

(19)



(11)

EP 3 769 823 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

27.01.2021 Bulletin 2021/04

(51) Int Cl.:

A63C 9/086 ^(2012.01)**A63C 9/08** ^(2012.01)**A63C 9/084** ^(2012.01)**A63C 9/00** ^(2012.01)(21) Application number: **20187172.0**(22) Date of filing: **22.07.2020**

(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(71) Applicant: **ATK SPORTS S.R.L.****41042 Fiorano Modenese (MO) (IT)**(72) Inventor: **INDULTI, Giovanni****41042 FIORANO MODENESE (MO) (IT)**(74) Representative: **Dall'Olio, Christian et al
INVENTION S.r.l.****Via delle Armi, 1
40137 Bologna (IT)**(30) Priority: **24.07.2019 IT 201900012741**(54) **A HEEL-PIECE FOR A SKI BINDING**

(57) A heel-piece (10) for a ski binding, comprising: a base (1) which is fixable to a ski; a turret (2) which rises from the base (1); a spring (3) which is U-shaped, which is hooked to the turret (2), and which has a first arm (11) and a second arm (12) flanked to one another and elastically nearable to and distanceable from one another; a guide and support member (4) which is borne by the turret (2), which supports the first arm (11) of the spring (3) and the second arm (12) of the spring (3) and which guides the first arm (11) of the spring (3) and the second arm (12) of the spring (3) in a direction (H) when the first arm

(11) of the spring (3) and the second arm (12) of the spring (3) distance and near to and from one another; it comprises interposition means (20) which are constrained to the guide and support member (4) and which are interposed between the first arm (11) of the spring (3) and the second arm (12) of the spring (3), on one side, and between the guide and support member (4), on the other side, for protecting the guide and support member (4) from wear and tear. The interposition means can comprise two C-shaped leaf springs or four abutment pins.

EP 3 769 823 A1

Description

[0001] The present invention relates to the technical sector concerning a heel-piece for a ski binding.

[0002] A heel-piece for a ski binding is known, which comprises: a base which is fixable to a ski; a turret which rises from the base; a spring which is hooked to the turret, and which has a first end and a second end flanked to one another and elastically nearable to and distanceable from one another; a guide and support member which is an integral part of the turret, which supports the first end of the spring and the second end of the spring and which guides the first end of the spring and the second end of the spring in a lateral direction when the ends distance from and near one another.

[0003] In particular, the spring has an elongate U-shape, in the sense that it is formed by: a first arm that contains the first end; a second arm which contains the second end; and a curved portion which connects the first arm with the second arm. The curved portion is hooked to the turret. The spring is symmetrical with respect to a plane passing between the first arm and the second arm.

[0004] A ski boot couplable with the heel-piece has on the relative rear part a first channel for coupling with the first end of the spring and a second channel for coupling with the second end of the spring. The first channel and the second channel are conformed in the following way: after having coupled the tip of the ski boot with the toe-piece of the ski binding, by pressing with the heel of the ski boot towards the ski (application of a substantially perpendicular force to the plane of the ski) the first channel intercepts the first end of the spring, with a consequent reciprocal relative sliding, and the second channel intercepts the second end of the spring, with a consequent reciprocal relative sliding, until the ski boot is coupled to the heel-piece. During the relative sliding described in the foregoing, the spring is elastically deformed: in particular, the first end of the spring and the second end of the spring move away from each other and then newly near one another.

[0005] The ski boot can decoupled from the heel-piece in two ways: in a first way, the ski boot decouples from the toe-piece and then simply moves away from the heel-piece; in a second way, the ski boot must move away from the ski with a movement substantially opposite the movement with which it is coupled to the heel-piece, and this can occur mainly in the event of an impact (for example a fall). The second decoupling mode, therefore, is for safeguarding the welfare of the skier and also in the event that the first end of the spring and the second end of the spring move away from each other and then newly near one another.

[0006] Thus, in order both to couple the ski boot to the heel-piece and to decouple the ski from the heel-piece, according to the second mode described in the foregoing, it is necessary to overcome the force of the spring.

[0007] While skiing, the ski boot unloads forces per-

pendicular to the plane of the ski and torsions on the heel-piece: as a consequence, the first end of the spring and the second end of the spring undergo constant impacts and sliding against the guide and support member, which over time causes wear. In detail, the wear especially determines wearing away some the material of the guide and support member: in fact, the guide and support member is usually made of an aluminium alloy, a carbon alloy or plastic, while the spring is made of a steel alloy or a titanium alloy, i.e. a harder mineral. This use of the guide and support member determines the formation of a first cavity at the contact zone with the first end of the spring and a second cavity at the contact zone with the second end of the spring; the first cavity and second cavity become progressively deeper, up to a point when the ski boot can no longer decouple from the heel-piece in the second above-described mode, due to the fact that when the ski boot tends to move away perpendicularly from the plane of the ski (second decoupling mode as discussed above), the first end of the spring is in the first cavity and the second end of the spring is in the second cavity, which prevents the first end of the spring and the second end of the spring from moving away from one another, i.e. to translate laterally towards the outside. After a certain amount of time this requires replacing the turret, with a consequent increase in costs.

