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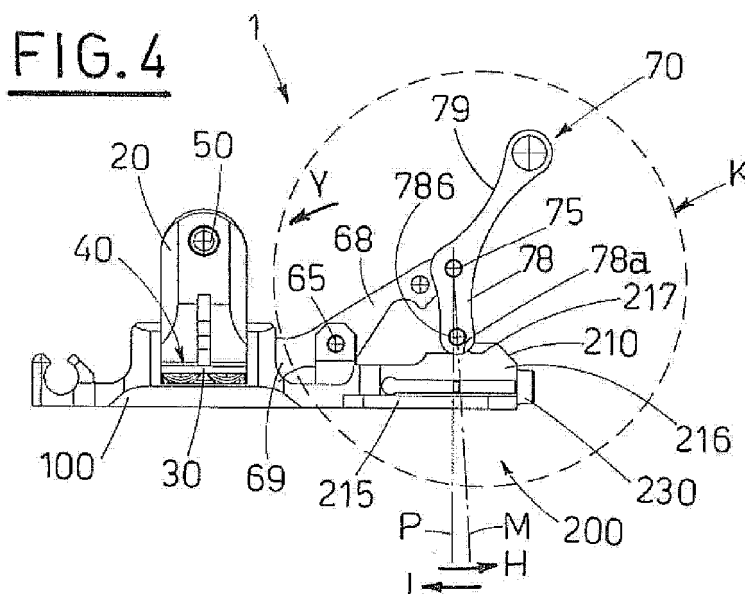
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(54) **A toe piece for an alpine ski attachments**

(57) A toe piece for an Alpine ski attachment, comprising: blocking means comprising: a plate fixable to a ski; two identical and oppositely-positioned blocking elements, centrally hinged to the plate, with upper ends bearing corresponding and facing pins; a mobile joint, oscillating about an axis that is parallel to the hinge axes of the blocking elements, the mobile joint (30) being arranged between lower ends of the blocking elements with interposing of elastic means, the blocking means defining an open operating configuration in which there is a maximum distance between the pins and the mobile joint (30)

is at a top dead center thereof, and a closed operating configuration in which there is a minimum distance between the pins and the mobile joint is at a bottom dead center thereof; stabilising means of the closed operating configuration comprising: a main lever hinged, at an intermediate point thereof, to the plate at a transversal axis and having the end of a first arm thereof hinged to the mobile joint; a blocking lever which is hinged, at an intermediate point thereof, by a transversal axis to the second arm of the main lever; and regulating means (200), fixable to the ski (500), of a preload of the elastic means (40).



Description

DESCRIPTION OF THE INVENTION

[0001] The invention relates to the field of blocking systems of toe pieces for Alpine ski attachments.

[0002] It is known that these attachments enable the ski-boot to be hooked onto the platform of the ski, and consist of a toe piece and a heel piece, which once appropriately fixed to a ski platform are able respectively to block the toe and the heel of a ski boot. The toe pieces comprise blocking means which can take on an open operating configuration and a closed blocking operating configuration. To block the boot it is necessary to predispose the toe piece in its open operating configuration and press the ski-boot onto the mobile joint of the toe piece in order to obtain passage into the closed configuration. In this configuration, the elastic means, typically the springs, oppose passage from the closed position into the open position.

[0003] Toe pieces must maintain the closed operating position during normal use of the skis and are predisposed to enable unblocking the boot both voluntarily and following involuntary occurrences such as for example falls, twisting of the foot or other situations in which the force applied to the ski-boot exceeds the force/resistance of the elastic means which maintain the toe piece in the closed configuration thereof.

[0004] Document MO2007A000365, belonging to the same Applicant, describes a toe piece for Alpine ski attachments which comprises, apart from the blocking means, stabilising means of the closed operating configuration predisposed to oppose unblocking of the toe piece of the boot. This known toe piece 1 is shown in figures 1 and 2 respectively in its open operating configuration and its closed operating configuration, fixed on a ski 500 platform. It comprises a plate 100 fixable to the ski 500 platform, two identical blocking elements 20, opposite one another, each of which is centrally hinged to the plate 100 by means of a pin 25 which is longitudinal to the ski 500 platform, has an upper end which bears a pin 50 orientated transversally to the ski platform and facing internally of the toe-piece 1 and a second lower end connected to a mobile joint 30 by interposing of first elastic means 40, for example springs 45. The pins 50 are designed to engage with relative holes realised in the front flanks of the ski boot (not illustrated) when the toe piece 1 assumes the closed operating configuration.

