

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 933 035 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.08.1999 Bulletin 1999/31

(51) Int Cl.⁶: **A43B 5/04, A63C 9/08**

(21) Application number: **99101892.0**

(22) Date of filing: **29.01.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Baggio, Giorgio**
35018 S. Martino di Lupari (Padova) (IT)
• **Wittmann, Heinz**
1071 Vienna (AT)

(30) Priority: **02.02.1998 IT MI980188**

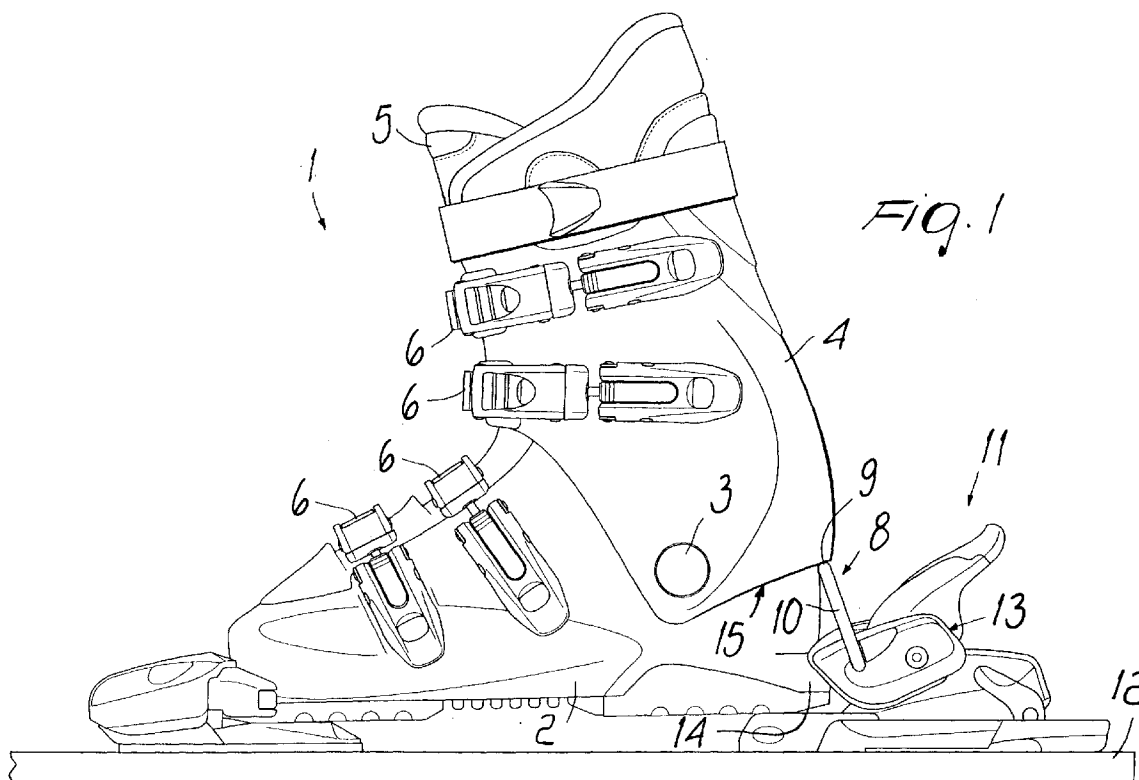
(74) Representative: **Forattini, Amelia et al**
c/o Internazionale Brevetti
Ingg. ZINI, MARANESI & C. S.r.l.
Piazza Castello 1
20121 Milano (IT)

(71) Applicant: **HTM SPORT S.p.A.**
I-16035 Rapallo (Genova) (IT)

(54) Locking device, particularly for ski boots

(57) A locking device, particularly for ski boots of the type constituted by a shell 2 and by an articulated quarter 4 constituted by a strut 8 which is associated at the heel unit 11 of a ski binding. The strut 8 interacts by abutment, when the boot is engaged with the binding, with

the quarter, which is freely articulated to the shell. It is thus possible to provide a boot which allows optimum walking when it is disengaged from the binding and is limited in its backward oscillation by the action of the strut when it is associated with the binding.



EP 0 933 035 A1

Description

[0001] The present invention relates to a locking device, particularly for ski boots composed of a shell to which a quarter is articulated.

[0002] In conventional ski boots, there is a strongly felt problem related to the possibility to achieve a limited backward oscillation of the quarter during sports practice and at the same time a free oscillation of the quarter once sports practice has ended, in order to allow the user to walk easily. Several systems have been devised for that purpose. For example, according to one of the conventional systems, adapted members on the boot quarter which can be activated, for example by levers, and can be positioned selectively so as to allow the free oscillation of the quarter or limit its oscillation by means of protrusions or other members which protrude at the shell externally thereto.

[0003] All the conventional systems entail the presence, at the quarter, of suitable devices and mechanisms which interact with the shell to limit or allow the free mutual oscillation of the two components.

[0004] All the conventional systems have the considerable drawback of requiring the provision of particular molds for inserting these devices in the boot. In addition to being possibly affected by malfunctions, the inserts cause an increase in the cost of the boot, since they must be manufactured and then assembled to the boot.