[0008] This drawback cannot be obviated by using a guide and support member having identical hardness with the spring, i.e. a steel alloy, or a titanium alloy, due to the fact that this would lead to an unacceptable increase in weight or increased costs for the heel-piece.

[0009] In the light of the above, the aim of the present invention consists in obviating the above-cited drawback.

[0010] The above aim is attained by a heel-piece for a ski binding according to claim 1.

[0011] The presence of the interposition means advantageously prevents the guide and support member from wear. The guide and support member, therefore, can be made of a less hard material than that of which the spring is made, which enables the heel-piece to be kept light and therefore suitable for use even in ski competitions.

[0012] Specific embodiments of the invention will be described in the following part of the present description, according to what is included in the claims and with the aid of the appended tables of drawings, in which:

- figures 1, 2 are respectively a front view and a lateral view of a heel-piece of a ski binding, object of the present invention, according to a first embodiment;
- figure 3 is a section view, along line III-III, of figure 2;
- figure 3A is the same view as figure 3, with the difference that the spring of the heel-piece is elastically deformed;
- figure 4 is a perspective view of the heel-piece of figure 1;

- figure 4A is a more detailed view of detail K1 of figure 4;
- figure 4B is the same view as figure 4, with the difference that the spring has been removed;
- figures 5, 6 are respectively a view from above and a front view of a heel-piece of a ski binding object of the present invention, according to a second embodiment;
- figure 7 is a section view, along line VII-VII, of figure 6;
- figure 7A is the same view as figure 7, with the difference that the spring of the heel-piece is elastically deformed;
- figure 8 is a perspective view of the heel-piece of figure 5;
- figure 8A is a more detailed view of detail K2 of figure 8;
- figure 8B is the same view as figure 8, with the difference that the spring has been removed.

[0013] With reference to the tables of drawings, reference numeral (10) denotes a heel-piece for a ski binding, object of the present invention, comprising: a base (1) which is fixable to a ski; a turret (2) which rises from the base (1); a spring (3) which is U-shaped, which is hooked to the turret (2), and which has a first arm (11) and a second arm (12) flanked to one another and elastically nearable to and distanceable from one another; a guide and support member (4) which is borne by the turret (2), which supports the first arm (11) of the spring (3) and the second arm (12) of the spring (3) and which guides the first arm (11) of the spring (3) and the second arm (12) of the spring (3) in a direction (H) when the first arm (11) of the spring (3) and the second arm (12) of the spring (3) distance and near to and from one another; interposition means (20) which are constrained to the guide and support member (4) and which are interposed between the first arm (11) of the spring (3) and the second arm (12) of the spring (3), on one side, and between the guide and support member (4), on the other side, for protecting the guide and support member (4) from wear and tear.

[0014] The spring (3) can be made of a steel alloy or a titanium alloy and wherein the guide and support member (4) is made of an aluminium alloy, of a carbon alloy or of a plastic material.

[0015] The turret (2) can be rotatable with respect to the base (1).

[0016] The guide and support member (4) can be an integral part of the turret (2) (as in the figures).

[0017] The first arm (11) can contain the first end (91) of the spring (3), while the second arm (12) can contain the second end (92) of the spring (3).

[0018] The spring (3) can comprise a curved portion (13) which connects the first arm (11) with the second arm (12). The curved portion (13) is hooked to the turret (2). The spring (3) can be symmetrical with respect to a plane passing between the first arm (11) and the second arm (12).

[0019] The spring (3) is preferably arranged to be parallel to the plane of a ski (not illustrated) when the heel-piece (10) is fixed to the ski.

[0020] The guide and support member (4) preferably comprises a first seat (21), which supports and guides the first arm (11) of the spring (3), and a second seat (22), which supports and guides the second arm (12) of the spring (3).

[0021] The interposition means (20) are preferably arranged at the first seat (21) and the second seat (22) and are arranged and conformed to prevent the guide and support member (4) from entering into contact with the first arm (11) and the second arm (12).

[0022] According to a first embodiment, illustrated in figures 1-4, the interposition means (20) comprise: a C-shaped first interposition element (31) which is housed in the first seat (21) and which abuts the first arm (11) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of a ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski; a C-shaped second interposition element (32) which is housed in the second seat (22) and which abuts the second arm (12) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of the ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski.

