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(71) Applicant: **OBER ALP S.p.A.**
39100 - Bolzano (IT)

(72) Inventor: **RIGHELE, Matteo**
I-39100 BOLZANO (IT)

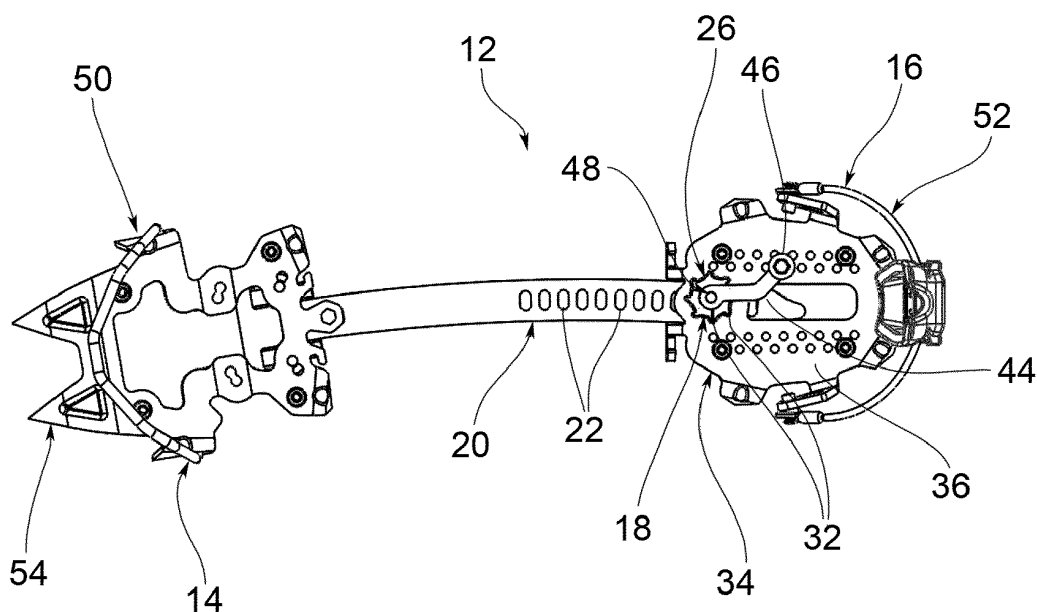
(74) Representative: **Busana, Omar**
Jacobacci & Partners S.p.A.
Piazza Mario Saggin, 2
35131 Padova (IT)

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(54) CRAMPON WITH ADJUSTMENT MEANS FOR FITTING

(57) A crampon (12) with a fitting adjustment comprises a toe portion (14) and a heel portion (16). The toe portion (14) and the heel portion (16) are connected to each other by adjustment means (18) comprising an elongated element (20) arranged on said toe portion, having a plurality of seats (22) suitable to couple with a respective adjustment pin (24) provided on said heel portion (16) to define a certain length of fit. The adjustment pin (24) is provided at an adjustment wheel (26) suitable

to rotate about its own axis of rotation (x). The adjustment pin (24) is arranged in an eccentric position with respect to said axis of rotation (x). The adjustment wheel (26) is suitable to be locked in at least two positions of rotation by means of a shape-coupling between a coupling portion (28) of said adjustment wheel (26) and a corresponding counter-shaped portion (30) provided on said heel portion (16).

**FIG.1****EP 4 085 785 A1**

Description

FIELD OF APPLICATION

[0001] The present invention relates to a crampon with fitting adjustment. Specifically, the present invention relates to crampons arranged with an adjustment mechanism that allows a precise fitting adjustment to be obtained.

PRIOR ART

[0002] As is well known, crampons are paired with boots during progression on ice and snow to facilitate and enable walking even on an icy surface.

[0003] Usually crampons are of the adjustable type, meaning they are suitable to be fitted on boots having different sizes and, in particular, different lengths.

[0004] In this discussion, longitudinal direction means a direction essentially parallel to the direction that defines the length of a boot or crampon. Whereas, transverse direction means a direction that is essentially perpendicular to the longitudinal direction, that is, a direction that defines the width of a boot or crampon.

[0005] For this reason, crampons are equipped with an adjustment system that allows their length to be varied according to the length of the boot on which they will be worn.

[0006] For example, a crampon is known consisting of a toe portion and a heel portion, connected together by an elongated element arranged on the toe portion, having a plurality of holes, suitable to be engaged by a pin arranged on an elastic flap on the heel portion.

[0007] To increase the precision of the adjustment of the fitting system, it is known to arrange a plurality of possible positions for the rear and/or front arch used for locking the boot. Said system, however, is impractical, because it is necessary to detach a component in order to reattach it later in a new location.

[0008] In Korean patent KR 101056728, an alternative technical solution is disclosed in which the crampon consists essentially of two portions, a toe portion and a heel portion, which are connected together by a bar arranged in the toe portion that couples with a corresponding seat arranged in the heel element. The coupling is done by means of shaped surfaces arranged at the sides of the bar and at the sides of the seat which are suitable for coupling with each other according to a plurality of positions. The system is subsequently locked in place through the use of a lock.

[0009] In this case the system allows for fairly precise adjustment, albeit based on discrete positions, but said adjustment is achieved with a complex system that is difficult to use in the environmental conditions in which this type of tool is normally used.

[0010] A further example is shown in European patent application EP 2666381 A1, in which a mechanism is shown that allows for a very precise length adjustment,

but at the expense of the repeatability of the adjustment. For example, if the crampon is used with a first type of boot, and at a later time with a second type of boot, the correct adjustment is not immediately applicable to the boot.

