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(54) **TOE-PIECE FOR SKI BINDINGS**

ZEHENSTÜCK FÜR SKIBINDUNGEN

PIECE DE POINTE POUR FIXATIONS DE SKI

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Description

[0001] The present invention relates to a toe-piece for ski bindings provided with safety release means for the toe of the ski boot.

[0002] It is known in the technical sector relating to ski touring that there exists the need to provide safety bindings comprising a front part or toe-piece able to lock the toe of the ski boot, allowing it to be rotated about a substantially horizontal axis, and a rear part or heel-piece able to cooperate with the heel of the ski boot so as to allow three different modes of use, respectively: heel released (normal walking); heel resting with greater or lesser degree of inclination of the ski boot (walking uphill) and heel locked (downhill skiing).

[0003] EP 0,199,098 describes, for example, known bindings of the type mentioned above which have, however, the drawback consisting in the fact that the toe-piece does not have independent means for releasing the boot in the transverse direction, as required in the event of a fall or a twisting movement during downhill skiing, said safety condition being achieved by means of corresponding means for operating the rear heel-piece, which is therefore very complex and heavy and results in an assembly which has poor rigidity and is awkward during fitting.

[0004] Document US-A-4 348 036 discloses a binding according to the preamble of claim 1.

[0005] The technical problem which is posed, therefore, is to provide a ski binding toe-piece able to achieve locking of the boot toe with the rigidity normally required for such applications and with the possibility of rotating the same toe about a horizontal axis, but at the same time able to allow the toe to come out of the toe-piece in the event of it being acted on by transverse forces, independently of the action of the heel-piece.

[0006] In connection with this problem it is also required that this toe-piece should have small dimensions and a reduced weight, be easy and inexpensive to produce and assemble and be able to be fitted easily to skis using normal standardised connection means.

[0007] These results are achieved according to the present invention by a toe-piece for ski bindings comprising a fixed support base having two jaws, with a respective end pin, able to rotate about an axis substantially perpendicular to the support base so as to pass from an open position into a closed position for locking the toe of a ski boot, said jaws having a resistance arm co-operating with actuating means able to rotate about an axis perpendicular to the support base against the opposing action of resilient means integral with the said toe-piece, said actuating means being constrained to a sliding piece able to be displaced in both senses in the longitudinal direction upon actuation of associated operating means, so as to cause closing/opening of the two jaws.

[0008] Further details may be obtained from the following description of a non-limiting example of embodiment of the subject of the present invention provided with

reference to the accompanying drawings, in which:

- Figure 1 is an exploded view of the toe-piece according to the present invention;
- 5 - Figure 2 is a top plan view of the toe-piece according to Fig. 1;
- Figure 3 is a cross-section along a plane indicated by III-III in Fig. 2;
- Figure 4a,4b is a perspective view and a top plan view of the toe-piece according to Fig. 1 during normal opening for positioning of the toe of the ski boot;
- 10 - Figure 5a,5b is a perspective view and a top plan view of the toe-piece according to Fig. 1 during closing onto the toe of the ski boot;
- 15 - Figure 6 is a top plan view of the toe-piece according to Fig. 1 during release of the ski boot when acted on by transverse forces;
- Figure 7a,7b is a perspective view and a top plan view of the toe-piece according to Fig. 1 during resetting;
- 20 - Figure 8 is a perspective view of a second embodiment of the toe-piece according to the present invention;
- Figure 9 is a view, from above, of a further embodiment of the toe-piece according to the present invention;
- 25 - Figure 10 is an exploded view of a further embodiment of the toe-piece according to the present invention;
- 30 - Figure 11 is a view of the toe-piece according to Fig. 10, partially open;
- Figure 12 is a perspective view of the toe-piece according to Fig. 10 during opening for positioning of the toe of the ski boot;
- 35 - Figure 13 is a perspective view of the toe-piece according to Fig. 10 during closing onto the toe of the ski boot for use during downhill skiing;
- Figure 14 is a perspective view of the toe-piece according to Fig. 10 during closing onto the toe of the ski boot for use when walking uphill;
- 40 - Figure 15 is a view of the toe-piece according to Fig. 10 during release of the ski boot when acted on by transverse forces; and
- 45 - Figure 16 is a perspective view of the toe-piece according to Fig. 10 during resetting.

[0009] As shown in Fig. 1 and with reference to the directions shown by way of example in the figures, so that the toe-piece part furthest from the seat for the toe 1a of the ski boot is assumed to be the "front", and a set of three axes, i.e. a longitudinal axis X-X, transverse axis Y-Y and vertical axis Z-Z, conventionally assumed for the sake of convenience of the description, the toe-piece according to the invention comprises essentially:

- 55 - a fixed base 100 formed by a first substantially flat base-piece 110 with raised longitudinal sides 111 having a respective eyelet 112 elongated in the lon-

- itudinal direction and a respective hole 113; the base-piece 110 is elongated in the longitudinal direction towards the front in the form of a strip 114 in which a hole 114a is present. The base 110 also has formed therein an inset area 110a able to contain the thickness of a counter base-piece 120 made of steel and having raised flanges 121 in the form of a C, the arms of which parallel to the plane of the base 110 are provided with respective coaxial holes 121a able to receive a pin 122 forming an axis of rotation perpendicular to the plane of the base 110;
- this being intended for two jaws 123 arranged opposite each other and symmetrical with respect to the longitudinal axis X-X and in turn formed with a power arm 123a, substantially perpendicular to the base 110 and having a respective conical pin 124 extending parallel to the said base and able to engage with a respective seat 1b in the toe 1a of the ski boot, and a resistance arm 123 substantially parallel to the base 110;
 - the fixed base 110 also has, integral therewith, resilient means 200 arranged so as to project towards the inside of the said base and acting in a direction parallel to the transverse axis Y-Y; said resilient means essentially consist of a pair of springs 210 supported by the respective transverse guiding and retaining elements 220 able to be displaced longitudinally inside the said eyelets 112 in the raised sides 111 so as to vary the position of the springs in the longitudinal direction;
 - the free end of the two springs 210 arranged opposite each other acts on the sides of the means 300 for rotationally actuating the jaws 123 retaining the toe of the ski boot; said actuating means comprise a lever 310 formed by a central body 311a extending in the longitudinal direction so as to be able to be arranged between the two said springs 210, a head 311 shaped so as to have two curved seats 312 symmetrical with respect to the longitudinal axis X-X and open towards the outside, as well as a through-hole 315 able to allow the insertion of means 320 perpendicular to the base 100 and forming an axis of rotation for the lever 310, as well as the element for locking displacement thereof in the two - longitudinal and transverse - directions; said axis of rotation 320 comprises essentially a threaded pin 321, the head 321a of which makes contact against the bottom surface of the base 110 and the shank 321b of which passes through an eyelet 115 in the said base, an eyelet 125 in the counter base-piece 120 and enters into the said hole 315 of the lever 310 so as to engage with a counter-pin 322 having a female thread; in a preferred embodiment it is envisaged that said lever 310 is fastened by means of the pin 320 to a sliding piece 350 having a respective hole 355 for insertion of the said pin. The sliding piece 350 also has, formed thereon, a flange 356 in the form of an overturned L, the free arm of which is able to support

a longitudinally acting safety spring 357, the function of which will become clear below in connection with operation of the toe-piece. In its front part, the sliding piece has an eyelet 354 suitable for engagement with retaining means 354a able to prevent raising in the vertical direction Z-Z, but allow displacement of the sliding piece 350 in both senses of the longitudinal direction X-X. At the front end the sliding piece 350 has a transverse seat 355 which houses inside it:

- the transverse arm 411 of a resilient U-shaped element 410, the longitudinal arms 412 of which have ends 412a folded towards the outside for insertion in corresponding seats 421 of a lever 420 for operating the entire toe-piece, able to be rotationally operated by the user.

[0010] According to preferred embodiments, it is envisaged that said operating lever 420 is provided with an eyelet 422 elongated in the longitudinal direction and receiving, inserted inside it, a button 430 with a gripping head 431 and fork-shaped body 432 able to be arranged over a longitudinal extension 313 of the lever 310 so as to lock/release rotation thereof.

[0011] In addition to this, it is envisaged in a preferred embodiment that the sliding piece 350 is situated, in the vertical direction, between two strips 340 of material with a low coefficient of friction for facilitating displacement thereof with respect to the base and rotation of the lever (311).

[0012] With the configuration described, the operating principle of the toe-piece is as follows:

- under normal conditions (Figs. 4a, 4b) the toe-piece has the operating lever 420 partially raised in the clockwise direction, lever 311 kept in alignment by the two opposite springs 210, jaws 123 with resistance arm 123b inserted in the seat 312 of the said lever 311 and rotated outwards so as to allow entry of the toe of the ski boot in the axial direction;
- once the toe 1a of the ski boot is correctly positioned (Figs. 5a,5b) the operating lever 420 is rotated in the anti-clockwise direction, causing by means of the U-shaped means 420, recalling, towards the front, of the sliding piece 350 which, via the pin 320, causes displacement of the lever 311 which in turn, acting on the resistance arms 123b of the jaws 123 causes rotation thereof towards the inside with closing of the toe-piece and penetration of the conical end pins 124 inside the respective seats 1b of the toe 1a of the ski boot; in this condition the ski boot may only rotate about the said pins 124 if the heel-piece part (not shown) of the binding is free;
- if (Fig. 6) the ski boot is acted on by transverse/twisting forces - schematically indicated by the arrow F - with a high enough modulus, the power arm 123a of the jaws 123 is acted on by a corresponding thrust which causes rotation of the resistance arm 123b

which in turn rotates the lever 310 about the pin 322; At this point two different conditions may occur:

- i) if the force F is not high enough to overcome the total resistance of the transverse spring 320, the latter, reacting, will bring the jaw 123 and therefore the entire toe-piece back into the normal position, resulting in an automatic self-centring effect;
 - ii) if the force F is such as to overcome the total resistance of the spring 320, the rotation of the lever 310 causes the rotation towards the outside/inside of the two jaws 123 so that the one which rotates outwards in the same direction as that of the force F is released from the seat 312 and, disengaging, allows the toe 1a of the ski boot to come out;
-) at this point the toe-piece is totally open and it is necessary to bring it back into the initial condition, resetting the mechanism;
 - for this purpose, the lever 420 is operated (Fig. 7a, 7b), applying a force such as to overcome the resistance of the longitudinal safety spring 357 which hitherto had not intervened and forcing the rotation in a clockwise direction of the said lever which pushes the sliding piece 350 and therefore the lever 310 in the axial direction, causing the arm 123b of the other jaw to come out also from the respective seat and total opening thereof;
 - upon reaching the end-of-travel position - formed by the transverse side of the eyelet 354 which comes into contact with the pin 354a - the lever 420 is rotated in the opposite direction so as to obtain the return movement of the sliding piece 350 towards the front of the toe-piece, said return movement causing reinsertion of the resistance arms 123b into the respective seats 312 of the lever 310 and therefore resetting of the toe-piece which is again ready for use.