[0005] Furthermore, the activation of these devices is not always easy, since the skier usually wears gloves and therefore encounters difficulties in gripping levers and other devices especially in low-temperature conditions.

[0006] An aim of the present invention is therefore to eliminate the above drawbacks and thus solve the above described technical problems by providing a device which allows the user to quickly and easily achieve the free oscillation of the quarter or a limitation of its oscillation.

[0007] A further object is to allow the skier to achieve these two different conditions for the oscillation of the quarter with respect to the shell without having to act directly at any device applied at the boot.

[0008] A further important object is to provide a device which associates with the preceding characteristics that of having low manufacturing costs which allow to reduce the manufacturing costs.

[0009] A further important object is to provide a device whose activation when skiing and deactivation when walking can be achieved without any direct intervention of the skier on the boot.

[0010] A further object of the invention is to provide a highly reliable locking device.

[0011] This aim, these objects and others which will become apparent from the description that follows are achieved by a locking device, as claimed in the appended claims.

[0012] Further objects will become apparent in the de-

scription that follows, which must be considered in combination with the accompanying drawings, which illustrate by way of non-limitative example a particular embodiment and in which:

Fig. 1 is a side view of a ski boot provided with the locking device, according to the invention;

Fig. 2 is a view, similar to Fig. 1, of a further embodiment of the device;

Fig. 3 is a perspective view of the embodiment of Fig. 2;

Fig. 4 is a partially sectional side view of a heel unit of a ski binding with the device according to a further aspect of the invention;

Figs. 5, 6 and 7 are schematic views of a manner in which ligament rupture can occur while skiing;

Fig. 8 is a side view of a ski boot with a further embodiment of the locking device;

Fig. 9 is a sectional view of the device of Fig. 8.

[0013] With reference to the above figures, and bearing in mind that they illustrate examples of particular embodiments and are in variable scales and that identical or equivalent parts correspond to individual reference numerals, Figs. 5, 6 and 7 schematically show how ligaments often rupture whilst skiing.

[0014] Step 1 shows the condition in which the skier, after a jump, touches the snow with the rear ends of his skis; then, in step 2, the tips of the skis increase their rate of descent due to the impact of the rear ends with the snow. In step 3, the boot, through the quarter, forces the tibia to increase its rate of descent and therefore to travel at the very high speed of the tips of the ski.

[0015] During this step, the rest of the body, owing to its inertia, is unable to instantly travel at the same speed as the tibia and a brief critical step (lasting approximately 200-400 thousandths of a second) thus begins.

[0016] During this critical step, the tibia pulls the knee forward, whilst the inertia of the body pulls the knee backward, thus spraining the ligaments.

[0017] The numeral 1 designates a ski boot constituted by a shell 2 to which a quarter 4 is articulated by a pivot 3.

[0018] The oscillation of the quarter 4 can be limited by means of an optional tongue 5 associated, in a front region, with the shell 2 and surrounded by the front flaps of the quarter 4. A fastening means, such as for example levers 6, is provided on the quarter and on the shell.

[0019] The numeral 7 designates the device for blocking the backward oscillation of the quarter 4 according to the invention. The device is constituted by a strut member 8 which can be for example essentially U-

shaped and accordingly forms a supporting base 9 and a pair of wings 10.

[0020] The strut 8 is associated at a heel unit 11 which constitutes a binding for a ski 12. Strut 8 can thus be associated, for example, at the ends of the pair of wings 10 laterally to the body or bracket 13 of the heel unit 11, which locks the heel 14 of the shell 2, the supporting base 9 of the strut being directed toward the quarter 4.

[0021] The arrangement of the quarter 8 entails configuring it so that it has a chosen inclination with respect to the snow-covered surface on which the ski 12 rests and therefore so that when the boot is fitted onto the binding the supporting base 9 interacts for example at the facing lower perimetric edge 15 of the quarter 4.

[0022] The illustrated embodiment has achieved the intended aim and all the objects, since a device has been obtained which automatically locks the quarter with respect to the shell in the skiing condition and therefore in the condition in which the boot is associated at the binding.

[0023] The device therefore allows the forward oscillation of the quarter 4 and therefore allows skiing, but prevents a backward oscillation of the quarter, thus ensuring that the boot has the rear retention that is indispensable for skiing.

[0024] The device therefore automatically solves the problems for the skier, since once skiing has ended and the boot has accordingly been removed from the binding, the quarter can automatically oscillate backward, thus allowing the skier to walk easily.

[0025] The quarter can in fact assume a vertical position with respect to the shell, making it easier to walk.

[0026] The illustrated embodiment can be subjected to numerous variations, within the scope of the appended claims. Thus, for example, the strut 8 can be constituted by a single member which is rigidly coupled at the bracket 13 in a region which is arranged approximately on a longitudinal median plane thereof or can be constituted by two or more variously coupled members which protrude from the bracket 13.

[0027] As an alternative, the strut 8 can be associated, at its ends, at a point of the heel unit which is stable once the heel unit has been closed, thus allowing to maintain a very precise and unchanging position for the strut 8.

[0028] As shown in Figs. 2 and 3, the strut can be rotatably associated, at its end, at the body or bracket 13 and be forced toward the shell and therefore the quarter 4 by flexible means, such as for example a cylindrical helical compression spring 16.

