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Invention S.r.l.
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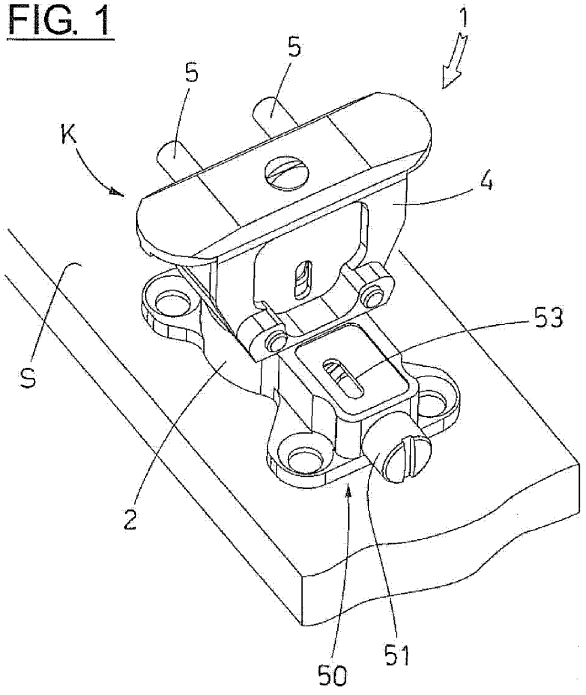
(54) **A jointed heel piece for an alpine ski binding**

(57) The heel piece (1) is constituted by a base (2) fixed to the ski (S) and by an upper block (4) bearing attachment pins (5) to the boot. The block (4), by means of a vertical-axis joint (3), is rotatable with respect to the base (2), in order to define two use configurations, respectively a hooked (K) configuration and a non-hooked (W) configuration of the pins (5) to the relative boot. The joint (3) is defined by a vertical-axis hub (40), solidly constrained to the block (4), projecting downwards and destined to rotatably couple with a circular seating (20) realised in the base 2. Positioning organs (30) are associated to the joint (3), destined to define and elastically stabilise the two use configurations (K, W) of the heel piece (1). Calibration organs (50) are in turn associated to the positioning organs (30), which calibration organs (50) are destined to vary resistance to rotation offered by the block (4) from a minimum to a maximum.

FIG. 1



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Description

[0001] The invention relates to the technical sector of bindings for Alpine skiing.

[0002] As is known, Alpine skiing is a sporting discipline in which the athlete re-ascends using the skis, from a point downhill up to a predetermined point from which he or she will newly descend with the skis, either on- or off-piste, using conventional skiing techniques.

[0003] In order to enable re-ascent with skis attached, without sliding backwards, sealskins are applied to the underneath of the skis, while the attachments and ski-boots have to be specially conformed in order to assume two operating positions, respectively for ascending and descending.

[0004] In the ascending position, each boot is hinge-constrained, by the front part only, to the toe piece, while the heel piece of the attachment is predisposed such as not to hook with the rear part of the boot; the boot can therefore oscillate about an axis which is transversal to the ski, such as to enable rising of the heel from the ski platform during each step made by the athlete.

[0005] In the descending position, the heel pieces block the rear parts of the relative boots, which thus become solidly constrained to the ski, enabling the athlete to guide the skis.

[0006] Both the toe piece and the heel piece are provided, in a known way, with safety hooks in a case of the athlete's falling.

[0007] In the most commonly used system for hooking the rear part of the ski boot to the heel piece, two horizontal pins are present, substantially parallel, positioned at a predetermined height from the ski platform, facing towards the toe piece and subjected to elastic means which maintain them in a minimum interaxial position.

[0008] In the boot, at the rear vertical side of the heel, an undercut is realised in which a wedge-shaped metal plate is fixed, destined, following downwards pressure exerted on the boot, to insert between the pins and cause them to splay; after passing beyond the plate the pins snap-fit to the plate above it, thus blocking the boot to the ski.

[0009] To arrange the heel piece in the ascent position, in some models a tilting element is provided, hinged to the heel piece, which is rotated such as to be positioned above the pins and to cover them, such as to prevent them from hooking to the boot.

