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

(11) **EP 3 750 604 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.12.2020 Bulletin 2020/51

(51) Int Cl.:
A63C 7/10 *(2006.01)* ***A63C 5/02*** *(2006.01)*

(21) Application number: **20175347.2**

(22) Date of filing: **19.05.2020**

(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
Designated Validation States:
KH MA MD TN

(30) Priority: **11.06.2019 SI 201900112**

(71) Applicant: **Elan, d.o.o.**
4275 Begunje na Gorenjskem (SI)

(72) Inventor: **ROZMAN, Bogdan**
4247 Zgornje Gorje (SI)

(74) Representative: **Sveticic, Andrej**
Patentna pisarna d.o.o.
Copova 14
1000 Ljubljana (SI)

(54) **ALPINE SKI BINDING BRAKE**

(57) The invention relates to an alpine ski binding brake, particularly for a folding ski. The task of the invention is to configure a simple mechanism that would allow the brake to be locked, but at the same time prevent the use of skis in the locked position of the brake. The brake (1) comprises a brake housing (2), a step-on plate (3), a brake bow (4), a lever (5) with a protrusion (6) that is pivotally mounted in the step-on plate (3) in the brake housing (2), a spring means (7) that pushes the brake housing (2) and the step-on plate (3) apart, an angled arm (8) pivotally mounted in the brake housing (2) with a first leg (8a) and the first leg (8a) of the angled arm being provided in the area of the protrusion with a cut-out (9) arranged in a way that, when in use, the protrusion can pass unobstructed through the cut-out (9) when the second leg (8b) of the angled arm is parallel to the ski plane, and in a way that the cut-out (9) faces away from the protrusion (6) of the lever when the angled arm projects with its other leg upwards in the position perpendicular to the ski plane, and that the first leg (8a) prevents the rotation of the lever (5).

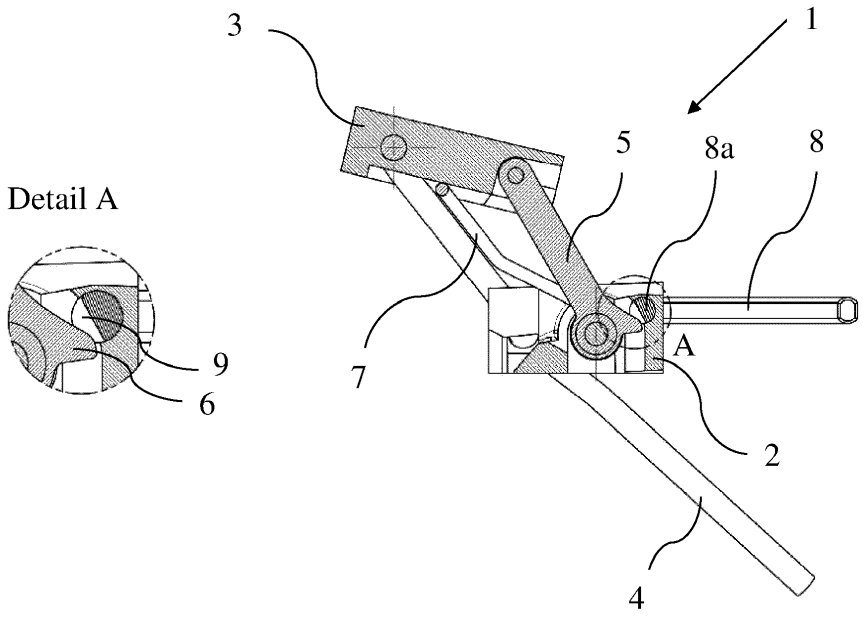

Figure 3

EP 3 750 604 A1

Description

Field of Invention

[0001] The invention relates to an alpine ski binding brake, particularly for a folding ski for sporting or military purposes.

Prior Art

[0002] Alpine ski binding brakes are known from prior art, the purpose of which is to prevent a ski from sliding uncontrollably down the slope while in use, when the safety bindings unbuckle the ski boot due to an excessive shock.

[0003] Patent US 9 242 167 B2 discloses a ski binding with a brake for backcountry skiing. The brake comprises a brake housing, in which a pair of brake arms are pivotally mounted in their central part, a base, in which the proximal end of the brake arms is pivotally mounted, and a coil spring mounted in the brake housing so as to push the base away from the housing. In the skiing position, the ski boot keeps the base pressed down against the force of the spring, and the brake legs are raised above the level of the ski's sliding surface and do not obstruct sliding on the ski slope. When the ski boot is detached from the safety binding due to an excessive shock, the spring pushes the base upwards and the brake legs downwards to a position below the level of the ski's cam surface so that it obstructs or prevents uncontrolled sliding of the ski down the slope. In the downhill position, the ski boot is not attached to the heel portion of the binding. The heel portion of the binding rotates to the side, wherein a boss with the sliding surface on the heel portion of the binding causes the heel portion of the binding to move away from the brake housing and at the same time causes a hook to engage with the brake, thus locking the brake in the downhill position, i.e. the position, in which the brake legs are raised above the level of the ski's sliding surface and do not obstruct sliding on the ski slope.

