(19) Europäisches Patentamt
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(11) **EP 2 233 024 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.09.2010 Bulletin 2010/39

(51) Int Cl.:
A43C 11/14 *(2006.01)*

(21) Application number: **10155162.0**

(22) Date of filing: **02.03.2010**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA ME RS

(30) Priority: **23.03.2009 IT VE20090019**

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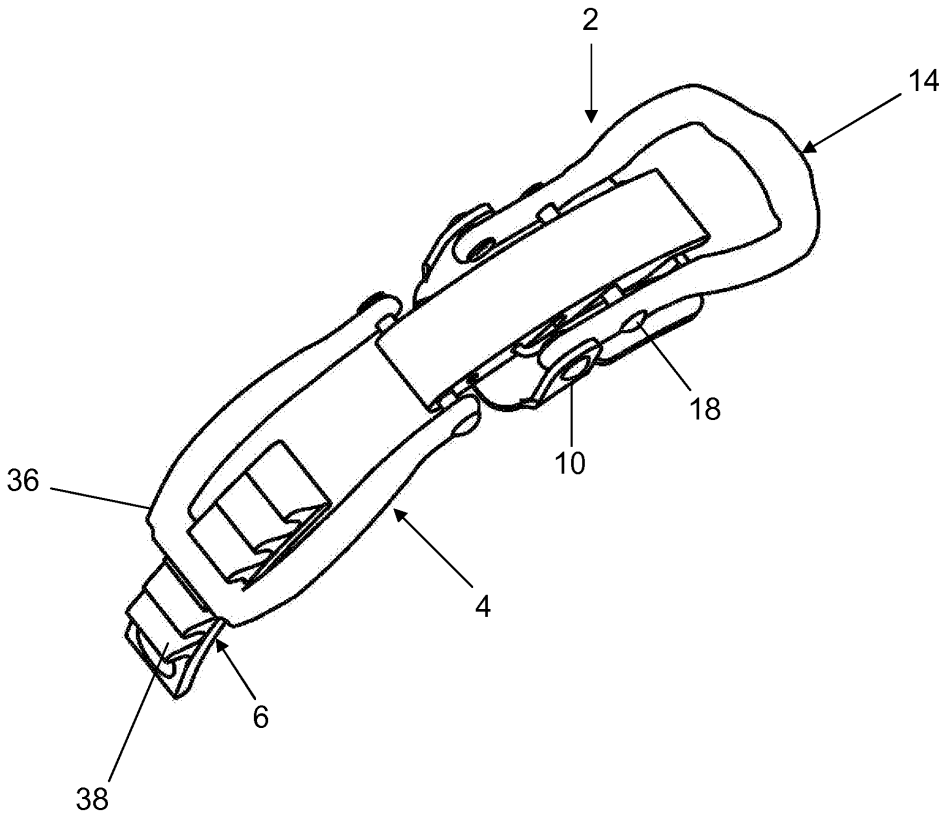
(54) Lever fastening device for sports footwear

(57) A lever fastening device, in particular for sports footwear, characterised by comprising:
- a lever (14) hinged to one side of the vamp and provided with a pin (18) selectively engagable by one of the teeth (24) of a toothed plate (20) with its axis longitudinally parallel to the longitudinal axis of the lever,
- elastic means (32) for maintaining said plate engaged with said pin,
- a puller element (4) hinged to the plate,
- a rack (6) fixed to the other side of the vamp,
the pitch of the teeth of the toothed plate (20) being different from the pitch of the teeth of the rack (6).

FIG. 1



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Description

[0001] The present invention relates to a lever fastening device for sports footwear.

[0002] Lever fastening devices for sports footwear are known: they generally comprise a fork fixed to a side of the vamp, for hinging a lever arm to which a threaded sleeve is fixed.

[0003] At a threaded end a puller is engaged in the threaded sleeve, its other end being provided with a U-piece engagable selectively with one of the teeth of a rack secured to the other side of the vamp.

[0004] The device is used by engaging the U-piece with a tooth of the rack while the lever arm is in its non-operated state, and then rotating the lever arm to pull the two sides of the vamp together.

