(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 591 695 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.05.2013 Bulletin 2013/20

(51) Int Cl.:
A43C 11/14 *(2006.01)* ***A43D 8/02*** *(2006.01)*

(21) Application number: **12188161.9**

(22) Date of filing: **11.10.2012**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **11.11.2011 IT PN20110074**

(71) Applicant: **GI.DI. Meccanica S.p.A.**
31028 Vazzola (TV) (IT)

(72) Inventor: **Giusti, Dino**
31015 Conegliano (TV) (IT)

(74) Representative: **Gonella, Mario et al**
Propria S.r.l.
Via della Colonna, 35
33170 Pordenone (IT)

(54) **Element for fastening devices in particular for sport footwear and relative production process**

(57) The present invention refers to an element (10, 20) for fastening devices, in particular for sports footwear. In particular, said element (10, 20) is obtained by a profile (1) extruded in a direction parallel to the longitudinal extension of said element (10, 20) and comprising a plate (1 A) having a longitudinal extension (L) greater than its transversal extension (T), from which protrude, perpendicularly to one of the two faces of said plate (1 A), a first and a second longitudinal rib (1B, 1 C) that extend near and parallel to the side edges of the plate (1 A), along the entire longitudinal extension (L) of said plate (1 A).

The present invention also refers to a process for manufacturing an element (10, 20) for fastening devices.

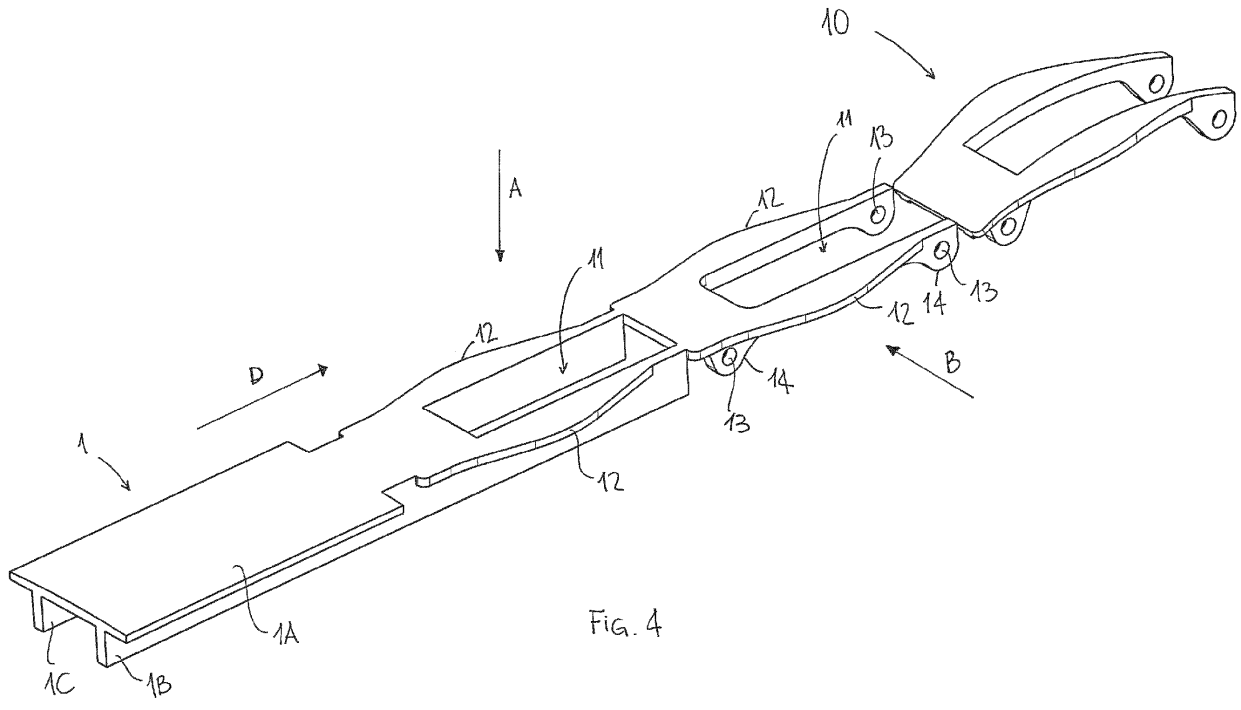


Fig. 4

EP 2 591 695 A1

Description

TECHNICAL FIELD OF INVENTION

[0001] The present invention refers to an element for fastening devices, in particular for sports footwear such as, for example, skiing or snowboarding shoes or boots, skates, climbing boots, cycling shoes, and to a process for manufacturing such element.

BACKGROUND OF INVENTION

[0002] Lever-type fastening devices are widely used in footwear, particularly in the sport field. Strength and lightness are thus essential requirements to provide a functional product, which must obviously be combined with an attractive look and, not less important, a favourable final cost of the finished item.

[0003] The price, in addition to the quality of the materials used, also depends on the type of processes that are carried out in making the various elements and on the reproducibility of the same.

[0004] At present, the fastening devices most commonly used include a jointed buckle lever on a base fastened to one of the edges of the footwear to be fastened. On the lever arm is pivoted a rod that is in turn connected to engaging means, such as for example a hook, suitable to engage corresponding engaging means integral with the other edge of the footwear, generally consisting of a rack means (an example of such fastening means is shown in figure 8).

[0005] All the components described above are made separately and assembled later through fastening or mechanically coupling means. In particular, the lever arm and the hook are obtained from an extruded element suitably subjected to milling to produce internal undercuts, to form holes for holding articulation means and for aesthetic shaping.

[0006] Although the lever arm and hook have somewhat similar shapes, they are made from different profiles, generally extruded in a direction transversal to their longitudinal extension and subsequently trimmed by milling.

[0007] However, by extruding the profiles in a transversal direction, the fibres in the material of the starting element are orientated in a direction perpendicular to that of the loads to which the element is subjected when in actual use, which is definitely a disadvantage in terms of strength and durability of the fastening device.

[0008] Moreover, the precision milling of a mechanical piece is a very delicate and costly process involving, moreover, a considerable quantity of waste due to the necessity of operating on profiles having a certain thickness: these characteristics determine to a considerable extent the final price of the component.

