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(54) Closure device particularly for sports shoes

(57) A closure device (1) particularly for fastening a first flap (4) and a second flap (15) of a sports shoe (5). The closure device comprises first means (2) for selective clamp-like locking of a lace (3) that is rigidly coupled, at one end, to the first flap (4) and is guided, at the other end, on the second flap (15), the lace (3) being associated, at its free end, with second means (17) for manually tensioning it.

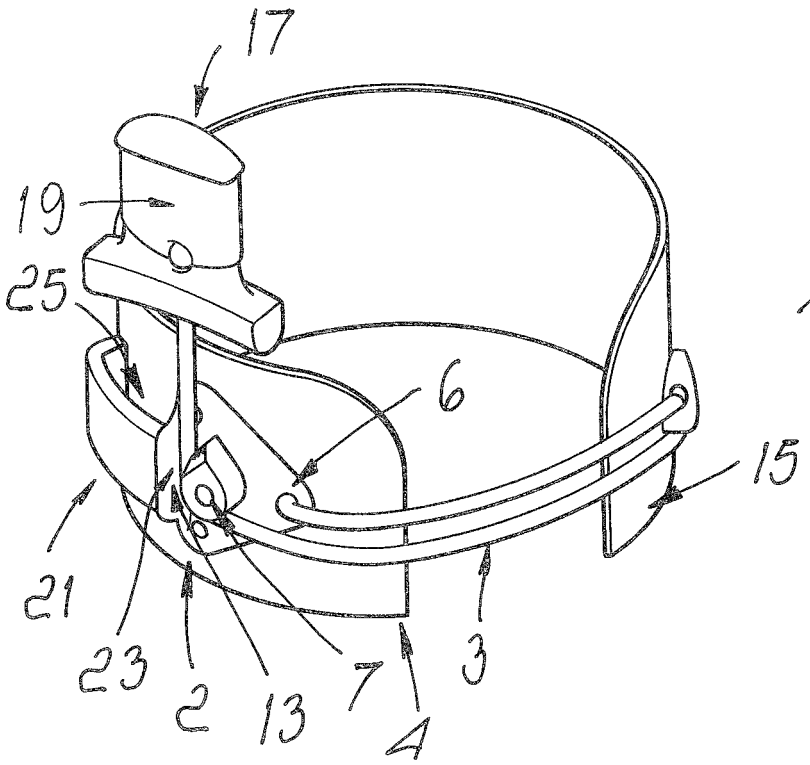

Fig. 2

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Description

[0001] The present invention relates to a closure device particularly for sports shoes.

[0002] Currently, the flaps of a shoe are closed by using a first known type of closure device, which comprises a series of pairs of eyelets arranged respectively on the first and second flaps of said shoe and through which a lace is made to slide alternately from the toe region toward the open end of the shoe, with the function of joining said first and second flaps.

[0003] The shoe is closed by means of a direct traction of the ends of the lace on the part of the user, stable fastening being obtained subsequently by forming a knot.

[0004] The main drawback of this first known type of closure device is that if the lace is not tensioned correctly along its entire path, there may be regions in which the flaps are fastened tightly and regions in which the flaps are mutually spaced, so that it is not possible to achieve uniform closure, further detracting from the comfort for the user's foot.

[0005] Another drawback of this known solution is that if the user wishes to reposition the lace or improve the degree of fastening because it is deemed insufficient or because there are localized pressure regions on the foot, it is necessary to untie the knot, correct the arrangement of the lace and fasten it again by means of a new knot, an operation that as a whole is laborious and requires time to be performed.

[0006] Another drawback of the cited background art is that the knot, as a consequence of the stresses caused by the use of the shoe, can loosen partially or fully, forcing the user to interrupt his sports activity to form a new knot.

[0007] These drawbacks are particularly felt when the shoe is intended for sports activity, limiting the use of said first closure device in this field.

[0008] A second known type of closure device is constituted by one or more straps, which are coupled by means of one of their portions to a first flap of the shoe and are arranged transversely thereto; temporary dry fastening means, constituted for example by bands marketed under the trademark Velcro, are applied to the upper face of said straps in two separate portions that can be overlapped by folding each strap in a U-like shape.

[0009] Said straps are passed through appropriately provided loops rigidly coupled to a second flap of the shoe and then folded in a U-like shape and tensioned until the two portions on which said temporary dry fastening means are applied are mutually superimposed and mated in the chosen point.

[0010] The main drawback of this second known type of closure device is that in order to allow the user to open the shoe, the temporary dry fastening means must have a modest mutual adhesion force, and this allows accidental opening of the shoe for example as a consequence of particularly intense stresses or impacts.

[0011] The aim of the present invention is to solve the above-mentioned problems, eliminating the drawbacks of the cited background art, by providing a device that allows to achieve safe and quick closure of the flaps of a shoe.

[0012] Within this aim, an obj ect of the invention is to provide a device that allows to perform a quick and precise adjustment of the closure of a shoe.

[0013] Another object of the invention is to provide a device that offers a closure that is stable and resistant against accidental impacts or stresses caused by the use of the shoe.

[0014] Another object is to provide a device that is structurally simple and has low manufacturing costs.

[0015] This aim and these and other objects that will become better apparent hereinafter are achieved by a closure device particularly for fastening a first flap and a second flap of a sports shoe, characterized in that it comprises first means for selective clamp-like locking of a lace that is rigidly coupled, at one end, to said first flap and is guided, at the other end, on said second flap, said lace being associated, at its free end, with second means for manually tensioning it.

