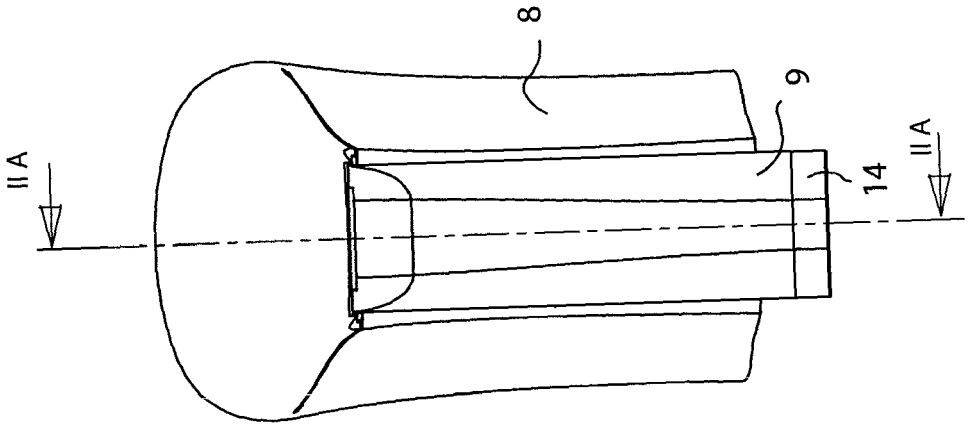

Fig. 2B

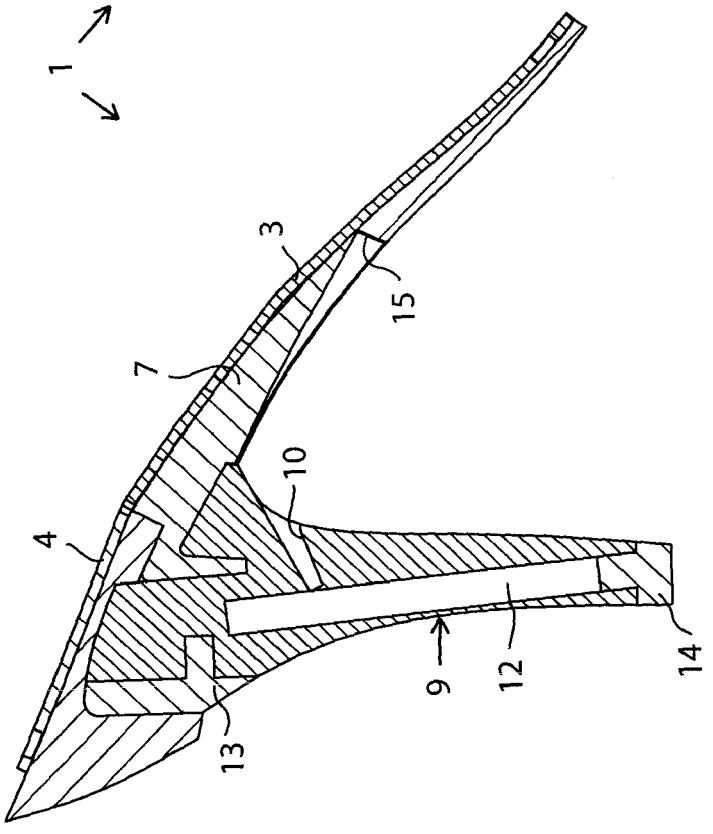

Fig. 2A

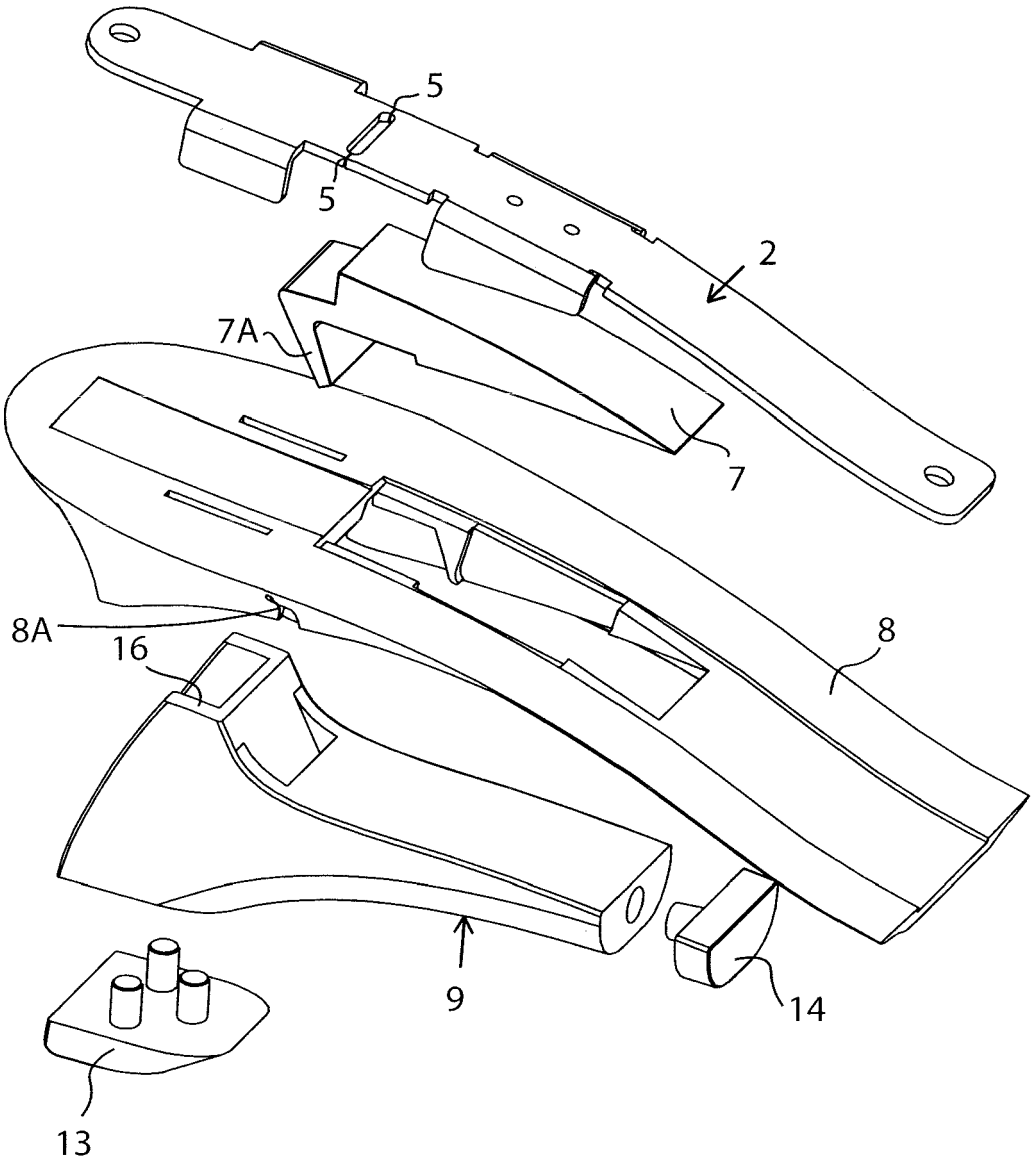

Fig. 3A

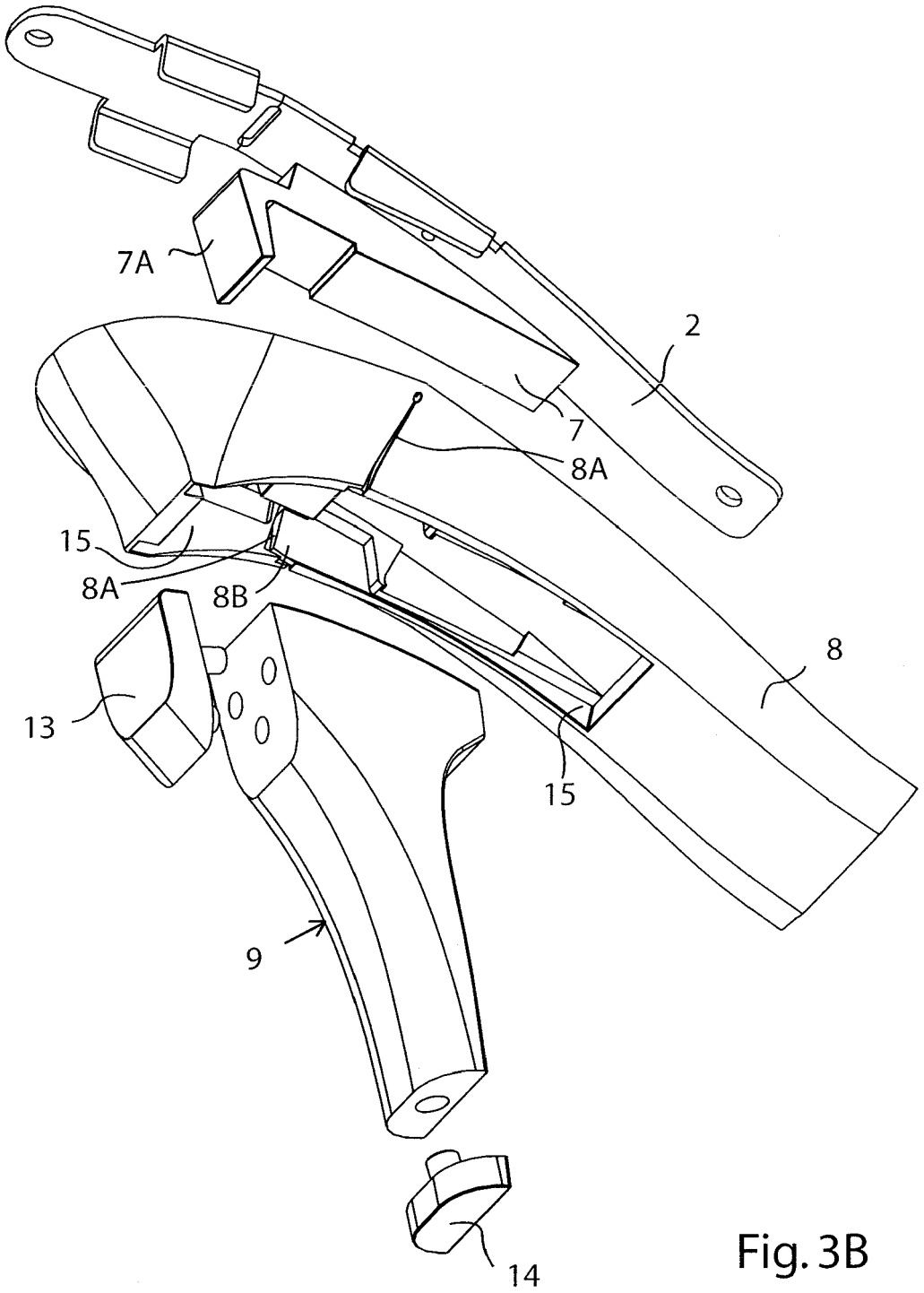

Fig. 3B