[0005] The stabilising means of the closed configuration are constituted by a main lever 60 hinged at an intermediate point thereof to the base 100 by means of a pin 65 arranged transversally to the ski 500 platform in an advanced position with respect to the mobile joint 30, with the end of the first arm 69 of the main lever 60, which is fork-shaped, engaging with the mobile joint 30, and by a blocking lever 70 articulated, at an intermediate point thereof, to the second arm 68 of the main lever 60 by means of a pin 75 arranged transversally to the ski 500

platform; the blocking lever 70 is subjected to second elastic means, typically a spring 95. The elastic reaction of the spring 95 is directed at causing a first arm 78 of the blocking lever 78 to diverge with respect to the main lever 60 in order to arrange the first arm 78 substantially vertically with respect to the ski 500 platform.

[0006] In the open operating configuration of figure 1, the maximum distance between the pins 50 is shown. In this configuration the mobile joint 30 is in the top dead centre thereof, the first arm 78 of the blocking lever 70 is substantially aligned to the second arm 68 of the main lever 60 and the ski 500 platform and the relative second arm 79 of the blocking lever 70 is facing forwards. The elastic reaction of the spring 95 in this configuration is overcome by the elastic reaction of the springs 45 which maintain the mobile joint 30 in the top dead centre.

[0007] When the ski boot is pressed on the mobile joint 30 of the toe piece 1 (in the direction indicated by the arrow F of figure 1) up to exceeding the elastic reaction of the springs 45, a snap-rotation of the blocking elements 20 ensues with respect to the respective pins 25 such as to obtain the closed operating configuration of figure 2, in which the pins 50 engage the corresponding holes realised in the front flanks of the boot (not illustrated).

[0008] In this closed operating configuration the distance between the pins 50 is at its minimum. In this configuration the mobile joint 30 is in the bottom dead centre position, the first arm 78 of the blocking lever 70 is substantially vertical to the ski 500 platform with the end 78a thereof which abuts the ski 500 platform. In this configuration the spring 95 is partially pre-loaded and the elastic reaction thereof contributes to opposing the passage of the toe piece 1 from the closed operating configuration (figure 2) to the open operating configuration (figure 1). In order to voluntarily unblock the ski boot it is sufficient to act on the blocking lever 70 in such a way as to cause it to oscillate in the direction denoted by the arrow G in figure 2.

[0009] The elastic reaction of the spring 95, which is added to the elastic reaction of the springs 45 to maintain the toe piece 1 in the closed operating position, must be appropriately selected on the basis of multiple factors among which, for example, weight, height and the experience of the skier. If the total elastic reaction is not appropriate, drawbacks can obtain, for example if the reaction is understated there is the risk that the toe piece might unblock the boot even after brusque manoeuvres and impacts, while, on the contrary, if the reaction is overstated the boot might not block during a fall with ensuing risk of injury to the skiers.

[0010] The main aim of the present invention is to provide a toe piece for ski attachments, in particular for Alpine skiing, in which the elastic reaction of the elastic means associated to the toe piece opposing the passage thereof from the closed operating configuration to the open operating configuration is adjustable simply and rapidly, even by a user who is not particularly expert.

[0011] The above aim is attained with a toe piece for

Alpine skiing comprising:

blocking means comprising: a plate fixable to a ski; two identical and oppositely-positioned blocking elements, centrally hinged to the plate by longitudinal axes thereof, with upper ends of the blocking elements bearing corresponding and facing pins; a mobile joint, oscillating about an axis that is parallel to the hinge axes of the blocking elements, the mobile joint being arranged between lower ends of the blocking elements with interposing of elastic means, the blocking means defining an open operating configuration in which there is a maximum distance between the pins and the mobile joint is at an top dead center thereof, and a closed operating configuration in which there is a minimum distance between the pins and the mobile joint is at a bottom dead center thereof;

stabilising means of the closed operating configuration comprising: a main lever hinged, at an intermediate point thereof, to the plate at a transversal axis that is perpendicular to the longitudinal axes and having the end of a first arm thereof hinged to the mobile joint; a blocking lever which is hinged, at an intermediate point thereof, by a transversal axis to the second arm of the main lever; and

regulating means, fixable to the ski platform, of a preload of the elastic means. The toe piece, fixable to the ski platform, enables adjustment of the elastic reaction or pre-load of the elastic means associated to blocking means in order to obtain, in the closed operating position, an adjustable elastic reaction.

