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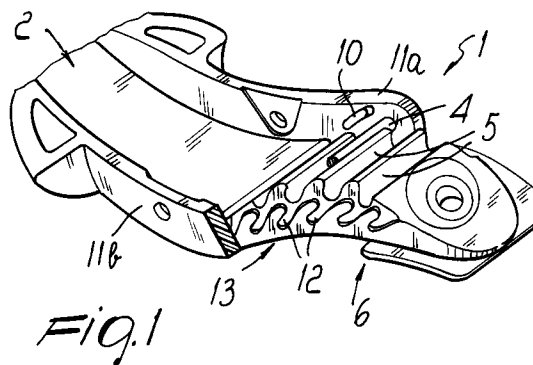
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I-20123 Milano (IT)(54) **Lever particularly for sports shoes.**

(57) Lever, particularly usable for sports shoes including a lever arm (2) which is articulated to a pivot (4) that can be arranged between two teeth (5) of a rack (6) that in turn is associable with the other flap to be closed. The lever arm has a protrusion (10) for engagement with complementarily shaped seats (12) formed laterally with respect to the rack. The protrusion (10) and the seats (12) allow to retain the pivot (4) between two teeth (5) of the rack (6) so as to allow to maintain the closed condition even when no traction is applied to the lever.

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The present invention relates to a lever particularly usable for sports shoes such as ski boots, ice skates, or roller skates.

In the manufacture of this kind of shoes it is necessary to mutually close flaps, such as for example the flaps of the shell or of the quarter, in order to close the shoe.

It is known to use, for this purpose, levers that are for example constituted by a lever arm which is pivoted at one end to two shoulders. The shoulders are rigidly coupled to a first flap to be closed and the lever arm has a rack, towards the surface of the shoe. A ring selectively interacts with the rack, and at its other end the ring is rigidly coupled to the second flap to be closed.

Other known levers have a U-shaped lever arm. A bar is associated between the wings of said arm and is associated by means of a coupling element with a cable or band or ring that interact, at their other end, with a rack that is associated with the second flap to be closed.

All these conventional levers have a drawback: as more than one lever is usually arranged on the shoe, once one lever has been closed, the closure of the adjacent lever reduces the load applied to the previous one, which therefore tends to disengage from the rack. The different tension between two contiguous levers in fact produces a traction force on the more tightly closed lever and an oppositely orientated force on the contiguous lever which tends to push the lever out.

Accordingly, even a small impact is sufficient to open the lever arm.

Italian patent no. 755,249 is known as a partial solution to this drawback and discloses a lever-like closure device for ski boots and sports shoes in general which is essentially constituted by a base plate which is essentially T-shaped and is rigidly coupled, at its corners, by a flap to be joined. Two parallel sides, provided with recesses which are open upward, protrude from its stem.

A closure lever is also articulated to the base plate approximately at the connection between the stem and the head. The lever has, in the direction of the flap to be closed, notches at which it is possible to place a ring which is rigidly coupled, at its other end, to the other flap to be closed.

In this solution, once the lever has been closed, the recesses coincide with the notches so as to clamp the ring between them.

However, even this solution has drawbacks: first of all it is constituted by two separate components which must be mutually assembled.

Furthermore, this assembly must be performed very precisely, like the execution of the recesses and of the notches, since any inaccuracy would prevent the placement of the ring between the notches and the recesses.

Italian utility model no. 189,418 discloses a lever for closure hooks, particularly for ski boots, which comprises a plate for fixing to a boot which has two lugs to which a lever for actuating the closure hook is pivoted. A protrusion is formed on the lever at the pivot of the lugs and is adapted to snap into a seat which is associated with the plate, to prevent rotation of the actuation lever while the closure hook is not subjected to traction.

The seat is formed at an adapted elastic blade which is coupled to the plate.

This solution, too, has drawbacks: first of all, it too requires the coupling of two separate elements, constituted by the blade and by the plate, which must be mutually coupled. Moreover, said elastic blade must be made of a particularly high-value material, due to the very large number of actuations of the lever, so as to avoid any yielding that would thwart its function.