SUMMARY OF THE INVENTION

[0009] The main objective of the present invention is to resolve the drawbacks of the prior art by devising elements of fastening devices, such as for example a lever arm or a hook, obtained from a single profile having a particular geometry and through an extrusion process that makes it possible to impart particular properties of strength and lightness to the same element.

[0010] In the scope of the above objective, an important aim is to devise an element for fastening devices that can be obtained by shearing alone, without requiring costly and delicate milling operations.

[0011] Also with the aim of containing the cost of the pieces, a further objective of the present invention is to devise an element for fastening devices that can be obtained with a minimum production of waste, with resulting savings in terms of material used.

[0012] A further objective of the present invention consists of devising an element for fastening devices achieved with short production times, by increasing the capability of manufacturing the fastening devices.

[0013] An equally important objective is to devise an element for fastening devices that accomplishes the above purpose and objectives at competitive production costs, so that its use is advantageous also from the economic point of view, and that can be obtained with the usual well-known plants, machines and equipment.

[0014] The above-mentioned purpose and objectives, and others that will become more evident later, are achieved with an element for fastening devices, particularly for sports footwear as defined in claim 1.

BRIEF DESCRIPTION OF DRAWINGS

[0015] Further characteristics and advantages obtainable with an element for fastening devices according to the present invention will be more evident from the following description of a particular, but not exclusive, embodiment shown by way of non-limiting example with reference to the following figures:

- figure 1 illustrates, in a perspective view, the geometry of a particular profile element used to form an element for fastening devices according to the present invention;
- figure 2A shows the profile of figure 1 in a cross-sectional view;
- figures 2B, 2C, 2D, 2E and 2F are cross-sectional views of possible geometries of the profile of figure1;
- figures 3A and 3B illustrate a sequence of processing phases, in a side view and a top view, respectively, feasible to obtain a first element for fastening devices, in particular an engaging hook;
- figure 4 illustrates the processing phases for an engaging hook as in figures 3A and 3B, in a perspective view;
- figures 5A and 5b show a sequence of processing

phases, in a side view and a top view, respectively, feasible to obtain a second element for fastening devices, in particular a lever arm, according to the present invention;

- figure 6 illustrates the processing phases for a lever arm as in figures 5A and 5B, in a perspective view;
- figure 7 shows a processing phase of an element for fastening devices according to the present invention that is particularly advantageous due to the geometry of the starting sectional element;
- figure 8 shows, by way of example, a prior-art fastening device, and
- figure 9 show, by way of example, a fastening device including elements according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0016] As mentioned above, the fastening devices generally used include a lever arm jointed to a base fastened to one of the edges of the footwear to be fastened. On the lever arm is pivoted a rod that is in turn connected to engagement means, such as for example a hook, suitable to engage corresponding engaging means integral with the other edge of the footwear, generally consisting of a rack means (figure 8).

[0017] To achieve the basic purpose of the present invention, a particular geometry has been studied that makes it possible to obtain elements for fastening devices such as a lever arm and/or a hook engaging the rack made from a single profile.

[0018] With reference to figure 1, reference number 1 generally indicates a profile having characteristics suitable to achieve the above specified objectives; in particular, said profile 1 is extruded in a direction parallel to the longitudinal extension of the element that is to be produced and has a transversal cross section that resembles the Greek letter "π".

[0019] Said profile includes a plate 1A having a longitudinal extension L greater than the transversal extension T, from which protrude, perpendicularly to one of the two faces of the plate 1A, a first and a second longitudinal ribs 1B, 1C that extend near and parallel to the side edges of the plate 1A, along the entire longitudinal extension L of the same plate.

[0020] Said plate 1A may have a substantially rectangular cross section, as shown in figure 2A, or, as an alternative, it may be suitably shaped, as shown solely by way of example in figures from 2B to 2F.

[0021] From a profile having a geometry as described above, it is possible to obtain an engaging hook 10 and/or a lever arm 20 suitable to be used in a fastening device for sports footwear.

[0022] To manufacture an engaging hook 10 it is sufficient to create a through opening 11 on a longitudinal portion of the plate 1A, in particular in the space included between said first and said second rib 1B, 1C, in order to create the space necessary for said hook 10 to interface with corresponding engaging means provided on the rack, and a plurality of holes 13, suitably arranged on said first and second rib 1B, 1C, to receive suitable articulation means.

[0023] Similarly, to obtain instead a lever arm 20 it is sufficient to create a through opening 21 on a longitudinal portion of the plate 1A, in the space included between said first and said second rib 1B, 1C, in order to create the space necessary to receive a rod, and to provide a plurality of holes 23, suitably arranged on said first and second rib 1B, 1C, to receive suitable articulation means.

[0024] In addition, to give elements of fastening devices 10, 20 made in this manner a more attractive appearance, milled cuts can be made on the side edges of the plate 1A and on the ribs 1B, 1C; moreover, the plate 1A can be bent.

[0025] A particularly advantageous procedure to obtain an element for fastening devices from a profile 1 having the geometry as described above includes a succession of cold-sheared slots as will be illustrated in greater detail later. In particular, said procedure is known in the metal plate processing field as transfer-die process.

[0026] Figures 3A, 3B and 4 illustrate, in different views, the subsequent processing phases of the extruded profile 1 according to the geometry described above, to obtain an engaging hook 10; likewise, in figures 5A, 5B and 6 are shown, in different views, the subsequent steps of processing the extruded profile 1 according to the geometry described above, to obtain a lever arm 20.

[0027] In general, the profile 1 is inserted into the front of the relative machine comprising the transfer dies, where it is subjected in a continuous process to a plurality of subsequent machining operations during its feeding movement, which takes place preferably in a horizontal direction indicated in the figures by the arrow D.

[0028] Initially, only a head portion of said profile 1 is inserted into the machine, and in particular a portion having an extension substantially equal to the width of a first element for the fastening devices to be manufactured.

[0029] Said portion reaches a first work station where it undergoes a first processing step consisting of shearing by means of a relative die, preferably in a direction perpendicular to the plane defined by the rectangular portion 1A, in the direction indicated by the arrow A.

[0030] This step creates a central through opening 11 suitable to create the space necessary for the hook 10, in actual working conditions, to interface with the rack; in the case of the lever arm 20, the first shearing step creates a through opening 21 suitable to provide the central sheared opening for receiving the rod.