[0010] All the heel piece models are provided with a vertical-axis joint which enables a safety unhooking which enables rotation between the upper block, bearing the pins, and the base fixed to the ski; in the absence of the tilting element, in order to arrange the heel piece in the ascent position this joint is used for orientating the pins towards the rear part of the ski.

[0011] The joint is elastically stabilised in the position in which the pins are facing forwards, such as to resist rotation up to a predetermined load corresponding to the normal stresses impressed by the athlete during descent.

[0012] In the conformation of the joints of known type, the "female" part is associated to the upper block and the "male" part is associated to the base; the elastic organs, also housed internally of the female part, are inevitably small and consequently their preload value, on which the greater or lesser amount required for unhooking depends, is adjustable only with a poor degree of progression.

[0013] The above-cited conformation implies that the joint cannot be made smaller than to a certain degree, which has negative implications for the overall lightness of the attachment which, as is known, represents a characteristic of particular relevance, especially in models destined for competitive sporting use.

[0014] An aim of the present invention is therefore to provide a heel piece with a joint for an attachment for Alpine skiing which is conformed in such a way as to be very compact and light.

[0015] A further aim of the invention relates to the desire to have means for calibrating the resistance to rotation which are regulatable more gradually and precisely with respect to the prior art.

[0016] A still further aim of the invention consists in obtaining a reliable and sturdy heel piece which is also suitable for competitive sporting use.

[0017] The characteristics of the invention will more clearly emerge from the following description of a preferred embodiment of the heel piece of the invention, in accordance with what is set out in the claims and with the aid of the accompanying figures of the drawings, in which:

figure 1 is a perspective view of the heel piece of the invention, associated to a ski;

figures 2A, 2B illustrate partly-sectioned lateral views of the heel piece, respectively in a descent position and an ascent position;

figure 3 is a plan view from below of figure 2A;

figure 4 is a section view along plane IV-IV of figure 2A;

figure 5 is a section view along plane V-V of figure 2A;

figure 6 is an exploded view of the heel piece of figure 1.

[0018] With reference to the above-mentioned figures of the drawings, 1 denotes in its entirety the heel piece of the invention, in an overall view.

[0019] The heel piece 1 defines, together with a toe piece (not illustrated), an attachment for Alpine skiing.

[0020] The heel piece 1, similarly to the known heel pieces described in the preamble hereto, is constituted by a base 2 fixed to the ski S, to which base is associated, with an interposing of a joint 3 having a vertical axis, an

upper block 4 comprising attachment means enabling hooking with the rear part of the boot (not illustrated).

[0021] The attachment means are constituted, in the example of the figures, by a pair of pins 5, of known type, described herein above.

[0022] The rotation of the upper block 4 with respect to the joint 3 defines, for the heel 1, the two known configurations of use, respectively hooking K (figures 1, 2A, 3, 5) and non-hooking W (figure 2B), of the pins 5 to the relative ski boot.

[0023] In the invention, in the heel piece 1 the joint 3 is defined by a vertical-axis hub 40, made solid to the upper block 4, projecting downwards and destined to couple rotatably with a circular seatings 20 realised in the base 2.

[0024] The base 2 and the upper block 4 are maintained mutually assembled by joining means 10 conformed such as to enable the above-mentioned rotation of the block 4.

[0025] The joining means 10 are constituted, for example, by a disc 11, removably fixed to the lower end of the hub 40 and having a diameter which is appropriately larger than the hub 40, which disc 11 is destined to abut an abutment 21 realised in the lower part of the seating 20 (figures 2A, 2B, 3, 4, 6).

[0026] The joint 3 thus-conformed is associated to positioning organs 30, destined to define and elastically stabilise at least the above-mentioned hooking configuration K of the heel piece 1.

[0027] The positioning organs 30 comprise a piston 31, housed slidably in the base 2 and subjected to the action of elastic organs 32 destined to press the piston 31 radially against the hub 40, a first face 41 being realised in the lateral surface thereof, in the hooking configuration K (figures 5 and 6).

[0028] In the illustrated example a second face 42 is comprised, realised at 180° from the first face 41, in the above-mentioned non-hooking conformation W (see once more figures 5 and 6).

[0029] When one of the two faces 41, 42 is faced to the head 31A of the piston 31, the relative configuration K, W is defined and elastically stabilised (figure 5).