Furthermore, the more the elastic blade interacts with the lever to keep it closed, the higher the effort that the user must apply to open the lever.

The aim of the present invention is to solve the described technical problems, eliminating the drawbacks of the prior art and thus providing a lever that can maintain its closed condition even if the traction element, associated therewith to close the flaps of the shoe, is not subjected to traction.

Within the scope of the above aim, an important object is to provide a lever that is structurally very simple and easy to activate and deactivate for the user.

Another object is to provide a lever that allows the user to perform no additional effort during closure and opening in order to achieve the intended aim.

Another important object is to provide a lever that can be activated even for an extremely large number of operations while always maintaining in optimum conditions the characteristic of its aim.

Another object is to provide a lever that has low manufacturing costs and can be obtained with conventional and known systems.

This aim, these objects and others which will become apparent hereinafter are achieved by a lever particularly for sports shoes, comprising a lever arm articulated to a closure member and having a pivot arranged between two teeth of a rack that is associable with another closure member to be closed, characterized in that said lever arm has means for engagement with complementarily shaped seats formed laterally with respect to said rack to retain said pivot between said two teeth.

Further characteristics and advantages of the invention will become apparent from the following detailed description of a particular but not exclusive embodiment, illustrated only by way of non-limita-

tive example in the accompanying drawings, wherein:

figure 1 is a partially sectioned perspective view of the lever in open condition;

figure 2 is a side sectioned view of the lever, taken along a longitudinal plane that passes through the seats formed laterally with respect to the rack;

figure 3 is a view, similar to the preceding one, of the lever in closed condition, where the rack has been shown in phantom lines.

With reference to the above figures, the reference numeral 1 designates the lever particularly usable for sports shoes, comprising a lever arm 2 articulated to a closure member constituted by a flap, or by a traction element 3, and having a pivot 4, at one end.

Pivot 4 can be arranged between two adjacent teeth 5 of a rack 6 that is associable with the other flap to be closed.

The dimensions of the pivot 4 are such that it can fit between two of said teeth 5. Teeth 5 have a seat 7 connected to the preceding tooth and to the following tooth respectively, by means of a first vertical wall 8 and a second vertical wall 9.

This shape prevents the pivot 4, once accommodated in the seat 7, from leaving the seat because of a force applied along an axis that lies at right angles to said first and second walls.

The lever arm 2 also has engagement means which are constituted by at least one protrusion 10 that protrudes internally at at least one of the arms 11a, 11b of lever arm 2.

Protrusion 10 is substantially curved and can be arranged, when the lever arm 2 rotates towards the rack 6, at one of several complementarily shaped seats 12 formed at the lateral surfaces of said rack 6.

The protrusion 10 can thus be removably located at said seats 12 during the rotation of the lever arm 2.

Accordingly, a set of teeth 13 is formed at each side of the rack 6 and protrudes approximately as much as the protrusion 10.

During closure, the protrusion 10, as shown in figure 3, prevents the lever arm 2 from lifting even in the absence of any traction force at the traction element 3 or even in the presence of a negative force, i.e. a force directed towards the rear part of the lever arm, since the particular curved shape of the protrusion 10 and of the complementarily shaped seats 12 opposes a movement at right angles to the rack 6.

Due to its curved shape, said protrusion also prevents opening actions performed along directions that form an acute angle assuming a vertex directed towards the rack on the side opposite to the one adjacent to the flap to be closed and

assuming a counterclockwise rotation.

The lever arm 2 can be released only by rotating it through such an angle as to disengage the protrusion 10 from the seat 12 formed by the set of teeth 13.

It has thus been observed that the invention has achieved the intended aim and objects, a lever having been obtained that remains in closed position even when no load is applied to the traction element, or rather even when there is no load orientated against the traction load that acts on the adjacent lever.

The seats 12 in fact contrast loads directed vertically with respect to the rack, whereas the seats 7, which are vertical with respect thereto, contrast the longitudinal loads orientated against the traction load, so that when the lever is closed any movement that might cause disengagement is prevented.

This condition is achieved very simply by the user, since the lever arm locks at the rack automatically, when the lever arm rotates towards said rack.