[0031] If necessary, during said first processing step, an aesthetic edge contour 12, 22 can be created on the unfinished element on the side edges of the rectangular portion 1A of the profile 1, the shape of which can be determined at will through a suitable shaping of the die, providing it is included within the side edges of the rectangular portion 1A projecting from the underlying ribs

1B, 1C of the profile 1.

[0032] Advantageously, if required, the particular geometry of the profile 1 makes it possible to create said through opening 11, 21 substantially flush with the ribs 1B and 1C without using a bottom die or matrix, usually essential to prevent the profile from deforming during shearing; in fact, thanks to their position, said ribs 1B and 1C create by themselves the necessary backing support for shearing, as shown in figure 7.

[0033] Once said first vertical shearing phase is completed, the portion that has undergone such operation is moved forward by translating the profile 1 horizontally in the direction indicated by the arrow D until it reaches a second work station; at the same time, due to the horizontal translation of the profile 1, a second portion of the profile 1 immediately adjacent to the first portion, and having substantially the same longitudinal extension, is inserted into the first shearing station, where it undergoes the first processing step described above.

[0034] Said second processing step consists of a shearing operation in a direction perpendicular to the direction A of the first shearing step and transversal to the extension L of the profile 1. The direction of said second shearing is shown in the figures with the arrow B.

[0035] Through said second step, on both of said first and second rib 1B, 1C of the profile 1 is created a plurality of holes 13, 23 suitably arranged to receive the rotational or pivot pins necessary for assembling and using the component element, and, if necessary, an aesthetic side shaping feature 14, 24. In this step it is necessary to use a matrix or bottom die as backing to support the shearing operation.

[0036] Subsequently, as with the previous phase, the portion that has undergone said second shearing is made to translate horizontally in the direction indicated by the arrow D until it reaches a subsequent processing station.

[0037] Consequently, said translation also involves the translation of the second portion, which has just undergone the first shearing step, to the second processing station, as well as the insertion into the machine of a further portion of the still intact profile 1, which will be subjected to the first processing step.

[0038] Thus, the portion that was first inserted now reaches the third processing station, where any required bending of the portion according to known procedures and its final shearing with respect to the previous portion is carried out, in a direction parallel to the transversal extension T of the profile 1, to obtain a first finished piece forming the desired component.

[0039] Clearly, the final shearing step and the bending step can be carried out at the same time or in sequence, in the order desired; the bending operation itself is optional and thus it can be omitted.

[0040] The subsequent portions will afterward be subjected to the bending phase and/or final shearing to form the component elements as the profile 1 is fed into the machine and the unfinished portions translate to the following processing station.

[0041] The succession of the steps as described above is the one that is most advantageous, but, obviously, the sequence can be modified without thereby departing from the scope of the present invention.

[0042] Further, preferably, until the last shearing step is reached, none of the component elements are yet formed, and they remain still joined to the previous unfinished piece and/or to the following one. However, it is pointed out that the shearing step with which an unfinished portion is separated from the adjacent unfinished portions could take place in any other phase.

[0043] In other words, in summary, a preferential process for manufacturing an element 10, 20 for fastening devices starting from a profile 1 having the geometry as specified above includes, even in a different sequence, the steps of:

a) shearing a first longitudinal portion of said profile 1 in a first direction A perpendicular to said plate 1A to form on said plate 1A a substantially central opening 11, 21 included between said first and second rib 1B, 1C;

b) shearing said first portion of said profile 1 in a second direction B substantially perpendicular to the direction of said first shearing A and transversal to the extension L of the profile 1, to form a plurality of through holes 13, 23 on said first and second rib 1B, 1C suitably arranged to determine the position of the rotational axes of said element 10, 20;

c) subjecting said first portion of said profile 1 to a further shearing in said first direction A suitable to separate transversally said longitudinal portion from the remaining part of the profile 1 to form said element 10, 20.

[0044] In addition, preferably during step a) a shearing step can be carried out on the side edges of said plate 1A to obtain a first edge contour 12, 22 and, preferably during step b), a shearing operation can be carried out on said first and said second rib 1B, 1C, to obtain a second edge contour 14, 24.

[0045] Finally, the above process can also include a further step d) in which said element 10, 20, or the corresponding unfinished element, is bent to enable the same element to adapt to the curved surface of a footwear. Clearly, in addition to the steps disclosed above, additional known steps can be provided.

[0046] Figure 9 illustrates, by way of example, a fastening device comprising elements of fastening devices 10, 20 made from a profile 1 having the geometry previously described and using the process disclosed above.

[0047] From what is disclosed above, it is thus evident that the present invention achieves the initially foreseen objectives and advantages: in effect, a particular geometry was thought out to apply to an extruded profile so as to be able to obtain, through a particular extrusion process, elements of fastening devices with different functions having the necessary strength and lightness;

in particular, the elements of fastening devices that can be produced from the same profile geometry are a lever arm and an engaging hook.

[0048] Advantageously, said elements of fastening devices, even if obtained from an extruded profile made from a very strong material such as Ergal®, can be manufactured without the use of costly and delicate milling operations; in fact, the thicknesses and dimensions of each portion of the starting profile have been suitably calibrated so as to make it possible to obtain said elements by shearing alone with a transfer die procedure, a process that is considerably faster than milling and has a moderate cost.

[0049] For the reason disclosed above, the trimming waste produced in the process will also be rather limited, thus making it possible to optimize the resources used, with consequent savings in terms of costs.

[0050] In addition, advantageously, the times for the production of elements of fastening devices from a profile according to the present invention are rather short, with an advantageous increase in their producibility.

[0051] It can be seen, moreover, that by extruding the profile in a direction that is not transversal but parallel to the longitudinal extension of the same profile, the fibres of the material are aligned in the direction of the tensile stresses to which the element is subjected during its use, thus imparting greater strength and durability to the fastening device.

[0052] Naturally, the present invention is open to numerous applications, modifications or variants without thereby departing from the scope of patent protection, as defined by the enclosed claims.

[0053] In addition, the materials and the equipment used for carrying out the present invention, as well as the shapes and dimensions of the individual components, may be the most suitable to the specific requirements.