[0016] Further characteristics and advantages of the invention will become better apparent from the following detailed description of two particular but not exclusive embodiments thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a closure device according to the invention in the fully closed position, associated with a shoe;

Figures 2, 3 and 4 are three perspective views of the closure device according to the invention, respectively in the open position, in the tension adjustment position, and in the fully closed position;

Figure 5 is a top view of the closure device, in which the lace is not present for the sake of greater clarity;

Figures 6 and 7 are two perspective views of a variation of the closure device according to the invention in two tension adjustment positions;

Figures 8 to 10 are a perspective view, a partially cutout side view, and a sectional view taken along the line X-X of Figure 9, of a second embodiment of the closure device according to the invention, in the tension adjustment position.

[0017] In the embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other embodiments.

[0018] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0019] With reference to the figures, the reference numeral 1 designates a closure device particularly for shoes, which comprises first means 2 for selective clamp-like locking of a lace 3, which is rigidly coupled at one of its ends to a first flap 4 of a shoe 5.

[0020] The first locking means 2 comprise a first base 6, which is approximately flat and has for example a triangular or circular or other plan shape and is rigidly coupled to the first flap 4 for example by means of stitches, riveting or adhesive bonding.

[0021] A pawl 8 is rotatably associated with the first base 6 by means of a first pivot 7, which protrudes approximately at right angles from the first base 6 toward the outside of the first flap 4.

[0022] The pawl 8 advantageously has a cusp-like plan shape, formed by a first locking surface 9, which is approximately flat, and by a second surface 10, which is also preferably flat; such surfaces are joined at a common edge 11 and are connected at their separate ends by means of a circular arc 12, which is preferably concentric with respect to a longitudinal axis 7a of the first pivot 7.

[0023] At least on the first surface 9 there is conveniently a knurling or a series of fins, in order to increase the force that can be applied by friction by said first surface when it is forced against a separate preferably deformable body, such as for example the lace 3.

[0024] The first pivot 7 is arranged at a preset distance from a third abutment surface 13, which is preferably flat and protrudes at right angles from the first base 6 toward the outside of the shoe 5. Such distance is advantageously such as to allow, for a preset range of angular positions of the pawl 8, the arrangement of the first surface 9 so that it faces the third abutment surface 13 at a mutual distance that is smaller than the thickness of the lace 3.

[0025] Conveniently, the distance between the longitudinal axis 7a of the first pivot 7 and the third surface 13 can be shorter than the distance between said axis and the common edge 11, so as to prevent a full rotation of the pawl 8, the first surface 9 abutting, at a chosen angular position thereof, against the third surface 13.

[0026] The radius of the circular arc 12 is shorter than the distance between the longitudinal axis 7a of the first pivot 7 and the third surface 13, in order to allow the rotation of the pawl; advantageously, the difference between such distance and the radius of the circular arc 12 is approximately equal to the thickness of the lace 3, so as to allow its insertion between the third surface 13 and the pawl 8 when said pawl is arranged so that its first locking surface 9 does not face the third abutment surface 13.

[0027] The rotation of the pawl 8 about the longitudinal axis 7a of the first pivot 7 can occur conveniently in contrast with an elastically deformable element constituted by a spring 14, preferably of the torsion type, which is interposed between the pawl 8 and the first base 6 and acts so as to force the first surface 9 toward the third surface 13.

[0028] The lace 3 is guided on a second flap 15 of the shoe 5 at a ring 16, which is rigidly coupled to said second flap and has an axis that is approximately parallel to the lateral surface of the second flap; it is possible to slide the lace 3 inside the ring so as to mutually connect the first and second flaps.

[0029] The closure device 1 further comprises second means for manually tensioning the lace 3, which are constituted by a hook 17 that is rigidly coupled to said lace at its free end 18; the hook 17 is preferably T-shaped and comprises a flat stem 19 that supports, at its free end, two wings 20 that protrude on two opposite sides.

[0030] An approximately U-shaped bridge 21 is rigidly coupled to the first flap 4 proximate to the first base 6 and is preferably arranged behind it.

[0031] Advantageously, the bridge 21 is arranged so that the surface of its base 22 is directed toward the facing first flap 4 and is parallel thereto; the bridge is rigidly coupled to the first flap at a first wing 23 thereof and at a second wing 24, which protrude approximately at right angles from the first flap 4 toward the outside of the shoe.

[0032] The bridge 21 therefore forms a through seat 25, which is arranged vertically and is adjacent to said first flap; advantageously, the size of the seat is such as to allow to accommodate inside it the stem 19 of the hook 17, and the wings 20 that protrude from said hook are able to abut against the lower edge 22a of the base 22.

[0033] Advantageously, the bridge 21 can be arranged so that its first wing 23 is adjacent to the first base 6, so that its outer face 23a constitutes the third surface 13 for the abutment of the first locking surface 9 of the pawl 8.

[0034] The operation of the closure device according to the invention entails that the pawl 8 is turned in contrast with the action of the spring 14, so as to move the first surface 9 away from the third surface 13, so that the space sufficient for the insertion of the lace 3 is formed between them, said lace being guided in a lower region by a portion of the circular arc 12.

[0035] In this condition, the tension of the lace 3 can be increased by the user until the chosen closure of the shoe is achieved, simply by pulling thereon by means of the hook 17; the pawl 8, by virtue of the presence of the first surface 9, in fact allows a translational motion of the lace 3 only in the direction in which its traction increases: in the example shown in the figure, this can be performed with a vertical upward movement of the free end 18 thereof.

[0036] An opposite traction on the lace 3 that acts so as to reduce its tension and therefore loosen the closure of the shoe in fact causes a rotation of the pawl 8, counterclockwise in the example, which tends to force the first surface 9 more firmly against the third abutment surface 13; the portion of the lace 3 that is positioned between said surfaces is therefore compressed more, and a translational motion thereof in this direction is made impossible by the presence of the knurling or of the fins formed on the first surface 9.