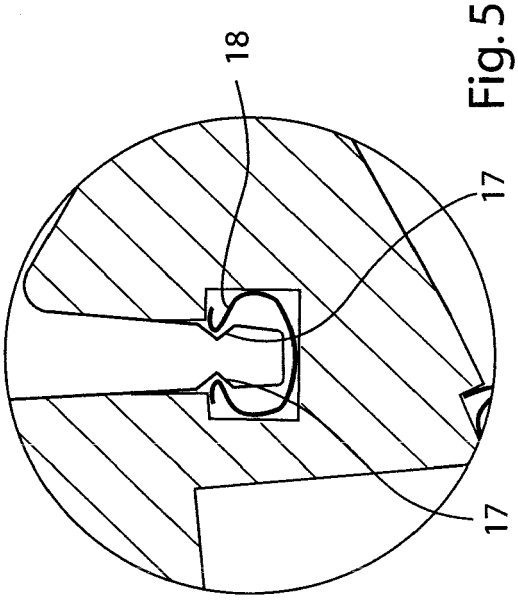

Fig.5

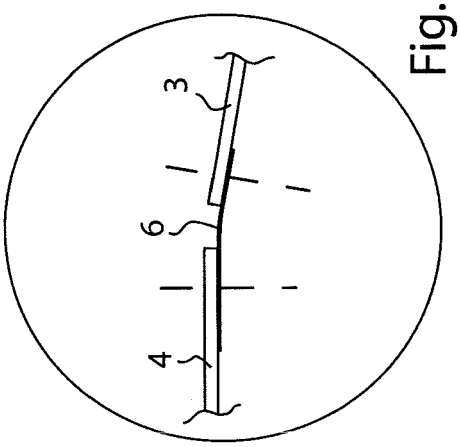

Fig.7

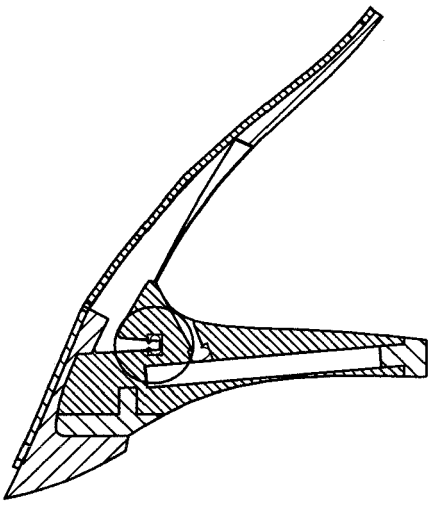

Fig.4

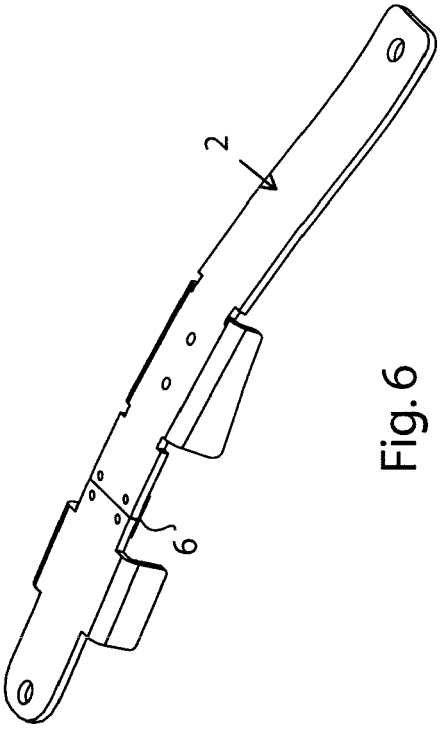

Fig.6