[0029] The spring can be interposed, for example, between the supporting base 9 of the strut 8 and the body or bracket 13.

[0030] This embodiment has a further advantage for the user, since the presence of the spring can, by forcing the strut 8 toward the shell, ensure the close contact thereof with the boot. If, for example, the strut affects, during the fastening of the boot and of the heel unit, the

rear surface of the quarter 4 proximate to the lower perimetric edge 15, the first forward flexing performed by the skier flexes the quarter 4 and therefore the spring forces the strut 8 to rotate until it is in contact with the shell and therefore allows its interaction with the lower perimetric edge 15 of the quarter 4.

[0031] Fig. 4 illustrates a further variation, in which the strut 8 is associated, at the free ends of the pair of wings 10, on a cam 17 which belongs to the internal mechanism of the heel unit 11. The strut accordingly does not interact at the body or bracket 13.

[0032] The cam 17 is pivoted, at one end, to the structure 19 of the heel unit by means of a first pivot 18. Proximate to the ends of the cam that interact with the strut 8, the cam interacts with a contrast cam 20 which can slide in contrast with a second spring 21.

[0033] This embodiment differs from the preceding ones in that the second spring 21 can be set so that, beyond a certain preset load, it allows the movement of the contrast cam 20 and therefore a slight rotation of the cam 17, which thus allows the quarter 4 to rotate slightly backward, so as to protect against possible rupture of the skier's leg ligaments if the skier falls with a combined backward and sideways movement.

[0034] Figs. 8 and 9 illustrate still a further embodiment, in which the strut 208 is essentially constituted by a lever in which a first end 50 is freely pivoted, by means of a transverse pivot, at the heel unit 11 that constitutes the binding for the ski 12.

[0035] The lever has a second end 209 which protrudes toward the quarter 4 of the ski boot 1 and constitutes a supporting base which interacts with the lower perimetric edge 15 of the quarter 4.

[0036] When the boot is fastened to the heel unit, the lower perimetric edge 15 of the quarter 4 accordingly rests on the end 209 of the strut 208 and the quarter is thus inclined forward and is therefore in a correct position for skiing.

[0037] The lever is pivoted in a lower region, proximate to the first end 50, to a second cam 51, which is shaped like a wedge in which the apex is directed toward the ski. The second cam is associated with the heel unit and is again pushed upward, since one of its sides interacts with the contrast cam 20.

[0038] On the opposite side with respect to the one that interacts with the contrast cam 20, the second cam 51 has a tooth 52 which engages a complementarily shaped tab 53 which is provided to the rear of the cam 17.

[0039] In this embodiment, the second spring 21, which controls the sliding of the contrast cam 20, can be set so that beyond a preset load it allows the movement of the contrast cam 20 and therefore the lowering of the second cam 51 and therefore the oscillation of the lever that constitutes the strut 8, the second end 9 of which performs a counterclockwise rotation so as to allow the lowering of the quarter 4.

[0040] This slight backward rotation of the quarter al-

lows to protect against the possible rupture of the ligaments of the user's leg.

[0041] The materials and the dimensions that constitute the individual components of the device may of course be the most pertinent according to the specific requirements.

[0042] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. A locking device, particularly for ski boots having a shell 2 and a quarter 4 is articulated thereto, characterized in that it comprises at least one strut member (8,108,208) associated with a ski (11, 12) so as to be able to oscillate and to abut with said quarter 4, which is freely articulated to said shell 2.
2. The device according to claim 1, characterized in that said strut member (8,108,208) is essentially U-shaped and forms a supporting base 9,109,209 and a pair of lateral wings 10,110.
3. The device according to one or more of the preceding claims characterized in that said strut member (8,108,208) is associated at a heel unit 11 of a ski binding.
4. The device according to one or more of the preceding claims characterized in that said strut member (8,108,208) is associated at the ends of said pair of wings 10 laterally to a fixed body or bracket 13 of said heel unit (11).
5. The device according to one or more of the preceding claims, characterized in that said supporting base 9,109,209 of said strut member (8,108,208) is directed toward said quarter 4.
6. The device according to one or more of the preceding claims, characterized in that said strut member (8,108,208) has a selected inclination with respect to the surface on which said ski 12 rests, said supporting base 9,109,209 interacting by abutment, when said boot is fitted onto said binding, at a facing lower perimetric edge 15 of said quarter 4.
7. The device according to one or more of the preceding claims, characterized in that said strut member (8,108,208) automatically blocks the articulation of said quarter 4 with respect to said shell 2 in the skiing condition.
8. The device according to one of more of the preceding claims, characterized in that said strut member (8,108,208) does not interact with said quarter 4 when the boot is removed from said binding 11.
9. The device according to one or more of the preceding claims, characterized in that said strut member (8) is constituted by a single part which is rigidly coupled at said body or bracket 13 in a region located approximately along a longitudinal median plane thereof.
10. The device according to one or more of the preceding claims, characterized in that said strut member (8,108,208) is associated, at its ends, at a point of said heel unit 11 which is stable once said heel unit has been closed, accordingly allowing to maintain a very precise and unchanging position for said strut.
11. The device according to one or more of the preceding claims, characterized in that said strut member (8) is rotatably associated, at one end, at said body or bracket (13) and is biased toward said shell 2 and quarter 4 by an elastic means (16).
12. The device according to claim 11, characterized in that said elastic means is a spring 16 arranged between said supporting base 9 of said strut and said body or bracket 13.
13. The device according to one or more of the preceding claims, characterized in that said strut member (108) is associated, at the free ends of said pair of wings 110, on a cam 17 which belongs to the internal mechanism of said heel unit 11, said cam being pivoted to said heel unit 11 at one end by a first pivot 18, in the vicinity of the ends of said cam that interact with said strut, said cam 17 interacting with a contrast cam 20 which can slide in contrast with a second spring 21.
14. The device according to claim 13, characterized in that said second spring 21 is set so that beyond a preset load it allows the movement of said contrast cam 20 and therefore a slight rotation of said cam 17 which allows said quarter 4 to rotate slightly backward, so as to avoid the possible rupture of the skier's leg ligaments when falling with a combined backward and sideways motion.
15. The locking device, according to claims 1, characterized in that said strut member (208) is constituted by a lever which has a first end 50 freely pivoted at a heel unit 11 which constitutes the binding for the ski, said lever having a second end 209 which protrudes toward said quarter 4 of said ski boot 1 so as to constitute a supporting base which interacts with