With the toe piece of the invention, wear on the components of the stabilising means of the closed operating configuration can be taken up and compensated for with the increase in the preload of the elastic means associated to the blocking means.

BRIEF DESCRIPTION OF THE FIGURES

[0012]

Figure 1 is a perspective view of a known toe piece for attachments for Alpine skiing in an open configuration;

Figure 2 is a perspective view of the toe piece for attachments for Alpine skiing of figure 1 in a closed operating position;

Figure 3 is a rear view of an embodiment of the invention;

Figure 4 is a lateral view according to the embodiment of figure 3;

Figure 4A is a lateral view of detail K of figure 3 in the open operating configuration, in enlarged scale with respect to the preceding figures;

Figure 5 is a view from above of the embodiment of figure 3;

Figures 6 and 7 are section views along axis X-X of the embodiment of figure 3 in which the elastic reaction of the stabilising means of the closed operating position is differently adjusted;

Figure 8 is a perspective view of the embodiment of figure 3.

[0013] In figures 1 to 8, the identical components have been denoted using the same numerical references as the following description in the various embodiments of the invention and have the same characteristics unless otherwise specified.

[0014] Figures 3-8 illustrate an embodiment of the toe piece of the invention in which the types of the components of the blocking means 100, 20, 25, 30, 40, 50 and the arrangement thereof are the same as reported previously for the toe piece of document M02007A000365.

[0015] In the above-cited embodiment the stabilising means 60, 65, 70, 75 of the closed operating configuration comprise a main lever 60 hinged at an intermediate point thereof to the plate 100 according to a transversal axis 65, perpendicular to the longitudinal axes 25 and having an end of a first arm 69 hinged to the mobile joint 30; a blocking lever 70 hinged, at an intermediate point thereof, by a transversal axis, to the second arm 68 of the main lever (60).

[0016] As shown in figures 3-8, the end 78a of a first arm 78 of the blocking lever 70 is advantageously conformed according to a semicircular convex profile; in the example shown in figures 3-8, the end 78a bears a roller 785 mounted idle on an axis 786: this reduces wear on the end 78a.

[0017] In the open operating configuration, the toe piece 1 exhibits the maximum distance between the pins 50 and the mobile joint 30 is in its top dead centre position. As can be seen in figure 4A, in this configuration the first arm 78 of the blocking lever 70 is substantially aligned to the second arm 68 of the main lever 60 and the relative second arm 79 of the blocking lever 70 faces forwards.

[0018] Similarly to what is set out in the prior art described herein above, when the ski boot is pressed onto the mobile joint 30 up to exceeding the elastic reaction of the springs 45, a snap-rotation is determined of the blocking elements 20 with respect to the pins 25 such as to obtain the closed operating configuration, shown in figures 3, 4 and 5-8, in which there is a minimum distance between the pins 50 and the mobile joint 30 is in its bottom dead centre. While in document M02007A000365, in that configuration the end 78a of the first arm 78 of the blocking arm 70 directly abutted the ski 500 platform, in

the present invention the end 78a abuts calibration means 200 which are interested by a concave recess 217 destined to abut the roller 785. As can be seen in figure 4, in this configuration the first arm 78 of the blocking lever 70 is not vertical as the plane M, passing through the transversal hinge axis 75 of the blocking lever 70 and the axis 786, does not coincide with the vertical plane P passing through the transversal axis 75, in particular the plane P is retracted with respect to the plane M.