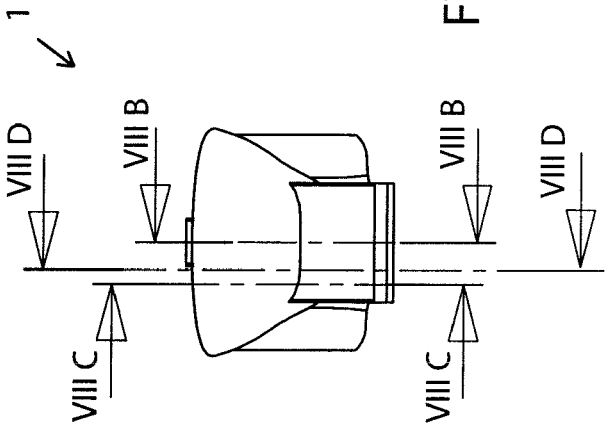

Fig. 8A

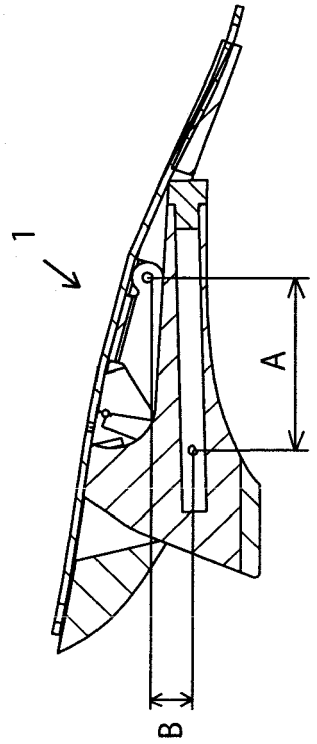

Fig. 8B

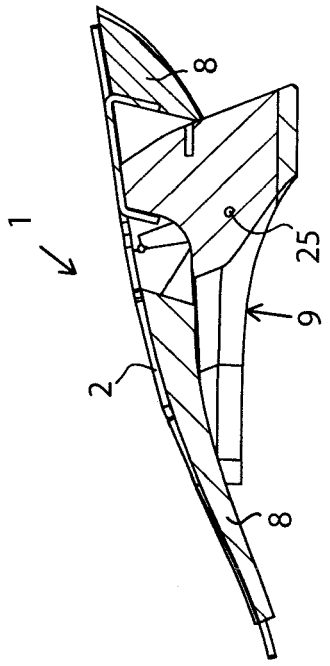

Fig. 8C

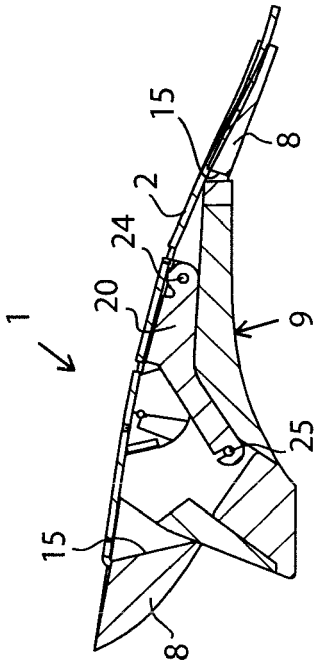

Fig. 8D

