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(54) Ski binding toe for touring skiing with an improved locking

(57) A ski binding toe for alpine skiing with an improved locking, comprising a first lever (10) (10) for manual and automatic locking and for manual unlocking of the jaws (50) of the ski binding toe, a second lever (20), pivoted on the first lever (10) through a sliding pin (30) which engages within a shaped profile (90) of the second lever (20), rotating pins (80, 100) provided on the levers (10, 20) for their articulated movement; the lever (10, 20) are constrained to rotate one respect the other and respect to a base (110) of the toe, by means of the rotating pins (80, 100), and are assembled together through the sliding pin (30), which slides in the shaped profile (90) present in the second lever (20) and allows a rotation of the levers (10, 20) with respect to the axis of the sliding pin (30). In addition, at least one elastic element (40) is placed in correspondence of a rotating pin (80) associated with the first lever (10), in order to so automate the locking system.

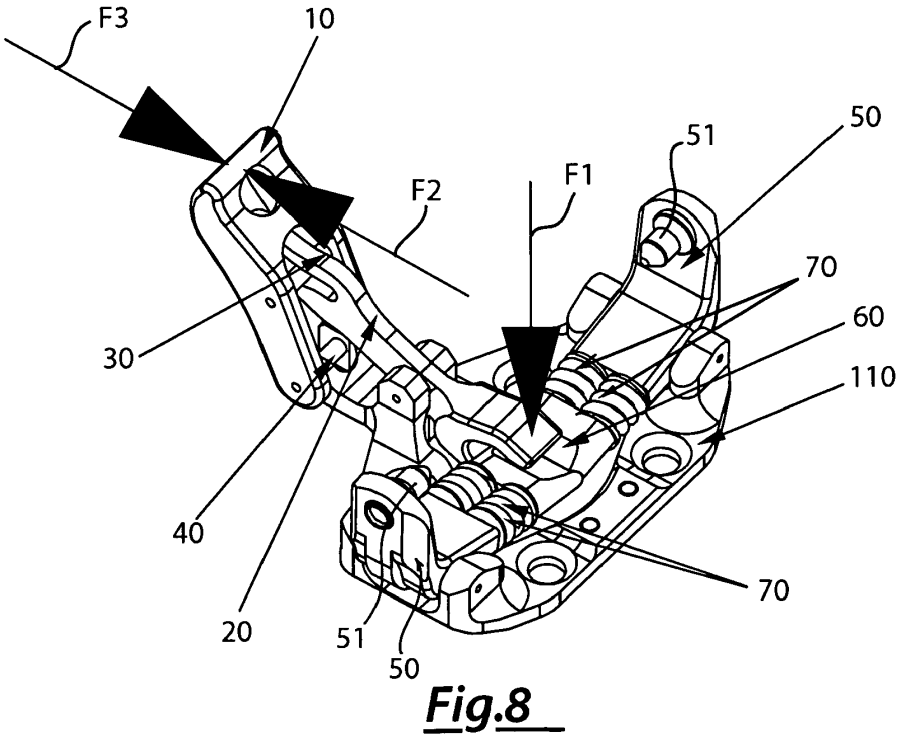

Fig.8

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Description

[0001] The present invention in general refers to ski binding for alpine skiing and, in particular, concerns a new constructive mode of the toe of such bindings, which allows to automatically and/or manually and safely lock the boot to the ski board, without accidental unlocks occur due to impacts or pressures caused by the ski structure and/or presence of snow, ice or extraneous bodies interposed between the toe and ski board.

[0002] It is known the use of ski bindings, whose function is to attach, in fact, the ski to the boot and keep it tightly clasped in order not to lose the skis during the race; at the same time, bindings must be ready to open in case of fall, so as to avoid causing the skier serious fractures, dislocations and bruises.

[0003] A ski bonding is traditionally fitted with two pieces which, depending on the type, can be separated or joined (usually the piece that unites them is a sole of the bonding) and are commonly referred to as heel and toe.

[0004] The heel is usually formed by a manual release lever, an indicator of adjustment of the seal of the heel, a screw of adjustment of the seal of heel and a stop element of the ski, while the toe normally includes a screw of adjustment of the height, an indicator of adjustment of the seal, a screw of adjustment of the seal a anti-slip pad.

[0005] Moreover, the toe is not fixed, but, since it must be open at the right time, it can rotate on one or two pins to be open on one or both sides.

[0006] The ski boot engages, then, between the toe and the heel and remains stationary while skiing; in addition, when the binding suffers an impact, a special mechanism allows the toe to rotate and open, while the heel lifts, in order to allow the ski to disengage and leave free the foot.