[0004] A folding ski is also known from prior art. When assembled, a folding ski functions as a classic ski, its advantage being its possibility of being folded and is as such more handy for carrying, transporting and storing. A collapsible ski is disclosed in patent SI 25117. The ski comprises a ski front section having a front end with a tip bent upwards from the base and a rear end, and a ski rear section having a front end and a rear end with a tail slightly bent upwards, wherein the rear end of the ski front section is inseparably connected with the front end of the ski rear section by means of a folding connection. The folding connection is stiffened by a connecting platform that is pivotally connected to the ski front section or the ski rear section and, when in use, engages the grooves formed on the ski front and rear sections. The upper portion of the connecting platform is provided with bindings for fastening a ski boot.

Technical Problem

[0005] The technical problem is to configure an alpine ski binding brake for a folding ski. An alpine ski binding brake for a folding ski must not obstruct rotation of the connecting platform around the axis when folding the ski, so it must have a lock that locks the brake in the position when the brake legs are raised above the plane of rotation of the folding ski connecting platform. Locking the brake can cause the brake to not be functional when skiing if the skier forgets to release the brake before using the ski, as, in case the ski boot is detached from the ski binding, the brake will not move to the braking position. When the ski boot would be detached from the ski bindings, a ski with a locked brake could slide freely down the slope and endanger other skiers. So, the technical problem is to configure a simple mechanism for an alpine ski binding brake for a folding ski that would allow the brake to be locked, but at the same time prevent the use of skis in the locked position of the brake.

Solution to the Technical Problem

[0006] The relative expressions such as front, rear, upper, lower, etc. are herein defined from the perspective of the ski user, when the ski is in its functional state.

[0007] The technical problem is solved by an alpine ski binding brake, preferably for a folding ski, comprising:

- a brake housing,
- a step-on plate,
- a brake bow that is pivotally mounted in the step-on plate at the proximal end and is pivotally mounted in the brake housing with its central portion,
- a lever pivotally mounted in the step-on plate with a first end and pivotally mounted in the brake housing with a second end so that the step-on plate can assume a raised position and a lowered position, the lever having a protrusion formed at the other end, a spring means arranged to push the brake housing and the step-on plate apart,
- an angled arm pivotally mounted in the brake housing with a first leg so as to be parallel to the mounting axis of the lever but spaced from it, and a second leg being formed substantially perpendicular to the first leg, wherein the first leg of the angled arm is provided in the area of the lever protrusion with a cut-out arranged in a way that, when in use, the protrusion can pass unobstructed through the cut-out when the second leg of the angled arm is parallel to the ski plane, and in a way that the second leg of the angled arm prevents the movement of the step-on plate from the lowered position to the raised position when the second leg of the angled arm is oriented perpendicularly upwards to the ski plane.

[0008] Moreover, another invention is described which solves the same technical problem and with the same

inventive idea.

[0009] The technical problem is solved by an alpine ski binding brake, preferably for a folding ski, that comprises:

a brake housing,
a step-on plate,
a brake bow that is pivotally mounted in the step-on plate at the proximal end and is pivotally mounted in the brake housing with its central portion,
a lever pivotally mounted in the step-on plate with a first end and pivotally mounted in the brake housing with a second end so that the step-on plate can assume a raised position and a lowered position, the lever having a groove formed at the other end in direction towards the axis of rotation of the lever,
a spring means arranged to push the brake housing and the step-on plate apart,
an angled arm pivotally mounted in the brake housing with a first leg so as to be parallel to the mounting axis of the lever but spaced from it, and a second leg being formed substantially perpendicular to the first leg, wherein the first leg of the angled arm is provided with a ridge along the first leg arranged in a way to engage the groove on the lever when the step-on plate is in the lowered position, thus preventing the rotation of the lever when the second leg of the angled arm is oriented perpendicularly upwards to the ski plane, and the rotation of the lever is unobstructed when the second leg of the angled arm is parallel to the ski plane.

[0010] When the second leg of the angled arm is parallel to the ski plane, the user presses the step-on plate downwards and rotates the second leg of the angled arm upwards, thus locking the brake in the inactive position. In this position of the brake, it is possible to rotate the pivotal platform of the folding ski and thus fold the ski. When the second leg of the angled arm is rotated upwards, it extends into the area of the ski boot, thus physically preventing the user from clamping the ski boot into the ski binding. The user can only fasten the ski boot into the ski binding when the second leg of the angled arm is rotated downwards by an angle of essentially 90°. When the user rotates the angled arm downwards, the lever with its other end can rotate freely in the brake housing. The brake is therefore no longer locked, and the second leg of the angled arm no longer prevents the ski boot from being attached to the ski binding.

[0011] The advantage of the alpine ski binding brake of the invention is that the brake can be locked in the upwards retracted position, yet at the same time the use of the skis is prevented in the locked position of the brake. A further advantage of the alpine ski binding brake in the built-in state according to the invention over known ski bindings is that the maintenance of the ski is facilitated, as the brake can be locked in the position when raised above the plane of the folding ski connecting platform, thus allowing a service technician unobstructed access to the lower sliding surface and the edges of the ski to be treated. Said maintenance-related advantage is reflected both in the maintenance of the folding ski as well as in the maintenance of the classic, i.e. unfolding ski.

Figure 1: Alpine ski binding brake arranged on a folding ski, in a locked state
Figure 2: Top view of a brake in an unlocked state
Figure 3: Brake of Figure 2 in cross-section
Figure 4: Perspective view of a brake in an unlocked state
Figure 5: Perspective view of a brake in a locked state
Figure 6: Brake in bottom view
Figure 7: Top view of a brake in a locked state
Figure 8: Brake of Figure 7 in cross-section
Figure 9: Cross-section of a brake in an unlocked state

[0012] The invention is described in more detail hereinbelow.