[0023] The first seat (21) preferably comprises a first wall (41) and a second wall (42) which is opposite the first wall (41); a first side (51) of the first interposition element (31) faces the first wall (41); a second side (52) of the first interposition element (31), opposite the first side (51) of the first interposition element (31), faces the second wall (42); the second seat (22) comprises a third wall (43) and a fourth wall (44) which is opposite the third wall (43); a first side (61) of the second interposition element (32) faces the third wall (43); a second side (62) of the second interposition element (32), opposite the first side (61) of the second interposition element (32), faces the fourth wall (44).

[0024] The first interposition element (31) is preferably a first band spring and the second interposition element (32) is a second band spring. According to a second embodiment, illustrated in figures 5-8, the interposition means (20) comprise: a first pin (71) which is housed in the first seat (21) and a second pin (72) which is housed in the first seat (21) and which is opposite the first pin (71), the first pin (71) and the second pin (72) abutting the first arm (11) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions

with respect to the plane of a ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski; a third pin (73) which is housed in the second seat (22) and a fourth pin (74) which is housed in the second seat (22) and which is opposite the third pin (73), the third pin (73) and the fourth pin (74) abutting the second arm (12) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of the ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski.

[0025] The first seat (21) preferably comprises a first wall (41) and a second wall (42) which is opposite the first wall (41); the guide and support member (4) has a first lateral hole (81) made therein which extends parallel to the first wall (41) and which receives the first pin (71) in such a way that the first pin (71) projects from the first wall (41) in order to abut the first arm (11) of the spring (3); the guide and support member (4) has a second lateral hole (82) made therein which extends parallel to the second wall (42) and which receives the second pin (72) in such a way that the second pin (72) projects from the second wall (42) in order to abut the first arm (11) of the spring (3); the second seat (22) comprises a third wall (43) and a fourth wall (44) which is opposite the third wall (43); the guide and support member (4) has a third lateral hole (83) which extends parallel to the third wall (43) and which receives the third pin (73) in such a way that the third pin (73) projects from the third wall (43) in order to abut the second arm (12) of the spring (3); the guide and support member (4) has a fourth lateral hole (84) made therein which extends parallel to the fourth wall (44) and which receives the fourth pin (74) in such a way that the fourth pin (74) projects from the fourth wall (44) in order to abut the second arm (12) of the spring (3).

[0026] The first lateral hole (81), the second lateral hole (82), the third lateral hole (83) and the fourth lateral hole (84) can be orientated with the relative axes lying in a plane parallel to the plane of the ski and perpendicular to the axis of the ski when the heel-piece (10) is fixed to the ski.

[0027] It is understood that the foregoing has been described by way of nonlimiting example, so that any constructional variants are to be taken to fall within the protective scope of the present technical solution, as claimed in the following.

Claims

1. A heel-piece (10) for a ski binding, comprising:

a base (1) which is fixable to a ski;
a turret (2) which rises from the base (1);
a spring (3) which is U-shaped, which is hooked to the turret (2), and which has a first arm (11) and a second arm (12) flanked to one another

and elastically nearable to and distanceable from one another;

a guide and support member (4) which is borne by the turret (2), which supports the first arm (11) of the spring (3) and the second arm (12) of the spring (3) and which guides the first arm (11) of the spring (3) and the second arm (12) of the spring (3) in a direction (H) when the first arm (11) of the spring (3) and the second arm (12) of the spring (3) distance and near to and from one another;

characterised in that:

it comprises interposition means (20) which are constrained to the guide and support member (4) and which are interposed between the first arm (11) of the spring (3) and the second arm (12) of the spring (3), on one side, and between the guide and support member (4), on the other side, for protecting the guide and support member (4) from wear and tear.

2. The heel-piece (10) of the preceding claim, wherein the guide and support member (4) comprises a first seat (21), which supports and guides the first arm (11) of the spring (3), and a second seat (22), which supports and guides the second arm (12) of the spring (3).

3. The heel-piece (10) according to the preceding claim, wherein the interposition means (20) are arranged at the first seat (21) and the second seat (22) and are arranged and conformed to prevent the guide and support member (4) from entering into contact with the first arm (11) and the second arm (12).

4. The heel-piece (10) of claim 2 or 3, wherein the interposition means (20) comprise: a C-shaped first interposition element (31) which is housed in the first seat (21) and which abuts the first arm (11) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of a ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski; a C-shaped second interposition element (32) which is housed in the second seat (22) and which abuts the second arm (12) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of the ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski.