[0007] A type currently extremely widespread of ski bindings toes provides the use of two shaped levers, assembled together and articulated with respect to an assembly pin; these levers are suitable to lock and disengage two L-shaped jaws and a spring system, which is driven by the ski boot pressure during the engagement.

[0008] Engagement occurs through two small tips present in the jaws, which are inserted into respective holes made in the side portion of the ski boot.

[0009] Furthermore, in order to ensure locking of the jaws and, therefore, of the ski boot, one of the shaped levers must be manually forced by the skier on a shaped profile, so as to make the second lever rigid and rigidly lock, as a result, the jaws on the boot.

[0010] Thus, as a result of an impact or pressure on the first lever, the boot disengages from the ski.

[0011] Another known automatic engagement and locking system of the levers system of the known type toes provides a locking of the jaws (and, therefore, of the ski boot) of "semi-rigid" type, which occurs thanks to a spring forcing one of the shaped levers of the toe on the ski board, stiffening the second lever, which, in turn, consequently locks the jaws of the boot.

[0012] Event in this case, an impact or pressure exerted on the first lever causes the disengagement of the boot from the ski.

[0013] However, the aforesaid bindings of known type present some evident drawbacks, first of all that one related to the seal, that is the ability to open or not on the basis of the stress it suffers.

[0014] Indeed, these types of binding risk to be too sensitive (and thus to open up, owing to an accidental unlocking, during descent, maybe just near a curve or because of a little jump, impact and/or pressure on the lever, with the risk for the skier of losing the skis during the race and suffering serious physical consequences) or too resistant (with the risk that the bonding does not come disengaged at the appropriate time, even in this case causing to the skier serious physical consequences).

[0015] Moreover, these bindings, which may be apparently functional, sometimes are not equally reliable, whether because they are not resistant enough at low temperatures, or because snow or ice which accumulates between the boot and the bonding, can act as hindrance; even salt present on snowy roads can erode the bonding making it ineffective.

[0016] In general, indeed, these automatic engagement systems are adversely affected by the structure of the ski, mounting of the bonding on the ski board and, as said, presence of snow, ice or extraneous bodies that may interpose between the locking lever of the bonding and the ski board. Finally, the ski binding toes of known type require that skier manually activates lever of the locking system so that the binding does not easily disengage from the boot.

[0017] Within the above mentioned requirements, purpose of the present invention is therefore to overcome the complained drawbacks and, in particular, to provide a ski binding toe for alpine skiing with an improved locking which assures a secure engagement of the jaws to the boot, without any manual intervention by the skier.

[0018] Other purpose of the present invention is to provide a ski binding toe for alpine skiing with an improved locking which assures the locking of the boot to the ski, even in case of stresses or accidental and/or involuntary impacts.

[0019] Other purpose of the invention is to provide a ski binding toe for alpine skiing with an improved locking, which guarantees in any situation an automatic and/or manual locking which is safe and reliable and not easily influenced by the structure of the sky and/or presence of snow, ice and/or extraneous bodies on the ski board.

[0020] Another purpose of the invention is to achieve a ski binding toe for alpine skiing with an improved locking which is extremely reliable, efficient and functional, compared to the toes of the ski bindings of the traditional type.

Further purpose of the invention is to create a ski binding toe for alpine skiing with an improved locking, which allows the skier to decide whether to leave the toe in an automatic locking, free or completely locked configura-

tion.

[0021] These and other purposes, according to the present invention, are achieved by implementing a ski binding toe for alpine skiing with an improved locking, according to claim 1 attached.

[0022] Other technical features of detail are described in the subsequent claims.

[0023] Additional features and advantages of a ski binding toe for alpine skiing with an improved locking, according to the invention, will be more evident from the description that follows, relating to an its illustrative and preferred, but not limited, embodiment and from the appended drawings, in which:

- figure 1A is a first assonometric view of a ski binding toe for alpine skiing with an improved locking in accordance with the present invention;
- figure 1B is a second assonometric view of the ski binding toe for alpine skiing of figure 1A, in accordance with the present invention;
- figure 1C is a third assonometric view of the ski binding toe for alpine skiing of figure 1A, in accordance with the present invention;
- figure 2 is a side view of the ski binding toe for alpine skiing with an improved locking, in accordance with the present invention;
- figure 3 is a front view of the ski binding toe for alpine skiing with an improved locking, in accordance with the present invention;
- figure 4 is a plan view from the top of the ski binding toe for alpine skiing with an improved locking, in accordance with the present invention;
- figure 5 is a side view of the ski binding toe for alpine skiing, in accordance with the invention, in a first operating position;
- figure 6 is an assonometric view of ski binding toe for alpine skiing, in accordance with the invention in the operating position of figure 5;
- figure 7 is a side view of the ski binding toe for alpine skiing, in accordance with the invention, in a second operating position;
- figure 8 is an assonometric view of the ski binding toe for alpine skiing, in accordance with the invention, in the operating position of figure 7;
- figure 9 is a side view of the ski binding toe for alpine skiing, in accordance with the invention, in a third operating position;
- figure 10 is an assonometric view of the ski binding toe for alpine skiing, in accordance with the invention, in the operating position of figure 9.