[0013] Fig. 8 shows a first variation of embodiment of the toe-piece according to the present invention, in this configuration the operating lever 1420 being connected to the resilient U-shaped element 1410 so as to rotate in the opposite direction to that described above, namely with rotation in the anti-clockwise direction for closing of the toe-piece and rotation in the anti-clockwise direction for opening thereof.

[0014] In both cases the lever 420 and the lever 1420 have respective seats 420a, 1420a for engaging with the end of the ski pole so that the force for closing/opening the toe-piece can be applied.

[0015] Fig. 9 shows a further variation of embodiment of the toe-piece according to the present invention which, in this configuration, has opposition springs 1210 arranged parallel to the longitudinal direction X-X; as shown the springs 1210 are supported by associated means 1220 which are fixed to the base piece 110 and conven-

tional per se and therefore not described in detail, the springs acting in this case against the head part 312 of the lever 311 and the operating principle of the toe-piece remaining the same as that already described.

[0016] As shown in Fig. 10, a further embodiment of the toe-piece according to the present invention comprises essentially:

- a fixed base 2100 formed by a first substantially flat base-piece 2110 with raised longitudinal sides 2111 provided with two respective holes 2113, 2114 coaxial with each other and arranged at different heights from the plane in the direction Z-Z. The base 2110 also has, incorporated therein, a counter base-piece 2120 provided with raised flanges 121 in the form of a C, the arms of which parallel to the plane of the base 2110 are provided with respective coaxial holes 121a able to receive a pin 122 forming an axis of rotation perpendicular to the plane of the base 2110; this being intended for two jaws 123 opposite each other and symmetrical with respect to the longitudinal axis X-X, in turn formed with a power arm 123a substantially perpendicular to the base 2110 and provided with a respective conical pin 124 extending parallel to the said base and able to engage with a respective seat 1b in the toe 1a of the ski boot, and a resistance arm 123b substantially parallel to the base 2110; said jaws being able to rotate towards the outside through an angle greater than 90°;
- means 2300 for reacting to rotation of the jaws 123 for retaining the toe of the ski boot; said reaction means comprise a cam 2311 shaped so as to have two curved seats 2312 symmetrical with respect to the longitudinal axis X-X and open towards the outside, for allowing entry/exit of the resistance arms 123b of the jaws 123; as well as a through-hole 2315 able to allow the insertion of means 2320 perpendicular to the base 2100 and forming an axis of rotation of the cam 2311; said axis of rotation 2320 comprises essentially a pin 2321 fixed by means of pressure to the sliding piece 2350 and able to be inserted inside corresponding holes 2355 of a sliding piece 2350 inside which said cam 2311 is inserted.

[0017] The sliding piece 2350 is made in the form of a box open laterally so as to allow seating of the cam 2311 and a constraining element 2600.

[0018] Said element 2600 has a hole 2605 extending in the transverse direction Y-Y and suitable for engagement with a pin 2430a passing through corresponding holes 2113 in the sides 2111 of the fixed base 2100; in this way the element 2600 forms the means for constraining the sliding piece 2350 to the fixed base 2100 with respect to which the said sliding piece is able to be displaced in both directions and the support surface for the cam 2311.

[0019] In the preferred embodiment shown, the constraining element is in the form of a "U" with arms 2601

which have two transverse coaxial holes, one of which 2602a is a through-hole and the other one 2602b threaded, suitable for engagement with a corresponding pin 2603 having a threaded end and therefore able to exert a compressive force on the arms 2601 of the "U" for the purposes which will be described below with reference to operation of the binding.

[0020] The transverse arm 2604 of the "U" has, projecting axially therefrom, a pin 2605 able to form the support of resilient opposition means acting in the longitudinal direction X-X and consisting of a spring 2210 housed inside the sliding piece 2350 inside which it is inserted via a threaded hole 2351 which is closed by an adjusting screw 2351a, greater or lesser screwing of which causes greater/lesser compression of the spring and therefore greater/lesser resistance to release of the jaws 123.

[0021] At its rear end the sliding piece 2350 has a surface 2350a which is suitably shaped so as to interact with a corresponding surface 2311a of the said cam 2311 so as to cause correct centring thereof in the rest condition.

[0022] At the front end the sliding piece 2350 has transverse extensions 2352 shaped in the manner of a cam 2352a in the vertical direction Z-Z and able to form a stop for the free end 2431a of arms 2431 of a lever 2430 for locking/releasing the sliding piece, able to be operated rotationally by the user about a pin 2430a inserted in the transverse direction y-y inside the said holes 2113 of the flanges 2111 of the base piece 2110.

[0023] The toe-piece comprises, moreover, a front fork-shaped lever 2420 pivotably mounted on the base piece 2110 by means of an associated transverse pin 2420a inserted inside the holes 2114 of the flanges 2111 of the base 2110 and the rear ends of which 2420b are able to act on the corresponding resistance arm 123b of the jaw 123 so as to bring it from the rest (closed position) into a more open position able to allow insertion of the toe 1a of the ski boot.

[0024] The opposing rotation outwards of the two jaws 123 results in a displacement of the sliding piece 2350 and a compression of the longitudinal spring 2210 which, upon release of the lever 2420, will bring the sliding piece, cam, lever and jaws back into the normal closed position.

[0025] With the configuration described, the operating principle of the toe-piece is as follows:

- in the rest condition (Fig. 11) the toe-piece is normally closed and has the control lever 2420 partially raised in the clockwise direction, the locking/release lever 2430 raised in the clockwise direction and the jaws 123 closed;
- in order to allow entry of the toe 1a of the ski boot in the axial direction, the control lever 2420 is operated, causing it to rotate downwards (Fig. 12) and producing the action of the rear ends 2420b of the lever 2420 on the corresponding arm 123b of the jaw 123 so as to bring it from the rest position into a more open position able to allow insertion of the toe of the ski boot;

- once the toe 1a of the ski boot is correctly positioned (Fig. 13), the control lever 2420 is released and, rotating in the clockwise direction, disengages its ends 2420b from the resistance arm 123b of the jaw 123, causing the recall, towards the front, of the sliding piece 2350 which causes the displacement of the cam 2311 which, in turn, acting on the resistance arms 123b of the jaws 123 causes rotation thereof towards the inside with closing of the toe-piece and penetration of the conical pins 124 inside the respective seats 1b in the toe 1a of the ski boot;

- once the ski boot is positioned, release of the control lever 2420 causes the return of the toe-piece into the rest condition described above which allows the user to select two respective modes of use:

- for downhill skiing (Fig. 13) with the locking/release lever 2430 raised and sliding piece 2350 free, or

- for uphill walking (Fig. 14) with the locking/release lever 2430 lowered so that the ends 2431a of its arms come into contact against the cam 2352a of the sliding piece 2350 locking it in position and preventing it from being displaced; in this condition the ski boot may only rotate about the said pins 124 if the heel-piece part (not shown) of the binding is free;

- from the downhill skiing configuration shown in Fig. 13 and if (Fig. 15) the ski boot is acted on by transverse/twisting forces - schematically indicated by the arrow F - with a high enough modulus, the power arm 123a of the jaw 123 is acted on by a corresponding thrust which causes rotation of the resistance arm 123b which in turn rotates the cam 2311 on the corresponding curved seat of the constraining element 2600, at this point two different conditions may occur:

- i) if the force F is not high enough to overcome the total resistance of the longitudinal spring 2210, the latter, reacting, will bring the sliding piece 2350 back into the normal position, causing an interaction between the corresponding rear shaped surface 2350a of the said sliding piece and shaped surface 2311a of the cam 2311 which will tend to rotate in the reverse direction, assuming the rest condition again and resulting in an automatic self-centring effect;

- ii) if the force F is such as to overcome the total resistance of the spring 2210, the rotation of the cam 2311 is such as to disengage the two opposite centring surfaces 2311a and 2350a, causing the rotation towards the outside/inside of the two jaws 123 so that the one which rotates outwards in the same direction as that of the force F is released from the seat 2312 and, disengaging, allows the toe 1a of the ski boot to

come out;

-) at this point the toe-piece is totally open and it is necessary to bring it back into the initial condition, resetting the mechanism;
- for this purpose (Fig. 16) the lever 2420 is operated, raising it completely in the clockwise direction; during rotation two opposite teeth 2425 engage with the locking/release lever 2430, causing it to rotate upwards and disengaging the arms 2431 from the cams 2352a of the sliding piece 2350; continuing its travel movement the lever 2420 enters into contact with two reliefs 2356 of the sliding piece 2350 which is pushed in the axial direction towards the rear, causing the arm 123b of the other jaw to come out also of the respective seat and total opening thereof;
- upon reaching the end-of-travel position - determined by the total compression of the spring 2210 - the opposite centring surfaces 2311a of the cam and 2350a of the sliding piece engage again causing the return of the cam 2311 into the normal position; rotating at this point the lever 2420 in the opposite direction, return of the sliding piece 2350 towards the front of the toe-piece will be obtained, said return movement causing the reinsertion of the resistance arms 123b into the respective seats 2312 of the cam 2311, bringing the toe-piece back into the normal rest condition.