Claims

1. Element (10, 20) for fastening devices in particular for sports footwear **characterized by** being obtained from a profile (1) extruded in a direction parallel to the longitudinal extension of said element (10, 20), said profile (1) including a plate (1A) having a longitudinal extension (L) greater than the transverse extension (T), a first and a second longitudinal rib (1B , 1C) protruding perpendicularly to a surface of said plate (1A), said ribs (1B, 1C) extending adjacent to and parallel to the side edges of said plate (1A), all along the longitudinal extension (L) of said plate (1A).

2. Element for fastening devices according to claim 1, wherein a through opening (11) is obtained on a longitudinal portion of said plate (1A) in the space between said first and said second rib (1B, 1C) and a plurality of holes (13) is obtained on said first and said second rib (1B, 1C) to form an engaging hook (10), said through opening (11) being capable of cooperating with engaging means of a rack and said plurality of holes (13) being capable of receiving suitable articulation means.

3. Element for fastening devices according to claim 1, wherein a through opening (21) is obtained on a longitudinal portion of said plate (1A) in the space between said first and said second rib (1B, 1C) and a plurality of holes (23) is obtained on said first and second rib (1B, 1C) to form a lever arm (20), said opening (21) being capable of housing a rod, said plurality of holes (23) being capable of receiving suitable articulation means.

4. Element for fastening devices according to claim 2 or 3, wherein a shape (12, 22, 14, 24) is conferred to said side edges of said plate (1A) and to the edges of said first and said second rib (1B, 1C).

5. Process to obtain an element (10, 20) for fastening devices according to claim 1, **characterized in that** it comprises the following steps, even in a different sequence:

   a) shearing a first longitudinal portion of said profile (1) according to a first direction (A) perpendicular to said plate (1A) so as to obtain on said plate (1A) a central opening (11, 21) between said first and second rib (1B, 1C);
   b) shearing said first portion of said profile (1) according to a second direction (B) perpendicular to said first direction (A) and transverse to the extension (L) of said profile (1), so as to obtain a plurality of through holes (13, 23) on said first and said second rib (1B, 1C), suitably arranged to define the position of rotation axes of said element (10, 20);
   c) shearing said first portion of said profile (1) according to said first direction (A) so as to transversally separate said longitudinal portion from the remaining portion of said profile (1) to obtain said element (10, 20).

6. Process according to claim 5, wherein during said step a) a shearing is performed on the side edges of said plate (1A) to obtain a first edge shaping (12, 22).

7. Process according to claim 5 or 6, wherein during step b) is performed a shearing in correspondence of said first and said second rib (1B, 1C), to obtain a second edge shaping (14, 24).

8. Process according to any of claims 5 to 7, wherein said longitudinal portion of said profile (1) is subjected to an additional step d) wherein said portion is bent.

9. Process according to any of claims 5 to 8, wherein said profile (1) is subjected to continuous processing of steps a) to c) through a translation of said profile (1) along a plurality of work stations including transfer dies.