[0024] With reference to the figures mentioned, the ski binding toe, according to the invention, comprises a first lever 10 for automatic locking and manual unlocking of the toe, a second lever 20, pivoted on the lever 10 using the sliding pin 30 that engages within the shaped profile 90, rotating pins 80, 100, provided on the levers 10 and 20, and a spring 40, placed at the rotating pin 80 and also associated with the pin 30, in order to automate the system.

[0025] The levers 10 and 20 are constrained to reciprocally rotate and with respect to the base 110 of the toe, through the pins 80, 100 and are assembled together by the pin 30, which slides driven in the shaped profile 90 present in the lever 20 and allows rotation of the levers 10, 20 with respect to the axis of the pin 30.

[0026] In a first rest position, the toe is in the open position shown in figures 5 and 6, in which the jaws 50 are open, the junction 60 results in a high position and the levers 10, 20 are aligned and forced into such a position by the springs 70, which are interposed between the junction 60 and jaws 50, while the pin 30 is in the end-of-stroke position inside the profile 90 present in the lever 20.

[0027] In a first phase of automatic engagement of the toe (see figures 7 and 8 attached), the skier presses with the toe of the boot on the junction 60 through the lever 20 (according to the direction and orientation indicated by the arrow F1 of figure 8), causing the springs 70 in a push position opposite to that one taken in the previous rest position and thus forcing the jaws 50 to insert the respective cylinder 51 in the respective seats made laterally in the upper of the boot.

[0028] At this stage, the lever 20 rotates around the pin 30 and follows the junction 60, which moves in a low position. In this situation, the lever 10, thanks to the shaped profile 90 and the presence of the spring 40, translates with respect to the lever 20, through the pin 80, and interposes between the lever 20 and base 110 of the binding toe, creating a reaction, as opposed to the disengagement, between the pin 30 and lever 20, which allows the lever 20 to remain in a low position, with the toe placed in a locked and semi-rigid position.

[0029] The reaction created by the system of levers 10, 20 and spring 40 automates the locking of the toe and provides a new automatic locking if the lever 10 is accidentally forced into the direction and orientation of the arrow F2 of figure 8.

[0030] In a phase of manual engagement of the toe, shown in detail in the attached figures 9 and 10, the skier may get, at his discretion, a hard lock of the toe of the binding by forcing the lever 10 in the direction and orientation of the arrow F3.

[0031] With such a manual procedure, the pin 30 slides further inside the shaped profile 90 of the lever 20 and places the lever 10 in such a configuration as to allow the rigid locking of the toe.

[0032] In a further phase of manual and safety engagement of the toe, the skier may get, at his discretion, a free and, therefore, safe lock of the toe of the binding by forcing the lever 10 in the direction and orientation of the arrow F2, over the position of automatic engagement shown in the appended figures 7 and 8, but without disengaging the toe.

[0033] With such a manual procedure, the pin 30 slides inside the shaped profile 90 present in the lever 20 until

a predefined position and places the lever 10 in such a configuration as to allow the free locking of the toe.

[0034] In order to disengage the boot from the toe of the binding, both in the configuration of automatic locking and in the manual disengagement configuration, the skier must impress a force or bump on the lever 10 according to the direction and the orientation of the arrow F2.

[0035] The constructive structure of the toe according to the invention allows to get, in particular, an extremely efficient and reliable operation, since the lever 10 is connected, in articulated way, thanks to the presence of the pin 80 onto which the spring 40 is mounted, with the tag 52 of the base 110 and this allows to make the operation of the automatic locking system independent from the ski structure, mounting of the toe on the ski board and, mostly, presence of snow, ice or extraneous bodies that may be interposed between the locking lever 20 and ski board; indeed, the structure according to the invention prevents such interposition, since the lever 20 is somewhat protected by the tag 52 of the base 110.

[0036] Moreover, according to the invention, it is not necessary that the skier manually actives, as it happens instead in the toes structures of known type, the lever of the locking system, so that the tip does not easily disengage from the boot.