[0013] The technical problem is solved by an alpine ski binding brake 1, preferably for a folding ski, said brake comprising:

a brake housing 2,
a step-on plate 3,
a brake bow 4 that is pivotally mounted in the step-on plate 3 at the proximal end and is pivotally mounted in the brake housing 2 with its central portion,
a lever 5 pivotally mounted in the step-on plate 3 with a first end and pivotally mounted in the brake housing 2 with a second end so that the step-on plate can assume a raised position and a lowered position, the lever 5 having a protrusion 6 formed at the other end,
a spring means 7 arranged to push the brake housing 2 and the step-on plate 3 apart,
an angled arm 8 pivotally mounted in the brake housing 2 with a first leg 8a so as to be parallel to the mounting axis of the lever but spaced from it, and a second leg 8b being formed substantially perpendicular to the first leg, wherein the first leg 8a of the angled arm is provided in the area of the lever protrusion with a cut-out 9 arranged in a way that, when in use, the protrusion can pass unobstructed through the cut-out 9 when the second leg 8b of the angled arm is parallel to the ski plane, and in a way that the second leg of the angled arm prevents the movement of the step-on plate from the lowered position to the raised position when the second leg of the angled arm is oriented perpendicularly upwards to the ski plane.

[0014] The cut-out 9 in the first leg 8a of the angled arm is formed to a depth of a maximum of 2/3 of the diameter of the first leg of the angled arm, preferably about to half the diameter.

[0015] The width of the cut-out 9 in the first leg of the angled arm is greater than the width of the protrusion 6

on the lever, preferably by at least 10%, so that the protrusion can pass unobstructed through the cut-out in the unlocked brake position.

[0016] The edges of the protrusion 6 and/or the edges of the cut-out 9 are rounded in the area where they engage each other, resulting in a smoother release of the brake when the angled arm is moved from the locked position of the brake to the unlocked position of the brake.

[0017] Moreover, another invention is described in more detail which solves the same technical problem and with the same inventive idea as the invention hereinabove.

[0018] The technical problem is solved by an alpine ski binding brake 1', preferably for a folding ski, said brake comprising:

a brake housing 2',
a step-on plate 3',
a brake bow 4' that is pivotally mounted in the step-on plate 3' at the proximal end and is pivotally mounted in the brake housing 2' with its central portion,
a lever 5' pivotally mounted in the step-on plate 3' with a first end and pivotally mounted in the brake housing 2' with a second end so that the step-on plate can assume a raised position and a lowered position, the lever 5' having a groove 10 formed in direction of the axis of rotation of the lever 5',
a spring means 7' arranged to push the brake housing 2' and the step-on plate apart,
an angled arm 8' pivotally mounted in the brake housing 2' with a first leg 8a' so as to be parallel to the mounting axis of the lever 5' but spaced from it, and a second leg 8b' being formed substantially perpendicular to the first leg, wherein the first leg 8a' of the angled arm is provided with a ridge 11 along the first leg arranged in a way to engage the groove 10 on the lever when the step-on plate 3' is in the lowered position, thus preventing the rotation of the lever when the second leg 8b' of the angled arm is oriented perpendicularly upwards to the ski plane, and the rotation of the lever is unobstructed when the second leg 8b' of the angled arm is parallel to the ski plane.

[0019] The ridge 11 has a square cross-section with a chamfered edge with an adjacent quarter section of the circle, the quarter section of the circle being arranged in the direction of the second leg 8b' of the angled arm. The groove 10 has a cross-sectional shape that is complementary to the shape of the ridge 11 in cross-section. Such shape of the groove 10 on the lever 5' and of the ridge 11 on the first leg of the angled arm 8a' ensures a smooth engagement/disengagement of the ridge and the groove, while preventing further rotation of the second leg of the angled arm 8b', which would result in the spring 7' being released and thus unlocking the brake.

[0020] The second leg 8b; 8b' of the angled arm can have any shape, important being only that it locks the insertion of the ski boot into the ski binding when the brake 1; 1' is in the locked state.

[0021] The spring means 7; 7'can be formed as a torsion coil spring.

Claims

1. An alpine ski binding brake (1), preferably for a folding ski, comprising:

   a brake housing (2),
   a step-on plate (3),
   a brake bow (4) that is pivotally mounted in the step-on plate (3) at the proximal end and is pivotally mounted in the brake housing (2) with its central portion,
   a lever (5) pivotally mounted in the step-on plate (3) with a first end and pivotally mounted in the brake housing (2) with a second end so that the step-on plate can assume a raised position and a lowered position, the lever (5) having a protrusion (6) formed at the other end,
   a spring means (7) arranged to push the brake housing (2) and the step-on plate (3) apart,
   an angled arm (8) pivotally mounted in the brake housing (2) with a first leg (8a) so as to be parallel to the mounting axis of the lever but spaced from it, and a second leg (8b) being formed substantially perpendicular to the first leg, wherein the first leg (8a) of the angled arm is provided in the area of the lever protrusion with a cut-out (9) arranged in a way that, when in use, the protrusion can pass unobstructed through the cut-out (9) when the second leg (8b) of the angled arm is parallel to the ski plane, and in a way that the second leg of the angled arm prevents the movement of the step-on plate from the lowered position to the raised position when the second leg of the angled arm is oriented perpendicularly upwards to the ski plane.