[0026] In order to facilitate operation of the lever 1420, the latter has an engaging seat 1420a inside which it is possible to insert the tip of the ski pole so as to exert the thrust providing the force for opening the toe-piece. In the event of wear of contact surfaces of the engaging pins 124 of the boot and/or the seats 1b of the latter, it will be possible to adjust the transverse screw 2603, tightening the longitudinal arms 2601 of the U which, adhering more firmly to the surface of the cam 2311, takes up the play, resulting in restoration of the initial operating conditions.

[0027] It can therefore be seen how, with the toe-piece according to the present invention, it is possible to obtain all the advantages resulting from the safety release mechanisms incorporated in the said toe-piece, it being also possible, however, to obtain a lower overall weight of the said heel-piece as well as simplification and reduction in the weight of the heel-piece, resulting in greater rigidity of the binding and therefore improved manoeuvrability of the ski.

[0028] In addition to this, it can also be seen how it is possible to adjust easily the resistance to opening of the toe-piece by displacing, in the longitudinal direction, the position of the springs 210 inside the eyelet 112 of the base 110, this allowing the production of a single toe-piece model able to operate correctly for a wider range (weight) of users.

[0029] Moreover, the toe-piece according to the invention allows easy adjustment depending on the variation

in transverse width of the seats engaging with the ski boot, said width diminishing with the wear of the said seats, as well as a practical fitting action obtained by means of the thrusting force applied on the lever 2420 by the tip of the ski pole, resulting in widening of the jaws, allowing insertion of the toe of the ski boot.

Claims

1. Toe-piece for ski bindings comprising a fixed support base (100;2100) having two jaws (123) situated opposite each other and with a respective pin (124) extending towards the inside in the transverse direction (Y-Y) and able to engage with a respective seat (1b) in the toe (1a) of a ski boot, said jaws (123) being able to rotate about an axis (122) substantially perpendicular to the support base (100;2100) from a closed position into an open position and vice versa for locking/releasing the toe (1a) of a ski boot, said jaws having a resistance arm (123b) co-operating with reaction means (311;2311) able to rotate about an axis (320;2320) perpendicular to the base (100; 2100) against the opposing action of resilient means (210;1210;2210) integral with the said toe-piece, **characterized in that** said reaction means (311; 2311) are constrained to a sliding piece (350;2350) able to be displaced in both senses in the longitudinal direction (X-X) against the recall action of resilient means (357;2210) and **in that** the respective pin (124) is conical.
2. Toe-piece according to Claim 1, **characterized in that** said fixed base (2100) comprises a first substantially flat base-piece (2110) with raised longitudinal sides (2111) having two respective holes (2113,2114) coaxial with each other and arranged at different heights from the plane in the direction (Z-Z).
3. Toe-piece according to Claim 2, **characterized in that** the base (2110) has, incorporated therein, a counter base-piece (2120) provided with raised flanges (121) in the form of a C, the arms of which parallel to the plane of the base (2110) are provided with respective coaxial holes (121a) able to receive a pin (122) forming an axis of rotation perpendicular to the plane of the base (2110).
4. Toe-piece according to Claim 3, **characterized in** said jaws (123) are pivotably mounted on said axis of rotation (122) perpendicular to the plane of the base (2110).
5. Toe-piece according to Claim 3, **characterized in that** said jaws (123) are situated opposite each other and symmetrical with respect to the longitudinal axis (X-X) and comprise a power arm (123a) substantially

- perpendicular to the base (110; 2110) and provided with said conical pin (124) extending parallel to the said base and a resistance arm (123b) substantially parallel to the base (110;2110).
6. Toe-piece according to Claim 1, **characterized in that** said reaction means comprise a cam (2311) shaped so as to have two curved seats (2312) symmetrical with respect to the longitudinal axis (X-X) and open towards the outside so as to allow entry/exit of the resistance arms (123b) of the jaws (123) as well as a through-hole (2315) able to allow the insertion of means (2320) perpendicular to the base (2100) and forming an axis of rotation of the cam (2311).
 7. Toe-piece according to Claim 1, **characterized in that** the sliding piece (2350) is made in the form of a box open laterally so as to be able to receive the cam (2311) and an element (2600) for performing constraining to the base (2100).
 8. Toe-piece according to Claim 1, **characterized in that** said sliding piece (2350) has, on its front surface, a threaded hole (2351) closed by an adjusting screw (2351a).
 9. Toe-piece according to Claim 1, **characterized in that** said resilient opposition means acting in the longitudinal direction X-X are housed inside said sliding piece.
 10. Toe-piece according to Claim 9, **characterized in that** said resilient opposition means comprise a spring (2210) longitudinally situated between said adjusting screw (2351a) and a pin (2605) axially projecting from said constraining means (2600).
 11. Toe-piece according to Claim 1, **characterized in that** said sliding piece (2350) has at its rear end a surface (2350a) suitably shaped so as to interact with a corresponding surface (2311a) of the said cam (2311) so as to cause correct centring thereof.
 12. Toe-piece according to Claim 1, **characterized in that** the sliding piece (2350) has at its front end transverse extensions (2352) shaped as a cam (2352a) in the vertical direction (Z-Z) and able to form a stop for the free end (2431a) of arms (2431) of a lever (2430) for locking/unlocking the sliding piece.
 13. Toe-piece according to Claim 12, **characterized in that** said locking/unlocking lever (2430) is able to rotate about a pin (2430a) inserted in the transverse direction (Y-Y) of holes (2113) in the flanges (2111) of the base piece (2110).
 14. Toe-piece according to Claim 7, **characterized in that** said element for constraining the sliding piece (2350) to the base (2110) is in the form of a U witch arms (2601) extending in the longitudinal direction (X-X) and provided with transverse coaxial holes, one of which (2602a) is a through-hole and the other (2602b) a threaded hole, suitable for engagement with a corresponding pin (2603) having a threaded end.
 15. Toe-piece according to Claim 1, **characterized in that** it comprises a front lever (2420) in the form of a fork pivotably mounted on the base piece (2110) by means of an associated transverse pin (2420a) inserted in the holes (2114) in the flanges (2111) of the base (2110), the rear ends (2420b) of said lever being able to act on the corresponding resistance arm (123b) of the jaw (123) so as to bring it from the rest position into a more open position able to allow insertion of the toe (1a) of the ski boot.
 16. Toe-piece according to Claim 1, **characterized in that** said base (100) comprises a first base piece (110) associated with a counter base-piece (120) provided with flanges (121) able to receive a pin (122) forming an axis of rotation perpendicular to the plane of the base (110) for said jaws (123).
 17. Toe-piece according to Claim 16, **characterized in that** said flanges (121) are raised in the form of a C and the arms parallel to the plane of the base (110) are provided with the respective coaxial holes (121a) for receiving said pin (122).
 18. Toe-piece according to Claim 16, **characterized in that** said base piece (110) has raised longitudinal sides (111) perpendicular to the said base and provided with a respective eyelet (112) extending in the longitudinal direction (X-X).
 19. Toe-piece according to Claim 16, **characterized in that** said first base piece (110) comprises a strip (114) elongated in the longitudinal direction towards the front and provided with a hole (114a) able to engage with a corresponding locking pin (354a) in the vertical direction (Z-Z).
 20. Toe-piece according to Claim 1, **characterized in that** said means for actuating the jaws (123) comprise a lever (310) formed by a central body (311a) extending in the longitudinal direction and a head (311) shaped so as to have two curved seats (312) symmetrical with respect to the longitudinal axis (X-X) and open towards the outside.
 21. Toe-piece according to Claim 20, **characterized in that** said lever (311) has a through-hole (315) able to allow the insertion of means (320) perpendicular to the base (100) and forming an axis of rotation of

- the lever (310).
22. Toe-piece according to Claim 21, **characterized in that** said axis of rotation (320) essentially consists of a threaded pin (321), the head (321a) of which comes into contact against the bottom surface of the base (110) and the shank (321b) of which passes through an eyelet (115) in the said base, an eyelet (125) in the counter base-piece (120) and enters into said hole (315) of the lever (310) so as to engage with a counter-pin (322) having a female thread.
23. Toe-piece according to Claim 1, **characterized in that** said sliding piece (350) has, at the front thereof, an eyelet (354) receiving retaining means (354a) able to prevent raising of the sliding piece in the vertical direction (Z-Z) and allow displacement thereof in both senses in the longitudinal direction (X-X).
24. Toe-piece according to Claim 1, **characterized in that** said sliding piece (350) has a flange (356) in the form of an overturned L, the free arm of which is able to support resilient safety means (357) acting in the longitudinal direction (X-X) against the action of the said control means (420).
25. Toe-piece according to Claim 1, **characterized in that**, at its front end, said sliding piece (350) has a transverse seat (355) able to engage with said control means (410, 420).
26. Toe-piece according to Claim 1, **characterized in that** said sliding piece (350) is situated, in the vertical direction, between two strips (340) of material with a low coefficient of friction.
27. Toe-piece according to Claim 1, **characterized in that** said resilient means (200) comprise a pair of springs (210) extending in the transverse direction and situated opposite each other, the free end thereof acting on the sides of the means (300) for actuating the jaws (123).
28. Toe-piece according to Claim 27, **characterized in that** the said resilient means (210) are supported by respective transverse guiding and retaining elements (220), integral with the sides (111) of the base (110).
29. Toe-piece according to Claim 28, **characterized in that** said means (220) supporting the springs (210) are able to be displaced in the longitudinal direction inside the said eyelets (112) of the raised sides (111) so as to vary the point of application of the transverse opposing action of the springs.
30. Toe-piece according to Claim 1, **characterized in that** said resilient means (1200) comprise a pair of springs (1210) arranged parallel to the longitudinal direction (X-X) on opposite sides of the lever (311) and acting against the head part (312) of the said lever.
31. Toe-piece according to Claim 30, **characterized in that** said springs (1210) are supported by associated means (1220) fixed to the base piece (110).
32. Toe-piece according to Claim 1, **characterized in that** said control means (410,420;1410) comprise a resilient element (410) in the form of a U, the longitudinal arms (412) of which have ends (412a) folded towards the outside for insertion in corresponding seats (421;1421) of a lever (420;1420) for operating the entire toe-piece, able to be rotationally operated by the user.
33. Toe-piece according to Claim 32, **characterized in that** the transverse arm (411) of the said resilient element is suitable for insertion inside a front transverse seat (355) of the sliding piece (350).
34. Toe-piece according to Claim 1, **characterized in that** said operating lever (420) is provided with an eyelet (422) elongated in the longitudinal direction and able to form a seat for a button (430) displaceable in both senses of the longitudinal direction inside said eyelet so as to cause locking/unlocking of the rotational movement of the lever (310) actuating the jaws (123).
35. Toe-piece according to Claim 1, **characterized in that** said button (430) has a gripping head (431) and fork-shaped body (432) able to be arranged over a longitudinal extension (313) thereof.
36. Toe-piece according to Claim 1, **characterized in that** the lever (420;1420;2420) has at least one respective seat (420a,1420a;2420a) for engagement with the tip of a ski pole.
37. Toe-piece according to Claim 1, **characterized in that** the outwards rotation of said jaws (123) may extend through an angle greater than 90°.