[0037] Finally, the structure of the toe according to the invention also avoids an involuntary disengagement due to impacts or pressures on the lever 20, since the same is positioned above the tag 52 of the base 110 (as already described and pointed out before).

[0038] The technical features of the ski binding toe for alpine skiing, which is object of the present invention, as well as the advantages are clear from the description made.

[0039] It is, finally, clear that many other variations may be made to the toe in question, without departing from the principle of novelty intrinsic in the inventive idea expressed here, as it is clear that, in the practical implementation of the invention, materials, shapes and sizes of the illustrated details can be changed, as needed, and replaced with others technically equivalent.

Claims

1. Ski binding toe for Alpine skiing with an improved locking including a first lever (10) for manual and automatic locking and for manual unlocking of the jaws (50) of said ski binding toe, a second lever (20) pivoting on said first lever (10) through at least one sliding pin (30) that engages within a shaped profile (90), and rotating pins (80, 100) provided on said first (10) and second (20) levers, said levers (10, 20) being constrained to rotate together and to rotate vis-à-vis a base (110) of said ski binding toe by means of said rotating pins (80, 100), said levers (10, 20) being also assembled together through said sliding pin (30), which is able to slide in a guide of said shaped profile (90) of said second lever (20) and which enables a rotation of said levers (10, 20) from the axis of said sliding pin (30), **characterized by** the fact that at least one first elastic element (40) is placed in correspondence of at least one of said rotating pins (80) which is associated with said first lever (10).

2. Ski binding toe as claimed in claim 1, **characterized by** the fact that said first elastic element (40) contacts said sliding pin (30) in order to automate the locking of the jaws (50) of said ski binding toe.

3. Ski binding toe as claimed in claim 1, **characterized by** the fact that, in a first resting position, said jaws (50) are open and a junction (60), that is located centrally among said jaws (50), is in a high position, while said levers (10, 20) are lined up and forced by second elastic elements (70), which are interposed between said junction (60) and said jaws (50) and said sliding pin (30) is in an end position within said shaped profile (90) of said second lever (20).

4. Ski binding toe as claimed in claim 3, **characterized by** the fact that, in a first phase of automatic locking, said junction (60) is pressed (F1), through said second lever (20), in order to bring said second elastic elements (70) in a pushing position and to force said jaws (50) against the ski boots of the user.

5. Ski binding toe as claimed in claim 4, **characterized by** the fact that said second lever (20) rotates around said sliding pin (30) following said junction (60), which moves towards a low position, while said first lever (10), thanks to said shaped profile (90) and to said first elastic element (40), translates with respect to said second lever (20) by means of said rotating pin (80), so as to interpose itself between said second lever (20) and said base (110) of the ski binding toe, in order to have a reaction between said sliding pin (30) and said second lever (20) which makes said second lever (20) to remain in a low position and said ski binding toe to reach a locked and semi-rigid position.

6. Ski binding toe as claimed in claim 1, **characterized by** the fact that said first lever (10) can be forced towards a first prefixed direction and versus (F3) in order to have a manual locking of the ski binding toe, so that said sliding pin (30) slides within said shaped profile (90) of said second lever (20) and moves said first lever (10) in a position that allows a rigid locking of the ski binding toe.

7. Ski binding toe as claimed in claim 6, **characterized by** the fact that, when said ski binding toe is manually locked, said first lever (10) can be forced towards said first direction and in the opposite versus (F2) to

said first versus (F3), so that said sliding pin (30) slides within said shaped profile (90) of said second lever (20) until a fixed position in which said first lever (10) is placed in a position that allows a free locking of the ski binding toe.

8. Ski binding toe as claimed in claims 6 or 7, **characterized by** the fact that a force or a shock which is imparted on said first lever (10) towards said first direction and in the opposite versus (F2) to said first versus (F3) allows to unlock the ski boots from the ski binding toe.

9. Ski binding toe as claimed in claim 1, **characterized by** the fact that said first lever (10) is articulated on at least one tag (52) of the base (110) of said ski binding toe, by means of said rotating pin (80), on which said first elastic element (40) is mounted.

10. Ski binding toe as claimed in claim 8, **characterized by** the fact that said second lever (20) is placed at a height which is higher than the height of said tag (52) of the base (110) of said ski binding toe.