[0030] Two further faces 43, 44 are advantageously realised in the hub 40, offset by 90° with respect to the first two, destined to define and elastically stabilise, in cooperation with the mentioned piston 31, other corresponding non-hooked configurations (not illustrated) of the heel piece 1; the presence of the further faces 43, 44 facilitates manual rotation of the block 4 from the hooked configuration K to the non-hooked configuration W and vice versa, and further optimise the safety unhooking of the heel piece 1 in the case of a fall during descent (see once more figures 5 and 6).

[0031] In the embodiment of the accompanying figures, the faces 41, 42, 43, 44 exhibit the relative flat surface, like the head 31 A of the piston 31.

[0032] In variant embodiments, not illustrated, the surface of the faces 41, 42, 43, 44 can be concave or convex; the head 31A of the piston 31 assumes a complementary convex form in the first case and concave in the second case.

[0033] Calibration organs 50 are comprised in the base, associated to the positioning organs 30, destined to vary resistance to rotation offered by the block 4 during the descent, from a minimum to a maximum.

[0034] The calibration organs 50 are constituted, in the embodiment of the figures, by an externally-threaded cup 51 engaged in a corresponding threaded hole 52 fashioned in the base 2 and designed to modify the preload of the elastic organs 32 which act on the piston 31, according to the weight of the skier, his or her muscular power and the technical level thereof.

[0035] The preset value must be such that the block 4 remains in the hooked configuration K as long as the stresses on the ski boot are contained within a predetermined value, and until a spontaneous partial rotation of the block 4 occurs, exceeding the value, with a consequent unhooking of the ski boot.

[0036] In order to have a visual reference of the set preload, a window 53 is realised in the base 2 above the threaded hole 52, which window 53 makes the front head of the cup 51 visible (see figure 1); in order to make the adjustment more precise, a graduated scale (not illustrated) is advantageously provided by the side of the window 53.

[0037] From the above description the special characteristics of the heel piece of the invention emerge clearly; the heel piece is very compact thanks to the original conformation of the joint 3, in which the female part is associated to the base while the male part is associated to the upper block 4.

[0038] The above-described conformation enables both the positioning organs 30 and the calibration organs 50 to be located externally of the hinge joint; the positioning organs 30 and calibration organs 50 being advantageously housed in the base of the heel piece, i.e. in the fixed part thereof; this has enabled having, among other things, a spring of a certain length which is adjustable with a greater graduality and precision with respect to the known-type springs inserted in the heel pieces.

[0039] It follows that, with functional characteristics being equal, the proposed heel-piece is lighter, with respect to known heel pieces, without any sacrifice in terms of sturdiness and reliability, such as to be particularly suitable also for competitive sporting use.

[0040] The above, however, is provided by way of non-limiting example, and any modifications in detail which become necessary for technical and/or functional reasons, are considered henceforth to fall within the ambit of protection defined by the appended claims.

Claims

1. A jointed heel piece for an Alpine ski bindings of a type in which a joint (3) has a vertical axis and is

destined to enable rotation of an upper block (4) to which attachment means (5) of a ski boot are associated, with respect to a base (2) fixed to the ski (S), in order to define two use configurations of the heel piece (1), respectively a hooked configuration (K) and a non-hooked configuration (W) of the attachment means (5) to the ski boot, the heel piece (1) being **characterised in that** it comprises: a vertical-axis hub (40) solidly constrained to the block (4), extending downwards and destined to rotatably couple with a circular seating (20) realised in the base (2), such as to define the joint (3); joining means (10) able to keep the block (4) and the base (2) mutually assembled, enabling the rotation of the block (4); positioning organs (30), associated to the joint (3), destined to define and elastically stabilise at least the hooked configuration (K) of the heel piece (1).

2. The heel piece of claim 1, **characterised in that** it comprises calibration organs (50) associated to the positioning organs (30), which calibration organs (50) are able to vary from a minimum to a maximum a resistance to rotation offered by the block (4), in order to keep the block (4) in the hooked configuration (K) in presence of stress on the ski boot contained within a predefined range, and in order to enable a spontaneous partial rotation of the block (4) in presence of stress of amounts exceeding the predefined range, with a consequent unhooking of the ski boot from the heel piece (1).