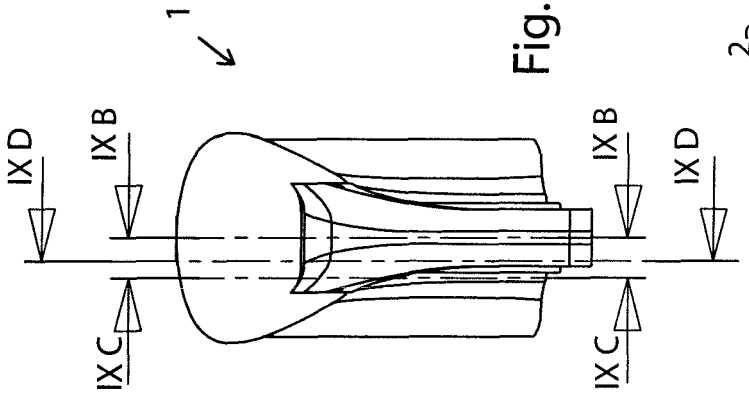

Fig. 9A

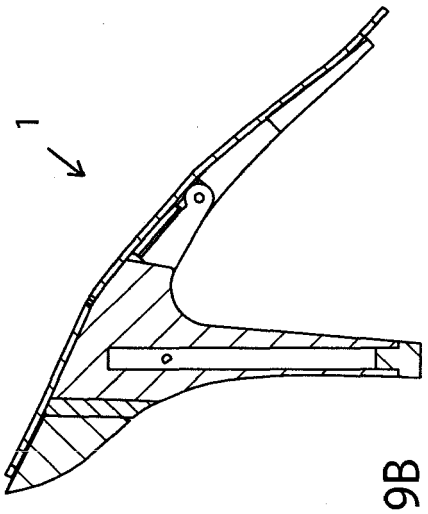

Fig. 9B

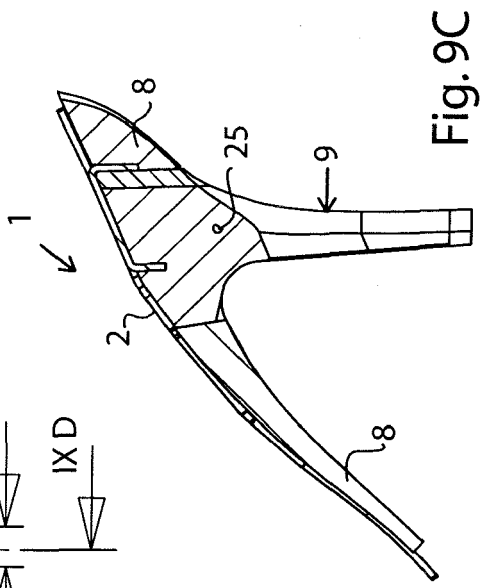

Fig. 9C

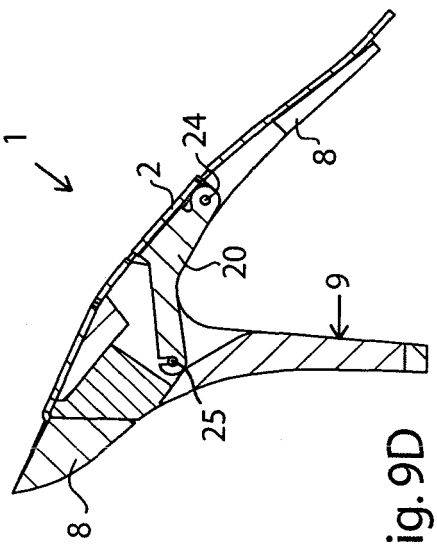

Fig. 9D