[0011] The prior art, while widely used and appreciated, is thus not without its drawbacks.

DISCLOSURE OF THE INVENTION

[0012] Thus, there is a need to resolve the cited drawbacks and limitations in reference to the prior art.

[0013] Therefore, there is a need to make crampons available with an adjustment mechanism that is easy to use.

[0014] In addition, there is a need for crampons equipped with an adjustment system that allows for a precise and repeatable fitting with great ease.

[0015] These requirements are met at least in part by a crampon with fitting adjustment according to claim 1.

DESCRIPTION OF THE DRAWINGS

[0016] Further features and advantages of the present invention will be more readily understood from the following description of its preferred and non-limiting examples of embodiments, wherein:

- Fig. 1 shows schematically a plan view from above of a crampon according to an embodiment of the present invention;
- Fig. 2 shows schematically a side view of a crampon according to an embodiment of the present invention;
- Fig. 3 shows schematically a plan view from above of a heel portion of a crampon according to an embodiment of the present invention;
- Fig. 4 shows schematically a plan view from below of a portion of a heel of a crampon according to an embodiment of the present invention;
- Fig. 5 and 6 show schematically an enlarged plan view from below of a portion of the heel portion of a crampon according to an embodiment of the present invention in two adjustment conditions;
- Fig. 7 shows schematically a perspective view of a heel portion of a crampon according to an embodiment of the present invention;
- Fig. 8 shows schematically a plan view from below of a heel portion of a crampon according to an embodiment of the present invention;
- Fig. 9 shows schematically a perspective view from below of a heel portion of a crampon according to an embodiment of the present invention; and
- Fig. 10 and 11 show schematically two perspective views according to different viewpoints of a crampon component according to an embodiment of the present invention.

[0017] Elements or parts of elements common to the embodiments described hereinafter will be indicated with the same reference numerals.

DETAILED DESCRIPTION

[0018] Fig. 1 denotes with reference 12 a crampon with fitting adjustment according to the present invention.

[0019] The crampon 12 comprises a toe portion 14 and a heel portion 16. The toe portion 14 and the heel portion 16 are connected to each other by adjustment means 18 comprising an elongated element 20 arranged on the toe portion 14 having a plurality of seats 22 suitable to couple with a respective adjustment pin 24 arranged on the heel portion 16 to define a given length of fit.

[0020] As seen in the embodiment shown in Fig. 10 and 11, the adjustment pin 24 is arranged at an adjustment wheel 26 suitable to rotate about its own axis of rotation x. The adjustment pin 24 is arranged at an eccentric position with respect to the axis of rotation x. Given the eccentricity of the adjustment pin 24, a rotation of the adjustment wheel 26 causes a translation of the adjustment pin 24 according to a longitudinal and transverse direction. The translation of the pin according to the longitudinal direction is exploited here to adjust the fit at intermediate positions between two seats 22.

[0021] In addition, the adjustment wheel 26 is suitable to be locked in at least two positions of rotation through shape-coupling between a coupling portion 28 of the adjustment wheel 26 and a corresponding counter-shaped portion 30 arranged on the heel portion 16.

[0022] According to a possible embodiment, the adjustment pin 24 may be substantially cylindrical. In the embodiments shown in the appended figures, the adjustment pin 24 is always depicted cylindrical; however, the adjustment pin 24 may have a different shape, for example, it may be provided with an elliptical cross-section instead of a circular one.

[0023] Advantageously, the distance between the axis of rotation x and the axis of the adjustment pin 24 may be between 3 and 4 mm, and the adjustment pin may be between 3 and 5 mm in diameter. The dimensions just indicated are given for explanatory and non-limiting purposes only.

[0024] According to a possible embodiment, the seats 22 may be elongated in the transverse direction. In this way, the seat may be adapted to ensure the sliding of the adjustment pin 24 according to a transverse direction during the rotation of the adjustment wheel 26. As seen, for example, in Fig. 8, in this case the pin occupies a position that is not central with respect to the seat 22.

[0025] Advantageously, the seat 22 may have a longitudinal dimension between 4 and 6 mm and a transverse dimension between 2 and 9 mm.

[0026] According to a possible embodiment, the adjustment wheel 26 may be arranged with side protrusions 32 suitable to improve the grip during rotation by a user. The protrusions may be shaped to increase the ergo-

nomics. For example, Fig. 11 shows a possible embodiment in which they protrude with a wave shape.

[0027] The heel portion 16 comprises a foot portion 34 having an upper surface 36 that in use faces the boot on which said crampon 12 is worn, and a lower surface 38 opposite said upper surface. According to a possible embodiment, the counter-shaped portion 30 may be arranged on the foot portion 34.

[0028] Advantageously, the counter-shaped portion 30 may be obtained directly on the foot portion 34.

[0029] As seen in Fig. 7, the adjustment wheel 26 may lie on the upper surface 36, while the adjustment pin 24 may protrude from the lower surface 38. In this case, the coupling portion 28 may be between the adjustment wheel and the adjustment pin 24.

[0030] According to a possible embodiment, the coupling portion 28 may comprise at least one coupling tooth 40, and the counter-shaped portion 30 may comprise corresponding recesses 42 suitable to accommodate the at least one coupling tooth 40 to prevent the rotation of the adjustment wheel 24.

[0031] To enable an adjustment, the number of said recesses 42 is greater than the number of coupling teeth.