Patentansprüche

1. Zehenstück für Skibindungen, umfassend eine feststehende Trägerbasis (100; 2100) mit zwei Backen (123), die einander gegenüberliegen, und mit einem entsprechenden Stift (124), der sich in der Querrichtung (Y-Y) zu der Innenseite hin erstreckt und in der Lage ist, mit einer entsprechenden Aufnahme (1 b) in dem Zehenteil (1a) eines Skischuhs einzugreifen, wobei die Backen (123) in der Lage sind, sich um eine Achse (122) herum, die im Wesentlichen senkrecht zu der Trägerbasis (100; 2100) verläuft, von

- einer geschlossenen Stellung in eine offene Stellung und umgekehrt zu drehen, um das Zehenteil (1a) eines Skischuhs festzuklemmen/freizugeben, wobei die Backen (123) einen Widerstandsarm (123b) aufweisen, der mit einem Reaktionsmittel (311; 2311) zusammenwirkt, das in der Lage ist, sich um eine senkrecht zu der Basis (100; 2100) verlaufende Achse (320; 2320) herum gegen die entgegengesetzt wirkende Kraft eines Federmittels (210; 1210; 2210) unter Bildung einer Einheit mit dem Zehenstück zu drehen, **dadurch gekennzeichnet, dass** das Reaktionsmittel zu einem Gleitstück (350; 2350) hin festgespannt ist, das in der Lage ist, gegen die Rückstellwirkung des Federmittels (357; 2210) in beiden Bewegungsrichtungen in der Längsrichtung (X-X) verschoben zu werden, und **dadurch**, dass der betreffende Stift (124) konisch ist.
2. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** die feststehende Basis (2100) ein erstes, im Wesentlichen ebenes Basisstück (2110) umfasst, das hervorstehende Längsseiten (2111) mit jeweils zwei einander entsprechenden Löchern (2113, 2114) aufweist, die koaxial miteinander verlaufen und in unterschiedlicher Höhe von der Ebene in der Richtung (Z-Z) angeordnet sind.
3. Zehenstück nach Anspruch 2, **dadurch gekennzeichnet, dass** die Basis (2110) darin integriert ein Gegen-Basisstück (2120) aufweist, das mit hervorstehenden, C-förmigen Flanschen (121) ausgestattet ist, deren parallel zu der Ebene der Basis (2110) verlaufende Arme jeweils mit entsprechenden koaxialen Löchern (212a) versehen sind, die in der Lage sind, einen Stift (122) aufzunehmen, der eine senkrecht zu der Ebene der Basis (2110) verlaufende Drehachse bildet.
4. Zehenstück nach Anspruch 3, **dadurch gekennzeichnet, dass** die Backen (123) senkrecht zu der Ebene der Basis (2110) verschwenkbar an der Drehachse (122) montiert sind.
5. Zehenstück nach Anspruch 3, **dadurch gekennzeichnet, dass** die Backen (123) einander gegenüberliegend und symmetrisch in Bezug auf die Längsachse (X-X) gelegen sind und einen im Wesentlichen senkrecht zu der Basis (110; 2110) verlaufenden Kraftarm (123a) mit dem sich parallel zu der Basis erstreckenden, konischen Stift (124) sowie einen im Wesentlichen parallel zu der Basis (110; 2110) verlaufenden Widerstandsarm (123b) umfassen.
6. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Reaktionsmittel eine Nocke (2311) umfasst, die so geformt ist, dass sie zwei gekrümmte Aufnahmen (2312) aufweist, die symmetrisch in Bezug auf die Längsachse (X-X) sind und nach außen hin offen sind, um ein Eintreten/Austreten der Widerstandsarme (123b) der Backen (123) zu erlauben, sowie ein Durchgangsloch (2315), das in der Lage ist, das Einführen eines Mittels (2320) zu erlauben, das senkrecht zu der Basis (2100) verläuft und eine Drehachse der Nocke (2311) bildet.
7. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (2350) in Form eines seitlich offenen Gehäuses gefertigt ist, so dass es in der Lage ist, die Nocke (2311) und ein Element (2600) zur Durchführung des Festspannens zu der Basis (2100) hin aufzunehmen.
8. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (2350) an seiner Vorderfläche ein Gewindeloch (2351) aufweist, das durch eine Einstellschraube (2351 a) verschlossen ist.
9. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das in der Längsrichtung X-X wirkende Gegenfedermittel in dem Gleitstück untergebracht ist.
10. Zehenstück nach Anspruch 9, **dadurch gekennzeichnet, dass** das Gegenfedermittel eine Feder (2210) umfasst, die in Längsrichtung zwischen der Einstellschraube (2351 a) und einem Stift (2605) gelegen ist, der axial von dem Festspannmittel (2600) vorsteht.
11. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (2350) an seinem Hinterende eine Oberfläche (2350a) aufweist, die in geeigneter Weise geformt ist, so dass sie mit einer entsprechenden Fläche (2311a) der Nocke (2311) in Wechselwirkung tritt, um eine korrekte Zentrierung derselben zu bewirken.
12. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (2350) an seinem Vorderende Querverlängerungen (2352) aufweist, die als Nocke (2352a) in der vertikalen Richtung (Z-Z) geformt sind und in der Lage sind, einen Anschlag für das freie Ende (2431a) von Armen (2431) eines Hebels (2430) zum Festklemmen/Freigeben des Gleitstücks zu bilden.
13. Zehenstück nach Anspruch 12, **dadurch gekennzeichnet, dass** der Festklemm/Freigabehebel (2430) in der Lage ist, sich um einen Stift (2430a) herum zu drehen, der in der Querrichtung (Y-Y) von Löchern (2113) in den Flanschen (2111) des Basisstücks (2110) eingesetzt ist.
14. Zehenstück nach Anspruch 7, **dadurch gekennzeichnet,**

- zeichnet, dass** das Element zum Festspannen des Gleitstücks (2350) an die Basis (2110) U-förmig ist, mit Armen, die sich in der Längsrichtung (X-X) erstrecken und mit quer verlaufenden, koaxialen Löchern versehen sind, von denen eines (2602a) ein Durchgangsloch und das andere (2602b) ein Gewindeloch ist, das dafür geeignet ist, mit einem entsprechenden Stift (2603), der ein mit Gewinde versehenes Ende aufweist, einzugreifen.
- 5
15. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** es einen vorderen Hebel (2420) in Form einer Gabel umfasst, die mittels eines zugehörigen Querstifts (2420a), der in die Löcher (2114) in den Flanschen (2111) der Basis (2110) eingesetzt ist, schwenkbar an dem Basisstück (2110) montiert ist, wobei die hinteren Enden (2420b) des Hebels in der Lage sind, auf den entsprechenden Widerstandsarm (123b) der Backe (123) so einzuwirken, dass diese von der Ruhestellung in eine offenere Stellung gebracht wird, die in der Lage ist, ein Einsetzen des Zehenteils (1a) des Skischuhs zu ermöglichen.
- 10
16. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** die Basis (100) ein erstes Basisstück (110) umfasst, das mit einem Gegen-Basisstück (120) verbunden ist, welches mit Flanschen (121) ausgestattet ist, die in der Lage sind, einen Stift (122) aufzunehmen, der eine senkrecht zu der Ebene der Basis (100) verlaufende Drehachse für die Backen (123) bildet.
- 15
17. Zehenstück nach Anspruch 16, **dadurch gekennzeichnet, dass** die Flansche (121) C-förmig hervorstehen und die parallel zu der Ebene der Basis (110) verlaufenden Arme mit den entsprechenden koaxialen Löchern (121 a) zum Aufnehmen des Stifts (122) versehen sind.
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18. Zehenstück nach Anspruch 16, **dadurch gekennzeichnet, dass** das Basisstück (110) hervorstehende Längsseiten (111) umfasst, die senkrecht zu der Basis verlaufen und jeweils mit einer Öse (112) ausgestattet sind, die sich in der Längsrichtung (X-X) erstreckt.
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19. Zehenstück nach Anspruch 16, **dadurch gekennzeichnet, dass** das erste Basisstück (110) einen in Längsrichtung zu der Vorderseite hin verlängerten Streifen (114) umfasst, der mit einem Loch (114a) versehen ist, das in der Lage ist, in der vertikalen Richtung (Z-Z) mit einem entsprechenden Sicherungsstift (354a) einzugreifen.
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20. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Mittel zum Betätigen der Backen (123) einen Hebel (310) umfasst, der durch einen
- 35
- sich in Längsrichtung erstreckenden Zentralkörper (311a) und einen Kopf (311) gebildet ist, welcher so geformt ist, dass er zwei gekrümmte Aufnahmen (312) aufweist, die in Bezug auf die Längsachse (X-X) symmetrisch und nach außen hin offen sind.
- 40
21. Zehenstück nach Anspruch 20, **dadurch gekennzeichnet, dass** der Hebel (311) ein Durchgangsloch (315) aufweist, das in der Lage ist, das Einsetzen eines Mittels (320) zu erlauben, das senkrecht zu der Basis (100) verläuft und eine Drehachse des Hebels (310) bildet.
- 45
22. Zehenstück nach Anspruch 21, **dadurch gekennzeichnet, dass** die Drehachse (320) im Wesentlichen aus einem Gewindestift (321), dessen Kopf (321 a) gegen die Unterseite der Basis (110) in Kontakt kommt, und dessen Schaft (321 b) sich durch eine Öse (115) in der Basis, eine Öse (125) in dem Gegen-Basisstück (120) hindurch so in das Loch (315) des Hebels (310) hinein erstreckt, dass er mit einem Gegenstift (322), der ein Innengewinde aufweist, eingreift.
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23. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (350) an seiner Vorderseite eine Öse (354) aufweist, die ein Haltemittel (354a) aufnimmt, welches in der Lage ist, ein Anheben des Gleitstücks in der vertikalen Richtung (Z-Z) zu verhindern und dessen Verschiebung in beiden Bewegungsrichtungen in der Längsrichtung (X-X) zu erlauben.
- 55
24. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (350) einen Flansch (356) in Form eines liegenden L aufweist, dessen freier Arm in der Lage ist, ein Sicherungs-Federmittel (357) zu tragen, das in der Längsrichtung (X-X) der Wirkung des Stellmittels (410, 420) entgegenwirkt.
26. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (350) an seinem Vorderende eine quer verlaufende Aufnahme (355) aufweist, die in der Lage ist, mit dem Stellmittel (410, 420) einzugreifen.
27. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gleitstück (350) sich in der vertikalen Richtung zwischen zwei Streifen (340) eines Materials mit einem geringen Reibungskoeffizienten befindet.
28. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Federmittel (200) ein Paar Federn (210) umfasst, die sich in Querrichtung erstrecken und sich in einander gegenüberliegender Position befinden, wobei deren freie Enden jeweils auf die Seiten des Mittels zum Betätigen der Backen