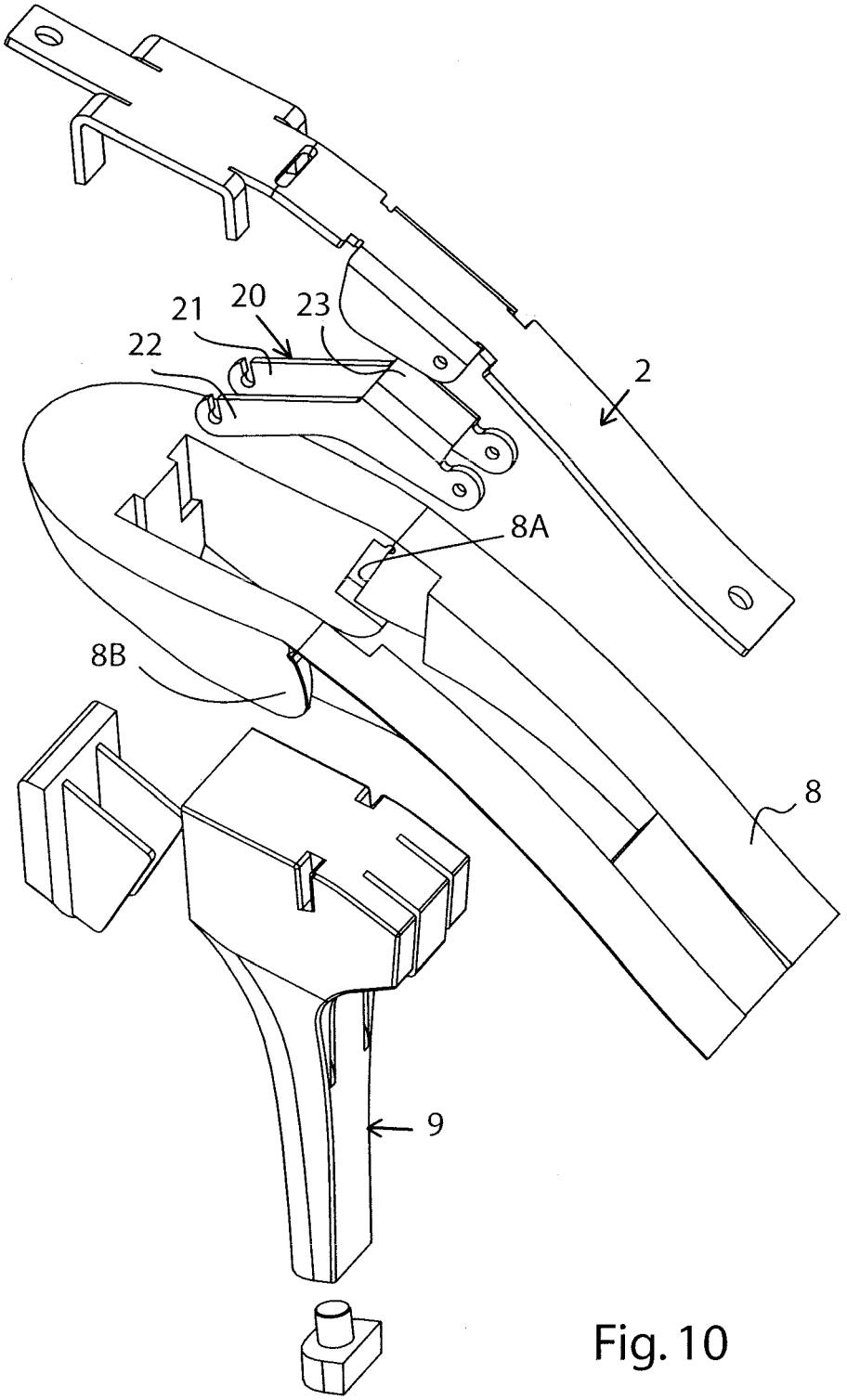

Fig. 10

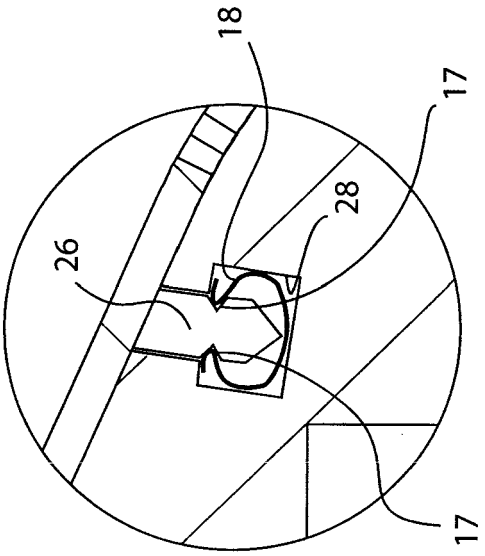

Fig. 12

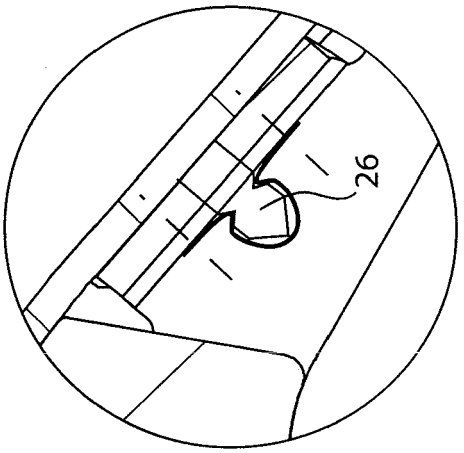

Fig. 14

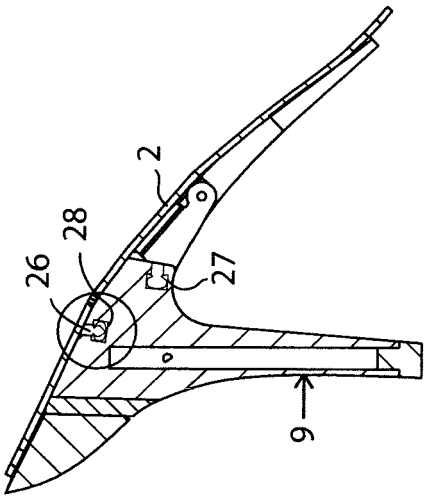

Fig. 11