5. The heel-piece (10) of the preceding claim, wherein: the first seat (21) comprises a first wall (41) and a second wall (42) which is opposite the first wall (41); a first side (51) of the first interposition element (31)

faces the first wall (41); a second side (52) of the first interposition element (31), opposite the first side (51) of the first interposition element (31), faces the second wall (42); the second seat (22) comprises a third wall (43) and a fourth wall (44) which is opposite the third wall (43); a first side (61) of the second interposition element (32) faces the third wall (43); a second side (62) of the second interposition element (32), opposite the first side (61) of the second interposition element (32), faces the fourth wall (44).

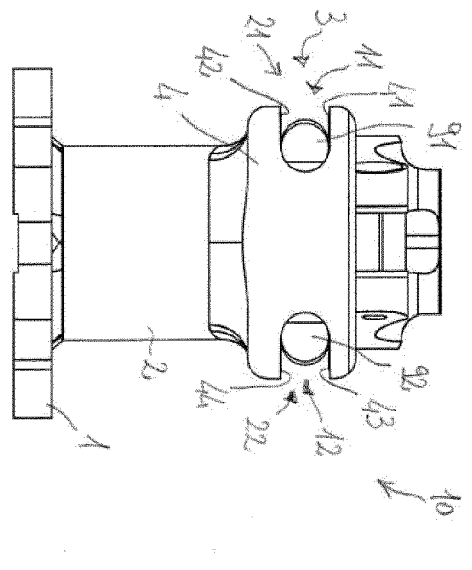
6. The heel-piece (10) of claim 4 or 5, wherein the first interposition element (31) is a first band spring (3) and wherein the second interposition element (32) is a second band spring (3).

7. The heel-piece (10) of claim 2 or 3, wherein the interposition means (20) comprise: a first pin (71) which is housed in the first seat (21) and a second pin (72) which is housed in the first seat (21) and which is opposite the first pin (71), the first pin (71) and the second pin (72) abutting the first arm (11) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of a ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski; a third pin (73) which is housed in the second seat (22) and a fourth pin (74) which is housed in the second seat (22) and which is opposite the third pin (73), the third pin (73) and the fourth pin (74) abutting the second arm (12) of the spring (3) during use of the heel-piece (10) and when the spring (3) is subjected to torsions with respect to the plane of the ski or during the use of the heel-piece (10) and when the spring (3) is subjected to stresses that are perpendicular to the plane of the ski.

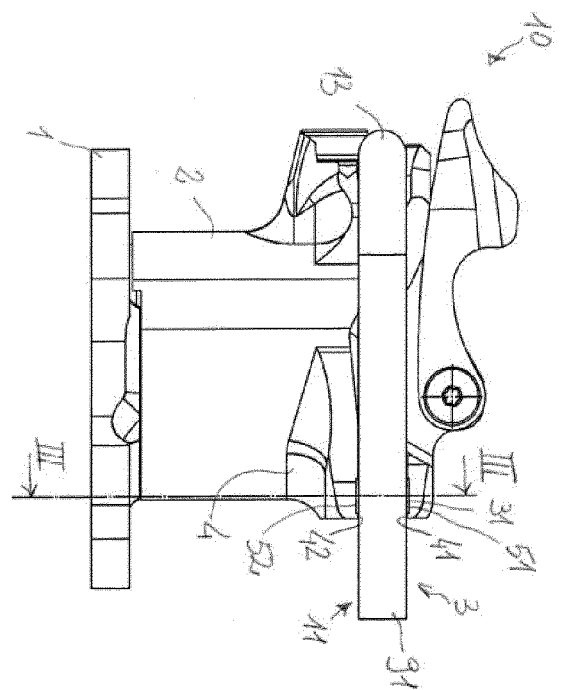
8. The heel-piece (10) of the preceding claim, wherein: the first seat (21) comprises a first wall (41) and a second wall (42) which is opposite the first wall (41); the guide and support member (4) has a first lateral hole (81) made therein which extends parallel to the first wall (41) and which receives the first pin (71) in such a way that the first pin (71) projects from the first wall (41) in order to abut the first arm (11) of the spring (3); the guide and support member (4) has a second lateral hole (82) made therein which extends parallel to the second wall (42) and which receives the second pin (72) in such a way that the second pin (72) projects from the second wall (42) in order to abut the first arm (11) of the spring (3); the second seat (22) comprises a third wall (43) and a fourth wall (44) which is opposite the third wall (43); the guide and support member (4) has a third lateral hole (83) which extends parallel to the third wall (43) and which receives the third pin (73) in such a way that the third pin (73) projects from the third wall (43) in order to

abut the second arm (12) of the spring (3); the guide and support member (4) has a fourth lateral hole (84) made therein which extends parallel to the fourth wall (44) and which receives the fourth pin (74) in such a way that the fourth pin (74) projects from the fourth wall (44) in order to abut the second arm (12) of the spring (3).