[0019] The closed operating configuration of the toe piece 1, illustrated in figures 3, 4 and 5-8, is stable as the end 78a is at the dead centre point and thus it is not necessary to subject the blocking lever 70 to further elastic means. The recess 217 prevents the lever 78 from further rotating in the direction denoted by the arrow H. The rotation in the opposite direction J, necessary for the passage from the closed operating conformation to the open one, is opposed by the fact that the end 78a, in order to be able to rotate in that direction, has to pass beyond the plane P and this causes the raising of the transversal axis 75, the rotation of the lever 60 about the transversal axis 645 in direction Y, with a consequent lowering of the end of the first arm 69 thereof, which causes an increase in the preload of the elastic means 40.

[0020] In order voluntarily to unblock the boot, it is sufficient to act on the blocking lever 70 similarly to what is described herein above for the toe piece described in document M02007A000365.

[0021] The calibration means 200 are, in the illustrated example, solidly constrained to the plate 100 and interposed between the blocking lever 70 and the ski 500 platform; this facilitates the fastening of the toe piece to the ski platform. The calibration means 200 are preferably realised in a single body with the plate 100.

[0022] As shown in figures 4A, the calibration means 200 and the second arm 68 of the main lever are specially shaped such as to interact, in the open operating configuration, with the end 78a of the blocking lever 70.

[0023] In the illustrated embodiment, the calibration means 200 comprise an elastic element 210, having a lower first portion 215 and a higher second portion 216, opposite to one another and together defining a threaded seating, and a truncoconical screw 230, preferably a truncoconical grub screw, rotatable in the threaded seating, the first and second portions 215, 216 being predisposed to splay or near following the rotation in one direction or the other of the truncoconical screw 230 in the threaded seating; the recess 217 is afforded in the upper portion 216.

[0024] Figure 6 shows the toe piece 1 in the closed operating configuration with the screw 230 partially screwed into the threaded seating. By further tightening the truncoconical screw, the lower and upper portions 215, 216 of the elastic element splay as shown in figure 7. The upper portion 216 imparts a push on the end 78a of the first arm 78 of the blocking lever 70, increasing the distance from the ski platform 500. In this way a rotation of the main lever 60 is caused in the cited direction Y

about the transversal axis 65 which lowers the end of the first arm 69 thereof and consequently the mobile joint 30 with which it is hinged, increasing the preload of the elastic means 40 and thus the elastic reaction thereof.

[0025] In order to reduce the elastic reaction of the elastic means 40 it is sufficient to unscrew the screw 230 from the relative seating.

[0026] It is thus possible to regulate the elastic reaction of the elastic means 40 by means of a simple tightening and/or loosening operation of the truncoconical screw 230 into and out of the relative seating, actuatable by the user him or herself. By completely loosening the screw 230 as in figure 6, the distance D1 of the end of the first arm 69 of the ski platform 500 as at its greatest and the toe piece is adjusted to the minimum preload of the elastic means 40. By completely tightening the screw 230, as illustrated in figure 7, the corresponding distance D2 is minimum and the toe piece is adjusted to the maximum preload of the elastic means 40.

[0027] Alternatively, the calibration means 200 can comprise a wedge-shaped slide, movable longitudinally to the ski, predisposed to abut the end 78a, when the toe piece 1 is in the closed operating configuration thereof. By moving the slide, the distance of the end 78a from the ski 500 platform varies, determining a rotation of the main lever 60 in the direction Y, or in the opposite direction with a consequent variation of the elastic reaction of the elastic means 40.

[0028] The calibration means 200, if removed from the plate 100, can be fixed in a known way to the ski 500 platform by interposing them between the blocking lever 70 and the ski 500 table in such a way that in the closed operating conformation the end 78a abuts the calibration means 200.

[0029] In a further embodiment, not illustrate, the stabilising means of the closed configuration can comprise further elastic means (for example a spring pin, preferably a spring) which act on the blocking lever 70 in a similar way to what is described for document M02007A000365.

[0030] The above is intended by way of non-limiting example, and any eventual variants of a practical-applicational nature are understood to fall within the ambit of protection of the invention as described herein above and as claimed herein below.