[0037] Closure is ensured, in the conditions for use, also by the action of the spring 14, which forces the first surface 9 toward the third abutment surface 13, locking the portion of the lace 3 that is interposed between them.

[0038] In this manner, the closure device 1 ensures that the intended shoe closure force is achieved and maintained, since the forces produced by use which act

so as to loosen the tension of the lace 3 are contrasted by the pawl 8, which is capable of rigidly coupling said lace with a force that is proportional to the stress that is applied.

[0039] If one wishes to loosen the tension of the lace 3, it is sufficient to pull its hook, in contrast with the spring 14, at or proximate to its free end, so as to cause a minimal rotation of the pawl 8 in the direction in which the first surface 9 moves away from the third surface 13 and allow the disengagement of the lace 3.

[0040] The stem 19 of the hook 17 can thus be inserted within the seat 25 and its stable positioning is facilitated by the wings 20, which abut against the lower edge 22a of the base 22 of the bridge 21.

[0041] The closure of the shoe can be adjusted also after the hook 17 has been coupled to the bridge 21, since it is possible to increase the tension of the lace 3 by acting on the portion thereof that is comprised between the pawl 8 and the hook 17 without having to remove said hook from the seat 25.

[0042] The shoe can be opened fully by extracting the hook 17 from the seat 25, optionally utilizing the elasticity of the wings 20, and by applying a slight traction thereto, so as to move the first surface 9 of the pawl 8 away from the third surface 13 by a distance that is sufficient to release the portion of the lace 3 that is clamped between them, which can thus be extracted, allowing to open the shoe completely.

[0043] A variation 101 of such first embodiment of the closure device, shown in Figures 6 and 7, comprises a safety catch 126, which is constituted by a lamina 127 that is rotatably associated with the first pivot 107 externally with respect to the pawl 108, is parallel thereto, and is for example shaped approximately like a rounded trapezoid.

[0044] The lamina 127 forms a tab 127a, which affects at least the region comprised between the first pivot 107 and the third surface 113, externally with respect to the pawl 108 and the lace 103, the angular stroke of which is limited by an abutment 128, which is constituted for example by a protrusion that protrudes externally from the first wing 123 or from the base 122 of the bridge 121.

[0045] In the closure position, the lamina 127, which rests against the abutment 128, is superimposed on the pawl 108, preventing the lace 103 from disengaging from said pawl; before opening the shoe, the lamina can be rotated until it is arranged at a preset angle with respect to the pawl 108, so as to allow the disengagement of the lace 103.

[0046] Figures 8 to 10 illustrate a second embodiment of the closure device 201 according to the invention, in which the first means 202 for locking the lace 203 comprise a second base 234, which is rigidly coupled to the first flap 204 of a shoe and has for example a circular plan shape, from which a preferably cylindrical second fixed pivot 229 protrudes toward the outside of the shoe approximately at right angles thereto.

[0047] The second pivot 229 supports, at one of its ends, an external wall 230, which also preferably has a circular plan shape and is arranged parallel to the second base 234 so as to form between them an interspace 231 that is toroidal and is open circumferentially outward.

[0048] The first means 202 for locking the lace 203 further comprise a plurality of first teeth 232, which are formed on the second base 234 and protrude toward the inside of the interspace 231, and a plurality of second teeth 233, which are formed on the internal face of the wall 230 and also protrude toward the inside of the interspace 231.

[0049] Said first and second teeth can have a straight or variously shaped configuration and can be optionally mutually offset; an advantageous embodiment arranges said first and second teeth, which are straight, along chords that are parallel to a diameter of the second base and of the external wall, optionally with a chosen inclination with respect to a horizontal plane.

[0050] The tensioning of the lace 203 occurs by inserting it in the interspace 230 and applying thereto the intended traction, so that the lace is guided by the outer lateral surface of the second pivot 229, the first and second teeth preventing its sliding in the direction in which the first and second flaps open.

[0051] The second embodiment further comprises second means for the manual tensioning of the lace 203, which are similar to the ones described for the first embodiment.

[0052] It has thus been found that the invention has achieved the intended aim and objects, a closure device particularly for sports shoes having been provided which allows to achieve safe and rapid closure of said shoe.

[0053] Another important object that has been achieved by the invention is to allow rapid and precise adjustment of the closure of the shoe.

[0054] Another important object that has been achieved is to provide a closure that is stable and resistant against accidental impacts or stresses caused by the use of said shoe.

[0055] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to specific requirements.

[0056] The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated.

[0057] The characteristics described as advantageous, convenient or the like may also be omitted or be replaced by equivalents.

[0058] The disclosures in Italian Patent Application No. TV2004A000086 from which this application claims priority are incorporated herein by reference.

[0059] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the

interpretation of each element identified by way of example by such reference signs.

Claims

1. A closure device particularly for fastening a first flap and a second flap of a sports shoe, **characterized in that** it comprises first means for selective clamp-like locking of a lace that is rigidly coupled, at one end, to said first flap and is guided, at the other end, on said second flap, said lace being associated, at its free end, with second means for manually tensioning it.

2. The device according to claim 1, **characterized in that** said first locking means comprise a first approximately flat base, which is rigidly coupled to said first flap preferably by sewing, riveting or adhesive bonding, a pawl being rotatably associated with said first base by means of a first pivot, which protrudes approximately at right angles from said first base toward the outside of said first flap.

3. The device according to claims 1 and 2, **characterized in that** said pawl has a cusp-like plan shape, which is formed by a first approximately flat locking surface and by a second flat surface, which are joined at a common edge thereof and are connected at their separate ends by means of a circular arc, which is concentric with respect to the longitudinal axis of said first pivot, at least one knurling or a plurality of fins suitable to interact with said lace being provided at least on said first surface.