[0005] If the degree of tightening is not that required, the lever arm is slackened and the end of the U-piece is engaged with an adjacent tooth to obtain a greater or lesser degree of tightening.

[0006] These known devices present however the drawback of a lengthy and laborious operation if the positioning of the puller does not provide the required degree of tightening with either of the two teeth: In this case, to achieve micro-adjustment the U-piece is disengaged from the rack and the puller is rotated within the sleeve to increase or decrease its length relative to the sleeve.

[0007] The object of the invention is to eliminate these drawbacks by providing a lever fastening device which enables the microadjustment to be made easily and comfortably.

[0008] This object is attained according to the invention by a lever fastening device, in particular for sports footwear, as described in claim 1.

[0009] The present invention is further clarified hereinafter with reference to the accompanying drawings, in which:

Figure 1	is a perspective view of a lever fastening device according to the invention,
Figure 2	is an exploded perspective view of the lever,
Figures 3 and 4	are longitudinal sections through the lever fastening device taken during the rack adjustment stage,
Figures 5, 6 and 7	are longitudinal sections through the fastening device taken during three successive lever arm adjustment stages, and
Figure 8	shows the lever arm engaged in the end of the spring.

[0010] As can be seen from the figures, the lever fastening device according to the invention comprises substantially a lever 2, a U-piece 4 and a rack 6.

[0011] The lever 2 comprises a fork 8, to the arms 10 of which a U-shaped lever 14, having its prongs 16 connected together by a pin 18, is hinged by rivets 12.

[0012] The lever also comprises a plate 20 provided on its lower surface with two teeth 24 and having its sides 26 provided with pairs of holes 28 for the offset insertion of the 90°-bent ends 30 of a U-shaped spring 32 with arms of different length and with the connection part 34 hook-shaped.

[0013] The cavities formed by the teeth of the plate 20 are inclined towards the rack.

[0014] The U-piece 4 is hinged to one end of the plate to selectively engage its end portion 36 with one of the teeth 38 of the rack 6, the pitch of whose teeth 38 is different from the pitch of the teeth 24 of the plate 20.

[0015] The lever fastening device of the invention is used as follows.

[0016] The pin 18 of the lever arm 14 is inserted between the toothed surface of the plate 20 and the spring 32 such as to engage one of the teeth 24 and remain stably in this configuration by virtue of the elastic action of the spring 32.

[0017] The user then engages the end 36 of the U-piece 4 with one of the teeth of the rack 6 and rotates the lever such as to exert a pulling action on the U-piece 4 and cause the vamp sides to come together (see Figure 3).

[0018] If the degree of tightening is not as required, the lever arm merely needs to be slackened, the end of the U-piece disengaged from the tooth, and moved into an adjacent tooth (see Figure 4).

[0019] If the desired degree of tightening is not obtained following the displacement of the U-piece 4, the user holds the U-piece 4 engaged between the teeth of the rack 6 with one hand, while with the other hand oscillates the lever arm 14 about the fork 10.

[0020] As a result of this operation the pin 18 of the arm 14 slides along the passive side of one of the teeth 24 (see Figure 5), to become positioned in the seat of the adjacent tooth (see Figure 6) and remain securely fixed in this position when the lever is again operated to pull the vamp sides together (see Figure 7).

[0021] Given the different pitch of the teeth of the plate and of the rack, a minimum adjustment can evidently be obtained corresponding to the difference between the two pitches.

[0022] It should also be noted that the bent shape of the end of the spring prevents total accidental unhooking of the pin 18.

[0023] Positioning the tooth in this seat (see Figure 8) also enables the two sides of the footwear vamp to be widely opened out without any "flapping" of the U-piece and lever, so that it can be used as the first usable tooth for pulling the two vamp sides together during fastening of the footwear.

Claims

1. A lever fastening device, in particular for sports footwear, **characterised by** comprising:

   - a lever (14) hinged to one side of the vamp and provided with a pin (18) selectively engagable by one of the teeth (24) of a toothed plate (20) with its axis longitudinally parallel to the longitudinal axis of the lever,
   - elastic means (32) for maintaining said plate engaged with said pin,
   - a puller element (4) hinged to the plate,
   - a rack (6) fixed to the other side of the vamp,

   the pitch of the teeth of the toothed plate (20) being different from the pitch of the teeth of the rack (6).