3. The heel piece of claim 1, **characterised in that** the joining means (10) are constituted by a disc (11), removably fixed to a lower end of the hub (40) and having an appropriately greater diameter than the hub (40), the disc (11) being destined to strike against an abutment (21) realised in a lower part of the seating (20).

4. The heel piece of claim 1, **characterised in that** the positioning organs (30) comprise a piston (31) housed slidably in the base (2) and subjected to action of elastic organs (32) destined to press the piston (31) radially against the hub (40), in a lateral surface of which hub (40) at least a first face (41) is fashioned, which face (41) is destined to be faced against the head (31A) of the piston (31) in the hooked configuration (K).

5. The heel piece of claim 4, **characterised in that** the positioning organs (30) are also able to define and elastically stabilise the non-hooked configuration (W) of the heel piece (1), and comprise a second face (42), realised at 180° from the first face (41), which second face (42) is destined to face the head (31 A) in the non-hooked configuration (W).

6. The heel piece of claim 4 or 5, **characterised in that** two further faces (43, 44) are fashioned in the lateral surface of the hub (40), which two further faces (43, 44) are staggered by 90° with respect to the first face (41) and which two further faces (43) are able to elastically stabilise, in cooperation with the piston (31), further non-hooked configurations of the heel piece (1).

7. The heel piece of claim 4 or 5 or 6, **characterised in that** the faces (41, 42, 43, 44) exhibit a flat surface as well as the head (31 A) of the piston (31).

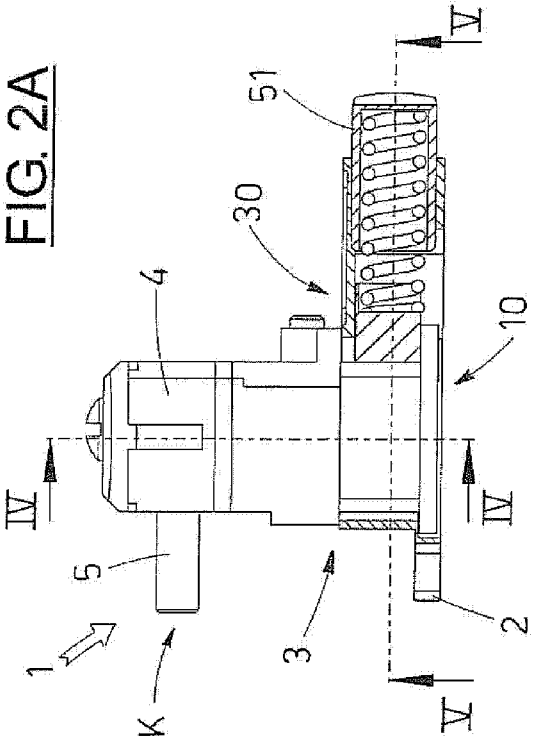
8. The heel piece of claim 4 or 5 or 6, **characterised in that** the faces (41, 42, 43, 44) exhibit a concave surface which is complementary to a convex shape of the head (31A) of the piston (31).

9. The heel piece of claim 4 or 5 or 6, **characterised in that** the faces (41, 42, 43, 44) exhibit a convex surface which is complementary to a concave shape of the head (31A) of the piston (31).

10. The heel piece of claim 2, **characterised in that** the calibration organs (50) comprise a cup (51) which is externally threaded and engaged in a correspondingly threaded hole (52) realised in the base (2), which cup (51) is able to modify a preload of the elastic organs (32) provided in the positioning organs (30).

11. The heel piece of claim 6, **characterised in that** it comprises a window (53) afforded in the base (2), above the threaded hole (52), which window (53) is able to make a front head of the cup (51) visible from outside.