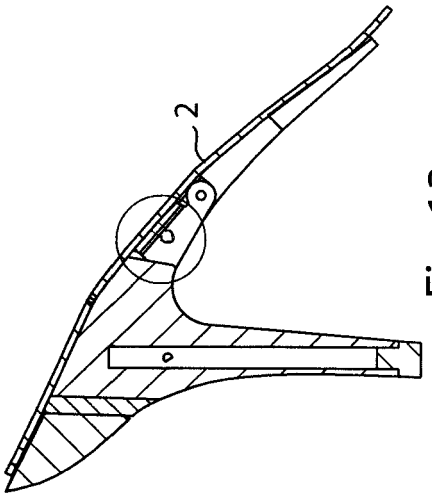

Fig. 13

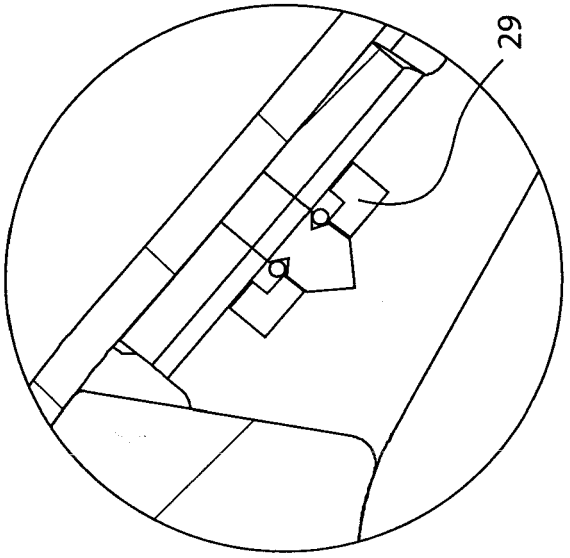

Fig. 16

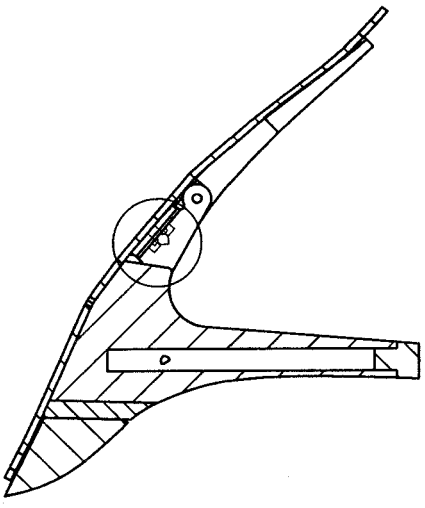

Fig. 15

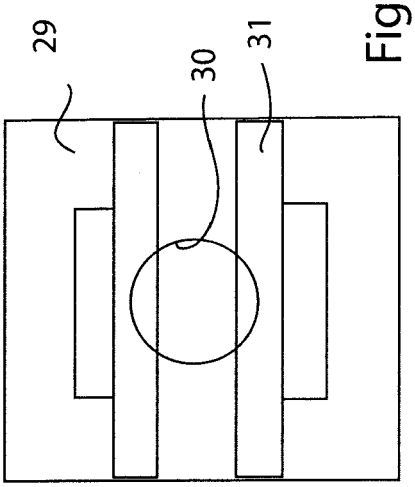