(123) wirken.

28. Zehenstück nach Anspruch 27, **dadurch gekennzeichnet, dass** das Federmittel (210) durch entsprechende quer verlaufende Führungs- und Halteelemente (220) getragen wird, die mit den Seiten (111) der Basis (110) eine Einheit bilden. 5
29. Zehenstück nach Anspruch 28, **dadurch gekennzeichnet, dass** das Mittel (220), das die Federn (210) trägt, in der Lage ist, innerhalb der Ösen (112) der vorstehenden Seiten (111) in Längsrichtung verschoben zu werden, um den Angriffspunkt der entgegengesetzt quer verlaufenden Wirkkraft der Federn zu verändern. 10
30. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Federmittel (1200) ein Paar Federn (1210) umfasst, die parallel zu der Längsrichtung (X-X) verlaufend an entgegengesetzten Seiten des Hebels (311) angeordnet sind und gegen das Kopfteil (312) des Hebels wirken. 20
31. Zehenstück nach Anspruch 30, **dadurch gekennzeichnet, dass** die Federn von einem zugehörigen Mittel (1220), das an dem Basisstück (110) befestigt ist, getragen werden. 25
32. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** das Stellmittel (410, 420; 1410) ein Federelement (410) mit einer U-Form umfasst, dessen Längsarme (412) Enden (412a) aufweisen, die nach außen hin gebogen sind, um in entsprechende Aufnahmen (421; 1421) eines Hebels (420; 1420) zum Betätigen des gesamten Zehenstücks, das von einem Benutzer durch Drehen betätigt werden kann, eingesetzt zu werden. 30
33. Zehenstück nach Anspruch 32, **dadurch gekennzeichnet, dass** der Querarm (411) des Federelements geeignet ist, in eine vordere, der quer verlaufende Aufnahme (355) des Gleitstücks (350) eingesetzt zu werden. 40
34. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** der Betätigungshebel (420) mit einer Öse (422) ausgestattet ist, die in Längsrichtung verlängert ist und in der Lage ist, eine Aufnahme für einen Druckknopf (430) zu bilden, der innerhalb der Öse in beiden Bewegungsrichtungen der Längsrichtung verschiebbar ist, um ein Festklemmen/ Freigeben der Drehbewegung des Hebels (310) zum Betätigen der Backen (123) zu bewirken. 45
35. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** der Druckknopf (430) einen Greifkopf (431) und einen gabelförmigen Körper (432) aufweist, der in der Lage ist, über eine Längsaus-

dehnung (313) davon angeordnet zu werden.

36. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** der Hebel (420; 1420; 2420) zumindest eine entsprechende Aufnahme (420a; 1420a; 2420a) aufweist, um mit der Spitze eines Skistocks einzugreifen. 5
37. Zehenstück nach Anspruch 1, **dadurch gekennzeichnet, dass** die Auswärtsdrehung der Backen (132) sich über einen Winkel von mehr als 90° hinweg erstrecken kann. 10

15 Revendications

1. Pièce de pointe pour fixations de ski, comprenant une base de support fixe (100; 2100) comprenant deux mâchoires (123) situées l'une en face de l'autre et pourvues d'une broche respective (124) qui s'étend vers l'intérieur dans la direction transversale (Y-Y) et capable de s'engager avec un appui respectif (1b) dans la pointe (1a) d'une botte de ski, lesdites mâchoires (123) étant capables de tourner autour d'un axe (122) qui est sensiblement perpendiculaire à la base de support (100; 2100) d'une position fermée à une position ouverte, et vice versa, afin de verrouiller/libérer la pointe (1a) d'une botte de ski, lesdites mâchoires comprenant un bras de résistance (123b) qui coopère avec des moyens de réaction (311; 2311) capables de tourner autour d'un axe (320; 2320) perpendiculaire à la base (100; 2100) contre l'action opposée de moyens élastiques (210; 1210; 2210) intégrés à ladite pièce de pointe, **caractérisée en ce que** lesdits moyens de réaction (311, 2311) sont contraints sur une pièce coulissante (350; 2350) qui peut être déplacée dans les deux sens dans la direction longitudinale (X-X) contre l'action de rappel de moyens élastiques (357; 2210), et **en ce que** la broche respective (124) est conique. 20
2. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite base fixe (2100) comprend une première pièce de base sensiblement plate (2110) présentant des côtés longitudinaux saillants (2111) comportant deux trous respectifs (2113, 2114) coaxiaux l'un par rapport à l'autre et agencés à des hauteurs différentes à partir du plan dans la direction (Z-Z). 35
3. Pièce de pointe selon la revendication 2, **caractérisée en ce que** la base (2110) comprend, incorporée dans celle-ci, une contre-pièce de base (2120) pourvue de brides saillantes (121) en forme de C, dont les bras parallèles au plan de la base (2110) comportent des trous coaxiaux respectifs (121a) qui sont capables de recevoir une broche (122) qui forme un axe de rotation qui est perpendiculaire au plan de la 50

- base (2110).
4. Pièce de pointe selon la revendication 3, **caractérisée en ce que** lesdites mâchoires (123) sont montés de façon pivotante sur ledit axe de rotation (122) perpendiculaire au plan de la base (2110). 5
 5. Pièce de pointe selon la revendication 3, **caractérisée en ce que** lesdites mâchoires (123) sont situées l'une en face de l'autre et sont symétriques par rapport à l'axe longitudinal (X-X) et comprennent un bras de commande (123a) qui est sensiblement perpendiculaire à la base (110; 2110) et qui est pourvu de ladite broche conique (124) qui s'étend parallèlement à ladite base, et un bras de résistance (123b) qui est sensiblement parallèle à la base (110; 2110). 10
 6. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens de réaction comprennent une came (2311) qui est configurée de manière à comprendre deux appuis courbes (2312) symétriques par rapport à l'axe longitudinal (X-X) et ouverts vers l'extérieur de manière à permettre l'entrée et la sortie des bras de résistance (123b) des mâchoires (123), ainsi qu'un trou traversant (2315) qui peut permettre l'insertion de moyens (2320) perpendiculaires à la base (2100) et qui forment un axe de rotation de la came (2311). 20
 7. Pièce de pointe selon la revendication 1, **caractérisée en ce que** la pièce coulissante (2350) est constituée sous la forme d'une boîte ouverte latéralement de manière à pouvoir recevoir la came (2311), et un élément (2600) pour exécuter la contrainte sur la base (2100). 25
 8. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite pièce coulissante (2350) présente sur sa surface avant, un trou fileté (2351) qui est fermé par une vis de réglage (2351a). 30
 9. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens d'opposition élastiques qui agissent dans la direction longitudinale X-X sont logés à l'intérieur de ladite pièce coulissante. 35
 10. Pièce de pointe selon la revendication 9, **caractérisée en ce que** lesdits moyens d'opposition élastiques comprennent un ressort (2210) qui est situé de façon longitudinale entre ladite vis de réglage (2351a) et une broche (2605) qui fait saillie axialement à partir desdits moyens de contrainte (2600). 40
 11. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite pièce coulissante (2350) présente à son extrémité arrière une surface (2350a) qui est configurée de façon appropriée pour interagir avec une surface correspondante (2311a) de ladite 45
 - came (2311) de manière à entraîner un centrage correct de celle-ci.
 12. Pièce de pointe selon la revendication 1, **caractérisée en ce que** la pièce coulissante (2350) présente à son extrémité avant des extensions transversales (2352) qui sont configurées comme une came (2352a) dans la direction verticale (Z-Z) et qui sont capables de former un arrêt pour l'extrémité libre (2431a) de bras (2431) d'un levier (2430) pour verrouiller/déverrouiller la pièce coulissante. 50
 13. Pièce de pointe selon la revendication 12, **caractérisée en ce que** ledit levier de verrouillage/déverrouillage (2430) est capable de tourner autour d'une broche (2430a) qui est insérée dans la direction transversale (Y-Y) de trous (2113) dans les brides (2111) de la pièce de base (2110). 55
 14. Pièce de pointe selon la revendication 7, **caractérisée en ce que** ledit élément pour contraindre la pièce coulissante (2350) sur la base (2110) se présente sous la forme d'un U comprenant des branches (2601) qui s'étendent dans la direction longitudinale (X-X) et qui comportent des trous coaxiaux longitudinaux, un (2602a) de ceux-ci étant un trou traversant, et l'autre (2602b) étant un trou fileté approprié pour s'engager avec une broche correspondante (2603) qui possède une extrémité fileté. 30
 15. Pièce de pointe selon la revendication 1, **caractérisée en ce qu'elle** comprend un levier avant (2420) qui se présente sous la forme d'une fourche qui est montée de façon pivotante sur la pièce de base (2110) au moyen d'une broche transversale associée (2420a) qui est insérée dans les trous (2114) dans les brides (2111) de la base (2110), les extrémités arrières (2420b) dudit levier étant capables d'agir sur le bras de résistance correspondant (123b) de la mâchoire (123) de manière à amener celui-ci de la position de repos dans une position plus ouverte où il peut permettre l'insertion de la pointe (1a) de la botte de ski. 35
 16. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite base (100) comprend une première pièce de base (110) qui est associée à une contre-pièce de base (120) pourvue de brides (121) capables de recevoir une broche (122) qui forme un axe de rotation perpendiculaire au plan de la base (110) pour lesdites mâchoires (123). 40
 17. Pièce de pointe selon la revendication 16, **caractérisée en ce que** lesdites brides (121) sont saillantes en forme de C, et les bras parallèles au plan de la base (110) comportent les trous coaxiaux respectifs (121a) destinés à recevoir ladite broche (122). 45