2. Brake (1) according to claim 1, **characterized in that** the cut-out (9) in the first leg (8a) of the angled arm is formed to a depth of a maximum of 2/3 of the diameter of the first leg of the angled arm, preferably about to half the diameter.

3. Brake (1) according to claim 1 or 2, **characterized in that** the width of the cut-out (9) in the first leg of the angled arm is greater than the width of the protrusion (6) on the lever, preferably by at least 10%.

4. Brake (1) according to any of claims 1 to 3, **characterized in that** the edges of the protrusion (6) and/or the edges of the cut-out (9) are rounded in the area where they engage each other.

5. An alpine ski binding brake (1'), preferably for a fold-

ing ski, comprising:

a brake housing (2'),
a step-on plate (3'),
a brake bow (4') that is pivotally mounted in the step-on plate (3') at the proximal end and is pivotally mounted in the brake housing (2') with its central portion,
a lever (5') pivotally mounted in the step-on plate (3') with a first end and pivotally mounted in the brake housing (2') with a second end so that the step-on plate can assume a raised position and a lowered position, the lever (5') having a groove (10) formed in direction of the axis of rotation of the lever (5'),
a spring means (7') arranged to push the brake housing (2') and the step-on plate apart,
an angled arm (8') pivotally mounted in the brake housing (2') with a first leg (8a') so as to be parallel to the mounting axis of the lever (5') but spaced from it, and a second leg (8b') being formed substantially perpendicular to the first leg, wherein the first leg (8a') of the angled arm is provided with a ridge (11) along the first leg arranged in a way to engage the groove (10) on the lever when the step-on plate (3') is in the lowered position, thus preventing the rotation of the lever when the second leg (8b') of the angled arm is oriented perpendicularly upwards to the ski plane, and the rotation of the lever is unobstructed when the second leg (8b') of the angled arm is parallel to the ski plane.

6. Brake (1') according to claim 5, **characterized in that** the ridge (11) has a square cross-section with a chamfered edge with an adjacent quarter section of the circle, the quarter section of the circle being arranged in the direction of the second leg (8b') of the angled arm and the groove (10) has a cross-sectional shape that is complementary to the shape of the ridge (11) in cross-section.

7. Brake (1; 1') according to any of claims 1 to 6, **characterized in that** the spring means (7; 7 ') is formed as a torsion coil spring.