Fig. 17

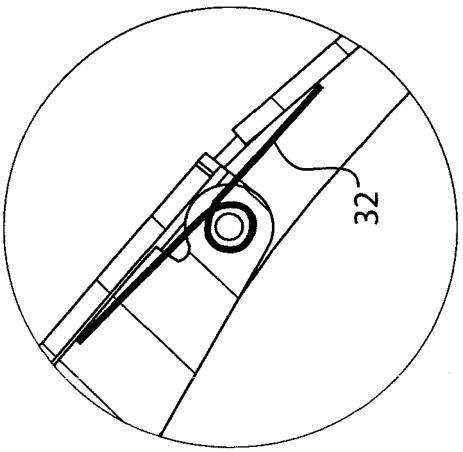

Fig. 19

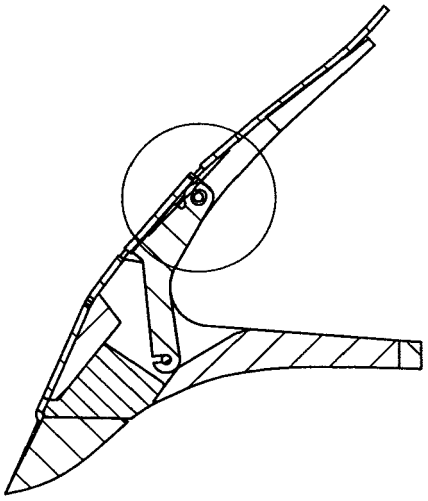

Fig. 18

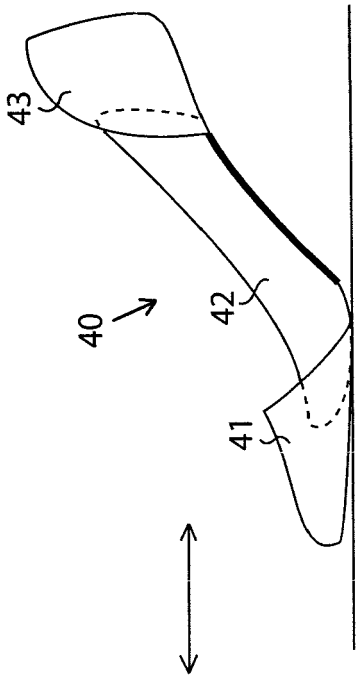

Fig. 21

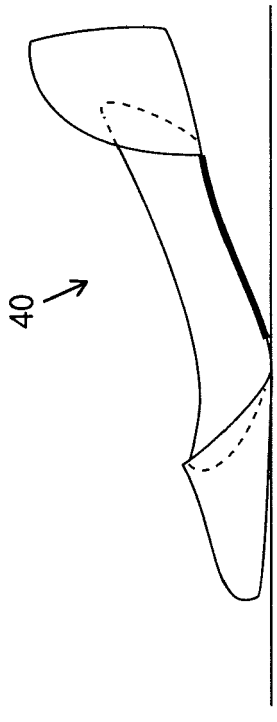

Fig. 20

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 6342

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 August 2007	Cianci, Sabino

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