Deactivation is also very easy, since it is sufficient to rotate the lever arm by a preset angle, without having to apply additional efforts.

The lever according to the invention is susceptible to numerous modifications and variations, all of which are within the scope of the same inventive concept.

Thus, for example, it is possible to provide two protrusions, each one protruding at the facing surfaces of the arms 11a and 11b of the lever arm 2.

Naturally the shape and the dimensions of the individual components of the structure may be the most pertinent according to the specific requirements.

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

Claims

1. Lever particularly for sports shoes, comprising a lever arm (2) articulated to a closure member (3) and having a pivot (4) arranged between two teeth (5) of a rack (6) that is associable with another closure member to be closed, characterized in that said lever arm has means (10) for engagement with complementarily shaped seats (12) formed laterally with respect to said rack (6) to retain said pivot (4) between said two teeth (5).

2. Lever according to claim 1, characterized in that said lever arm (2) is U-shaped and has two arms (11a,11b), said engagement means being constituted by at least one protrusion (10) that protrudes inside the inner lateral surface of at least one of the arms (11a,11b) that form said lever arm. 5
3. Lever according to claim 2, characterized in that said at least one protrusion (10) is curved. 10
4. Lever according to claim 2, characterized in that said at least one protrusion (10) is located between said pivot (4) and the free end of said lever arm (2). 15
5. Lever according to claim 4, characterized in that said at least one protrusion (10) can be selectively and removably arranged at one of said complementarily shaped seats (12) formed on a set of teeth (13) that protrudes laterally with respect to said rack (6). 20
6. Lever according to claim 4, characterized in that said at least one protrusion (10) is located at such a distance from said pivot (4) as to allow to place it within one of said seats (12) after a rotation imparted to said lever arm (2) while said pivot (4) is located between two adjacent teeth of said rack (6). 25 30
7. Lever according to one or more of the preceding claims, characterized in that said at least one protrusion (10) is at least as thick as said set of teeth (13) that protrudes laterally with respect to said rack (6). 35
8. Lever according to claim 1, characterized in that said at least one protrusion (10) is shaped like a circular arc centered on the axis of said pivot (4). 40
9. Lever according to one or more of the preceding claims, characterized in that when the lever arm (2) is closed on said rack (6) said at least one protrusion (10) prevents said lever arm from making any movement other than a rotation so as to open. 45
10. Lever according to claim 1, characterized in that said at least one protrusion (10) and said seats (12) have such dimensions as to allow the disengagement of said lever arm (2) from said rack (6) beyond a given rotation angle imparted to said lever arm (2). 50 55
11. Lever according to one or more of the preceding claims, characterized in that said pivot (4)

is accommodated within a seat (7) of said rack (6) that is connected to said two teeth (5) by means of a first vertical wall (8) and a second vertical wall (9).