a lower perimetric edge 15 of said quarter 4 when the boot is engaged with said heel unit 11.

16. The device according to one or more of the preceding claims, characterized in that said lever is pivoted in a lower region, proximate to said first end 50, to a second cam 51 which is shaped like a wedge with the apex directed toward the ski, said second cam (51) being associated with said heel unit 11 and being biased upward, one of its sides interacting with said contrast cam 20.
17. The device according to one of more of the preceding claims characterized in that on the opposite side with respect to the one that interacts with said contrast cam 20, said second cam 51 has a tooth 52 which engages a complementarily shaped tab 53 provided to the rear of said cam 17.
18. The device according to one of more of the preceding claims, characterized in that said second spring 21, which controls the sliding of said contrast cam 20, can be set so that beyond a preset load it allows the movement of said contrast cam 20 and therefore the lowering of said second cam 51 and therefore the oscillation of said lever, the second end of which performs a counterclockwise rotation to allow the downward movement of said quarter 4.

30

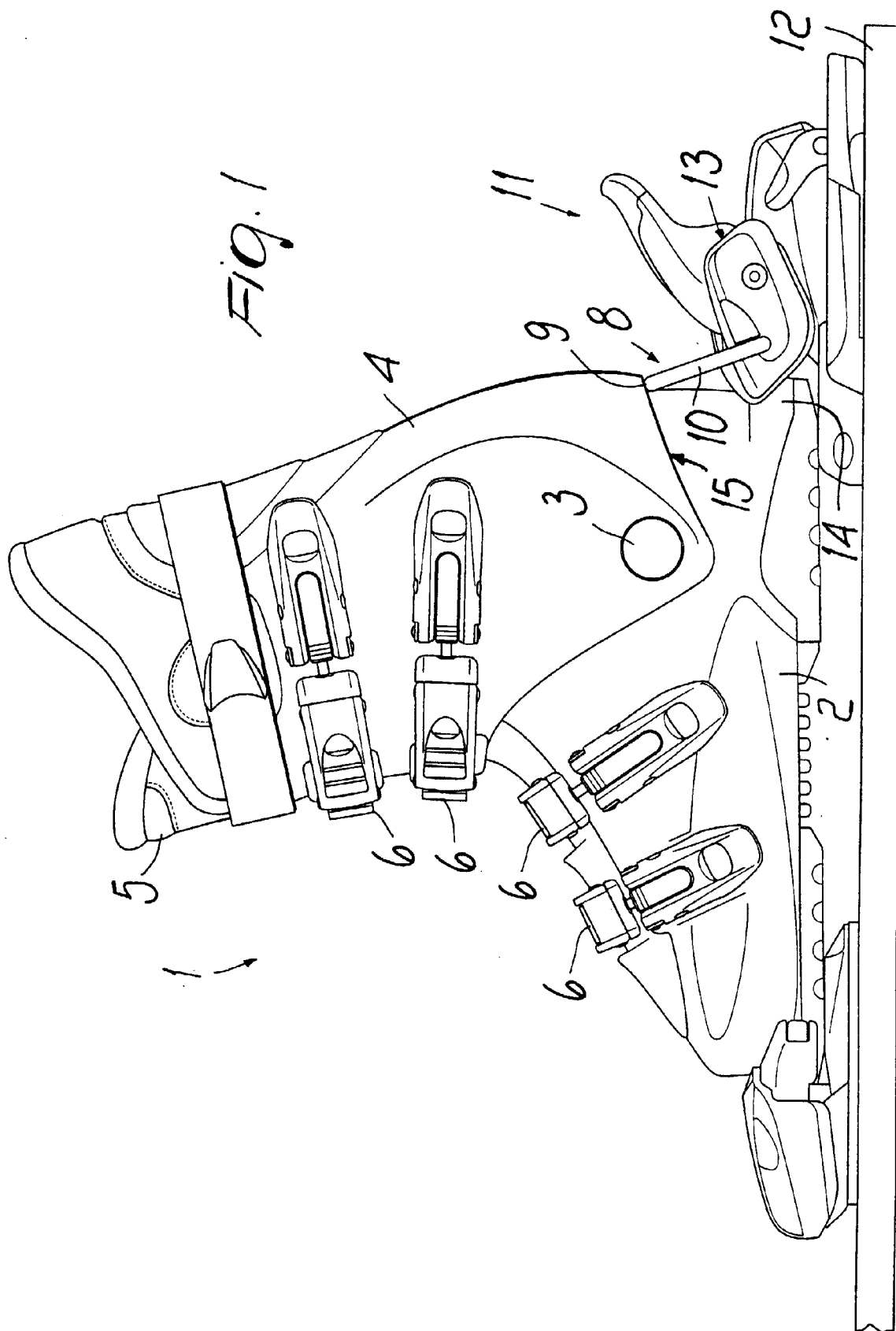
35

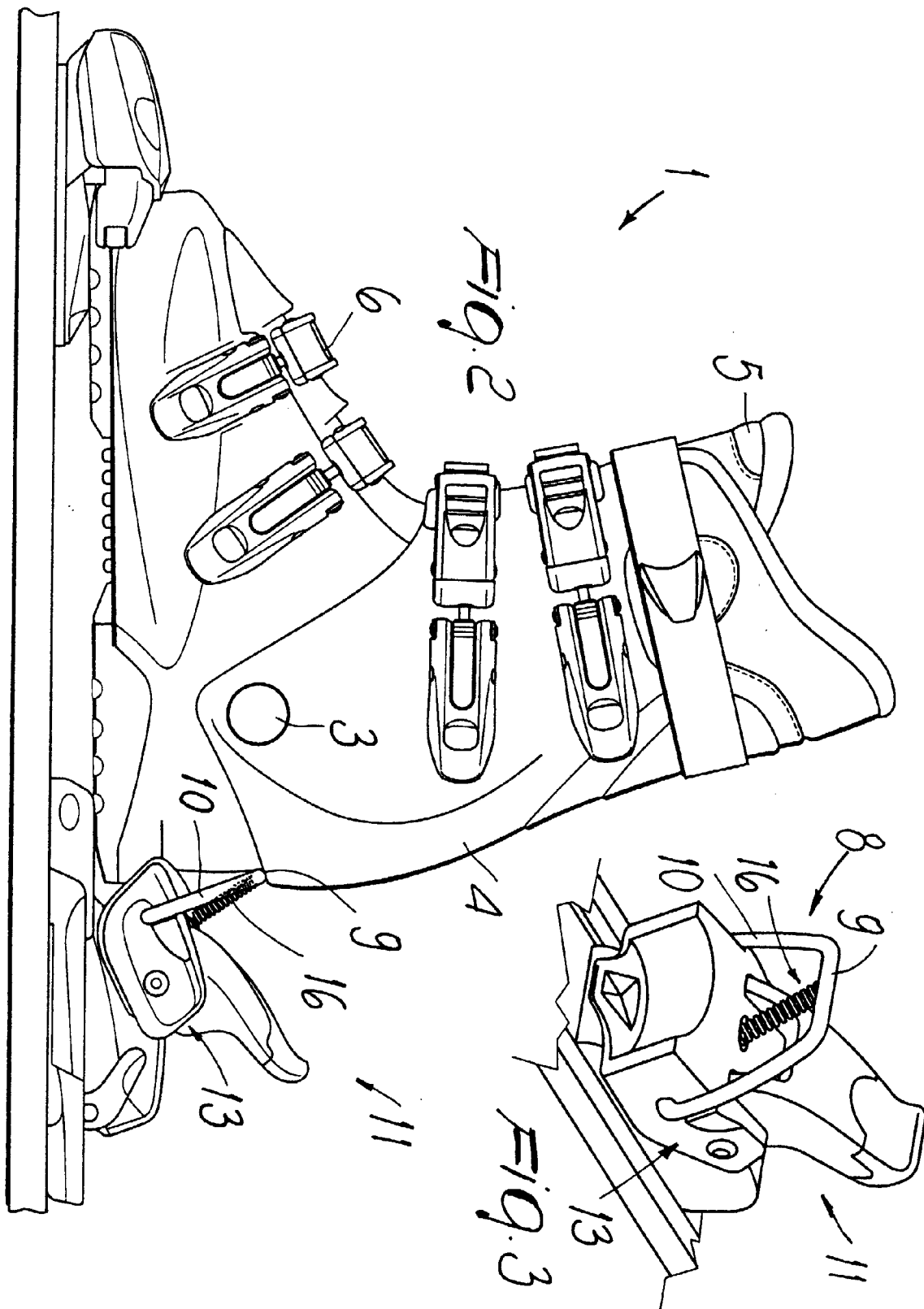