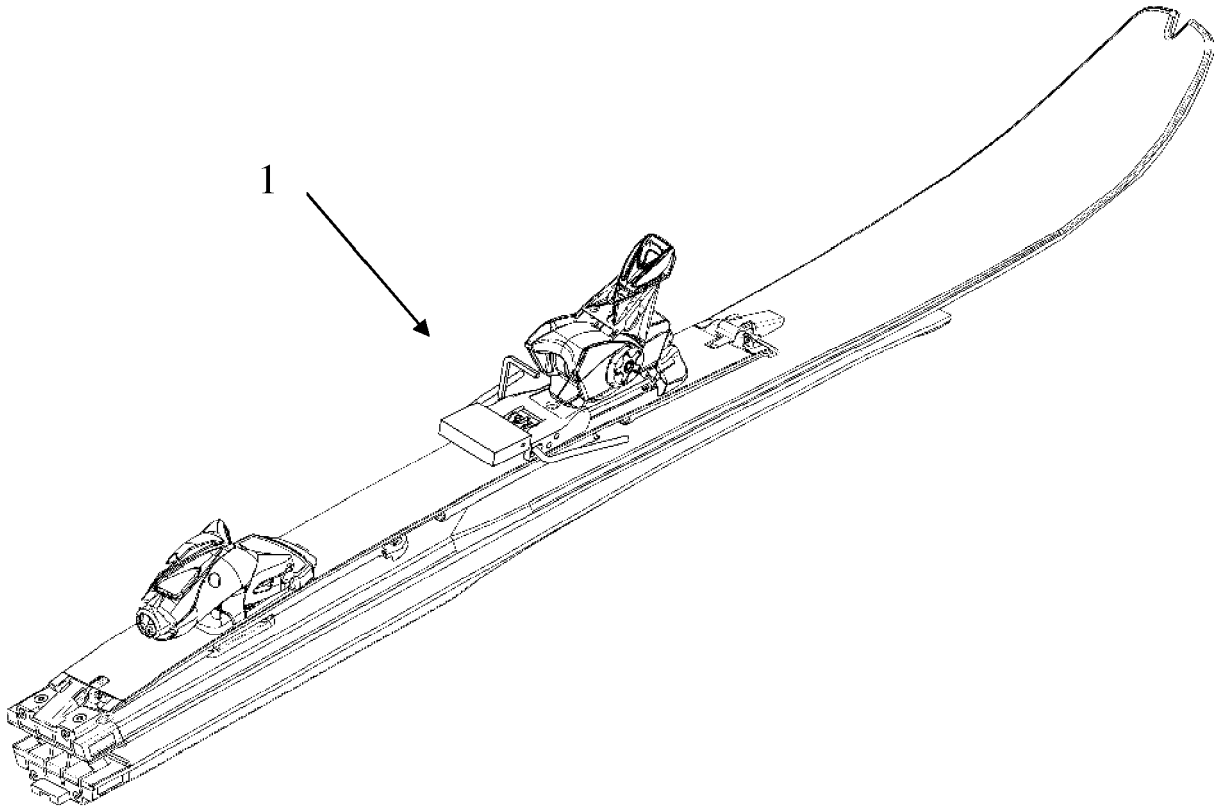

Figure 1

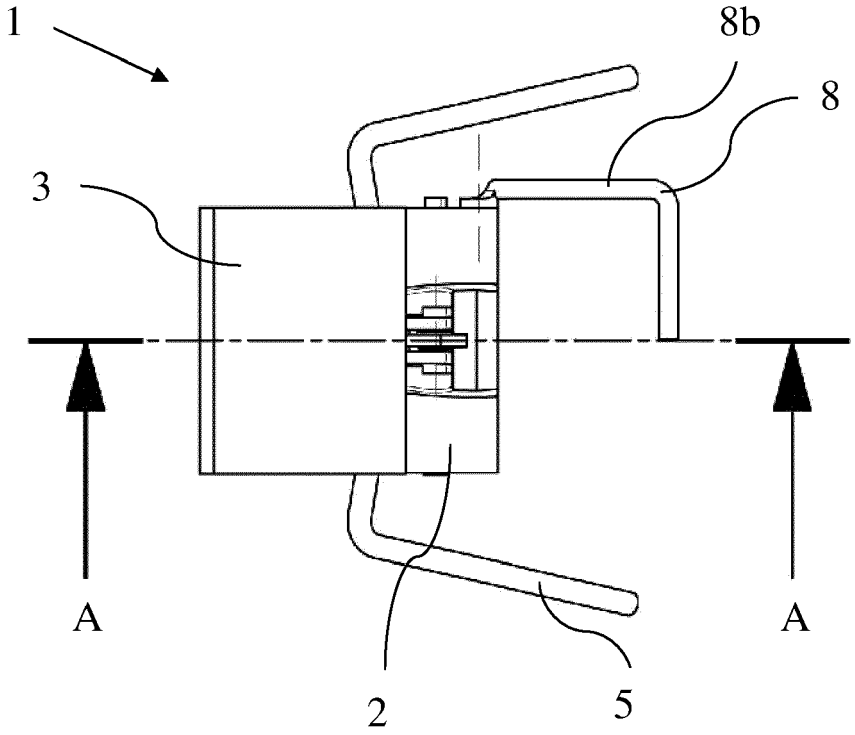

Figure 2

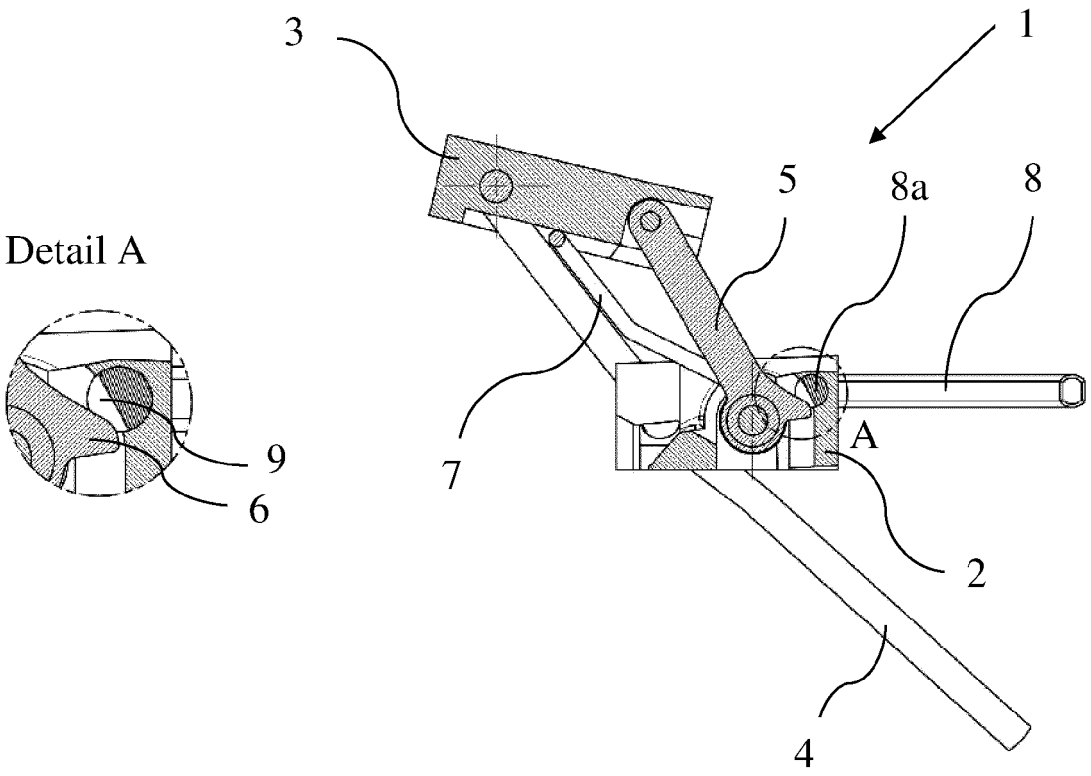

Figure 3

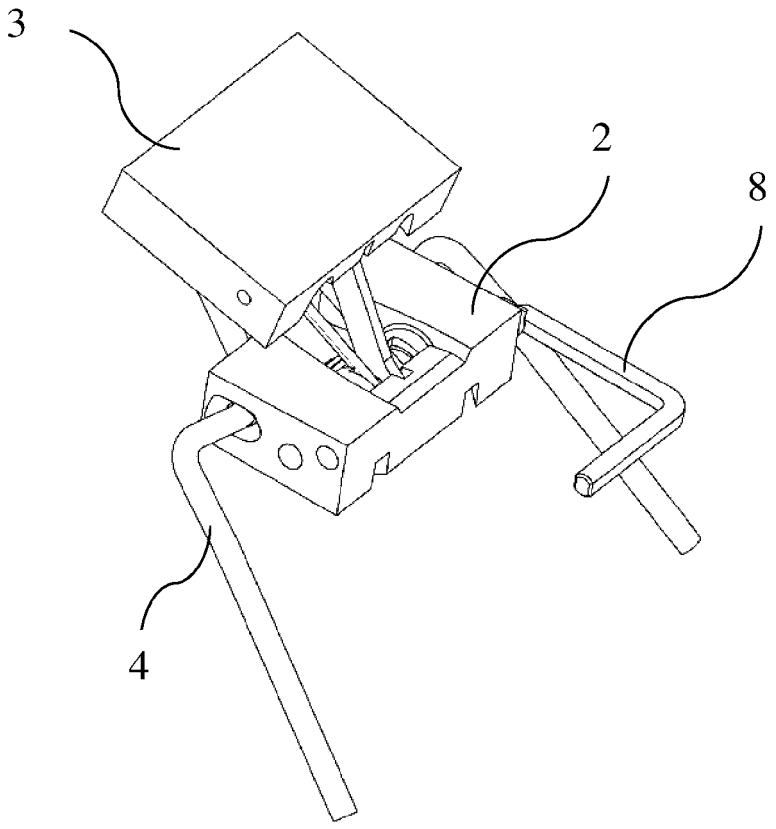

Figure 4

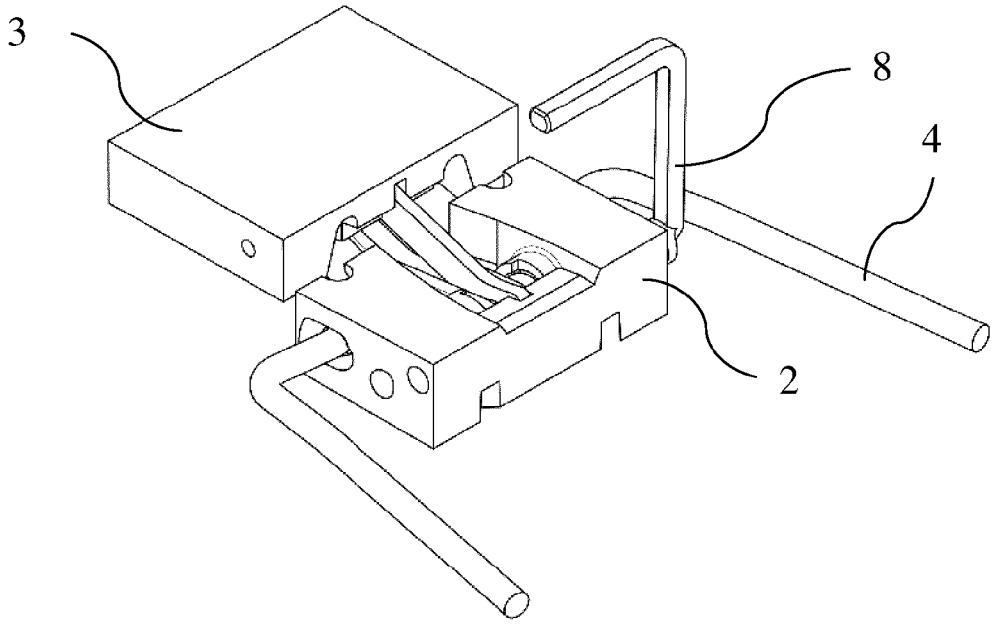

Figure 5

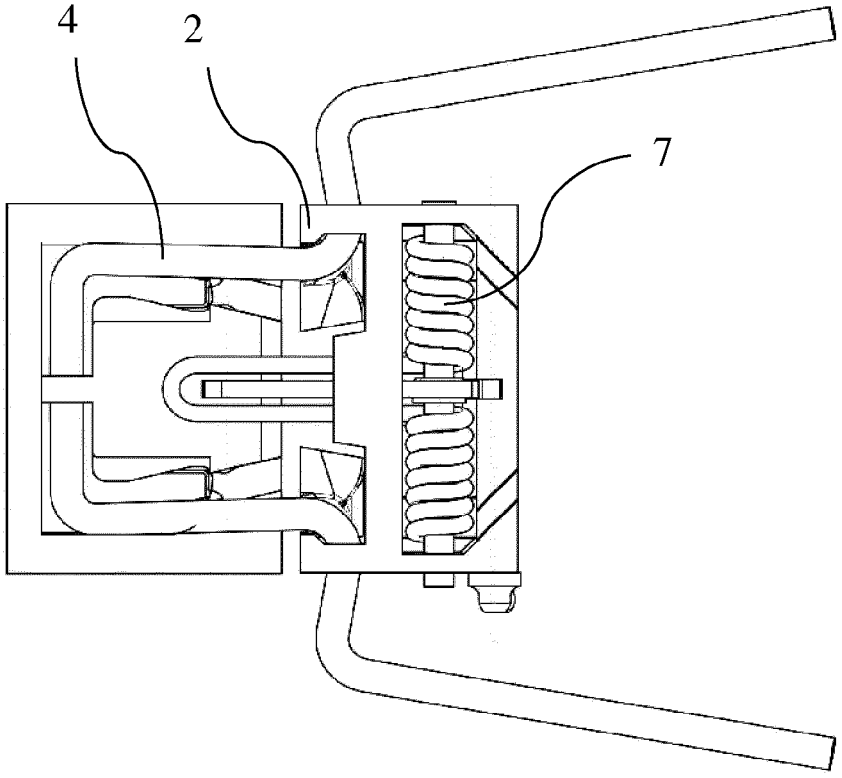

Figure 6

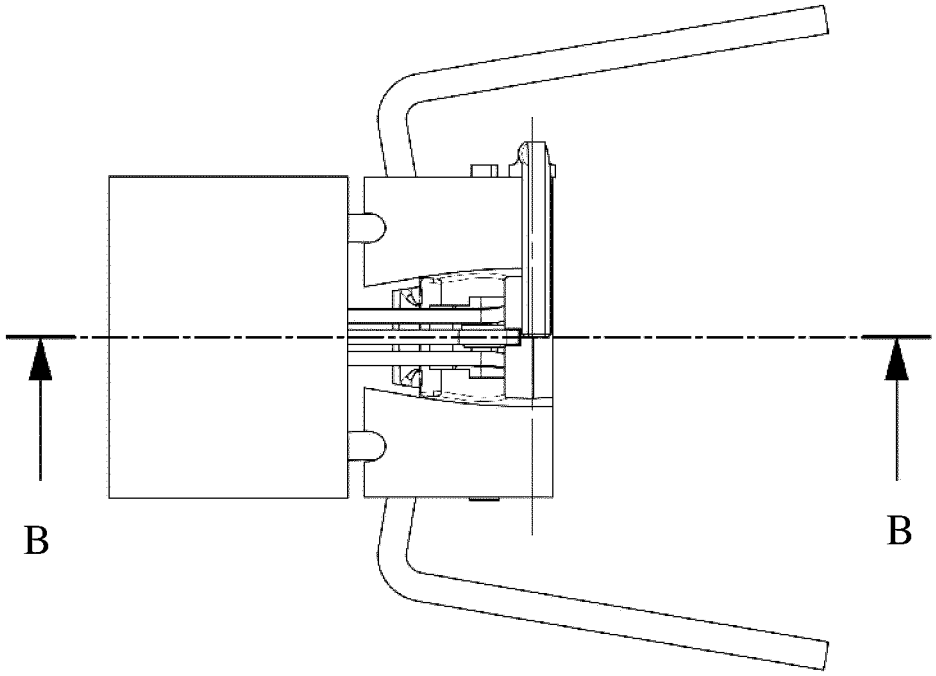

Figure 7

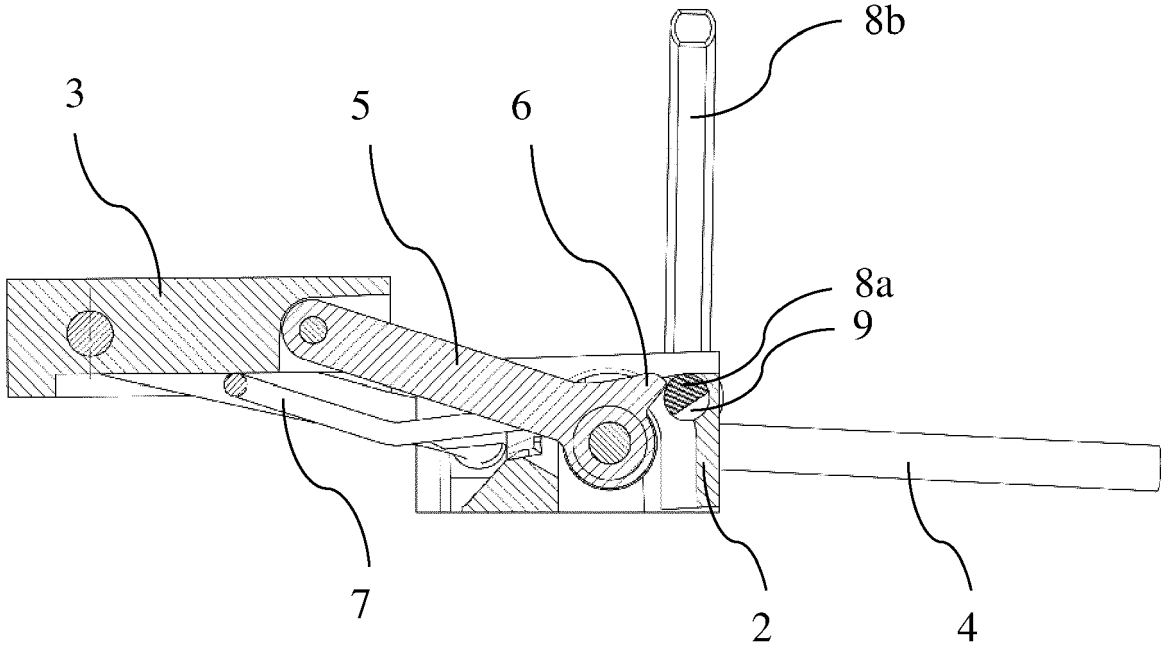

Figure 8

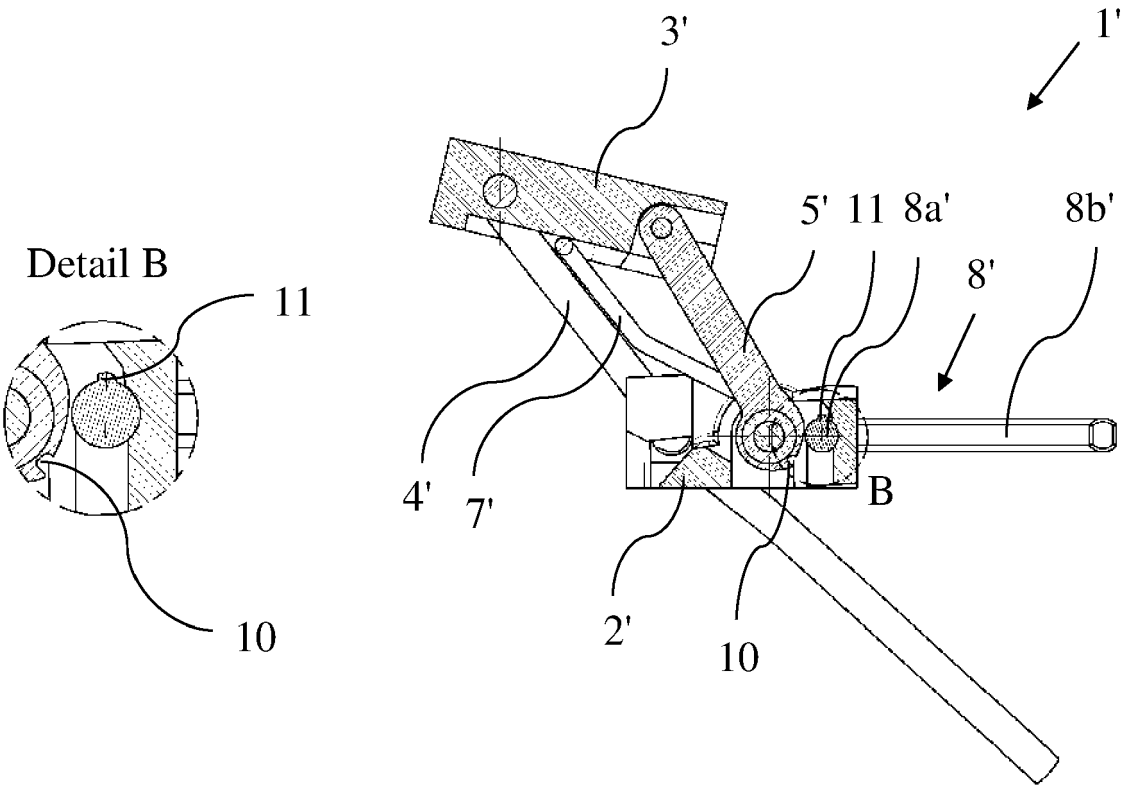

Figure 9

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 17 5347