Claims

1. A toe piece for an Alpine ski attachment, comprising:

blocking means comprising: a plate (100) fixable to a ski (500); two identical and oppositely-positioned blocking elements (20), centrally hinged to the plate (100) by longitudinal axes (25) thereof, with upper ends of the blocking elements (20) bearing corresponding and facing pins (50); a mobile joint (30), oscillating about an axis that is parallel to the hinge axes

of the blocking elements (20), the mobile joint (30) being arranged between lower ends of the blocking elements (20) with interposing of elastic means (40), the blocking means defining an open operating configuration in which there is a maximum distance between the pins (50) and the mobile joint (30) is at a top dead center thereof, and a closed operating configuration in which there is a minimum distance between the pins (50) and the mobile joint (30) is at a bottom dead center thereof;

stabilising means of the closed operating configuration comprising: a main lever (60) hinged, at an intermediate point thereof, to the plate (100) at a transversal axis (65) that is perpendicular to the longitudinal axes (25) and having the end of a first arm (69) thereof hinged to the mobile joint (30); a blocking lever (70) which is hinged, at an intermediate point thereof, by a transversal axis (75) to the second arm (68) of the main lever (60);

characterised in that it further comprises:

regulating means (200), fixable to the ski (500), of a preload of the elastic means (40).

2. The toe piece of claim 1, **characterised in that** the regulating means (200) are interposable between the blocking lever (70) and the ski (500) and predisposed, once the toe piece (1) is in the closed operating position thereof, to encounter an end (78a) of a first arm (78) of the blocking lever (70) and to vary a distance of the end (78a) from the ski (500) in order to cause a relative rotation between the blocking lever (70) and the main lever (60), with a consequent regulation of the preload of the elastic means (40).
3. The toe piece of claim 2, **characterised in that** the end (78a) of the first arm (78) of the blocking lever (70) exhibits a convex semi-circular profile conformation and **in that** the regulating means (200) exhibit a corresponding concave recess (217) for encountering the first end (78a).
4. The toe piece of claim 3, **characterised in that** the end (78a) bears a roller (785) mounted idle on a relative axis (786).
5. The toe piece of claim 3, **characterised in that** the regulating means (200) comprise an elastic element (210), having a lower first portion (215) and an upper second portion (216), in which the recess (217) is afforded, which lower first portion (215) and upper second portion (216) are opposite to one another and together define a threaded seating, and a truncoconical screw (230) which is rotatable in the threaded seating, the first portion (215) and the second portion (216) being predisposed to separate

from or near one another following a rotation in a direction or in another direction of the truncoconical screw (230) in the threaded seating.

6. The toe piece of claim 1, **characterised in that** the regulating means (200) are solidly constrained to the plate (100).
7. The toe piece of claim 6, **characterised in that** the regulating means (200) are made in a single body with the plate (100).