40

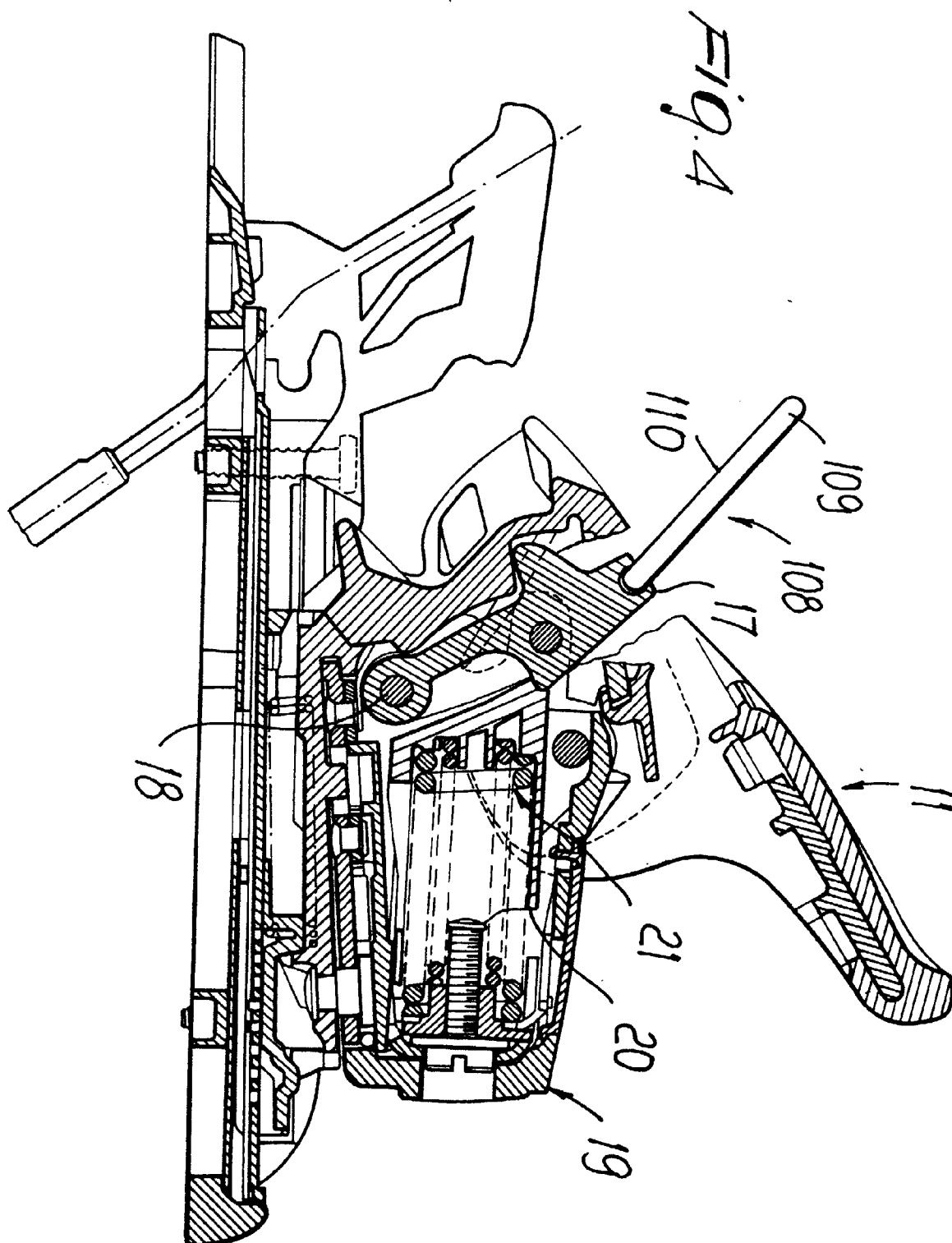
45

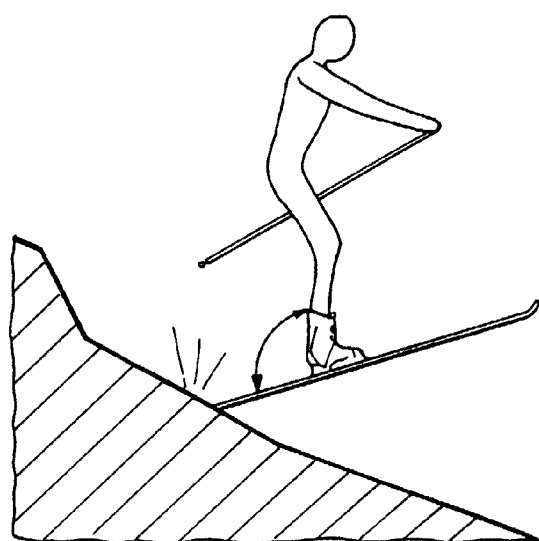
50

55



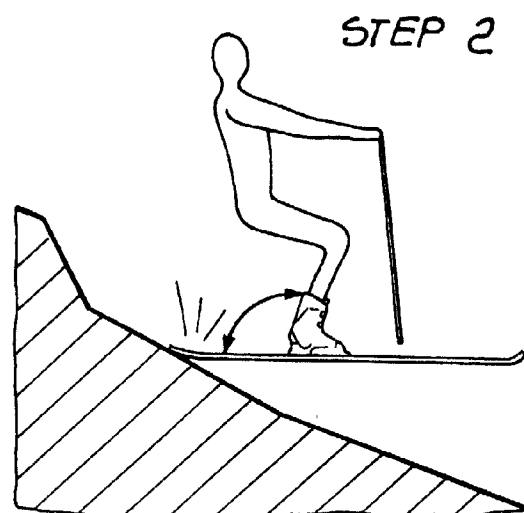






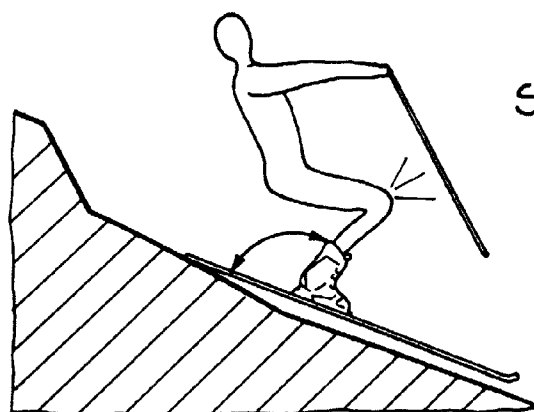
STEP 1

Fig. 5



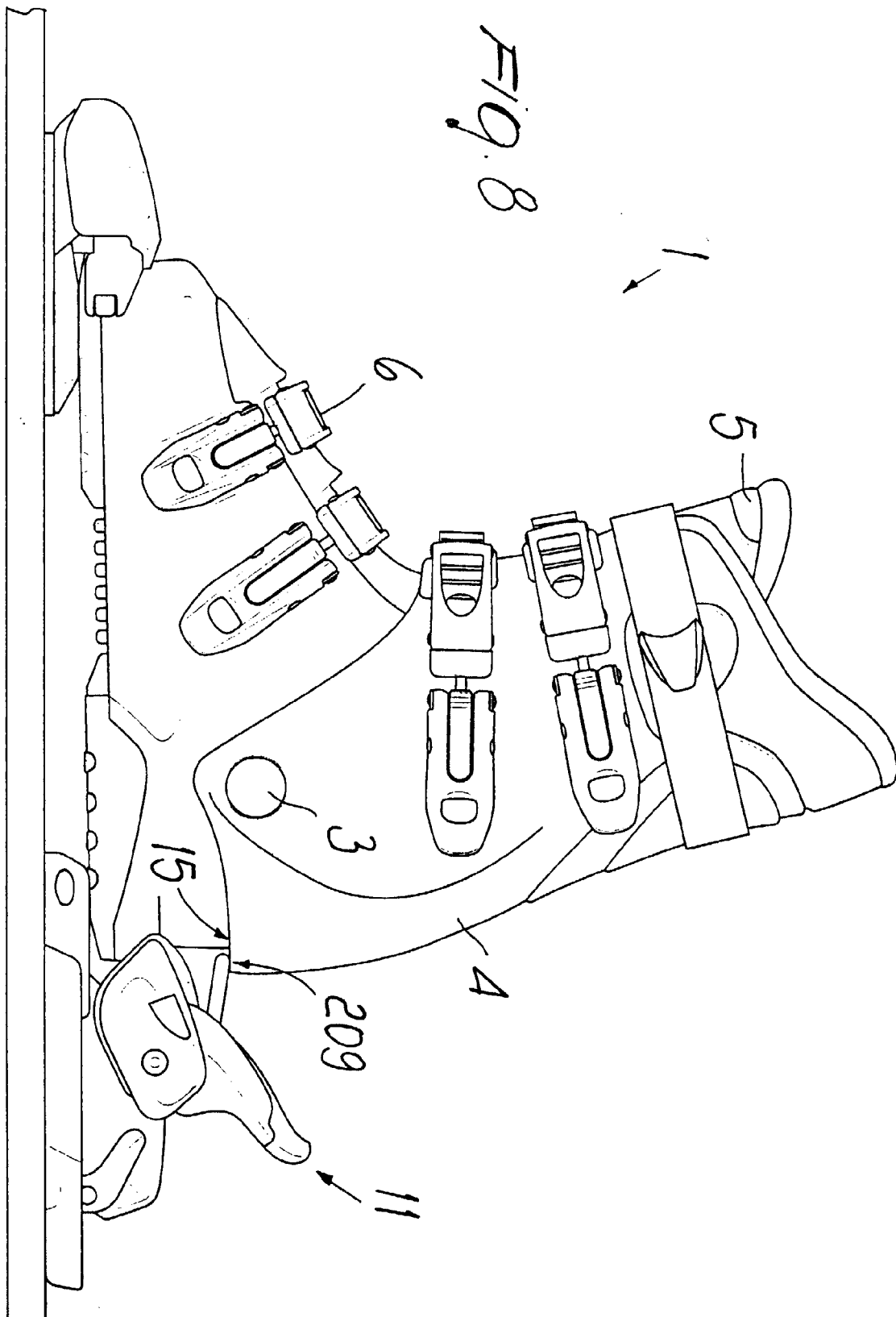
STEP 2

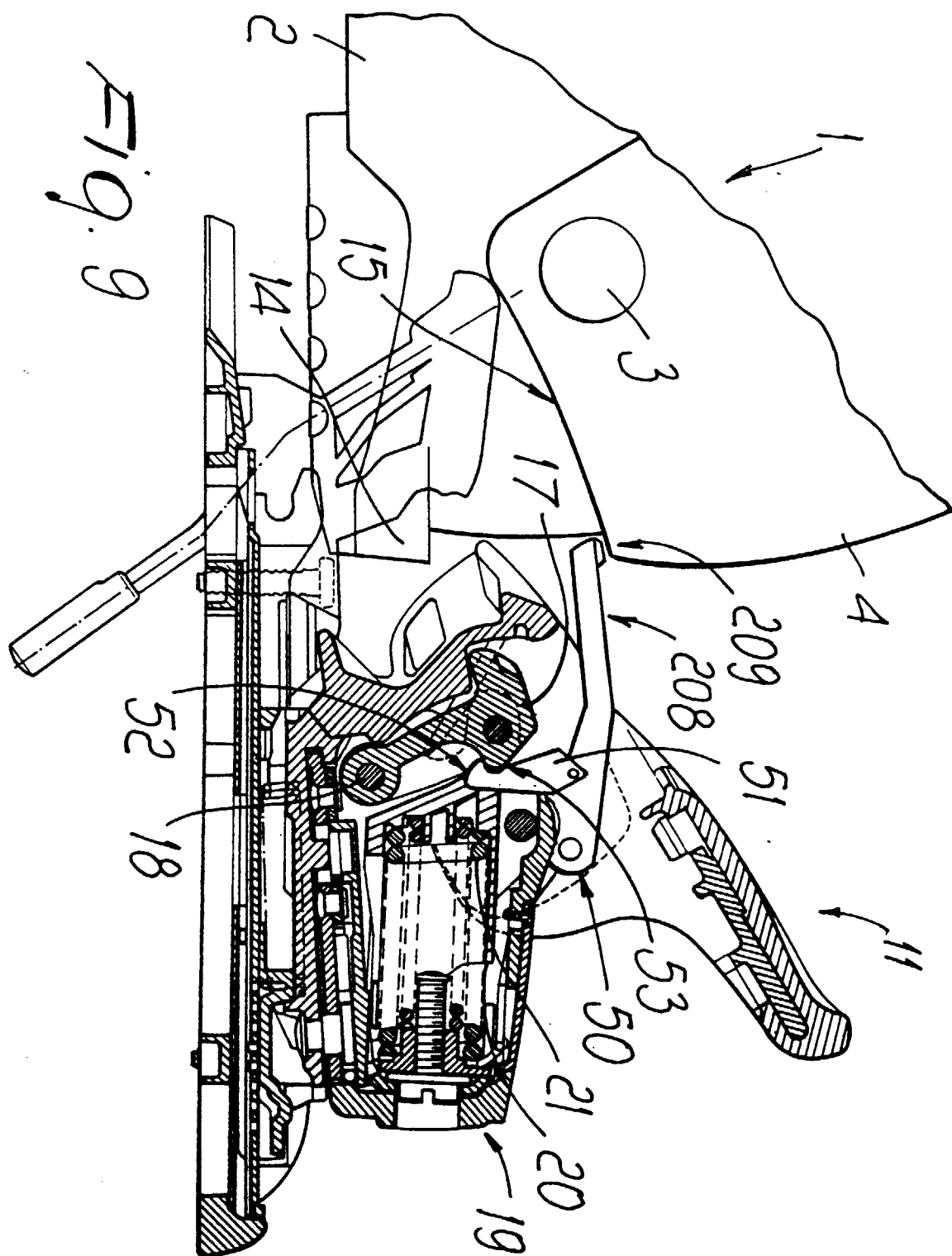
Fig. 6



STEP 3

Fig. 7







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 10 1892

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	AT 360 889 B (TYROLIA) 15 June 1980 * the whole document *	1-9	A43B5/04 A63C9/08
X	AT 340 813 B (SMOLKA & CO.) 15 April 1977 * the whole document *	1,3-12, 15	