[0032] Preferably, the coupling portion 28 may comprise three coupling teeth 40 and the counter-shaped portion 30 may comprise nine corresponding recesses 42. One such embodiment is shown in Fig. 5 and 6, which show different coupling positions between the adjustment wheel 26 and the counter-shaped portion. In this particular embodiment, six intermediate positions between two seats 22 are possible.

[0033] Advantageously, the coupling between the coupling teeth 40 and the recesses 42 allows an adjustment of about 30° between one position and the next. According to a possible embodiment, the coupling between the coupling teeth 40 and the recesses 42 allows an adjustment of about 1.8 mm in the longitudinal direction.

[0034] According to a possible embodiment, the adjustment wheel 26 may be held in place by an arm 44. The arm 44 may have a first end 46, rigidly attached to the foot portion 34, and a second end 48 may be rotatably connected to the adjustment wheel 26. As seen in the appended figures, the adjustment wheel may be arranged with a coupling cylinder 56 suitable to couple with a respective seat on the second end 48 of the arm 44.

[0035] Advantageously, the adjustment wheel 26 may be arranged between the upper surface 36 and the arm 44.

[0036] According to a possible embodiment, the arm 44 may be in the shape of a spread-out L so that the adjustment wheel 26 is in a substantially transversely centered position with respect to the heel portion 16, and the first end 46 attached to the foot portion 34 is in a substantially off-center position with respect to the adjustment wheel 26.

[0037] The adjustment means may be made of a material known per se, such as metal, polymeric material, carbon, or a combination thereof.

[0038] In a manner known per se, the heel portion 16 and the toe portion 14 may comprise respective fastening means 50, 52 suitable for enabling the attachment of said crampon 12 to a boot. Similarly, the crampon 12 comprises protruding spikes 54.

[0039] Thus, the advantages that are achievable through the crampon of the present invention are now evident.

[0040] First, once the adjustment pin 24 has been coupled to the respective seat 22, suitable to define a given length of fit, it is sufficient to act on the adjustment wheel if further adjustment to the length of fit is needed in the intermediate positions between the preselected seat 22 and the immediately neighboring seats (if any).

[0041] In this way, the adjustment is simple and effective, because it overcomes the problems related to the strength of the elongated element in the case in which there are many seats close to each other. In this way, there is no need to provide intermediate seats, as the adjustment is made by turning the adjustment wheel.

[0042] Moreover, the adjustment of the length of fit is easily repeatable.

[0043] In fact, once the coupling between the seat and the adjustment pin has been selected, it is sufficient to simply adjust the adjustment wheel to one of the permitted positions, which are easy to identify and remember.

[0044] An additional advantage is that according to one aspect of the present invention, the adjustment of the length of fit is done by acting on only one position of the crampon and especially without the aid of any tools.

[0045] Moreover, by appropriately configuring the coupling between the coupling teeth 40 and the recesses 42, it is possible to achieve an adjustment on the order of even a tenth of a millimeter, while maintaining the repeatability of the adjustment.

[0046] A person skilled in the art may, in order to satisfy particular requirements, make modifications to the embodiments described above and/or substitute described elements with equivalent elements without thereby departing from the scope of the accompanying claims.

Claims

1. Crampon (12) with a fitting adjustment comprising a toe portion (14) and a heel portion (16), said toe portion (14) and said heel portion (16) being connected to each other by adjustment means (18) comprising an elongated element (20) arranged on said toe portion, having a plurality of seats (22) suitable to couple with a respective adjustment pin (24) provided on said heel portion (16) to define a certain length of fit; said crampon (12) being **characterized in that** said adjustment pin (24) is provided at an adjustment wheel (26) suitable to rotate about its own axis of rotation (x), said adjustment pin (24) being arranged in an eccentric position with respect to said axis of rotation (x); said adjustment wheel (26) being suitable

to be locked in at least two positions of rotation by means of a shape coupling between a coupling portion (28) of said adjustment wheel (26) and a corresponding counter-shaped portion (30) provided on said heel portion (16).

2. Crampon (12) according to claim 1, **characterized in that** said adjustment pin (24) is substantially cylindrical.

3. Crampon (12) according to any of the claims 1-2, **characterized in that** said seats (22) are elongated in a transverse direction.

4. Crampon (12) according to any of the claims 1-3, **characterized in that** said adjustment wheel (26) is provided with side protrusions (32) suitable for improving the grip during rotation by a user.

5. Crampon (12) according to any of the claims 1-4, **characterized in that** said heel portion (16) comprises a foot portion (34) having an upper surface (36) which in use is facing the boot on which said crampon (12) is worn, and a lower surface (38) opposite the former; said counter-shaped portion (30) being provided on said foot portion (34).

6. Crampon (12) according to claim 5, **characterized in that** said adjustment wheel (26) lies on said upper surface (36), while said adjustment pin (24) protrudes from the lower surface (38), said coupling portion (28) being included between said adjustment wheel and said adjustment pin (24).

7. Crampon (12) according to any of the claims 1-6, **characterized in that** said coupling portion (28) comprises at least one coupling tooth (40), said counter-shaped portion (30) comprising corresponding recesses (42) suitable to accommodate said at least one coupling tooth (40) to prevent the rotation of said adjustment wheel (24).

8. Crampon (12) according to claim 7, **characterized in that** the number of said recesses (42) is greater than the number of said coupling teeth (40).

9. Crampon (12) according to any of the claims 1-8, **characterized in that** said coupling portion (28) comprises three coupling teeth (40) and said counter-shaped portion (30) comprises nine corresponding recesses (42).

10. Crampon (12) according to the preceding claim, **characterized in that** the coupling between the coupling teeth (40) and the recesses (42) allows an adjustment of about 30° between one position and the next.