FIG. 2A



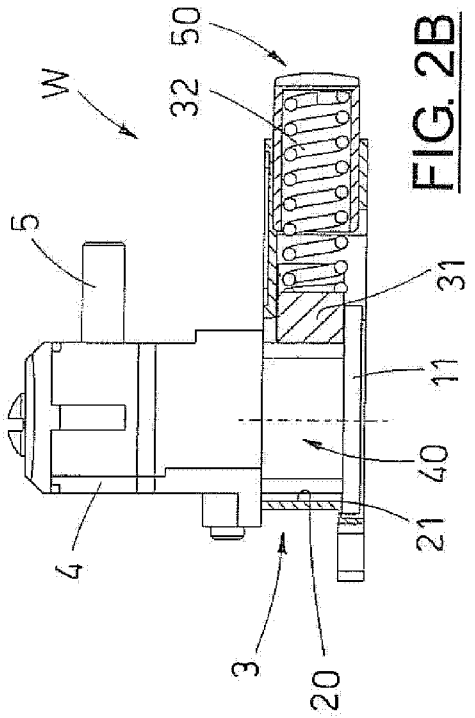


FIG. 2B

FIG. 1

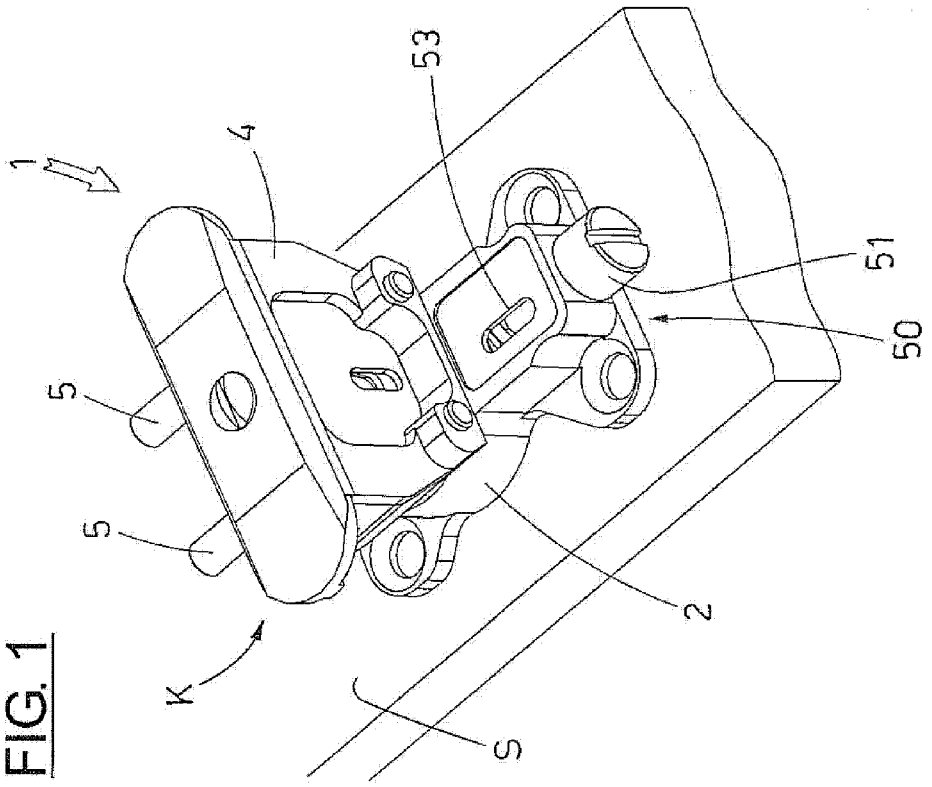
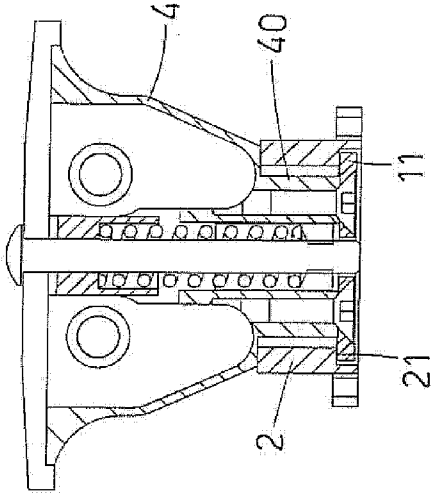