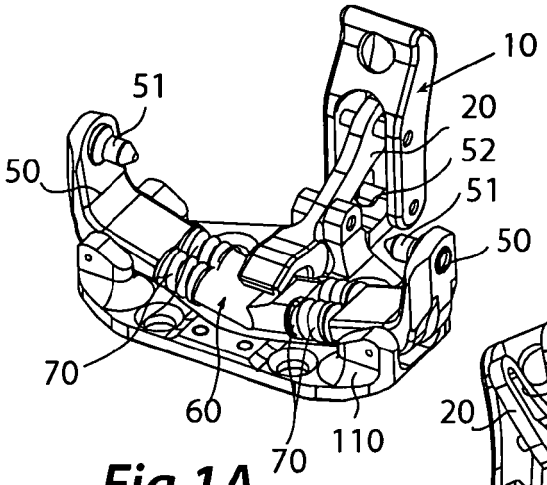

Fig.1A

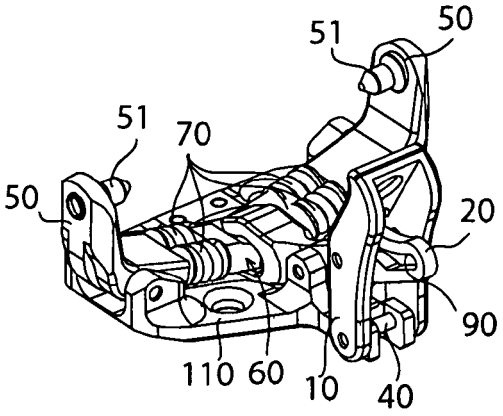

Fig.1C

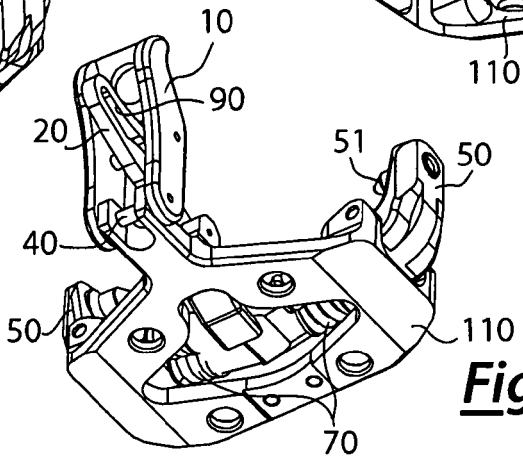

Fig.1B

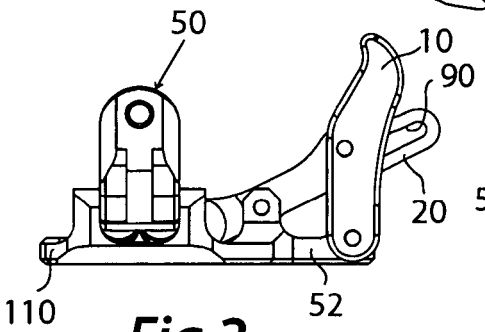