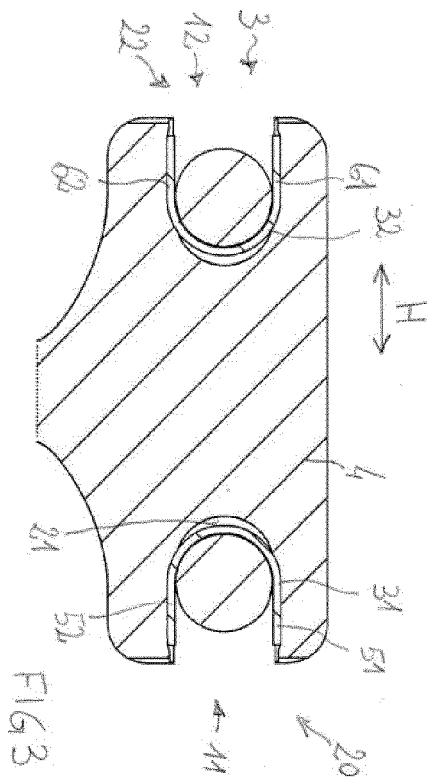
9. The heel-piece (10) of any one of the preceding claims, wherein the spring (3) is made of a steel alloy or a titanium alloy and wherein the guide and support member (4) is made of an aluminium alloy, of a carbon alloy or of a plastic material.



FG1



F162



F163

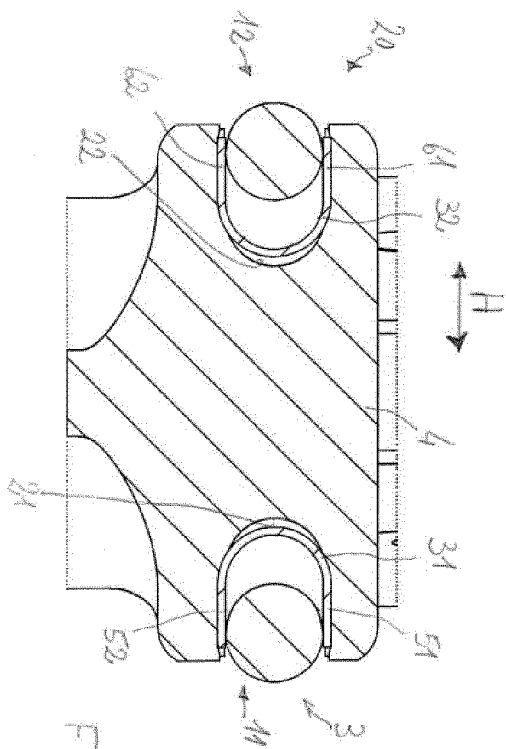
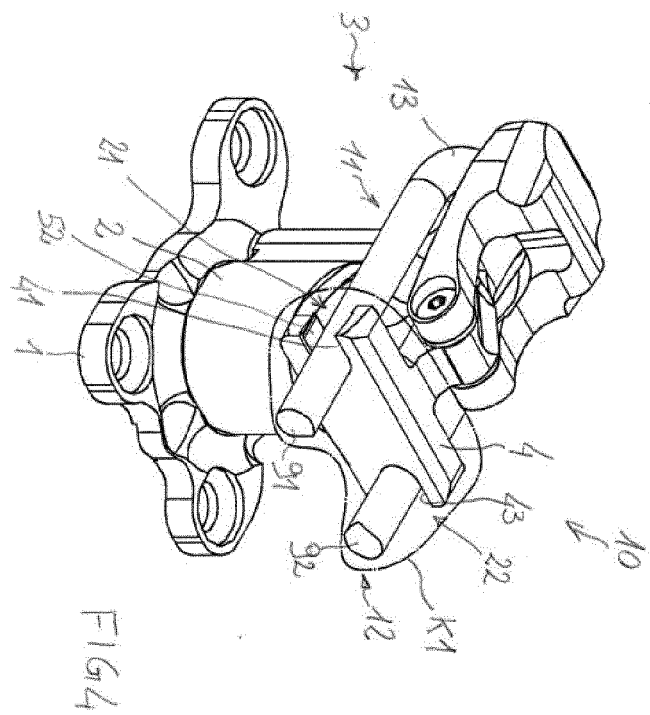
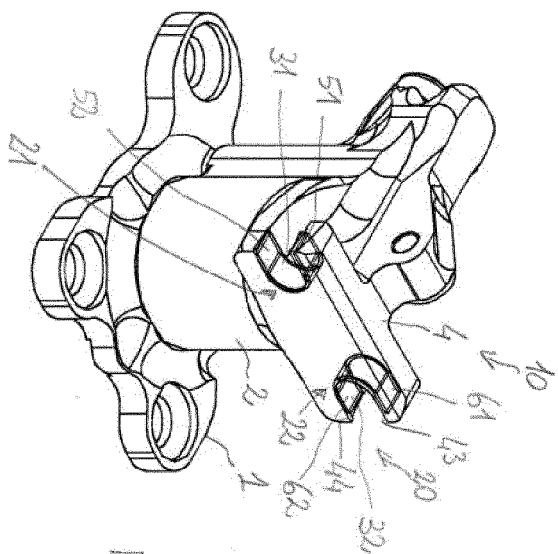