11. Crampon (12) according to any of the claims 9-10,
characterized in that the coupling between the coupling teeth (40) and the recesses (42) allows an adjustment of about 1.8 mm in the longitudinal direction. 5
12. Crampon (12) according to any of the claims 5-11,
characterized in that said adjustment wheel (26) is held in position by an arm (44), said arm (44) having a first end (46) rigidly attached to the foot portion (34), and a second end (48) being rotatably connected to said adjustment wheel (26). 10
13. Crampon (12) according to claim 12, **characterized in that** said adjustment wheel (26) is arranged between said upper surface (36) and said arm (44). 15
14. Crampon (12) according to any of the claims 9-13,
characterized in that said arm (44) is in the form of a spread-out L, such that the adjustment wheel (26) is in a substantially transversely centered position with respect to the heel portion (16) and the first end (46) attached to the foot portion (34) is in a substantially off-center position with respect to the adjustment wheel (26). 20 25
15. Crampon (12) according to any of the claims 1-14,
characterized in that said heel portion (16) and said toe portion (14) comprise respective fastening means (50, 52) suitable for enabling attachment of said crampon (12) to a boot. 30
16. Crampon (12) according to any of the claims 1-15,
characterized in that it comprises protruding spikes (54) . 35

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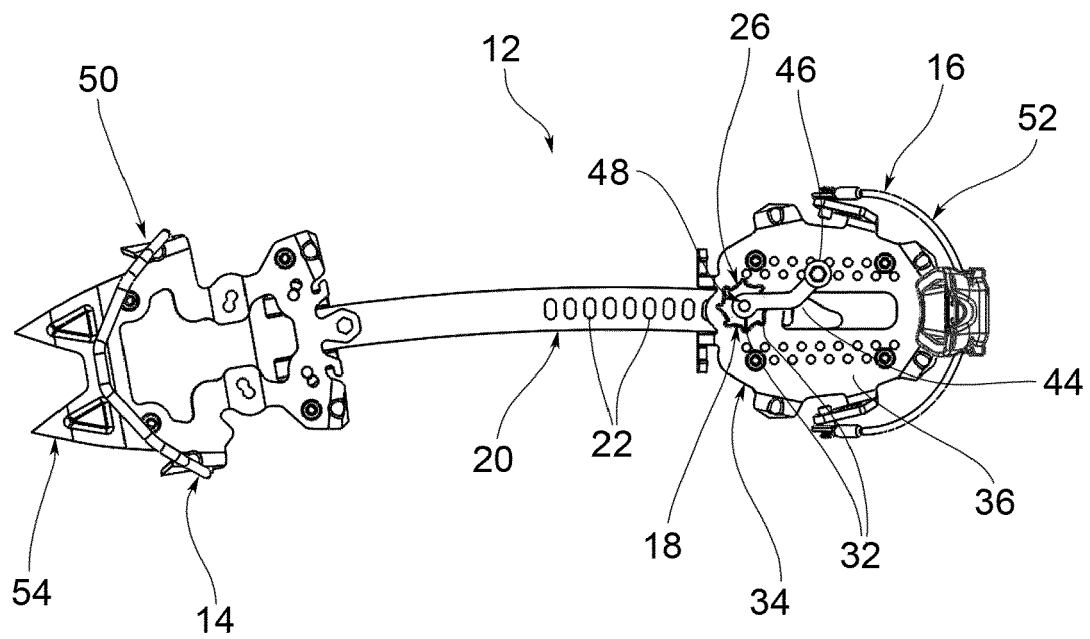