Fig.2

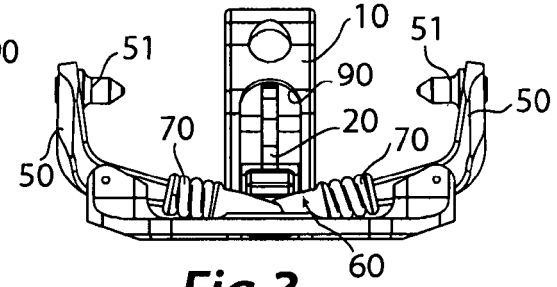

Fig.3

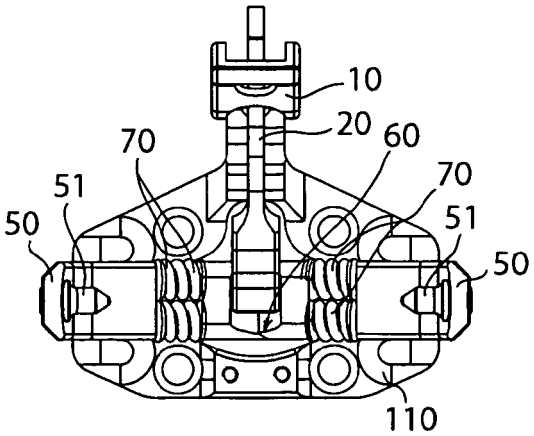

Fig.4

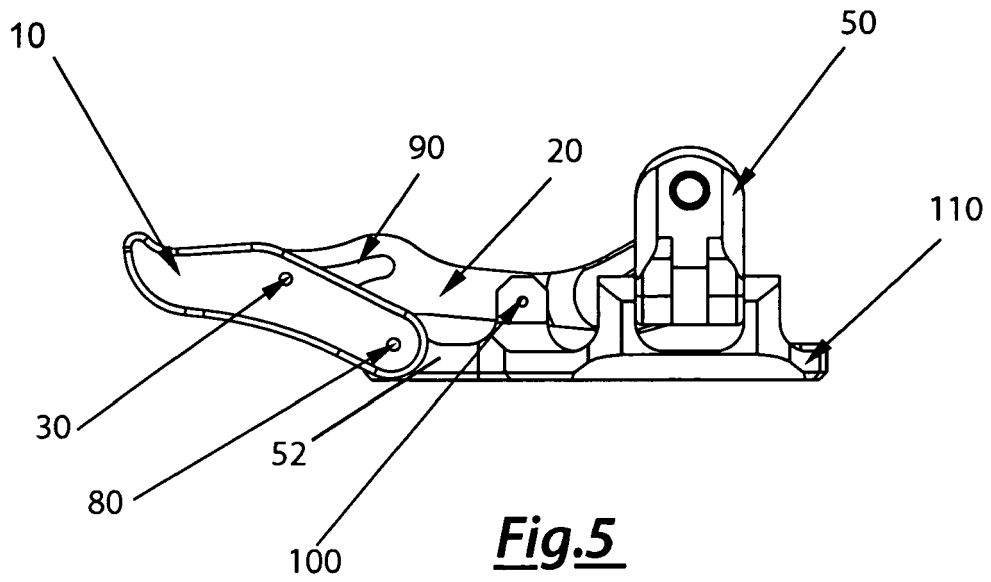

Fig.5

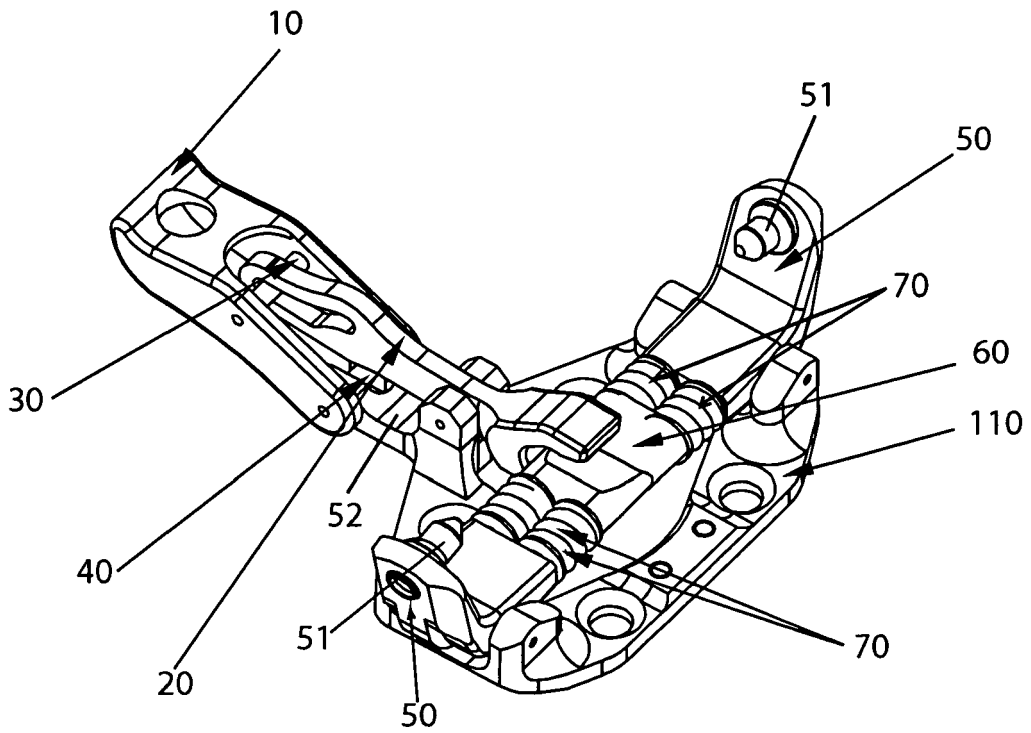