FIG 2



F164



F1G4B

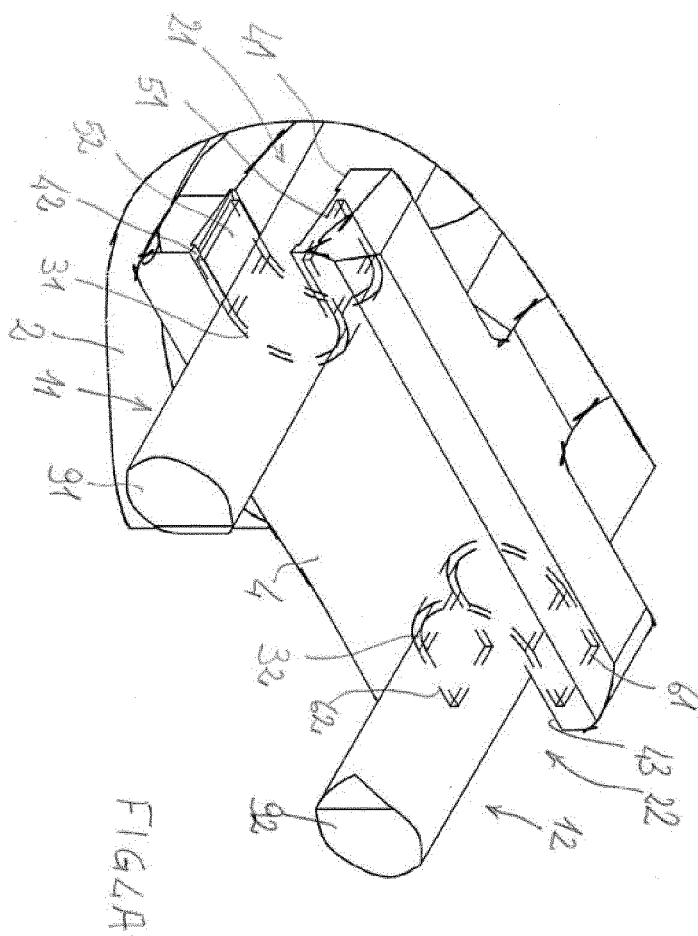
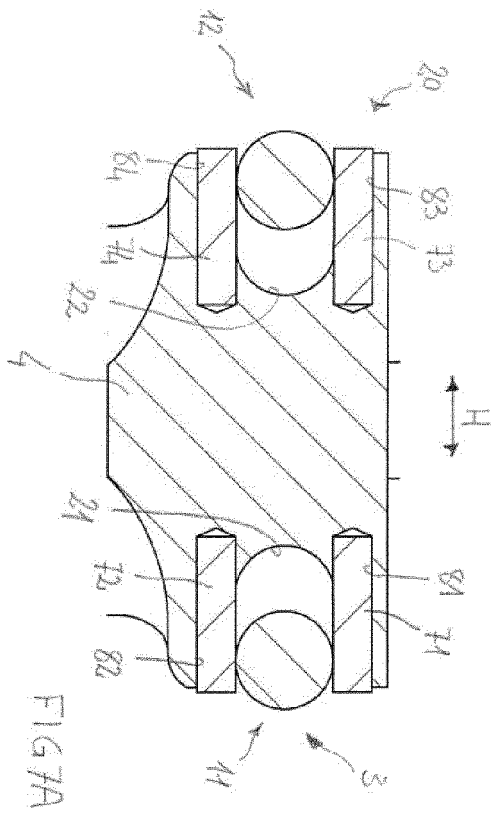
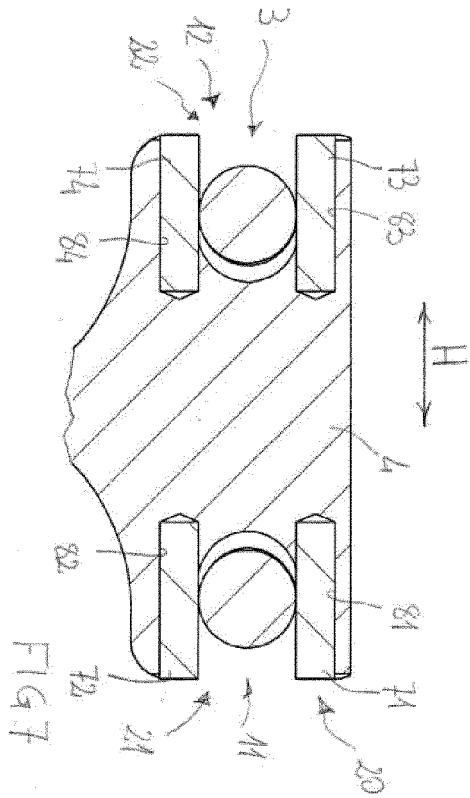