FIG.1

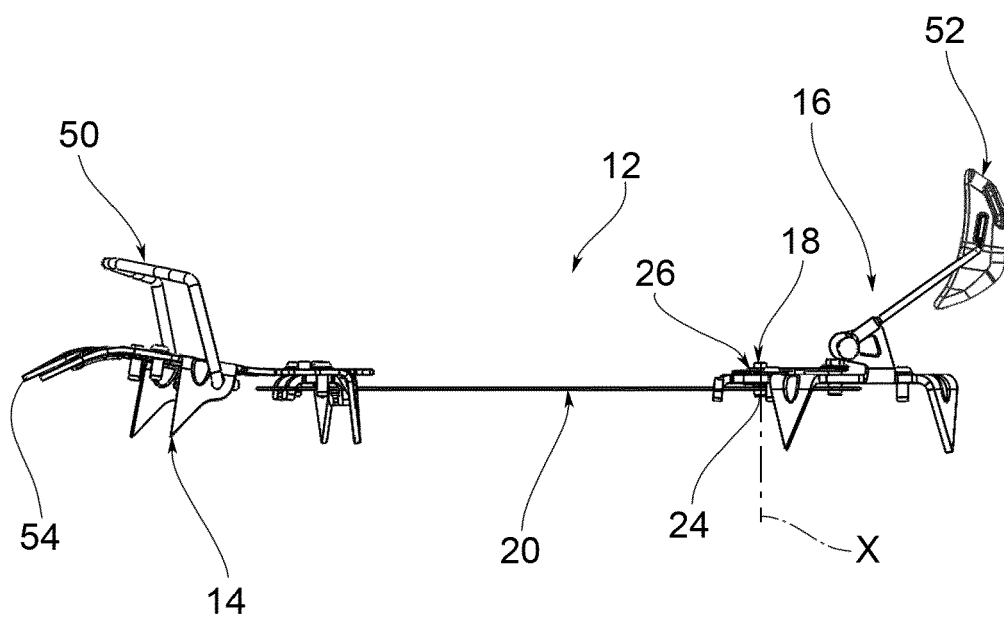


FIG.2

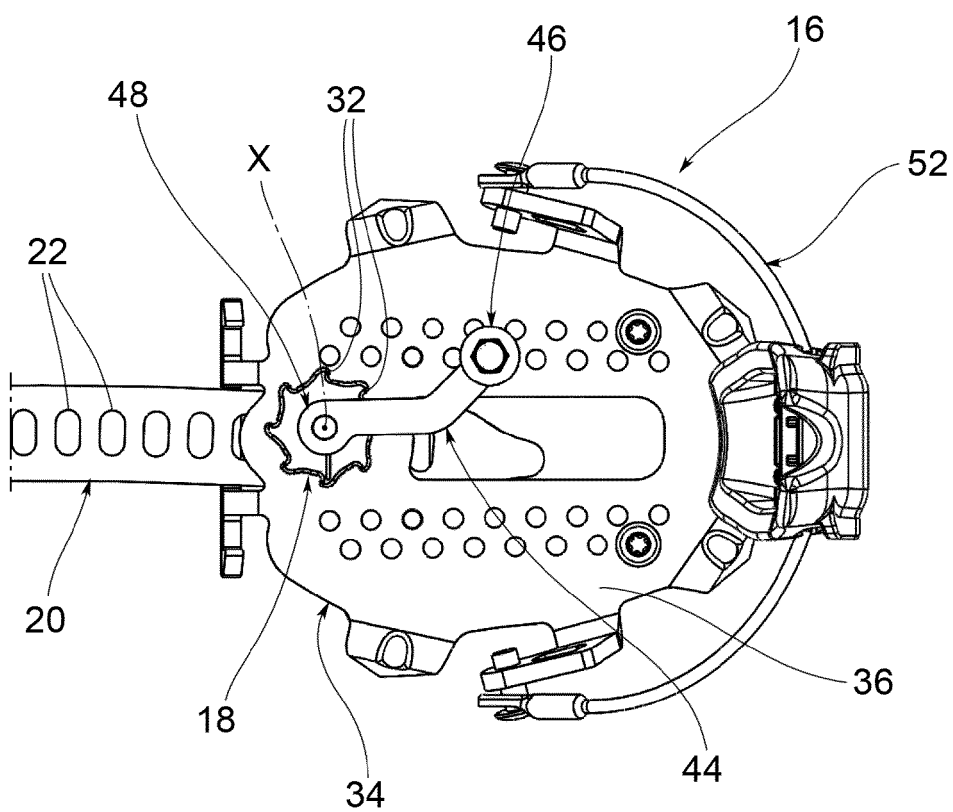


FIG.3

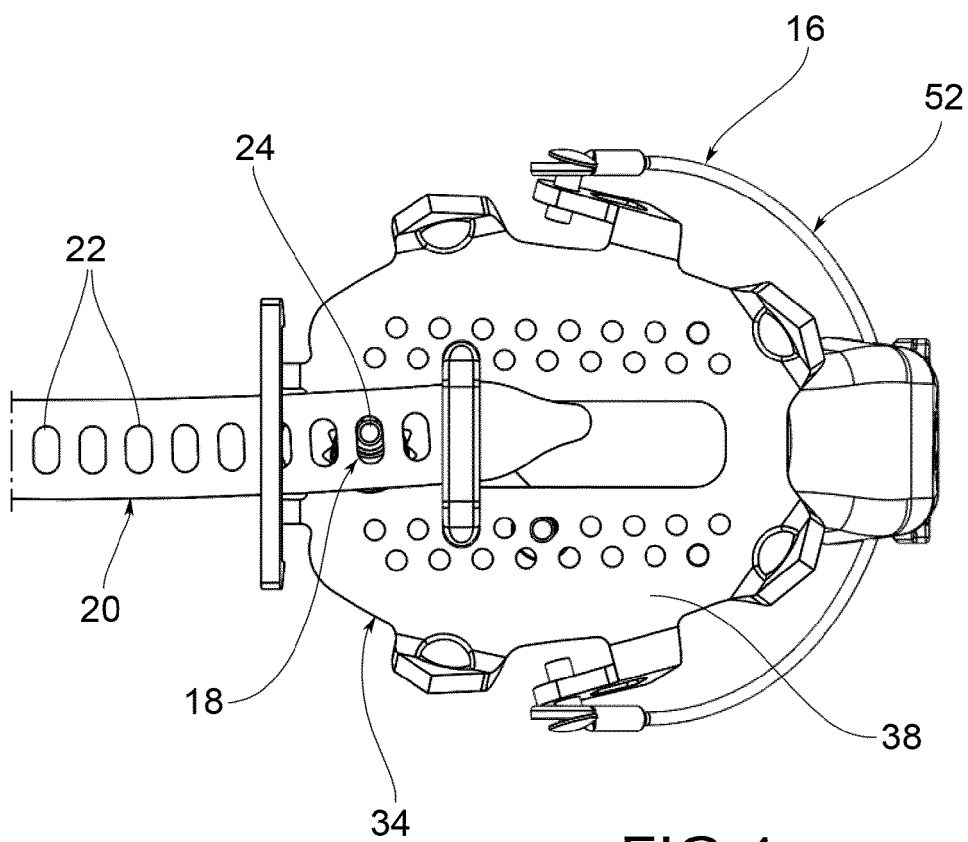


FIG.4

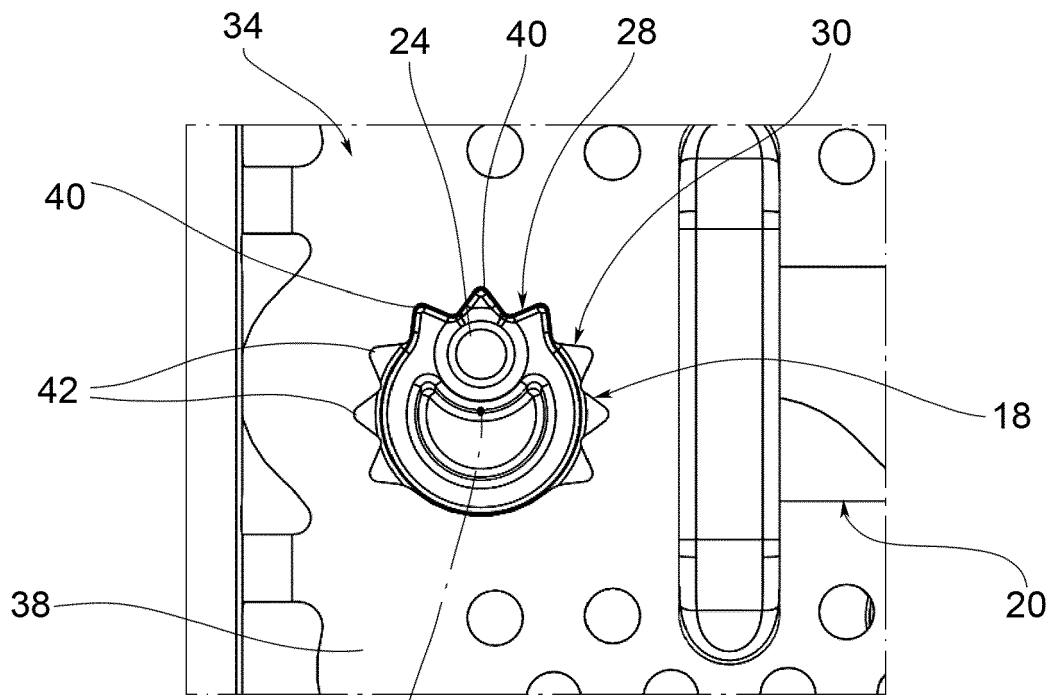


FIG.5

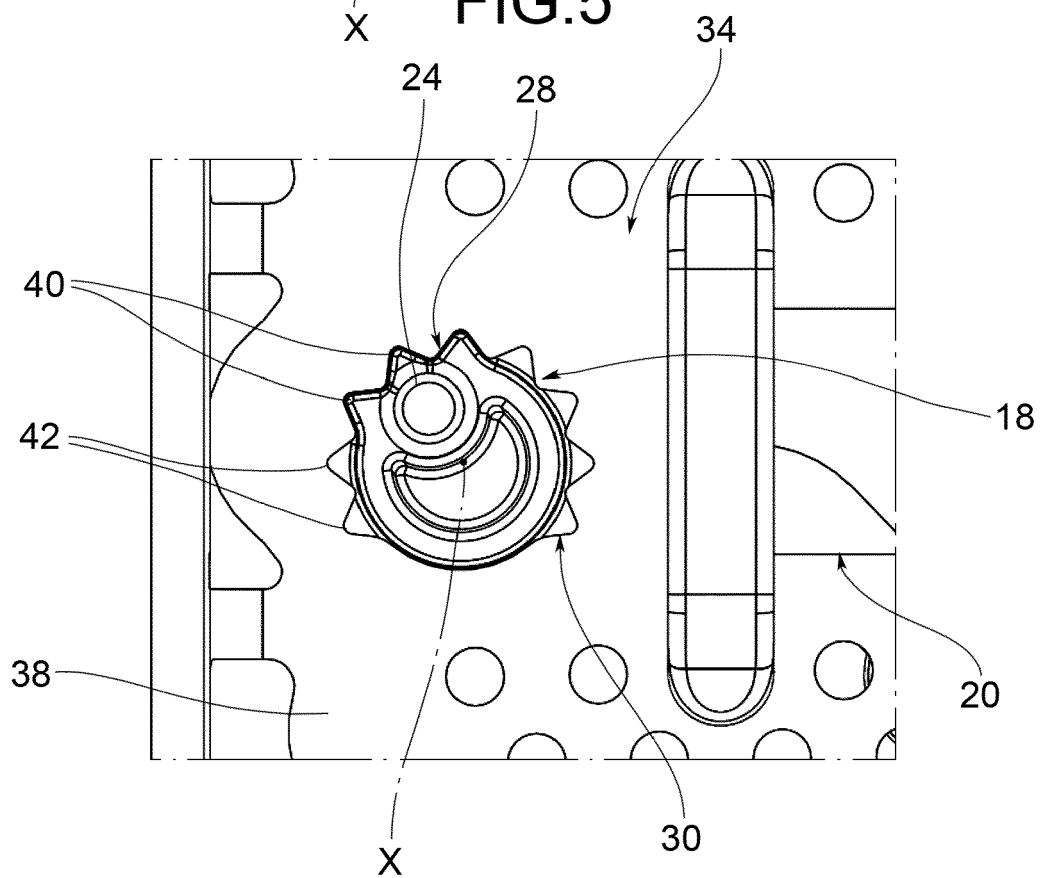


FIG.6

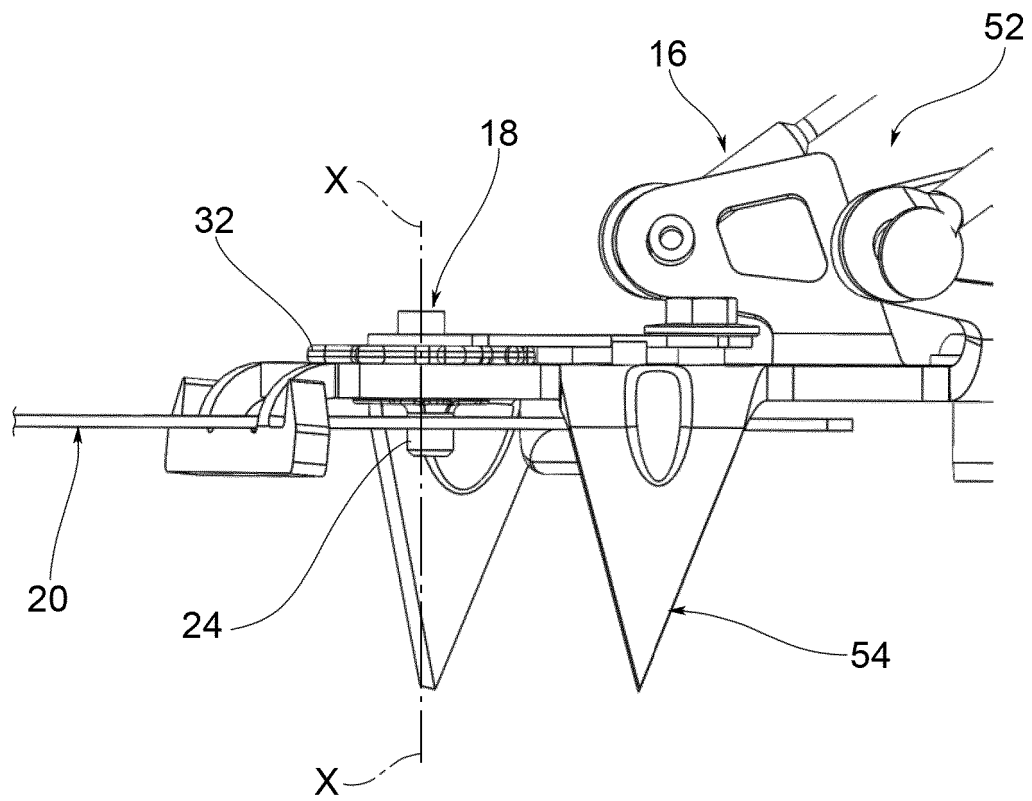


FIG. 7

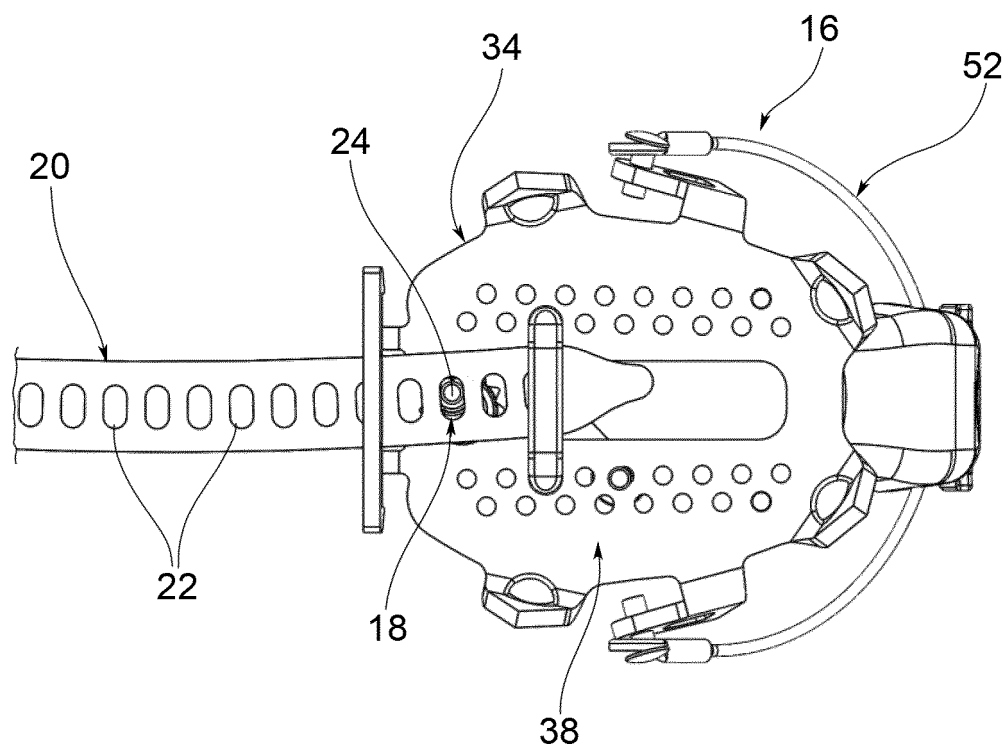


FIG. 8