Fig.6

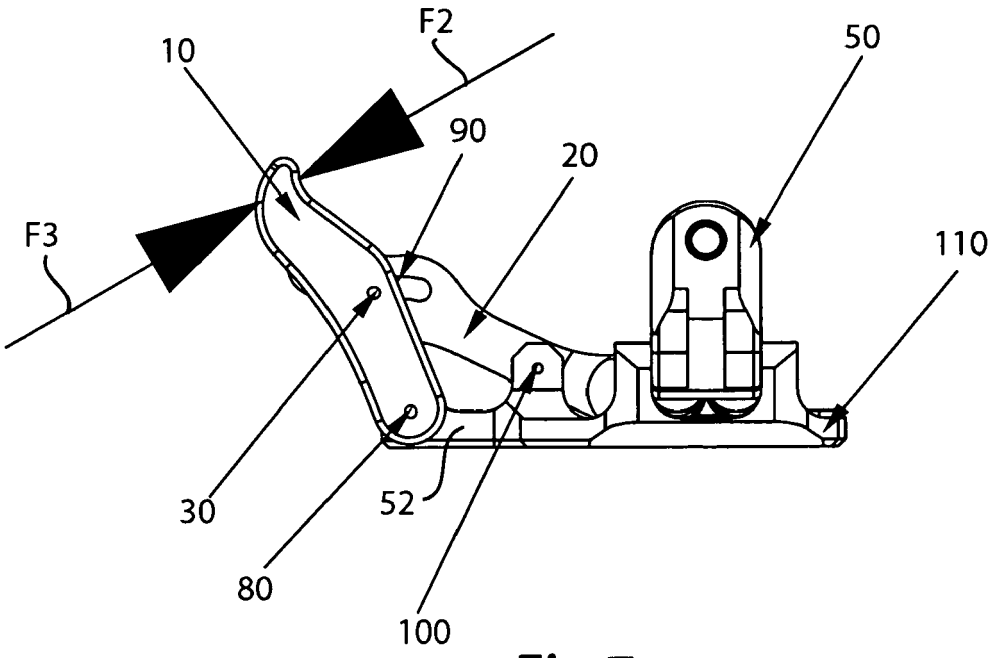
F2
10
50
90
20
F3
110
30
52
80
100

Fig.7

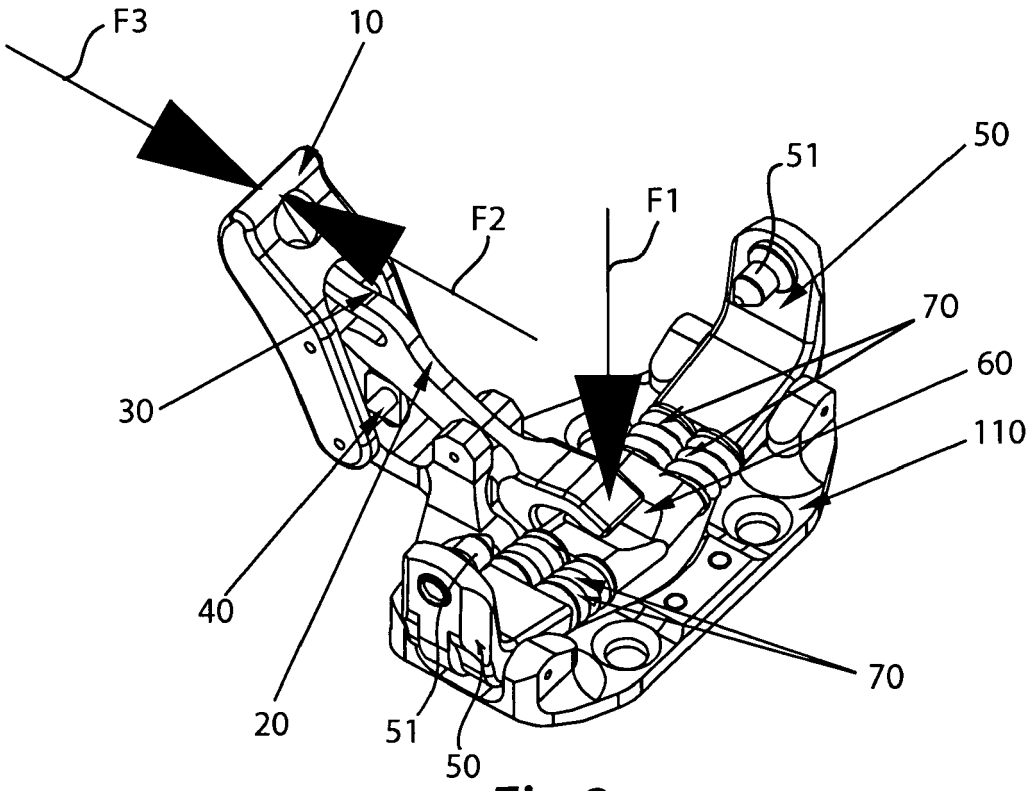
F3
10
50
51
F1
F2
70
60
30
110
40
70
20
51
50