18. Pièce de pointe selon la revendication 16, **caractérisée en ce que** ladite pièce de base (110) présente des côtés longitudinaux saillants (111) qui sont perpendiculaires à ladite base et qui comportent un oeillet respectif (112) qui s'étend dans la direction longitudinale (X-X). 5
19. Pièce de pointe selon la revendication 16, **caractérisée en ce que** ladite première pièce de base (110) comprend une bande (114) allongée dans la direction longitudinale vers l'avant et qui comporte un trou (114a) qui est capable de s'engager avec une broche de verrouillage correspondante (354a) dans la direction verticale (z-z). 10
20. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens pour actionner les mâchoires (123) comprennent un levier (310) qui est formé par un corps central (311a) qui s'étend dans la direction longitudinale, et par une tête (311) qui est configurée de manière à présenter deux appuis courbes (312) qui sont symétriques par rapport à l'axe longitudinal (X-X) et qui s'ouvrent vers l'extérieur. 20
21. Pièce de pointe selon la revendication 20, **caractérisée en ce que** ledit levier (311) comporte un trou traversant (315) qui peut permettre l'insertion de moyens (320) perpendiculaires à la base (100) et qui forment un axe de rotation du levier (310). 25
22. Pièce de pointe selon la revendication 21, **caractérisée en ce que** ledit axe de rotation (320) consiste essentiellement en une broche filetée (321), dont la tête (321a) vient au contact contre la surface inférieure de la base (110), et dont la tige (321b) passe à travers un oeillet (115) dans ladite base et un oeillet (125) dans la contre-pièce de base (120) et entre dans ledit trou (315) du levier (310) de manière à s'engager avec une contre-broche (322) qui présente un filet femelle. 30
23. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite pièce coulissante (350) présente, à son extrémité avant, un oeillet (354) qui est destiné à recevoir des moyens de retenue (354a) qui sont capables d'empêcher la montée de la pièce coulissante dans la direction verticale (Z-Z) et de permettre le déplacement de celle-ci dans les deux sens dans la direction longitudinale (X-X). 35
24. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite pièce coulissante (350) comprend une bride (356) qui se présente sous la forme d'un L retourné dont la branche libre est capable de supporter des moyens de sécurité élastiques (357) qui agissent dans la direction longitudinale (X-X) contre l'action desdits moyens de commande (420). 40
25. Pièce de pointe selon la revendication 1, **caractérisée en ce que**, à son extrémité avant, ladite pièce coulissante (350) présente un appui transversal (355) qui est capable de s'engager avec lesdits moyens de commande (410, 420). 45
26. Pièce de pointe selon la revendication 1, **caractérisée en ce que** ladite pièce coulissante (350) est située, dans la direction verticale, entre deux bandes (340) d'une matière qui présente un coefficient de friction faible. 50
27. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens élastiques (200) comprennent une paire de ressorts (210) qui s'étendent dans la direction transversale et qui sont situés l'un en face de l'autre, l'extrémité libre de ceux-ci agissant sur les côtés des moyens (300) pour actionner les mâchoires (123). 55
28. Pièce de pointe selon la revendication 27, **caractérisée en ce que** lesdits moyens élastiques (210) sont supportés par des éléments de guidage et de retenue transversaux respectifs (220) qui sont intégrés aux côtés (111) de la base (110). 60
29. Pièce de pointe selon la revendication 28, **caractérisée en ce que** lesdits moyens (220) qui supportent les ressorts (210) peuvent être déplacés dans la direction longitudinale à l'intérieur desdits oeillets (112) des côtés saillants (111) de manière à modifier le point d'application de l'action d'opposition transversale des ressorts. 65
30. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens élastiques (1200) comprennent une paire de ressorts (1210) qui sont agencés parallèlement à la direction longitudinale (X-X) sur des côtés opposés du levier (311) et qui agissent contre la partie de tête (312) dudit levier. 70
31. Pièce de pointe selon la revendication 30, **caractérisée en ce que** lesdits ressorts (1210) sont supportés par des moyens associés (1220) qui sont fixés à la pièce de base (110). 75
32. Pièce de pointe selon la revendication 1, **caractérisée en ce que** lesdits moyens de commande (410, 420; 1410) comprennent un élément élastique (410) qui se présente sous la forme d'un U, dont les branches longitudinales (412) présentent des extrémités (412a) qui sont pliées vers l'extérieur pour être insérées dans des appuis correspondants (421; 1421) d'un levier (420; 1420) pour actionner l'ensemble de la pièce de pointe, qui peut être actionné de façon rotative par l'utilisateur. 80
33. Pièce de pointe selon la revendication 32, **caracté-**

risée en ce que le bras transversal (411) dudit élément élastique est approprié pour être inséré à l'intérieur d'un appui transversal avant (355) de la pièce coulissante (350).

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- 34.** Pièce de pointe selon la revendication 1, **caractérisée en ce que** ledit levier de commande (420) comporte un oeillet (422) qui est allongé dans la direction longitudinale et qui est capable de former un appui pour un bouton (430) qui peut être déplacé dans les deux sens de la direction longitudinale à l'intérieur dudit oeillet de manière à entraîner le verrouillage/déverrouillage du mouvement de rotation du levier (310) qui actionne les mâchoires (123).

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- 35.** Pièce de pointe selon la revendication 1, **caractérisée en ce que** ledit bouton (430) comprend une tête de saisie (431) et un corps en forme de fourche (432) qui peuvent être agencés sur une extension longitudinale (313) de celui-ci.

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- 36.** Pièce de pointe selon la revendication 1, **caractérisée en ce que** le levier (420; 1420; 2420) comprend au moins un appui respectif (420a; 1420a; 2420a) destiné à s'engager avec la pointe d'un bâton de ski.

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- 37.** Pièce de pointe selon la revendication 1, **caractérisée en ce que** la rotation vers l'extérieur desdites mâchoires (123) peut s'étendre à travers un angle qui est supérieur à 90°.