FIG. 4



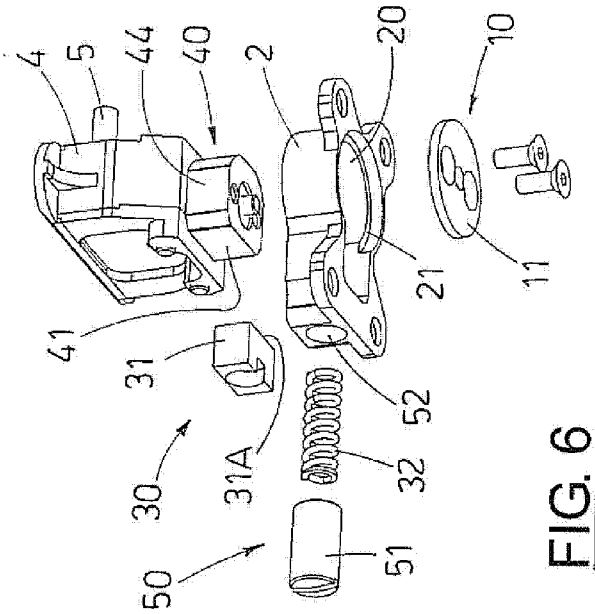
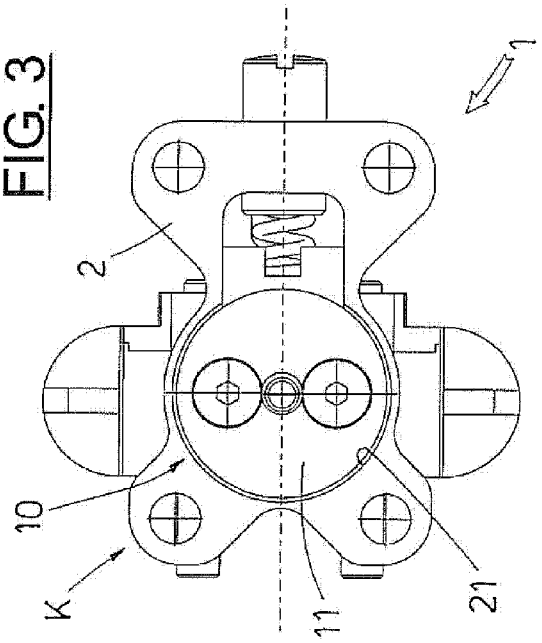


FIG. 6

FIG. 3



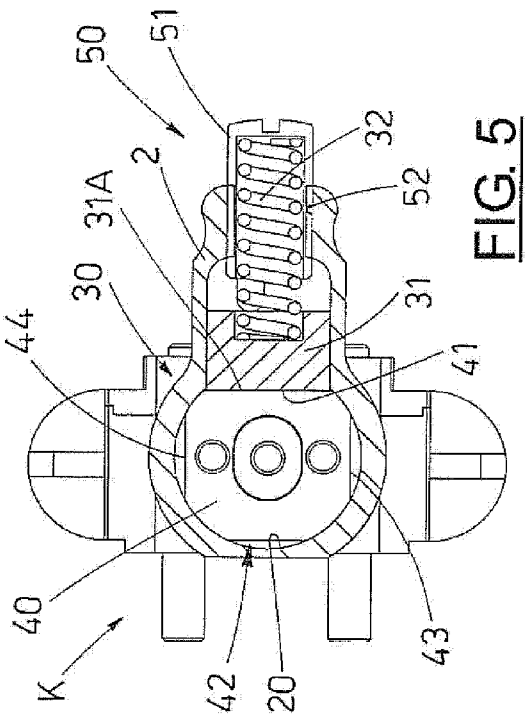


FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 11 15 1211

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 2009/105866 A1 (G3 GENUINE GUIDE GEAR INC [CA]) 3 September 2009 (2009-09-03) * pages 1,2,9,14; figures 2,15 * -----	1-11	INV. A63C9/08 A63C9/084 A63C9/086
A	AT 402 020 B (BARTHEL FRITZ [AT]) 27 January 1997 (1997-01-27) * the whole document * -----	1-11	
			TECHNICAL FIELDS SEARCHED (IPC) A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 April 2011	Haller, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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1

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 15 1211

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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15-04-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009105866 A1	03-09-2009	EP 2259850 A1	15-12-2010
AT 402020 B	27-01-1997	NONE	

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