4. The device according to claims 1 and 3, **characterized in that** said first pivot is arranged at a preset distance from a third abutment surface, which is flat and protrudes at right angles from said first base toward the outside of said shoe, so as to allow, for a preset range of angular positions of said pawl, the arrangement of said first surface so that it faces said third surface at a mutual distance that is smaller than the thickness of said lace.

5. The device according to claims 1 and 4, **characterized in that** the distance between said longitudinal axis of said first pivot and said third surface is shorter than the distance between said longitudinal axis and said common edge, so as to prevent a complete rotation of said pawl, said first surface abutting, at a chosen angular position thereof, against said third surface.

6. The device according to claims 1 and 5, **characterized in that** the radius of the said circular arc is shorter than the distance between said longitudinal axis of said first pivot and said third surface, so as to allow the rotation of said pawl, the difference between said distance and said radius of said circular arc being approximately equal to the thickness of said lace, which can be inserted between said third surface and said pawl when said pawl is arranged so that its first locking surface thereof does not face said third abutment surface.

7. The device according to claims 1 and 6, **characterized in that** the rotation of said pawl about said longitudinal axis of said first pivot occurs conveniently in contrast with an elastically deformable element, which is constituted by a spring, preferably of the torsion type, which is interposed between said pawl and said first base, and acts so as to force said first surface toward said third surface.

8. The device according to claim 1, **characterized in that** said first locking means comprise a second base, which is rigidly coupled to said first flap and has a circular plan shape, and from which a second preferably cylindrical fixed pivot protrudes toward the outside of said shoe approximately at right angles to said first flap.

9. The device according to claims 1 and 8, **characterized in that** said second pivot supports, at one of its ends, an external wall that has a circular plan shape and is arranged parallel to said second base so as to form between them an interspace that has a toroidal shape and is open outward circumferentially.

10. The device according to claims 1 and 9, **characterized in that** said first means for locking said lace comprise a plurality of first teeth, which are formed on said second base and protrude toward the inside of said interspace, and a plurality of second teeth, which are formed on the internal face of said wall and protrude toward the inside of said interspace.

11. The closure device according to claims 1 and 10, **characterized in that** said first and second teeth have a straight or curved shape and are mutually offset.

12. The device according to claims 1, 10 and 11, **characterized in that** said first and second teeth are arranged along chords that are parallel to a diameter of said second base and of said external wall, and have a chosen inclination with respect to a horizontal plane.

13. The device according to one or more of the preceding claims, **characterized in that** said lace is guided on said second flap of said shoe at a ring that is rigidly coupled to said second flap and with an axis that is approximately parallel to the lateral surface of said second flap, said lace sliding within said ring so as

to mutually connect said first and second flaps.

14. The device according to claims 1 and 13, **characterized in that** said second means for manually tensioning said lace are constituted by a hook, which is rigidly coupled to said lace at its free end, said hook comprising a flat stem on which two wings that protrude on two opposite sides are formed at one of its free ends.

15. The device according to claims 1 and 14, **characterized in that** an approximately U-shaped bridge is rigidly coupled to said first flap proximate to said first or second base and is arranged behind it.

16. The device according to claims 1 and 15, **characterized in that** said bridge is arranged so that the surface of its base lies in the direction of said facing first flap and is parallel thereto, said bridge being rigidly coupled to said first flap at a first wing thereof and at a second wing thereof, which protrude approximately at right angles from said first flap toward the outside of said shoe.

17. The device according to claims 1 and 16, **characterized in that** said bridge forms a through seat, which is arranged vertically and is adjacent to said first flap, the size of said seat being such as to allow to accommodate inside it said stem of said hook, the wings that protrude from said hook being able to abut against the lower edge of said base.