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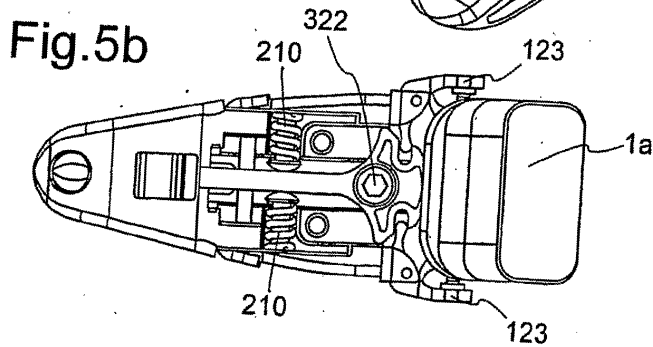
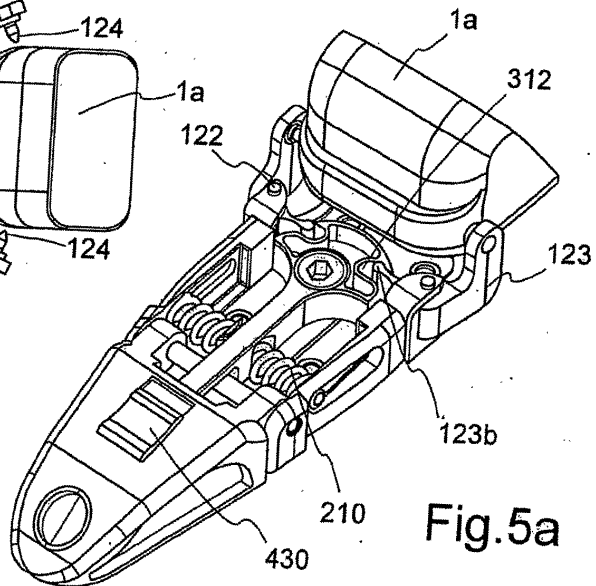
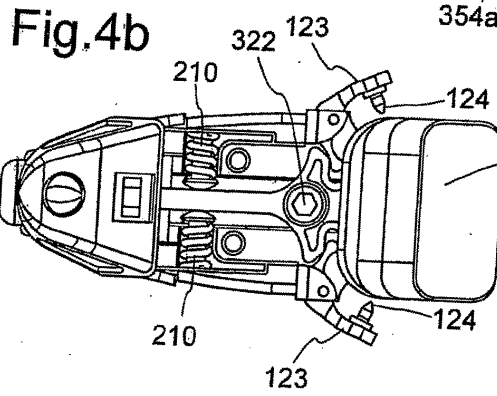
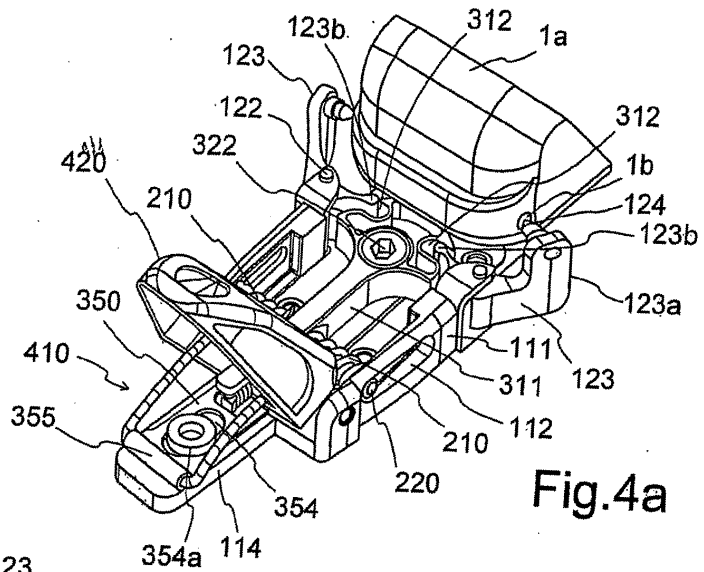
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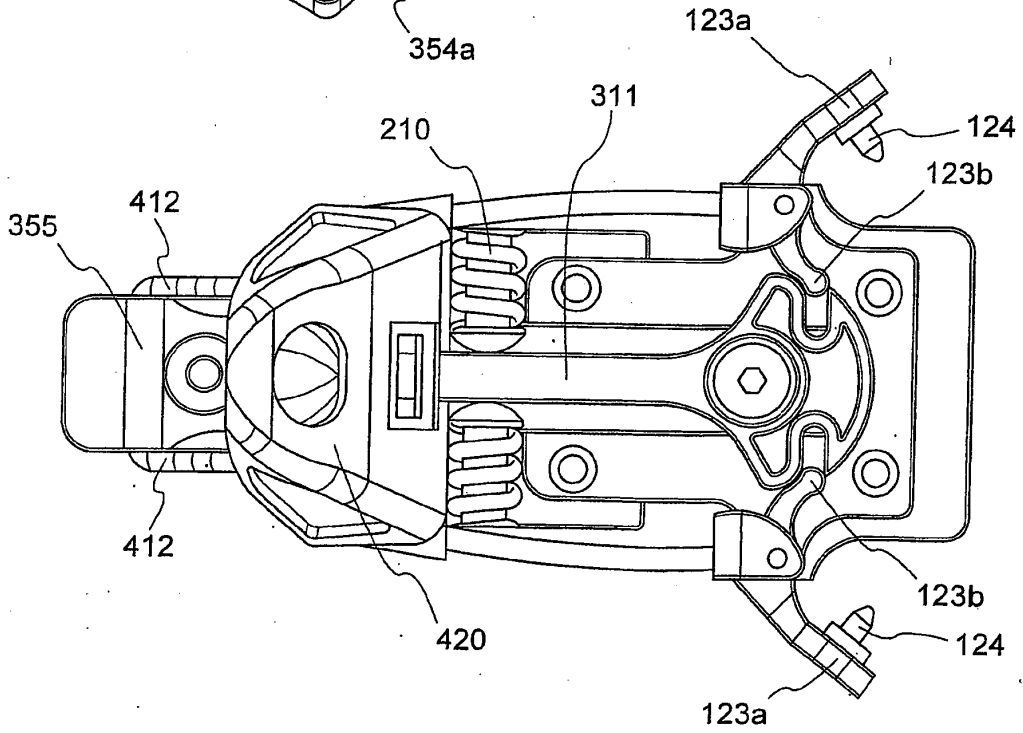
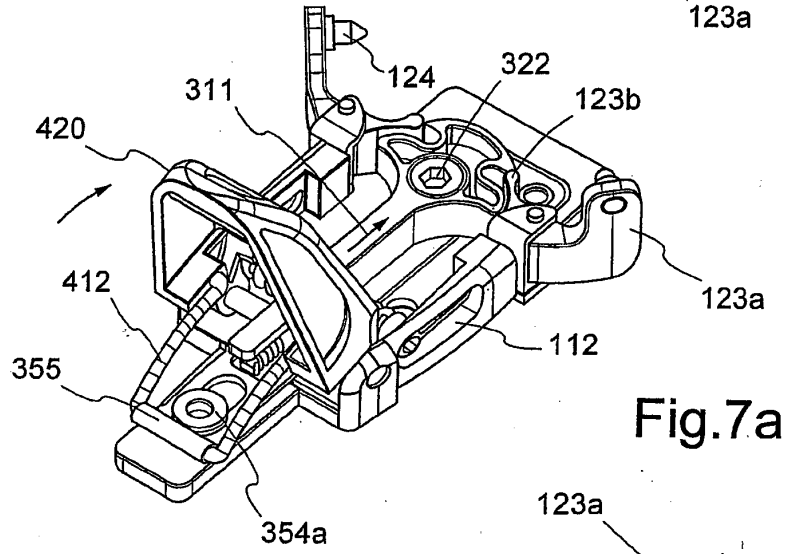
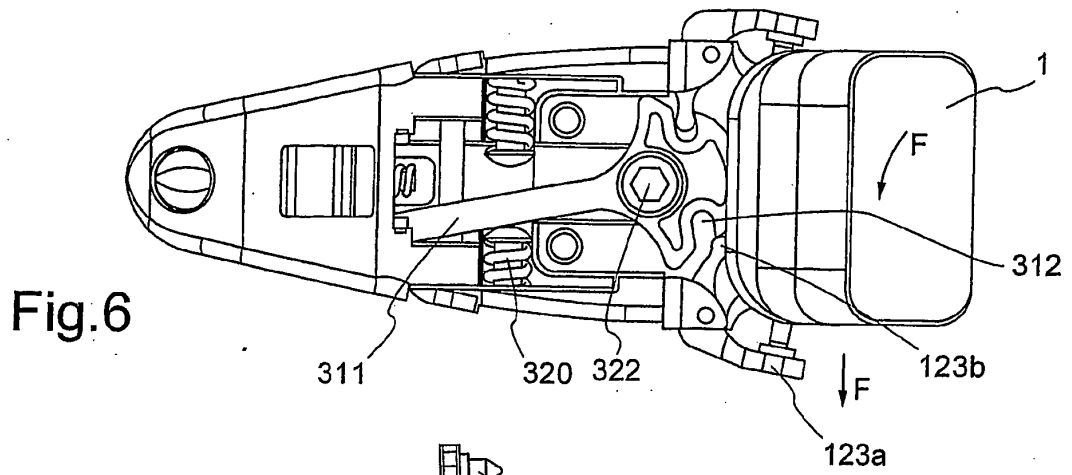
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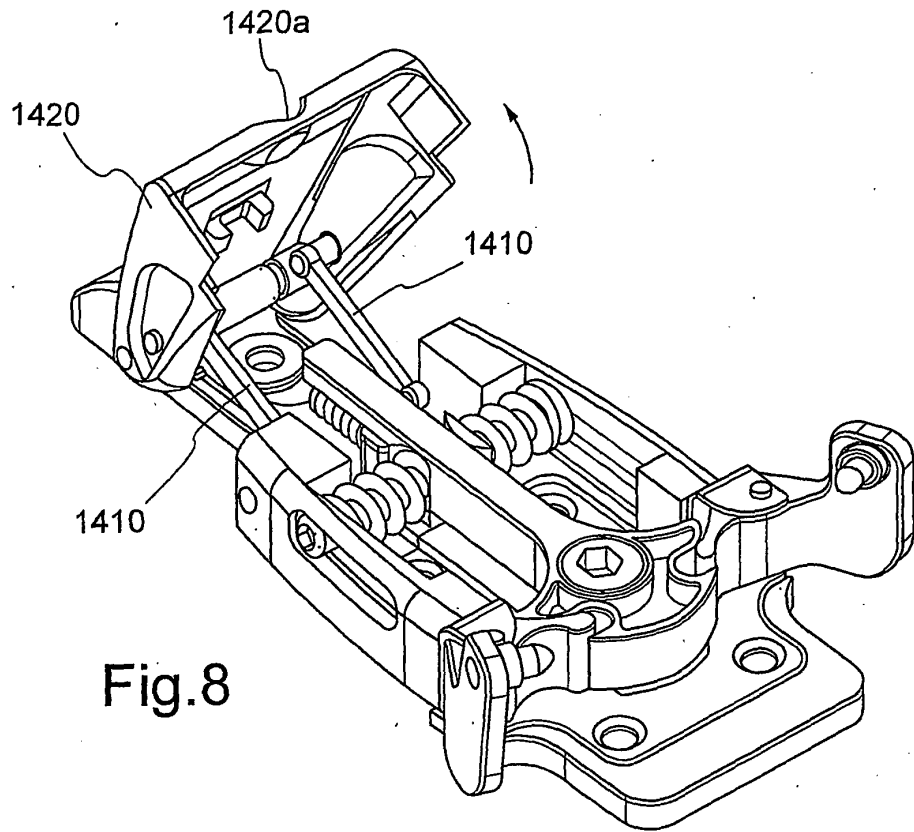