2. A device as claimed in claim 1, **characterised in that** said elastic means consist of a U-shaped spring with different-length arms the bent ends (30) of which engage in the sides (36) of the plate along different axes.

3. A device as claimed in claim 2, **characterised in that** the joining portion (34) of the spring (32) is hook-shaped.

4. A device as claimed in claim 1, **characterised in that** the lever is U-shaped and is hinged to the vamp on a fork (8).

FIG. 1

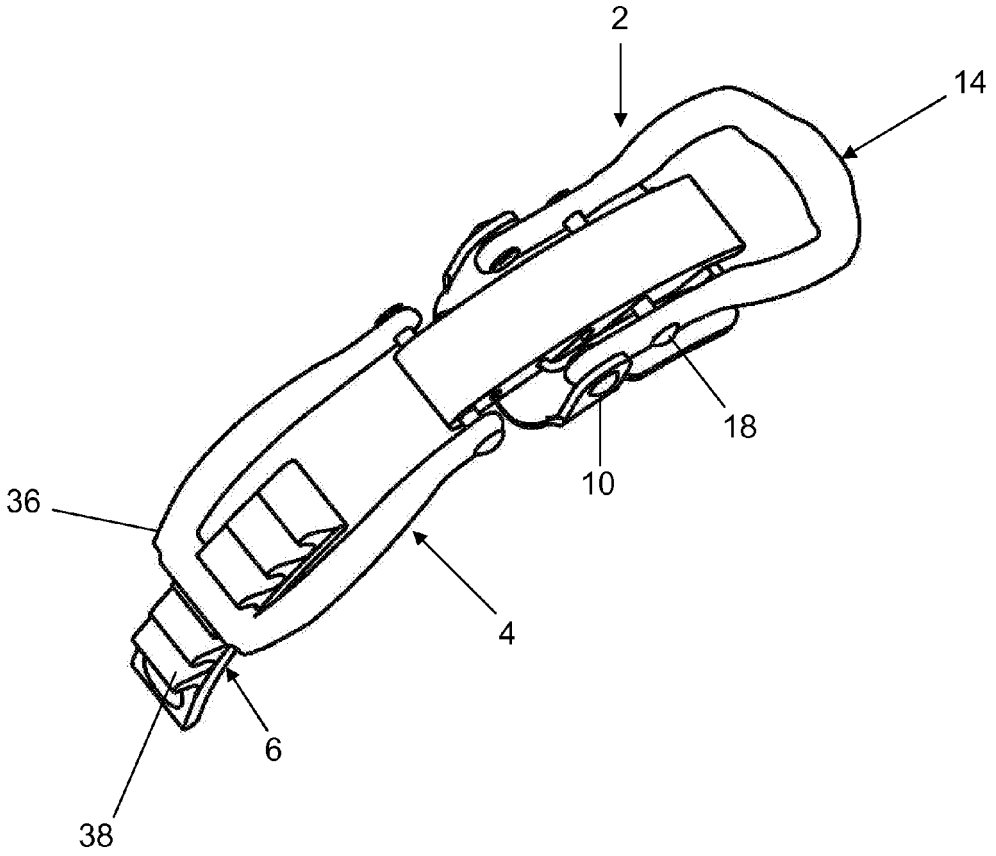


FIG. 2