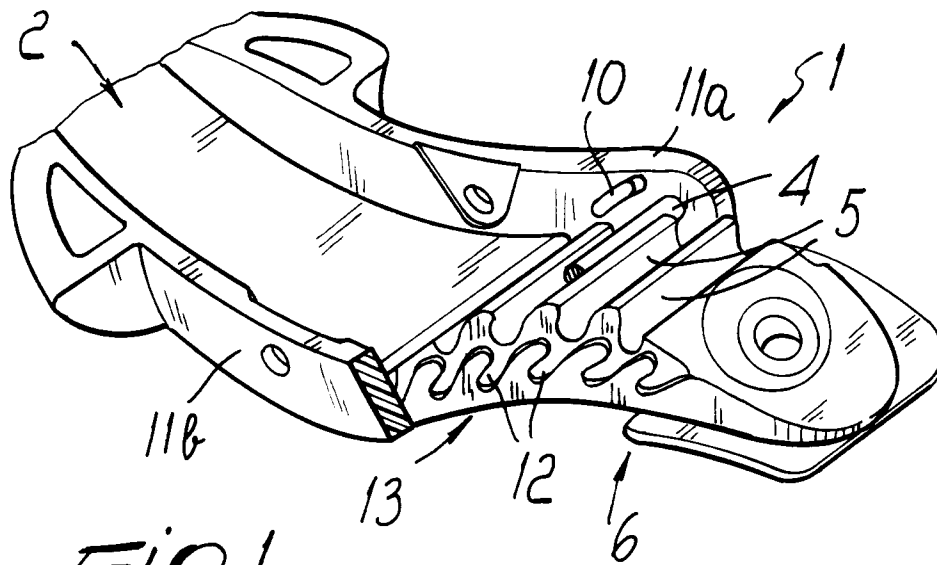


Fig. 1

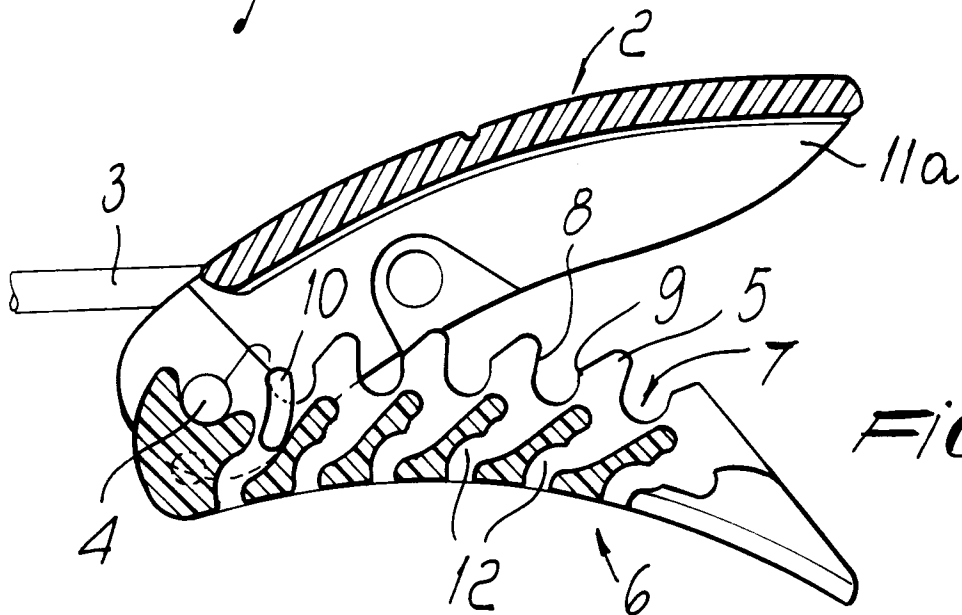


Fig. 2

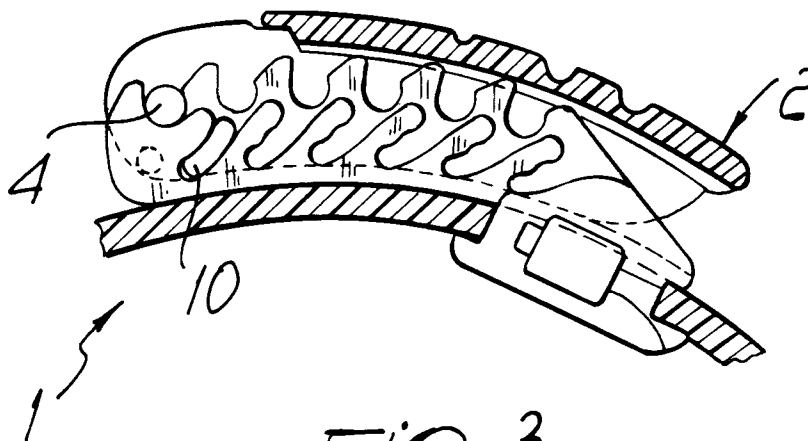


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 6329

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE-A-19 25 040 (J. LEDERER) * the whole document *	1	A43C11/14
A	EP-A-0 070 272 (SESAMAT) * the whole document *	1	
A	DE-A-16 85 813 (F. SCHLITTENBAUER) * the whole document *	1	
A	DE-B-16 85 796 (STOCKO) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A43C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 February 1995	Examiner Declerck, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			