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y A	EP 2 740 519 A2 (ROSSIGNOL SA [FR]) 11 June 2014 (2014-06-11) * paragraph [0032] - paragraph [0034]; figures 8-13 *	1-3,7 4-6	INV. A63C7/10 A63C5/02
Y	DE 41 42 390 A1 (SILVRETTA SHERPAS SPORTARTIKEL [DE]) 11 February 1993 (1993-02-11) * column 9, line 23 - column 9, line 56; figures 5-8 *	1-3,7	
A	EP 2 415 504 A1 (ATK RACE S R L [IT]) 8 February 2012 (2012-02-08) * paragraph [0025] - paragraph [0044]; figures 1-9 *	1-7	
A	WO 01/87433 A1 (HUNTER LEMNA J [US]) 22 November 2001 (2001-11-22) * page 10, line 9 - page 19, line 17; figures 2,5,6,7 *	1-7	
A	FR 2 538 258 A1 (SALOMON & FILS F [FR]) 29 June 1984 (1984-06-29) * page 3, line 5 - page 6, line 2; figures 1-10 *	1-7	TECHNICAL FIELDS SEARCHED (IPC) A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 November 2020	Murer, Michael

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 17 5347

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.

02-11-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2740519 A2	11-06-2014	EP 2740519 A2	11-06-2014
		FR 2999090 A1	13-06-2014
		US 2014159343 A1	12-06-2014
DE 4142390 A1	11-02-1993	NONE	
EP 2415504 A1	08-02-2012	EP 2415504 A1	08-02-2012
		IT 1401408 B1	26-07-2013
WO 0187433 A1	22-11-2001	US 6390491 B1	21-05-2002
		US 2003006582 A1	09-01-2003
		WO 0187433 A1	22-11-2001
FR 2538258 A1	29-06-1984	CH 657060 A5	15-08-1986
		DE 3344617 A1	05-07-1984
		FR 2538258 A1	29-06-1984

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 9242167 B2 **[0003]**
- SI 25117 **[0004]**