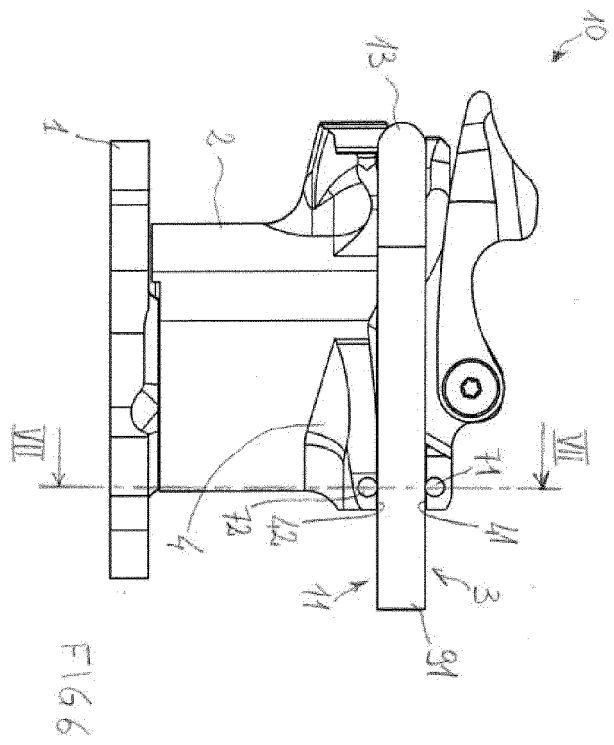
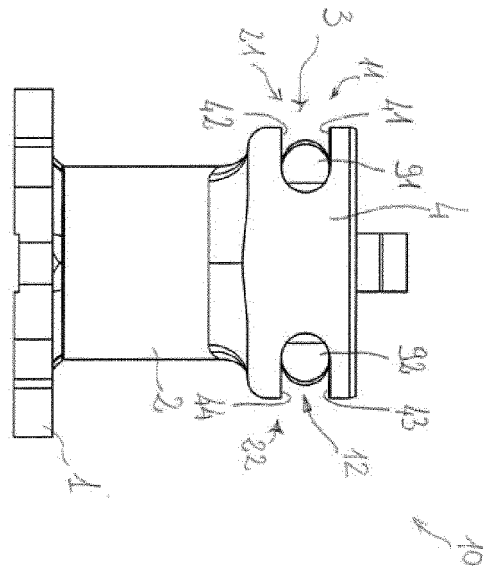
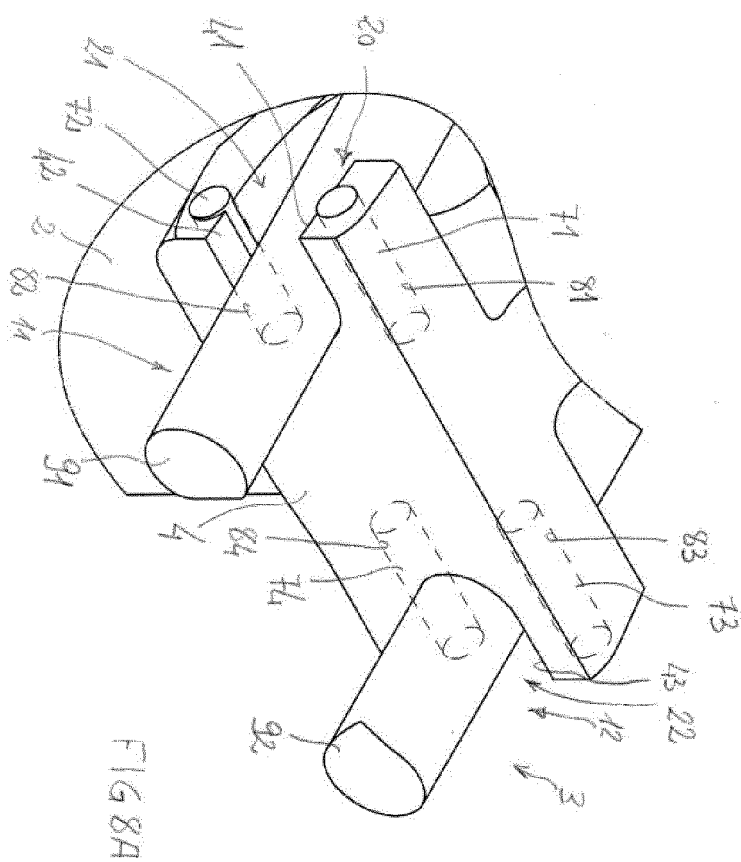
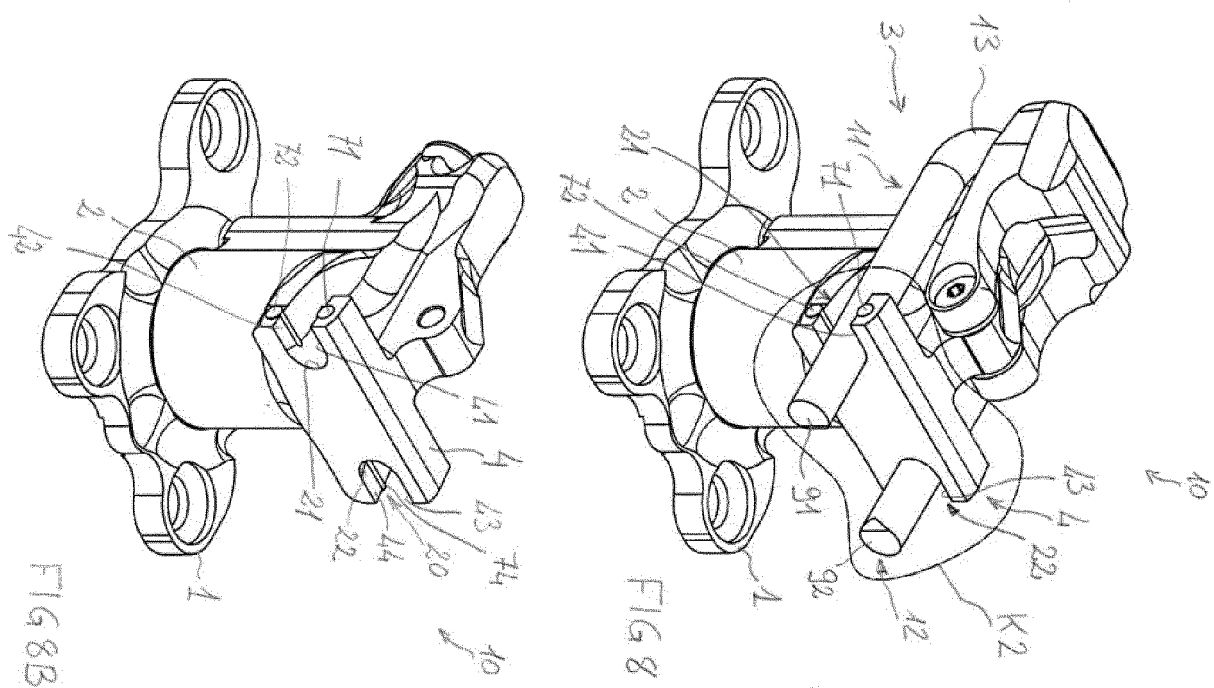