X	AT 365 935 B (TYROLIA) 15 July 1981 * the whole document *	1,3,5-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A43B A63C
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 11 May 1999	Examiner LOSENICKY
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

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

EP 99 10 1892

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-05-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
AT 360889 B	10-02-1980	AT 349369 B	10-04-1979
		AT 502378 A	15-06-1980
		AT 141076 A	15-08-1978
		AT 365935 B	25-02-1982
		AT 788579 A	15-07-1981
		AT 369279 B	27-12-1982
		CH 623209 A	29-05-1981
		DE 2657093 A	01-09-1977
		FR 2342040 A	23-09-1977
		US 4133119 A	09-01-1979
AT 340813 B	10-01-1978	AT 972175 A	15-04-1977
		CH 612354 A	31-07-1979
		DE 2633315 A	30-06-1977
		DE 2723206 A	09-03-1978
		FR 2335251 A	15-07-1977
		JP 1173351 C	28-10-1983
		JP 52080931 A	07-07-1977
		JP 57060029 B	17-12-1982
		US 4093270 A	06-06-1978
AT 365935 B	25-02-1982	AT 349369 B	10-04-1979
		AT 66581 A	15-05-1982
		AT 788579 A	15-07-1981
		AT 141076 A	15-08-1978
		AT 360889 B	10-02-1980
		AT 502378 A	15-06-1980
		AT 369279 B	27-12-1982
		CH 623209 A	29-05-1981
		DE 2657093 A	01-09-1977
		FR 2342040 A	23-09-1977
		US 4133119 A	09-01-1979

EPO FORM P0459

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