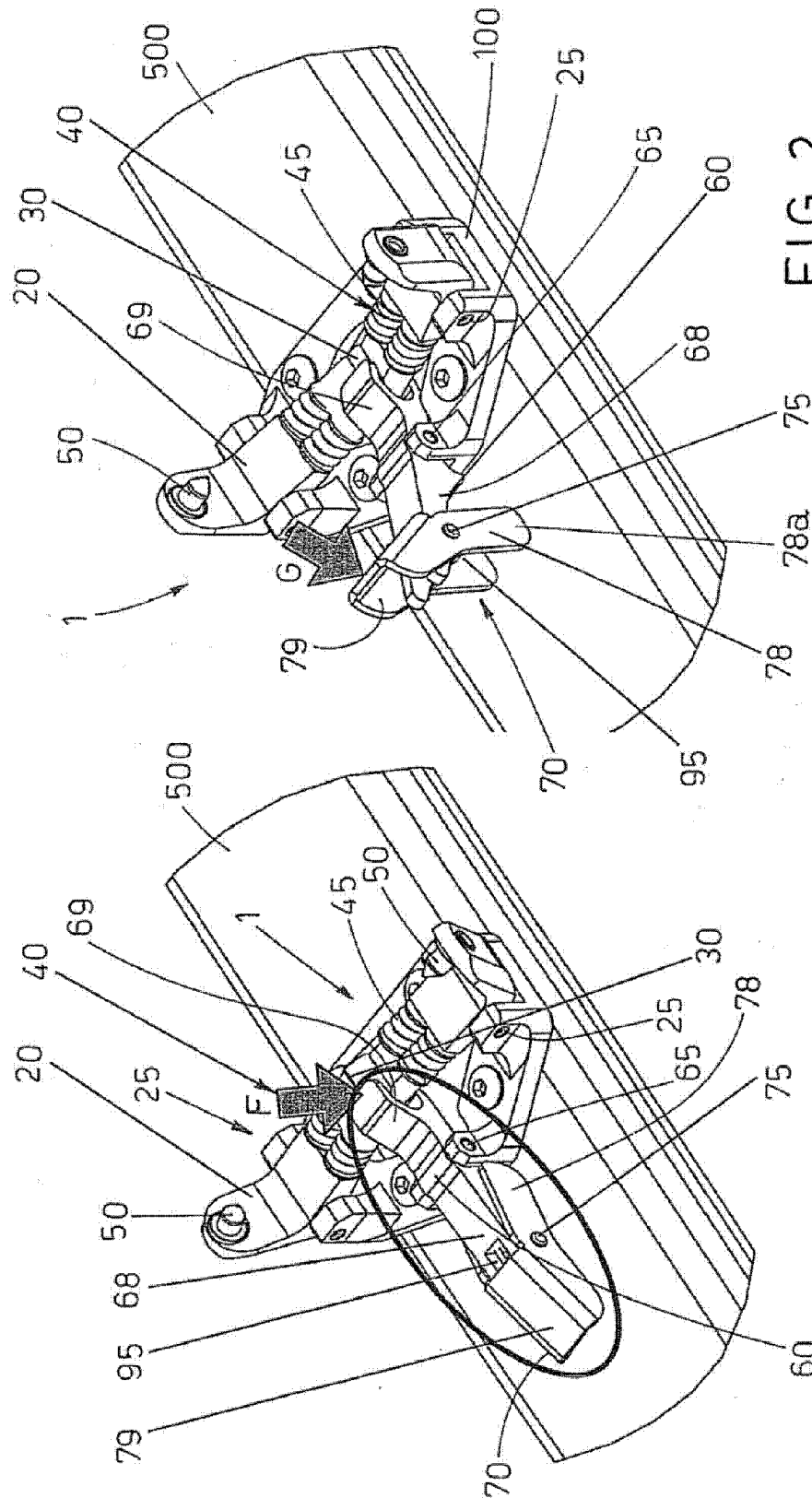


FIG. 1
PRIOR ART

FIG. 2
PRIOR ART

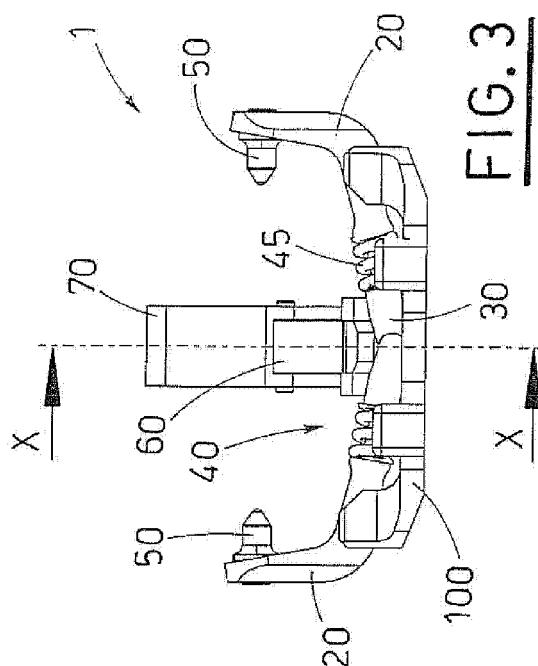


FIG. 3

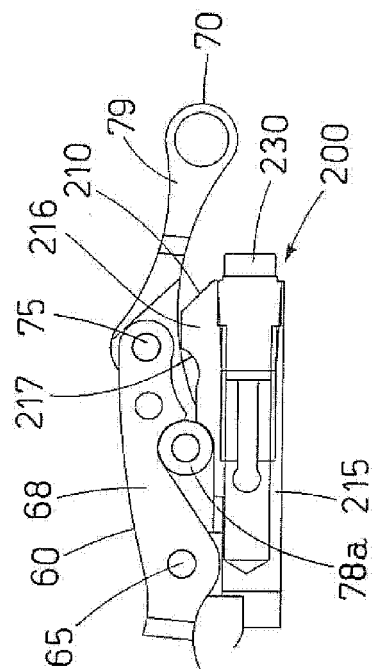


FIG. 4A

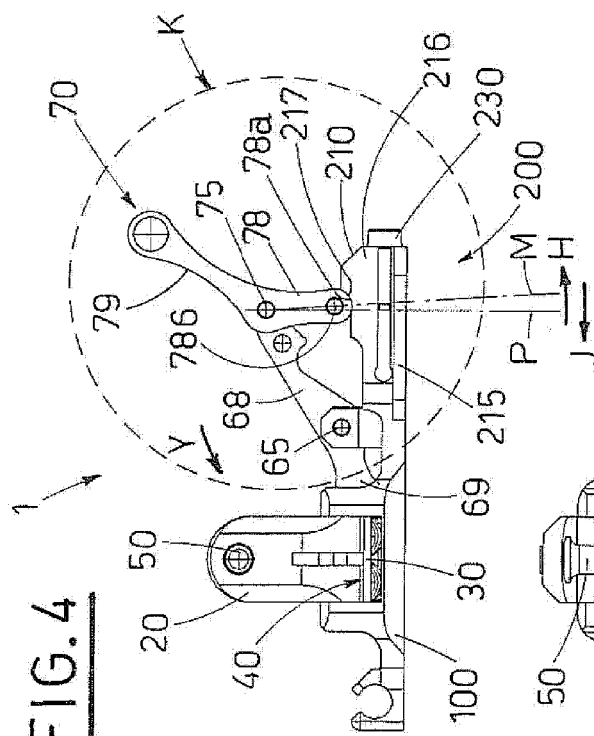


FIG. 4

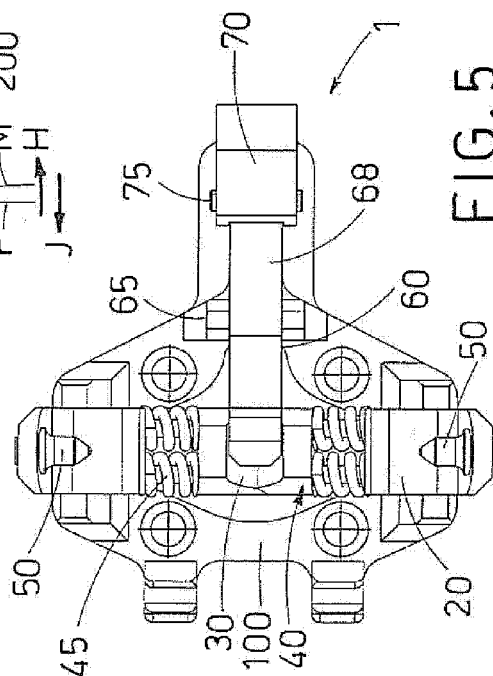
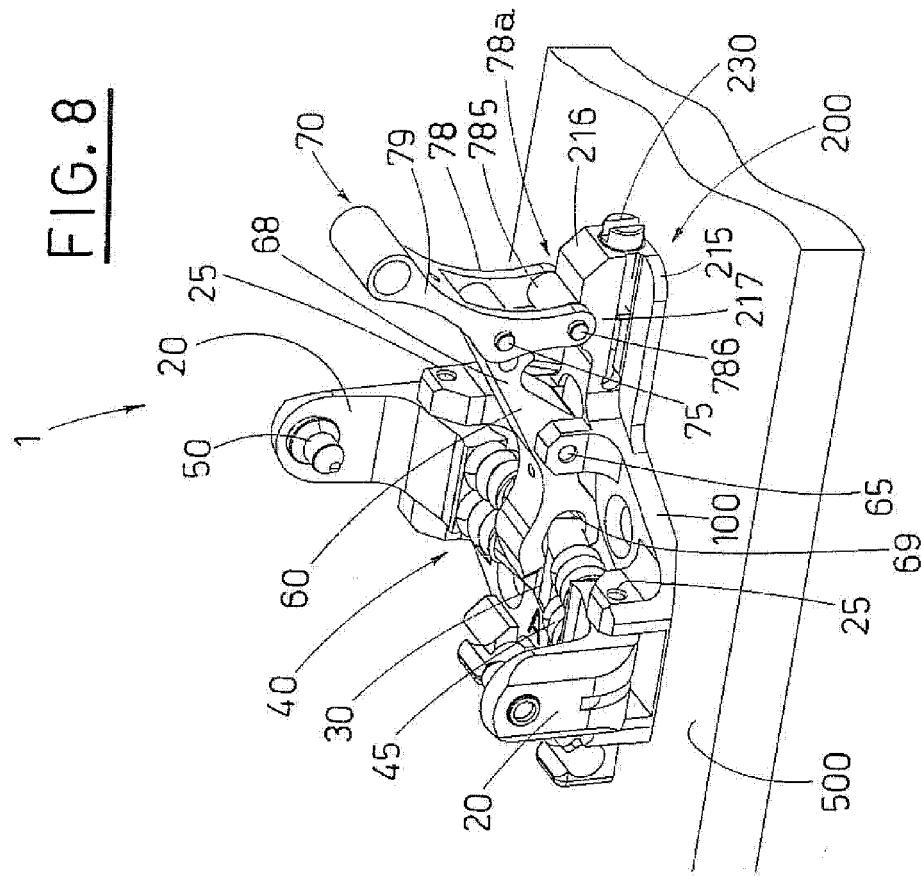
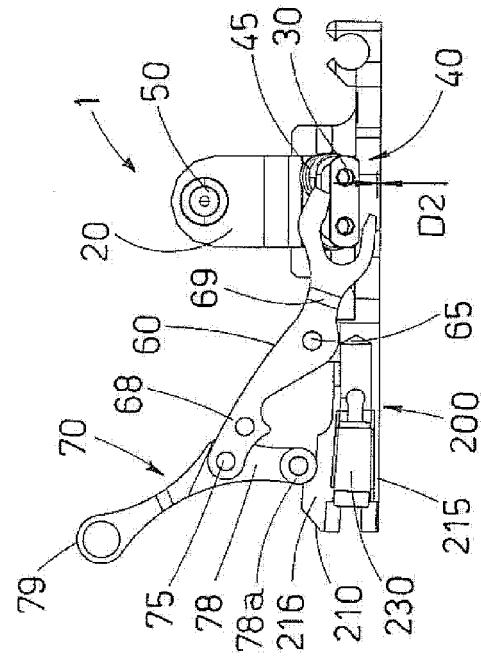
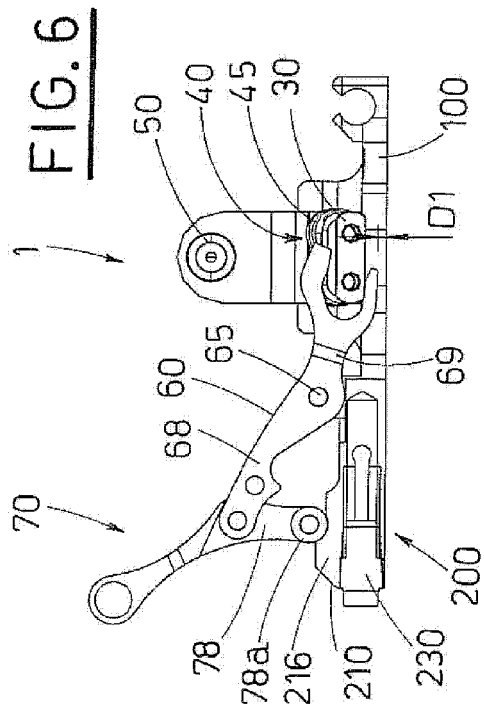


FIG. 5





EUROPEAN SEARCH REPORT

Application Number
EP 11 15 1479

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	WO 2009/121187 A1 (G3 GENUINE GUIDE GEAR INC [CA]) 8 October 2009 (2009-10-08) * pages 8,13-15; figure * *	1-7	INV. A63C9/085 A63C9/086
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A	EP 0 199 098 A2 (BARTHEL FRITZ) 29 October 1986 (1986-10-29) * the whole document *	1-7	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A63C
Place of search		Date of completion of the search	Examiner
Munich		2 May 2011	Haller, E
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EPO FORM 1503 03.82 (P04C01)

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

EP 11 15 1479

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02-05-2011

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

REFERENCES CITED IN THE DESCRIPTION

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