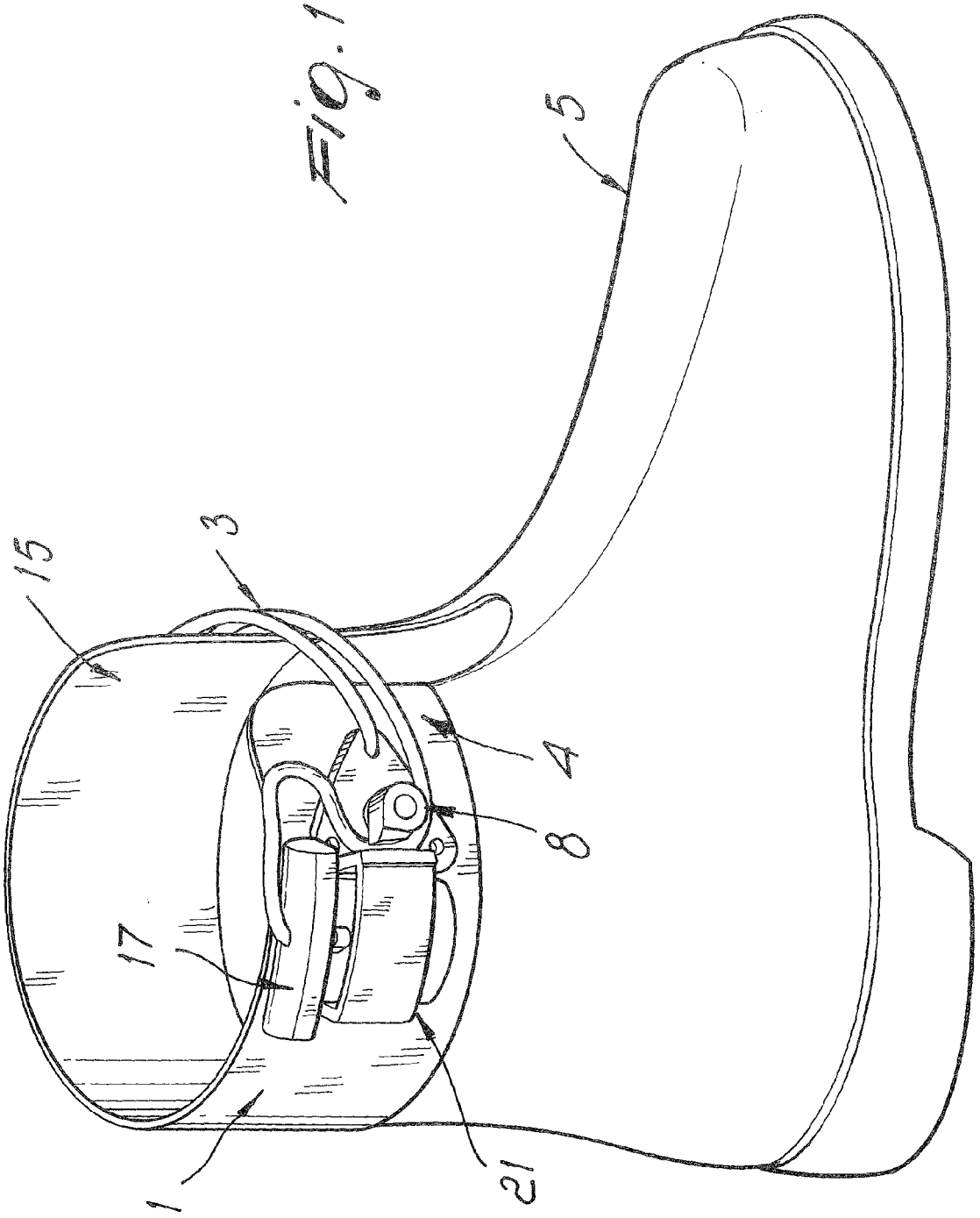
18. The device according to claims 1, 7 and 17, **characterized in that** said bridge is arranged so that said first wing thereof is adjacent to said first base, the outer face of said first wing constituting said third surface for the abutment of said first locking surface of said pawl.

19. The device according to claims 1 and 18, **characterized in that** it comprises a safety catch, which is constituted by a lamina that is rotatably associated with said first pivot externally with respect to said pawl and is parallel thereto and approximately shaped like a rounded trapezoid.

20. The device according to claims 1 and 19, **characterized in that** said lamina forms a tab that affects at least the region comprised between said first pivot and said third surface externally with respect to said pawl and said lace, and the angular stroke of which is limited by an abutment that is constituted by a protrusion that protrudes externally from said first wing or from said base of said bridge.

21. The device according to claims 1 and 20, **characterized in that** said lamina, by resting in the closure position against said abutment, is superimposed on said pawl, so as to prevent the disengagement of said lace from said pawl.