10. Sports footwear comprising at least one element (10, 20) for fastening devices according to claim 1.

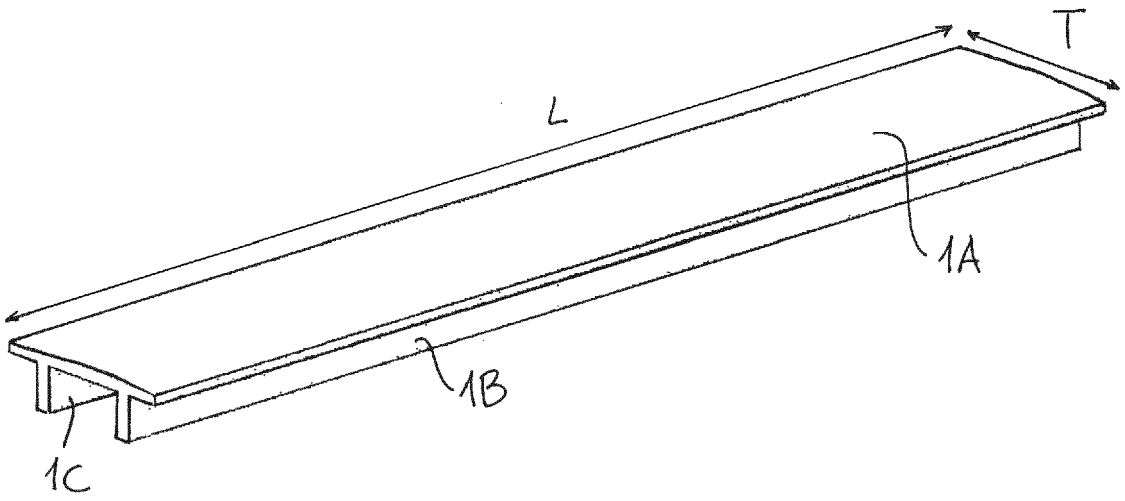


Fig.1

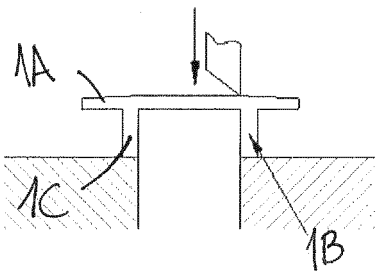


Fig.7

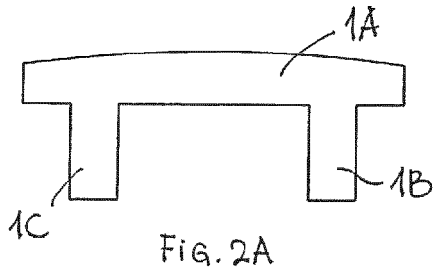


Fig. 2A

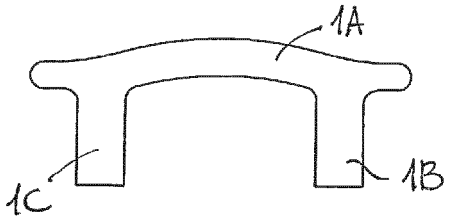


Fig. 2B

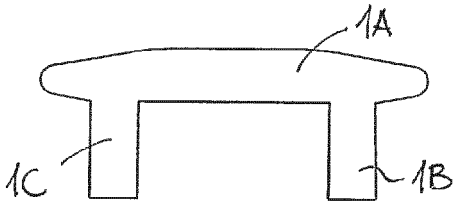