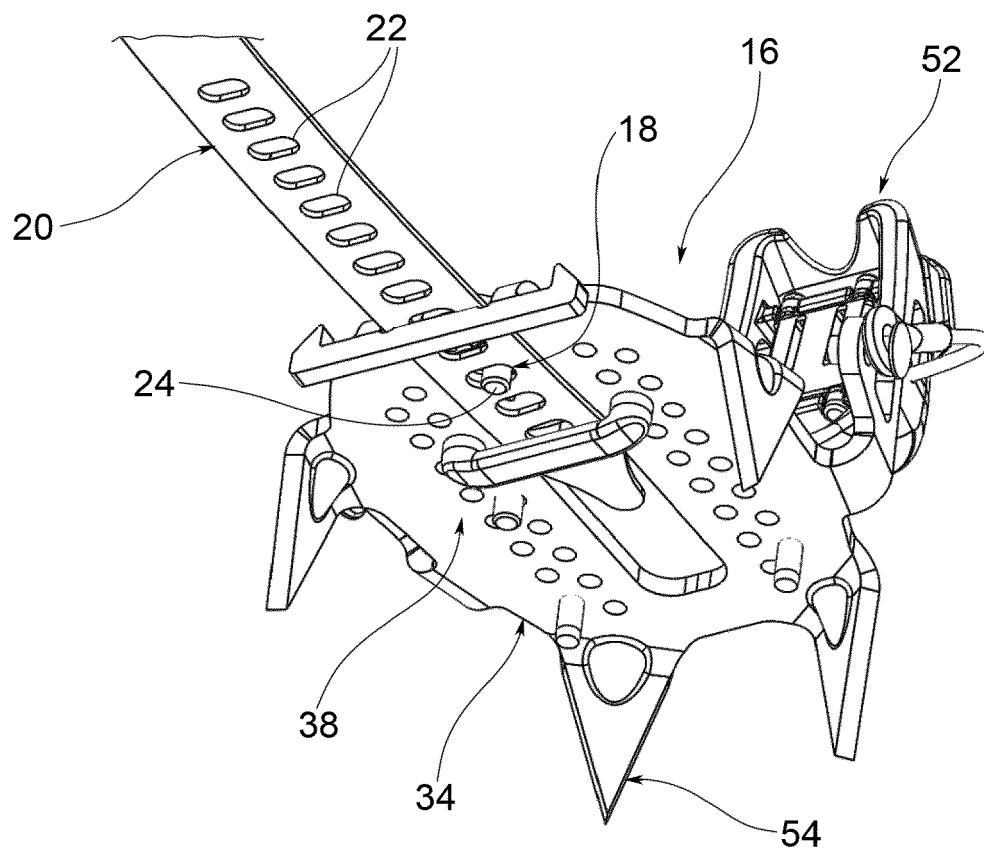


FIG. 9

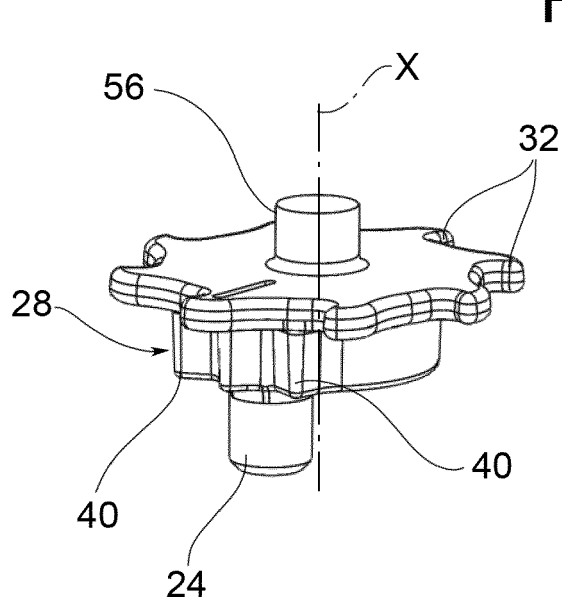


FIG. 10

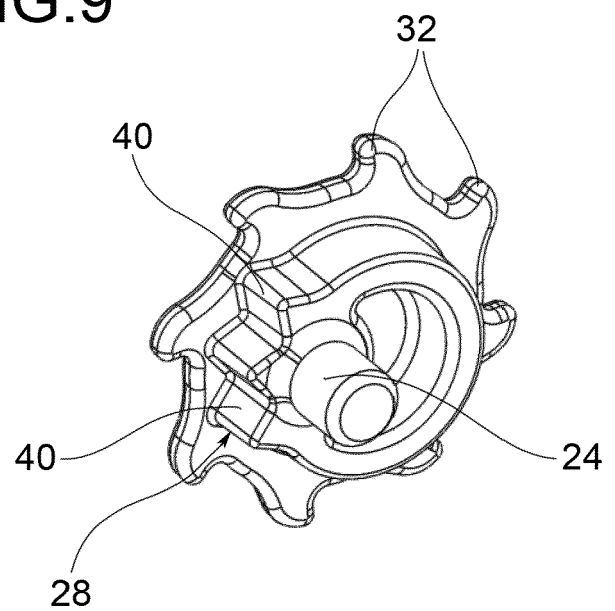


FIG. 11



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 1518

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 2 633 773 A1 (CAMP SPA [IT]) 4 September 2013 (2013-09-04) * paragraph [0038] - paragraph [0040] * * figures 1-7 *	1-16	INV. A43C15/06
A	JP S63 194603 U (KIM CHUN SIK) 14 December 1988 (1988-12-14) * figures 1-5 *	1-16	

TECHNICAL FIELDS SEARCHED (IPC)

A43C

The present search report has been drawn up for all claims

1

Place of search

The Hague

Date of completion of the search

7 September 2022

Examiner

Papatheofrastou, M

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 17 1518

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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07-09-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2633773	A1	04-09-2013	NONE
JP S63194603	U	14-12-1988	JP H035283 Y2 12-02-1991
		JP S63194603 U	14-12-1988
		KR 890000155 U	02-03-1989

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 101056728 [0008]
- EP 2666381 A1 [0010]