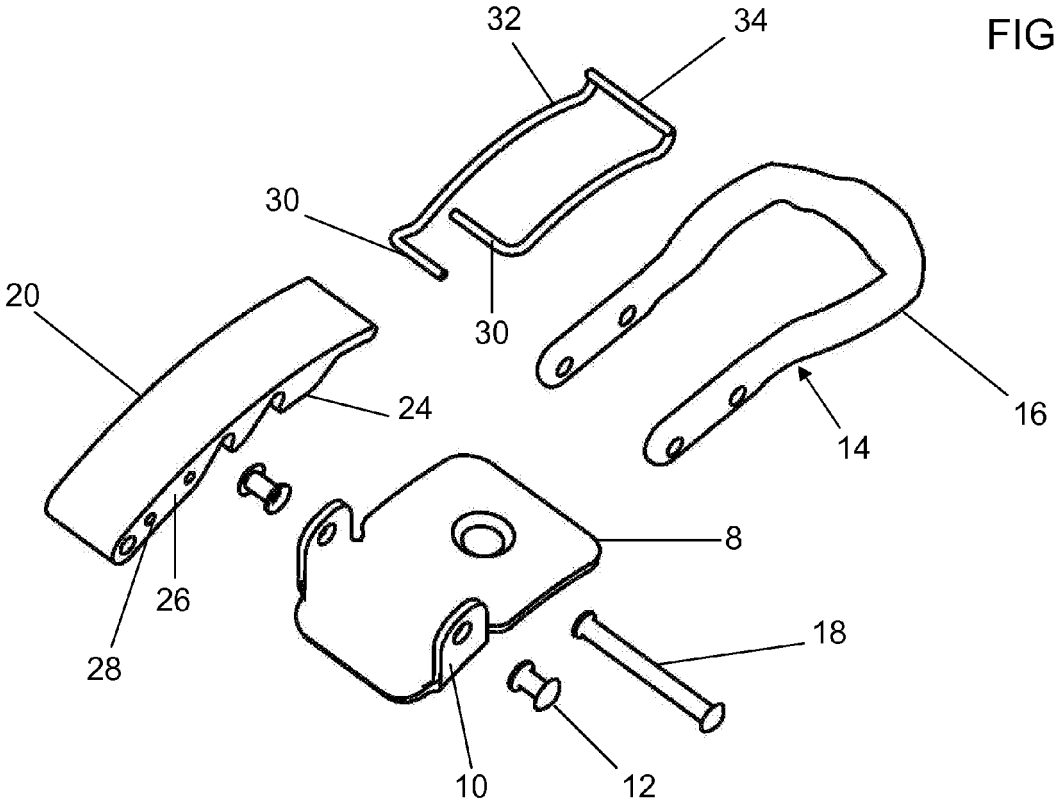


FIG. 3

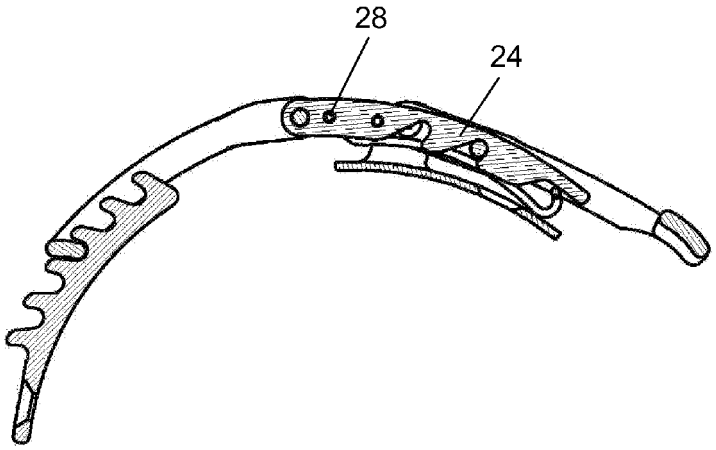


FIG. 4

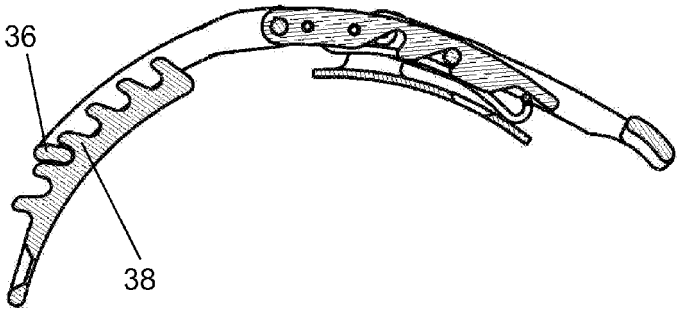


FIG. 5

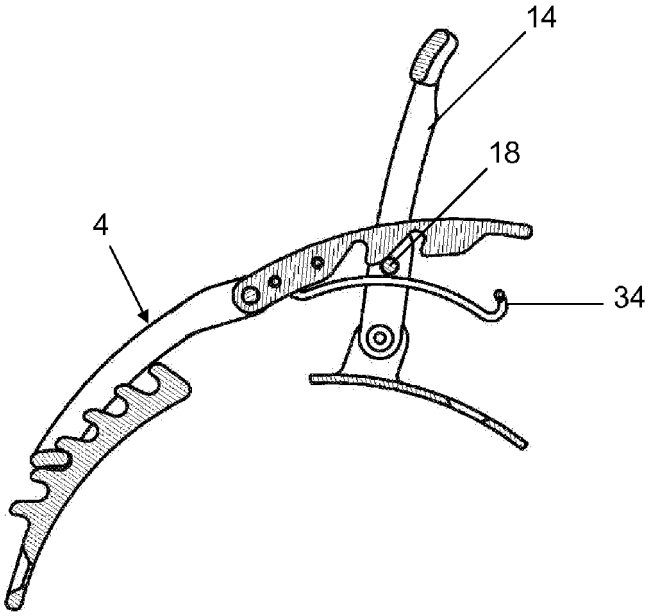


FIG. 6

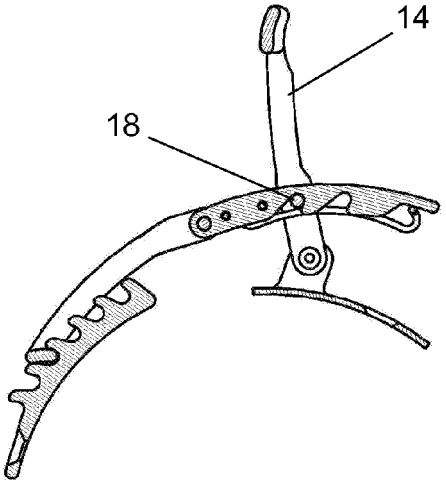


FIG. 7

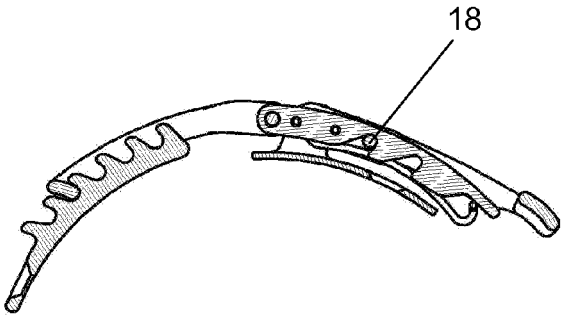
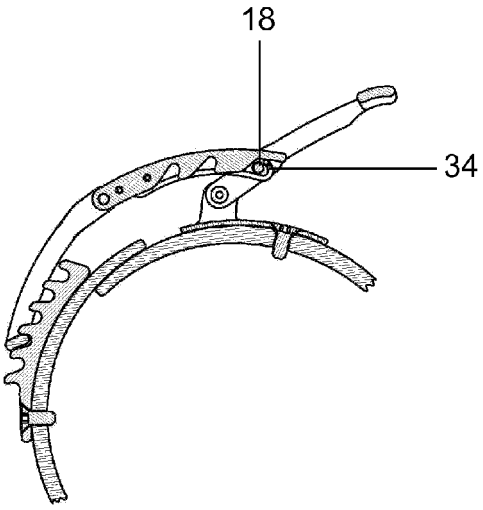


FIG. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 5162

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 774 864 A1 (PREMEC S P A [IT]) 18 April 2007 (2007-04-18) * paragraphs [0035], [0036]; figures *	1-4	INV. A43C11/14
A	US 4 651 392 A (OLIVIERI OLIVIERO [IT]) 24 March 1987 (1987-03-24) * column 2, lines 26-45; figures 1,2 *	1-4	
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			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
Munich	14 June 2010	Vesin, Stéphane

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EPO FORM 1503 03.82 (P04C01)

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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14-06-2010

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