Fig. 2C

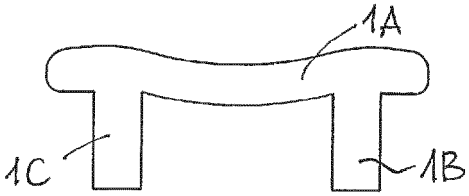


Fig. 2D

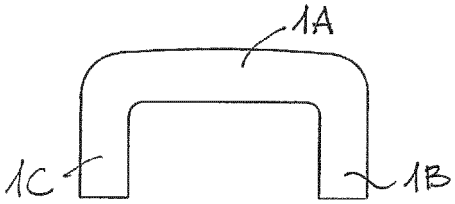


Fig. 2E

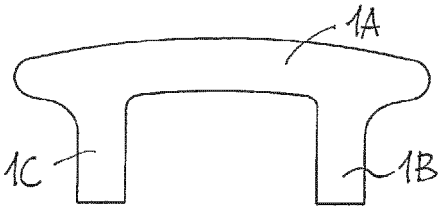


Fig. 2F

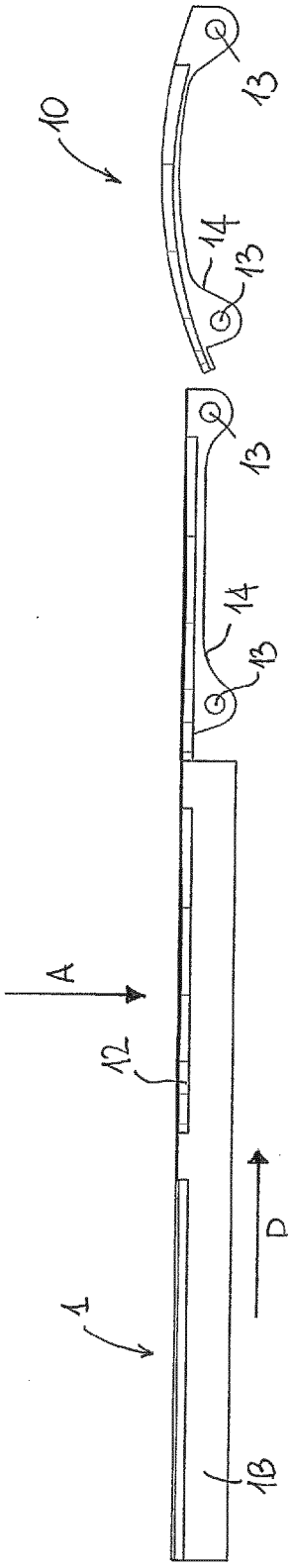


Fig.3A

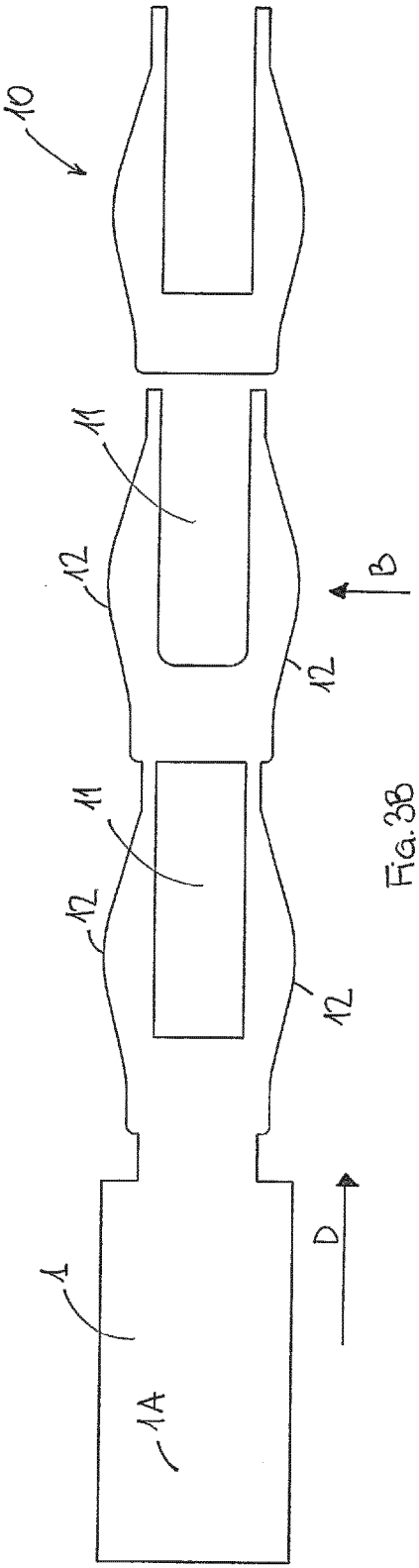


Fig.3B

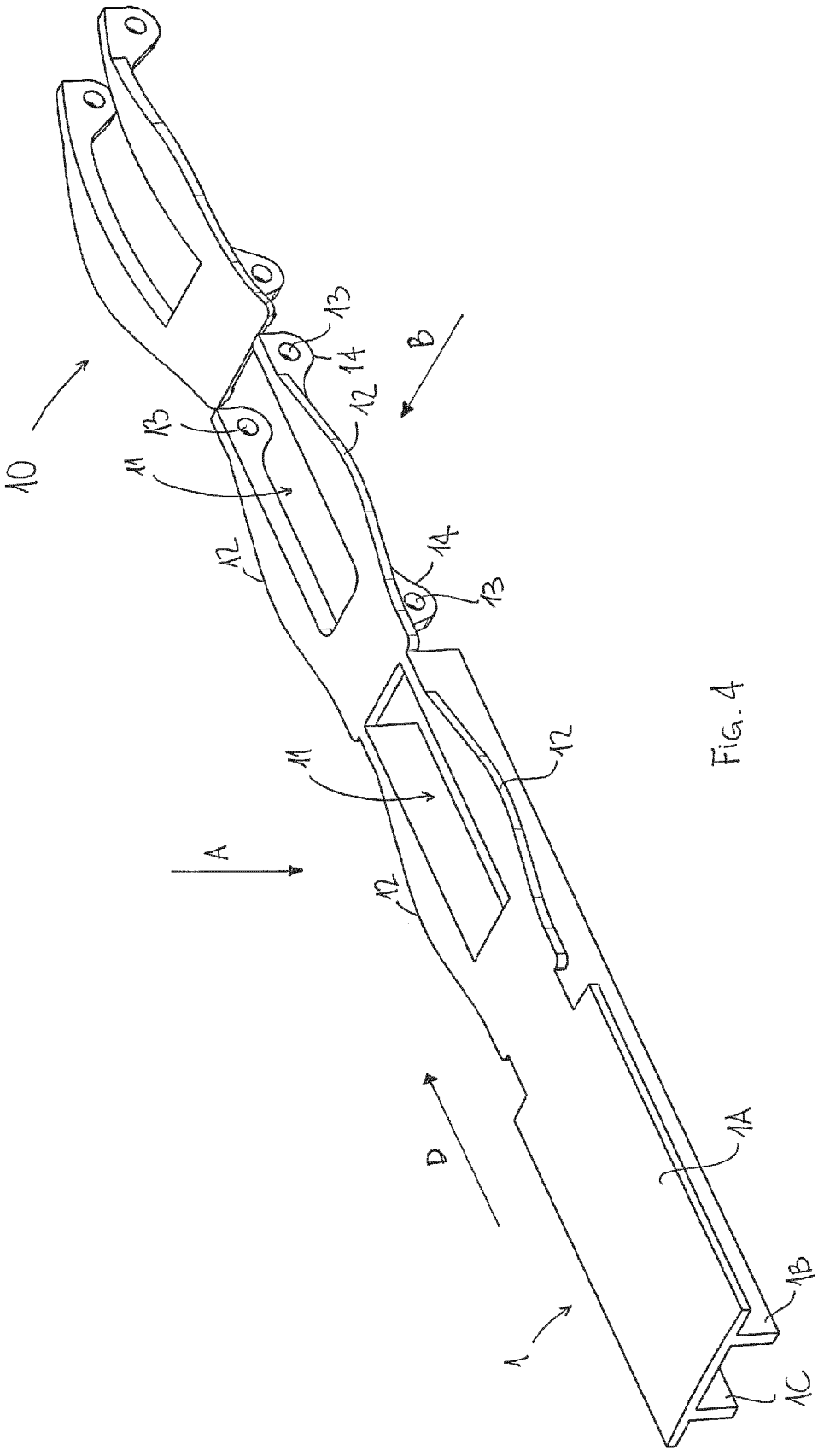
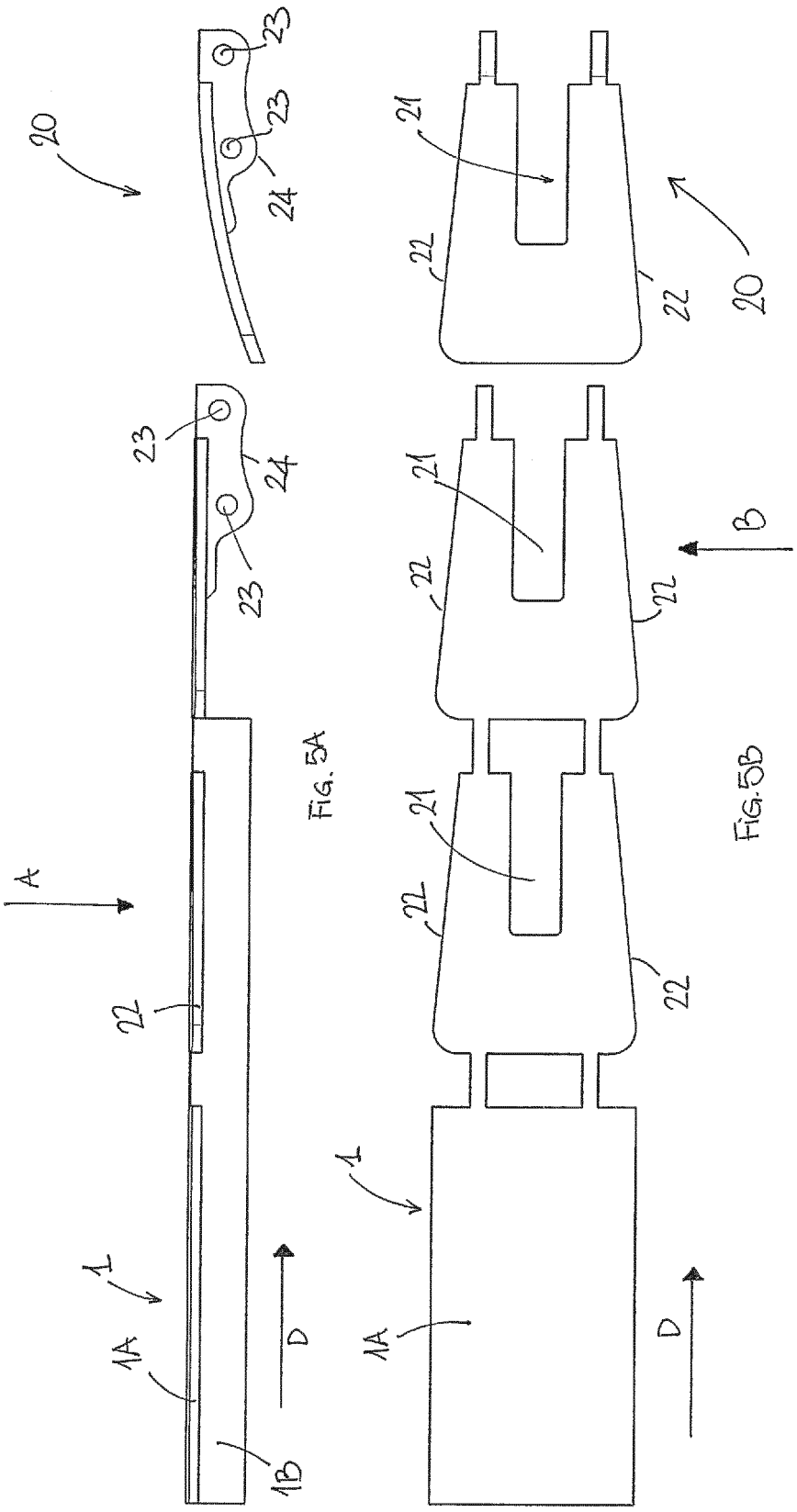