Fig. 8

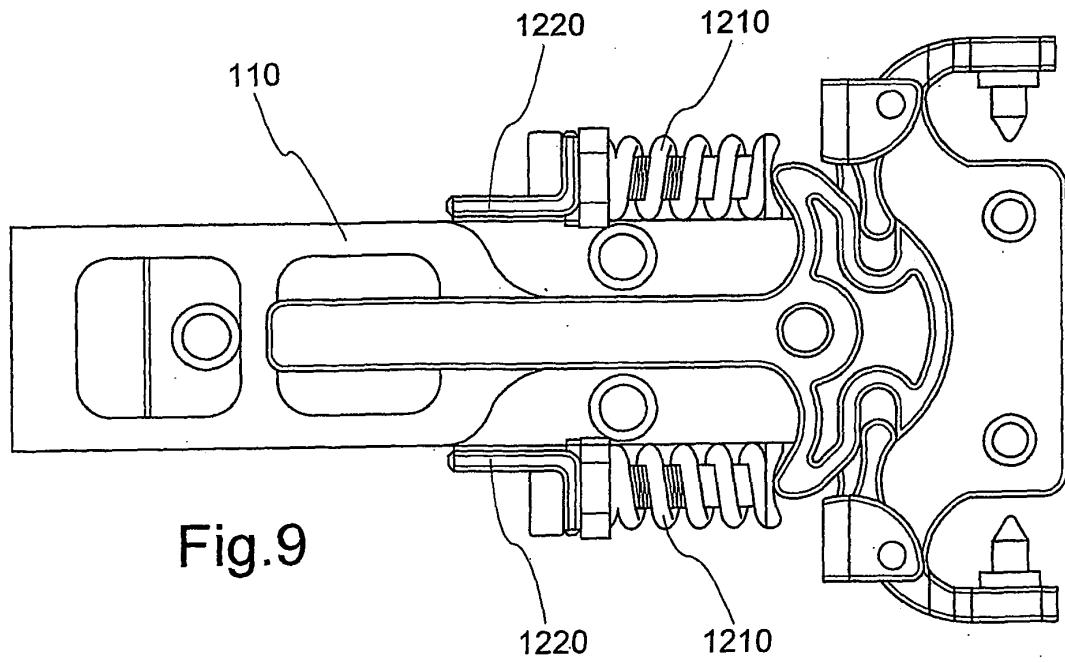
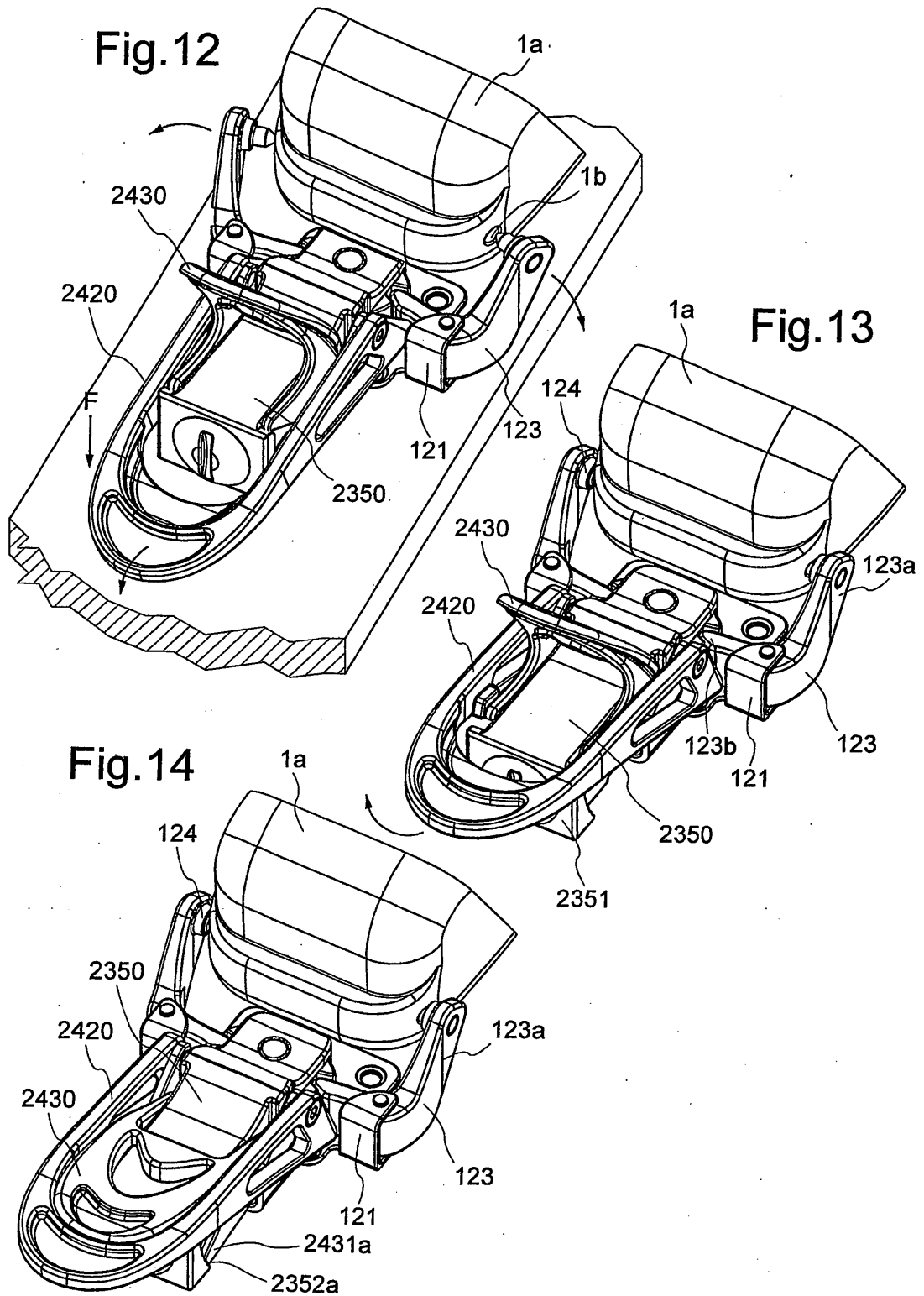
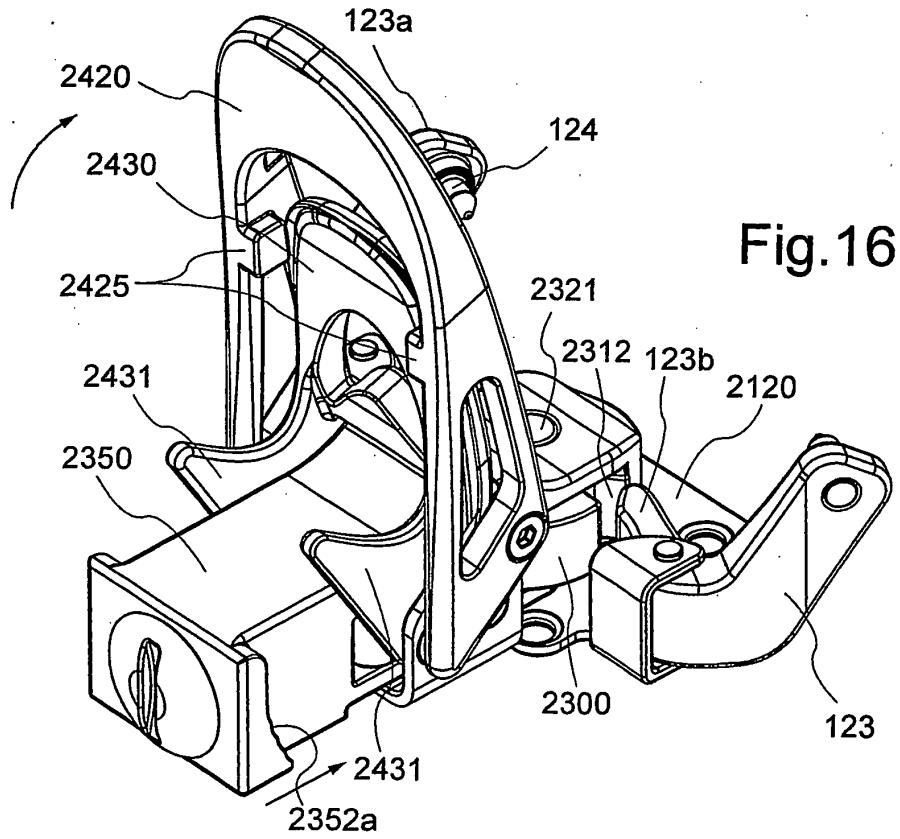
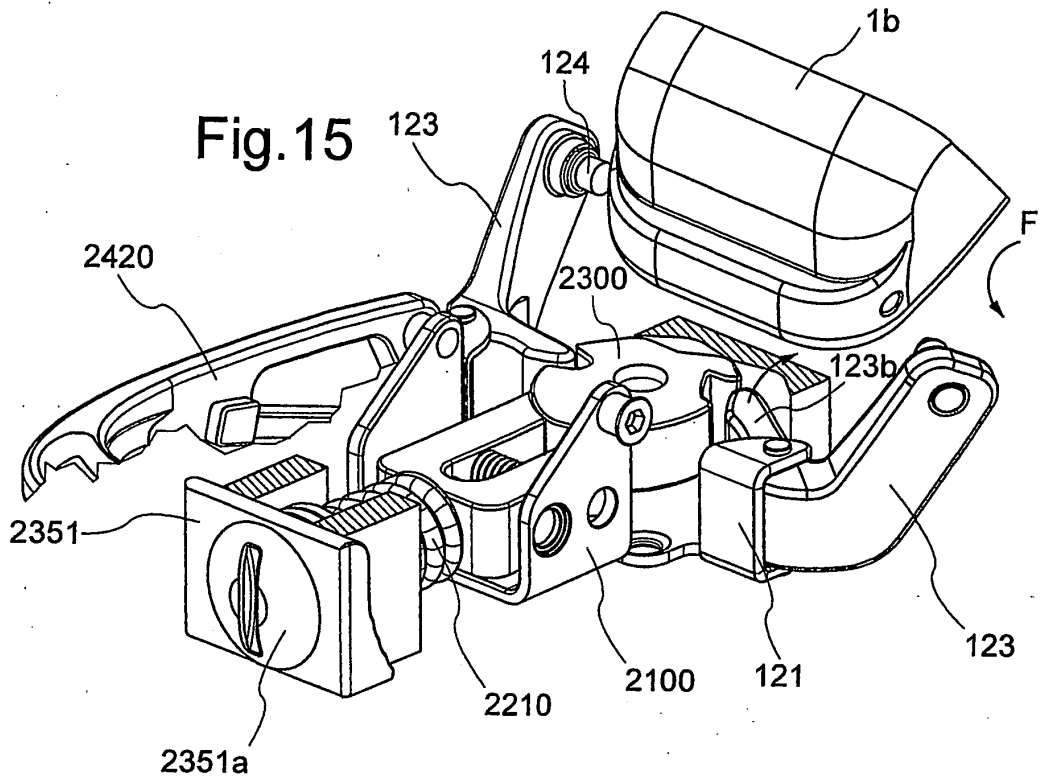


Fig. 9





REFERENCES CITED IN THE DESCRIPTION

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