Fig.8

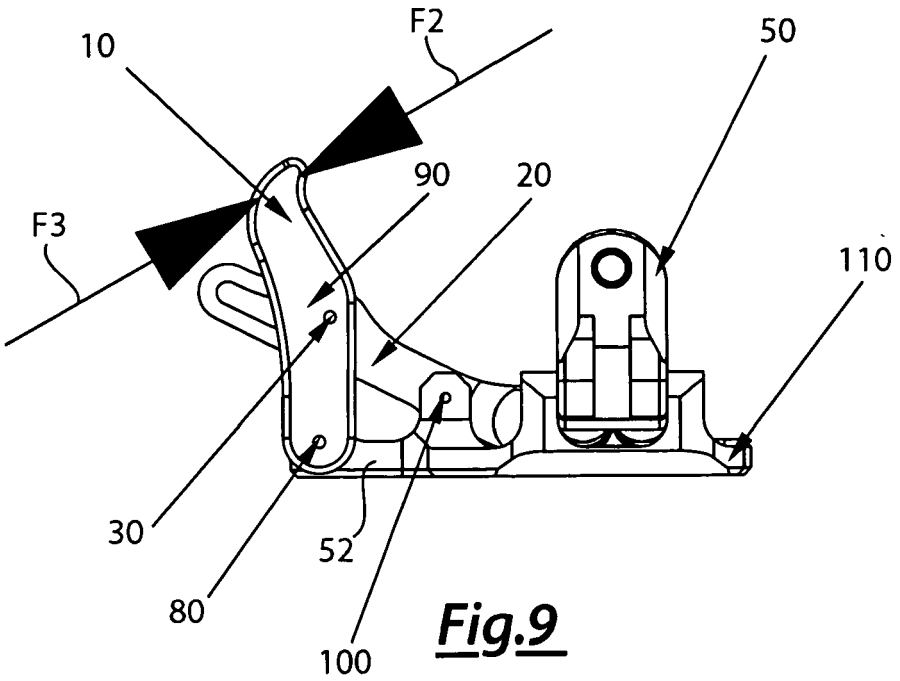
10
F2
50
90
20
F3
110
30
52
80
100

Fig.9

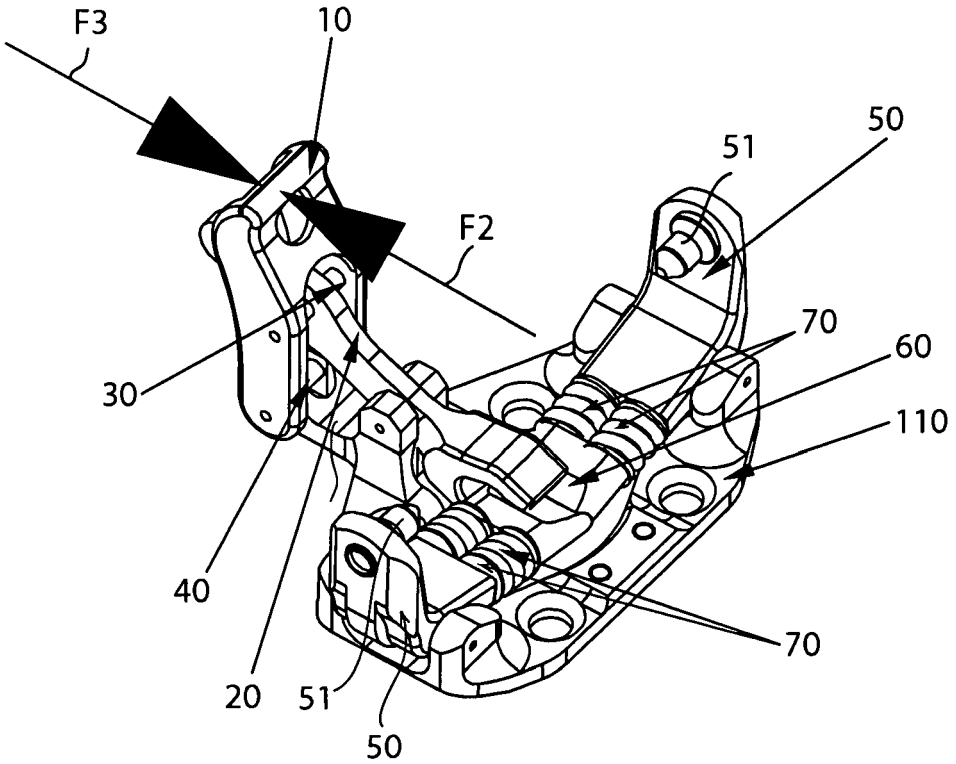
F3
10
50
51
F2
70
60
30
110
40
70
20
51
50

Fig.10

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EUROPEAN SEARCH REPORT

Application Number
EP 10 42 5323

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 January 2011	Vesin, Stéphane

CATEGORY OF CITED DOCUMENTS

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1

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