FIG 2







EUROPEAN SEARCH REPORT

Application Number
EP 20 18 7172

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 452 730 A1 (SALEWA SPORT AG [CH]) 16 May 2012 (2012-05-16)	1,2,7-9	INV. A63C9/086 A63C9/08 A63C9/084 A63C9/00
A	* paragraphs [0002], [0005], [0006], [0024], [0033] - [0037], [0046]; figures 1-3 *	3-6	
A	----- EP 3 053 632 A1 (FRITSCHI AG SWISS BINDINGS [CH]) 10 August 2016 (2016-08-10) * paragraphs [0070], [0076] - [0081]; figures 1,2,3 *	1-9	
A	----- EP 3 000 511 A1 (SALOMON SAS [FR]) 30 March 2016 (2016-03-30) * paragraphs [0057] - [0069]; figure 3 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 November 2020	Examiner Murer, Michael
CATEGORY OF CITED DOCUMENTS		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	
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			

 1
EPO FORM 1503 03.02 (P04C01)

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

EP 20 18 7172

5

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.

27-11-2020

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2452730 A1	16-05-2012	DE 102010043880 A1	16-05-2012
		EP 2452730 A1	16-05-2012

EP 3053632 A1	10-08-2016	NONE	

EP 3000511 A1	30-03-2016	EP 3000511 A1	30-03-2016
		EP 3260178 A1	27-12-2017
		FR 3026311 A1	01-04-2016
		US 2016089592 A1	31-03-2016

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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