Fig. 1



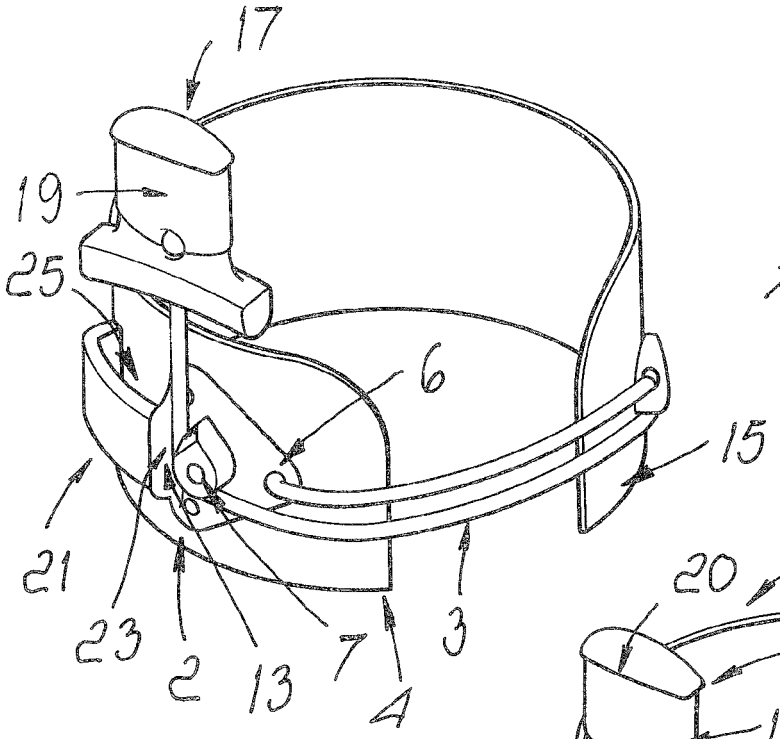


Fig. 2

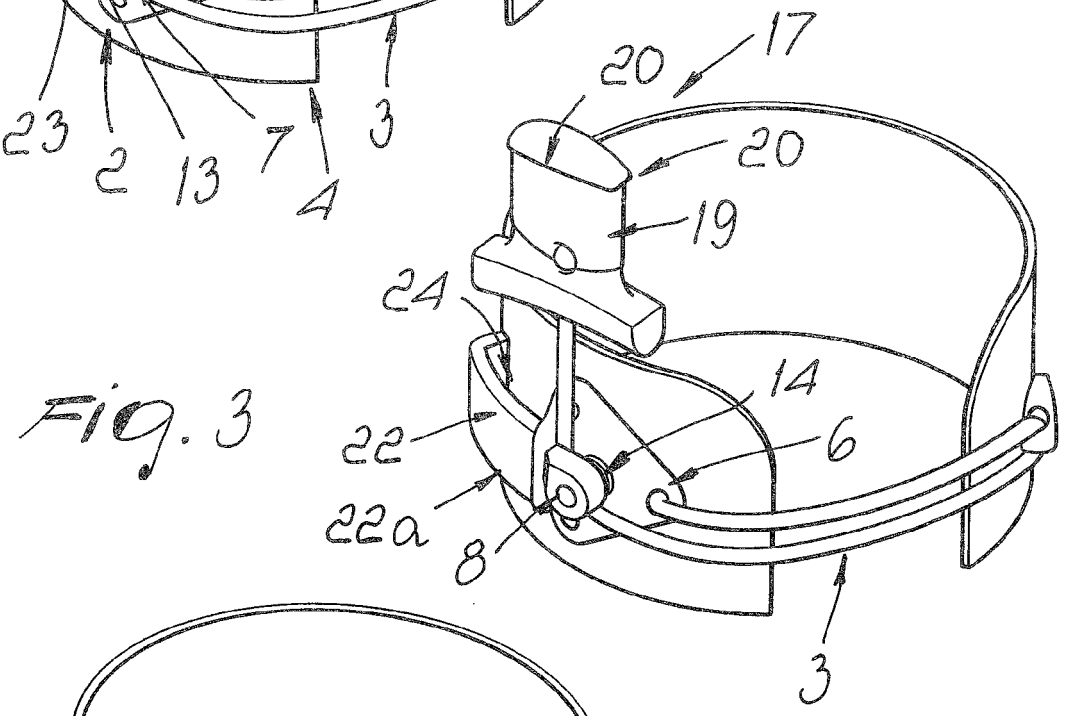


Fig. 3

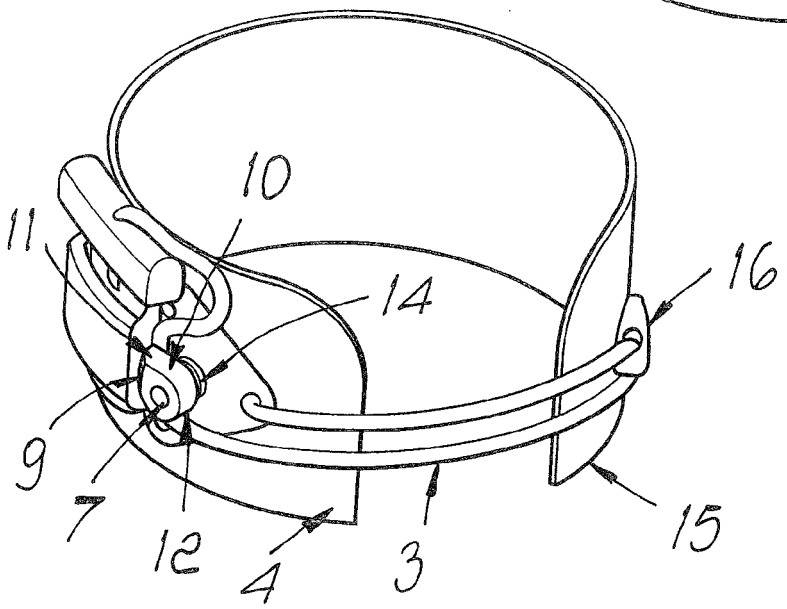


Fig. 4

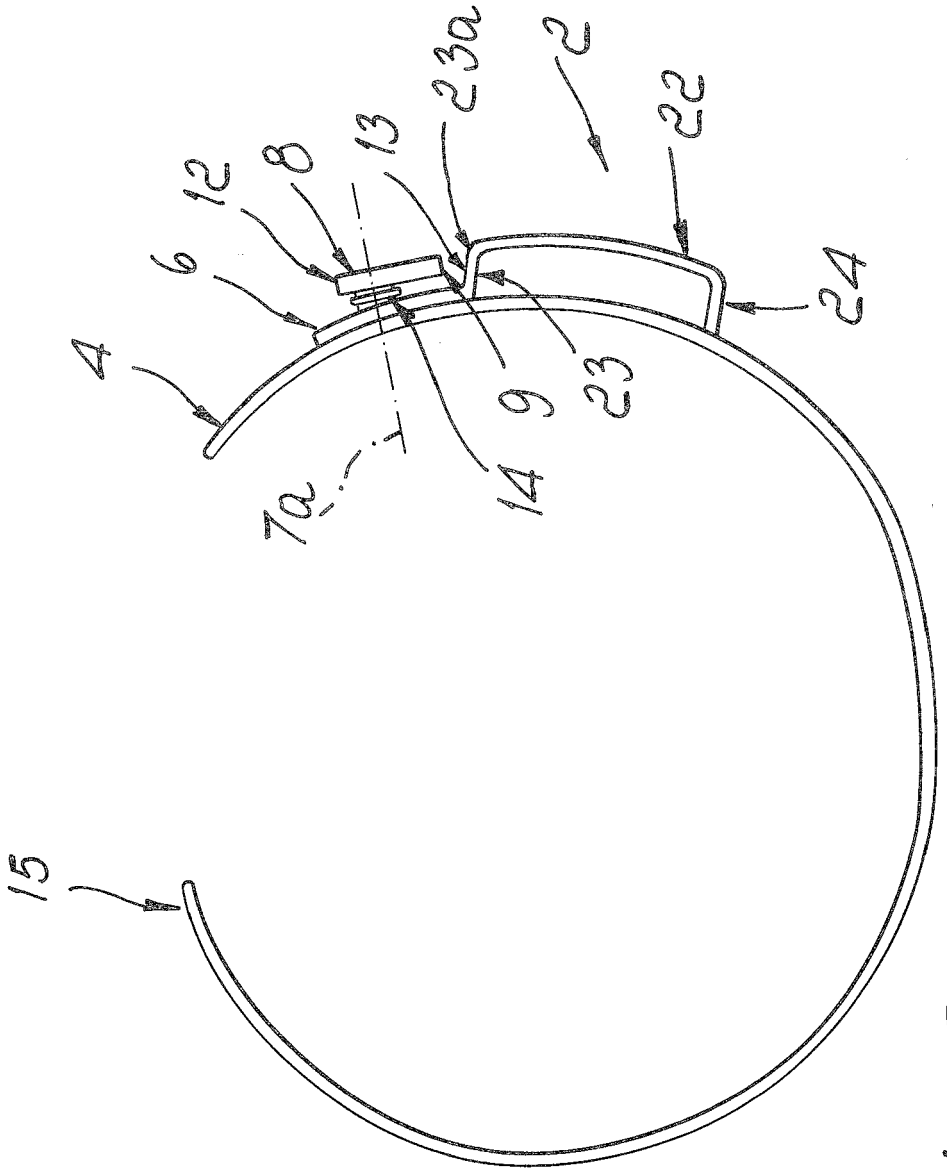


Fig. 5

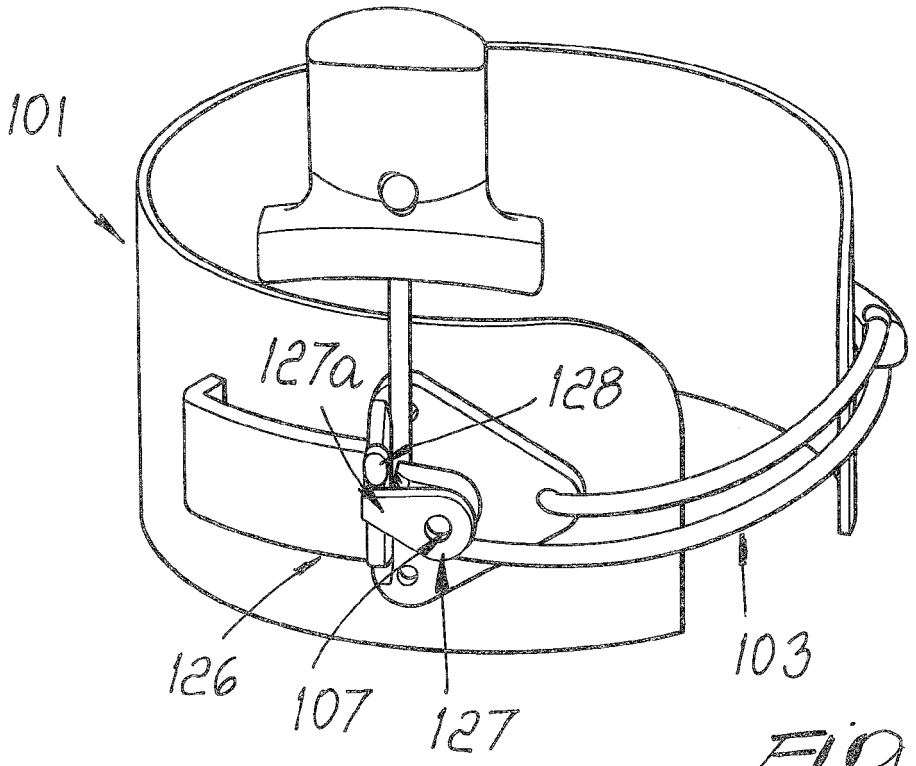


Fig. 6

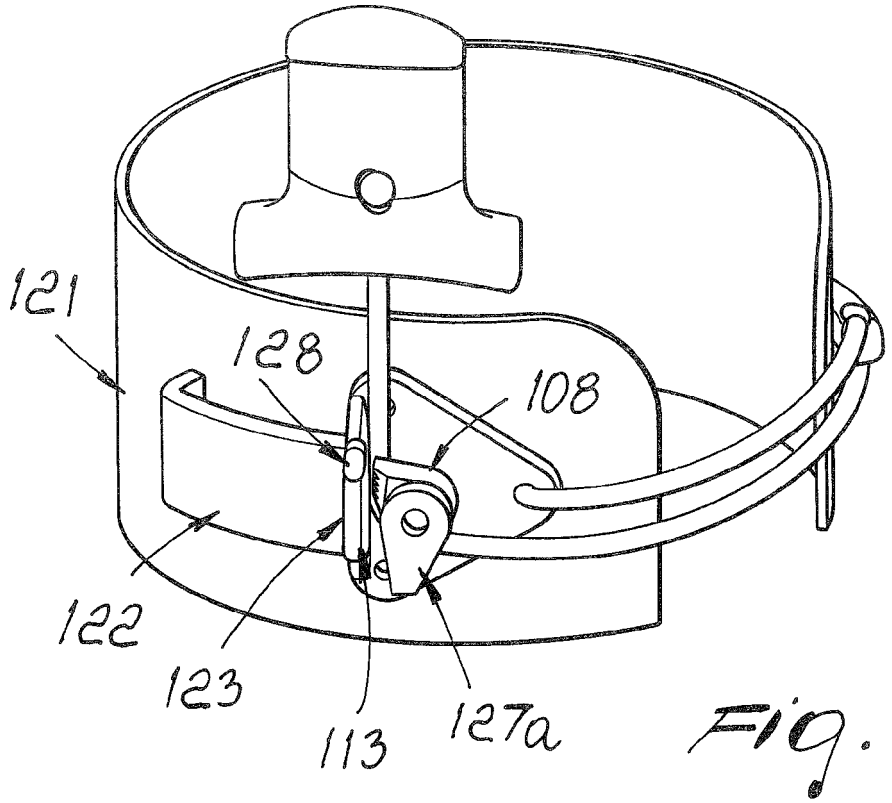


Fig. 7

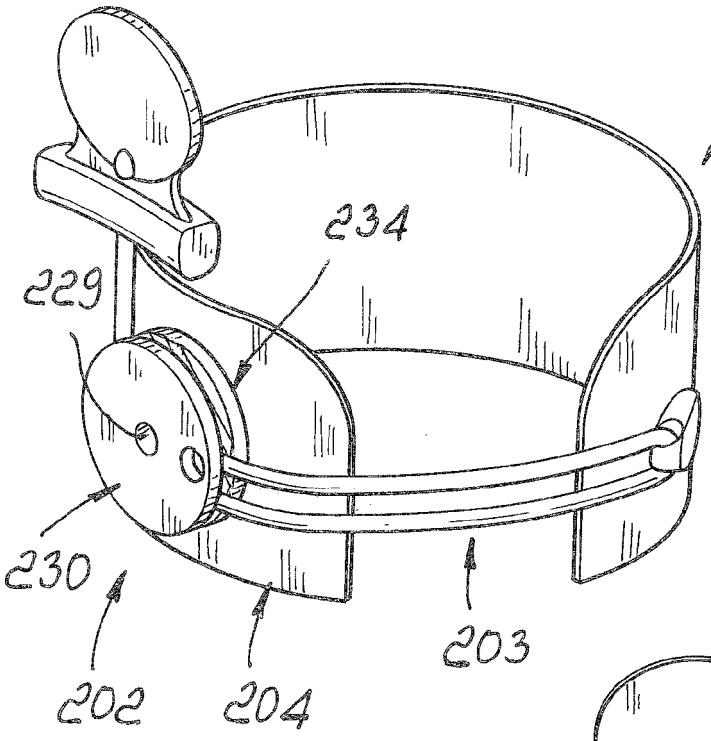


Fig. 8

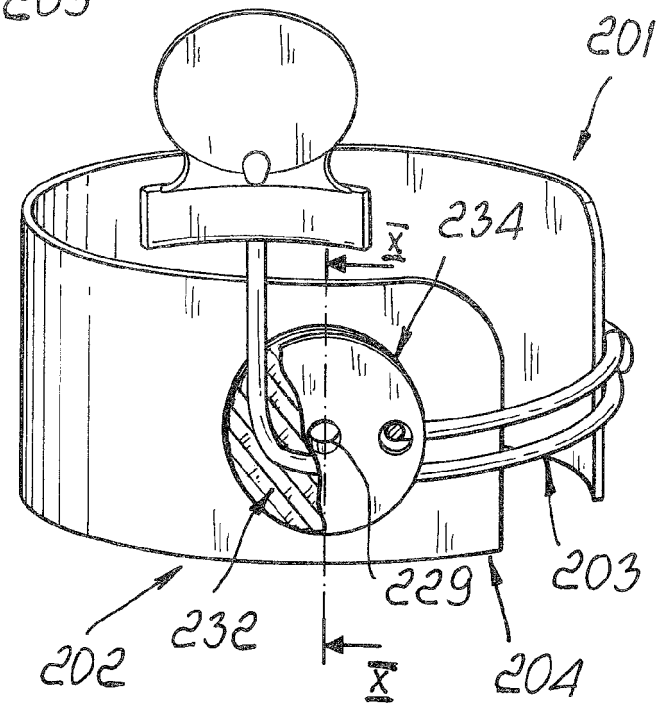


Fig. 9

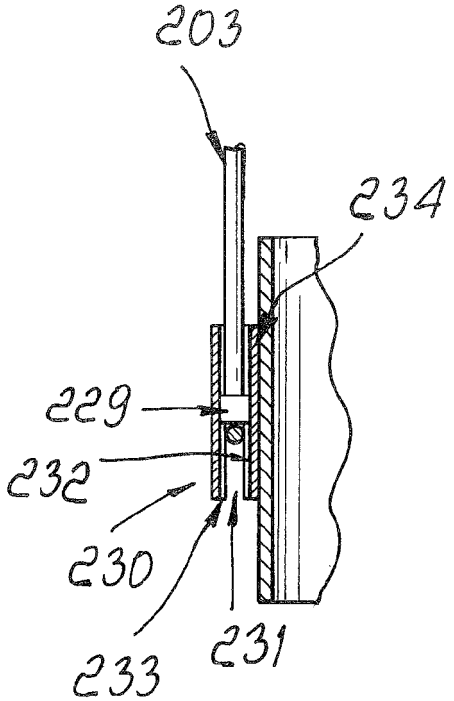


Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 5186

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	FR 2 827 486 A (SALOMON SA) 24 January 2003 (2003-01-24) * page 2, line 10 - page 6, line 6; figures 2,4,5 *	1-7,13 8-10	INV. A43C7/04 A43C11/00
Y	DE 32 154 C (FREDERIK HENRY SMITH) 31 October 1884 (1884-10-31) * the whole document *	8-10	
X	DE 197 10 702 A1 (HANSEN, REINHARD, SALZBURG, AT; HEINZ, BERNHARD, 83395 FREILASSING, DE) 17 September 1998 (1998-09-17) * column 4, line 35 - column 5, line 27; figure 2 *	1-7,13	
A	US 2004/000036 A1 (SARTOR PAOLO ET AL) 1 January 2004 (2004-01-01) * the whole document *	1-7	
A	FR 2 750 834 A (SALOMON SA) 16 January 1998 (1998-01-16) * the whole document *	1	TECHNICAL FIELDS SEARCHED (IPC) A43C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 July 2006	Cianci, S

CATEGORY OF CITED DOCUMENTS

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31-07-2006

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