Fig. 4


20
23
23
24
23
24
A
22
1
1A
1B
D
Fig. 5A
21
22
22
20
21
22
22
B
21
22
22
1
1A
D
Fig. 5B

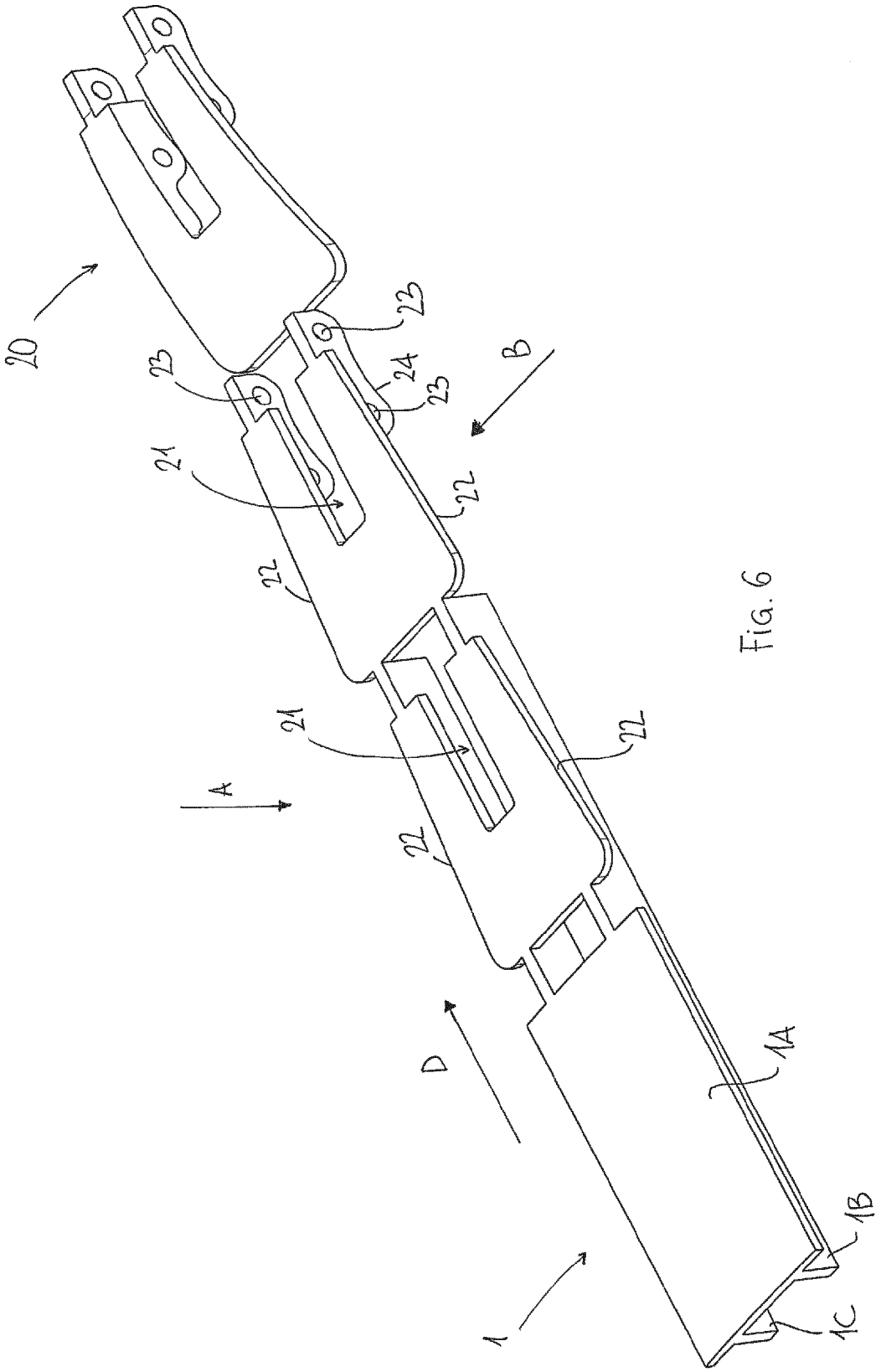


Fig. 6

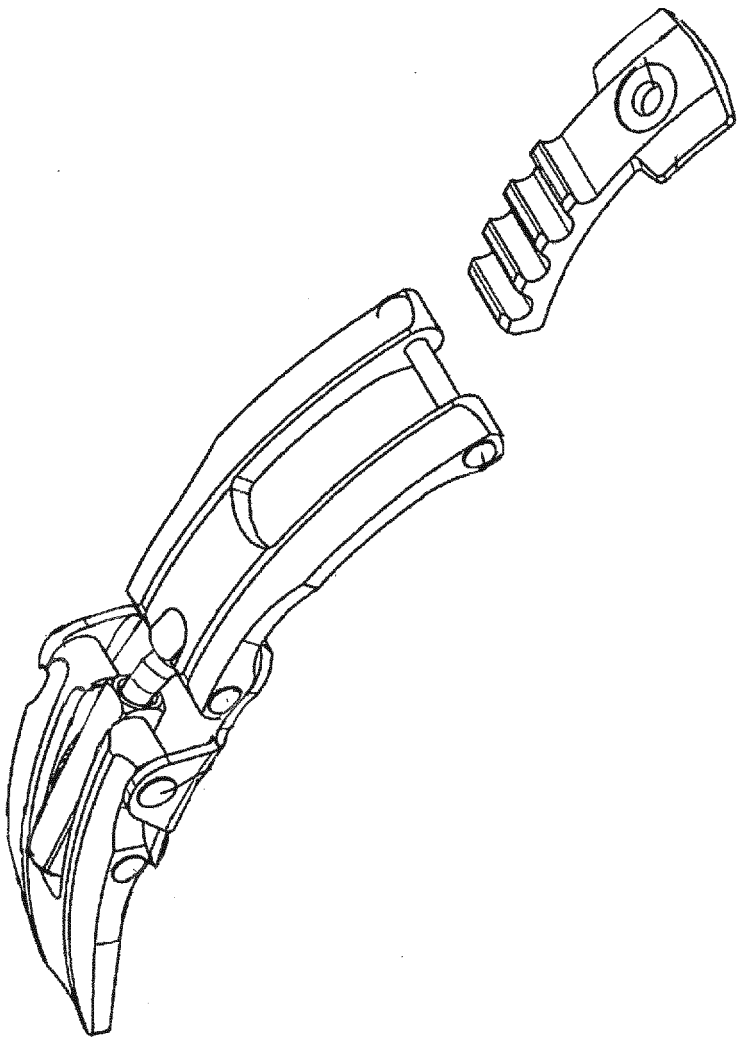


Fig. 8

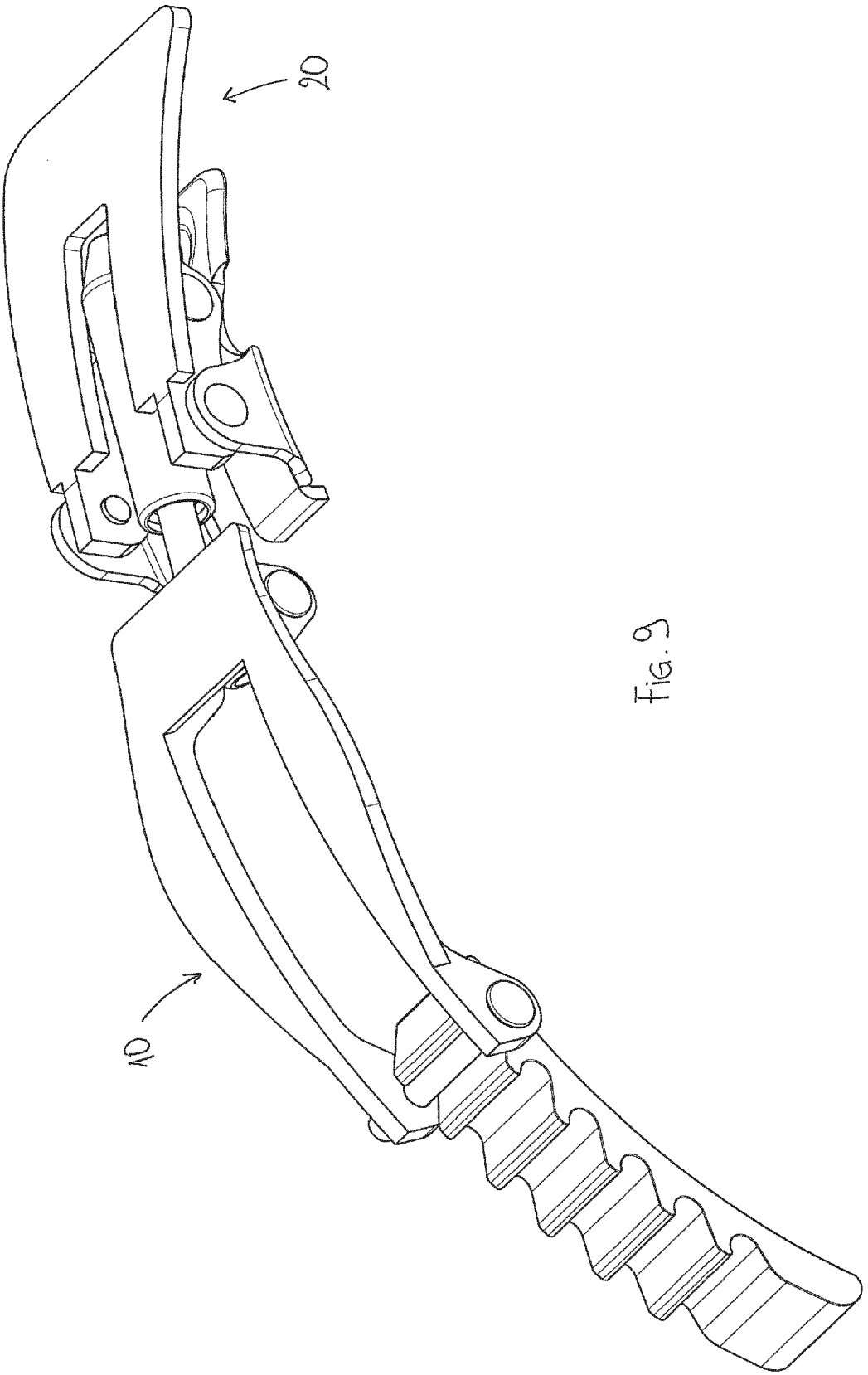


Fig. 9

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 18 8161

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 2 238 852 A1 (O L M SRL [IT]) 13 October 2010 (2010-10-13) * paragraphs [0050] - [0080]; figures 6-12 *	1-10	INV. A43C11/14 A43D8/02
A	EP 1 714 573 A1 (LANGE INT SA [CH]) 25 October 2006 (2006-10-25) * paragraphs [0011] - [0017]; figures *	1-10	
A	EP 2 147 609 A1 (PREMEC S P A [IT]; BAGGIO GIORGIO [IT]) 27 January 2010 (2010-01-27) * paragraphs [0014] - [0027]; figures *	1,5	
A	EP 0 880 912 A2 (BAUER ITALIA SPA [IT]) 2 December 1998 (1998-12-02) * the whole document *	1,5	

TECHNICAL FIELDS SEARCHED (IPC)

A43C
A43D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 February 2013	Cianci, Sabino

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 18 8161

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-02-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2238852 A1	13-10-2010	EP 2238852 A1	13-10-2010
		IT TV20090012 U1	02-10-2010
EP 1714573 A1	25-10-2006	EP 1714573 A1	25-10-2006
		US 2006236508 A1	26-10-2006
EP 2147609 A1	27-01-2010	NONE	
EP 0880912 A2	02-12-1998	CA 2238699 A1	29-11-1998
		EP 0880912 A2	02-12-1998
		IT PD970114 A1	30-11-1998
		JP 11075909 A	23-03-1999

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82