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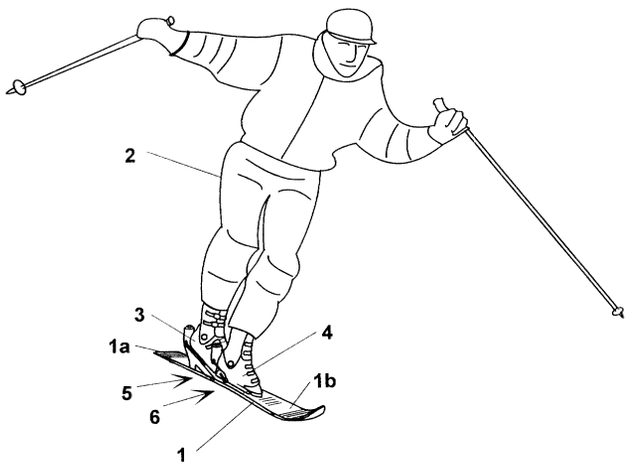
## (54) MONOSKI

(57) A monoski and relative ski-boots binding system (5,6) for binding the ski-boots (3,4) arranged in longitudinal direction with respect to the ski (1) one behind the other. The ski-boots rear (5) and front (6) bindings have respectively a rear plate (15) and a front plate (16) arranged between the ski (1) and the ski-boots (3,4) as a single binding unit (100). A common centre piece (40) is provided with parts (25,36) movable integrally in longitudinal direction, whereby the locking of a ski-boot (3) is possible with the locking movement of the other ski-boot (4). The rear plate (15) has a raised portion (15a) of predetermined height whereby the rear ski-boot (3) has the boot sole inclined in longitudinal direction with respect to the ski (1). The rear plate (15) can be rotatable about a transversal pin (42) provided at the common centre piece (40). This way the monoski allows a skiing with sharp turns, allows easily a scooter running and allows to get up easily even with both ski-boots locked. The common centre piece (40) can rotate about an axis orthogonal (41) to the plane of the ski (1), so that the ski-boots (3,4) are released (25,36) at the same time.

**Fig. 1**

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## Description

### Field of the invention

**[0001]** The present invention relates to the sport of skiing and more precisely it relates to a monoski having a ski-boots binding system for a monoski skiing.

**[0002]** In particular, the invention relates to a ski-boots binding unit for a monoski.

### Background of the invention

**[0003]** Three types of monoski are known, i.e. sport equipment consisting in a single ski having a couple of ski-boot bindings so that the skier can go downhill on the snow with a single ski.

**[0004]** A first type of monoski provides two parallel bindings arranged longitudinally on the ski. A second type of monoski is the snowboard, which provides a couple of bindings parallel to each other but transversal to the ski, that consists in a board with larger width than a normal ski.

**[0005]** Furthermore monoskis with two ski-boots bindings aligned on the same axis of the ski are known respectively with a rear and a front binding one behind the other, as described in FR2604631, US5056803 and DE2723864.

**[0006]** In this third kind of monoski, however, the problems that have prevented skiers from using it have not been solved yet.

**[0007]** A first problem is that a very low distance between the rear and front bindings is necessary. On the contrary, the skier would not ski with legs close to each other, and would be obliged at the same time to have the feet aligned on the same ski axis, whereby skiing is not comfortable.

**[0008]** Moreover, the use of ski-lifts must. be easily allowed, and this requires that a ski boot has to be released, whereas the other remains bound to the monoski.

**[0009]** Other problems relate to the safety release of the ski boots from the bindings in case of fall, as well as a simple structure of the ski-boots bindings same.

**[0010]** It is an object of the present invention to provide a monoski with a ski-boot binding system that is different from the snowboard and from the monoski with parallel longitudinal bindings and does not have the above problems.

### Summary of the invention

**[0011]** These and other objects are accomplished by the monoski according to the invention and by the binding system thereof to the ski-boots, wherein a binding system is provided having a front binding and a rear binding that are arranged aligned behind each other in longitudinal direction with respect to the ski. Said binding system comprises a toe piece for the front ski-boot, a common centre piece and a heel piece for the rear ski-boot. The characteristic is that the common centre piece has parts that are movable longitudinally in the locking step, whereby the lock of a ski boot is possible with the locking movement of the other ski-boot.

**[0012]** In particular, the common centre piece can move longitudinally from a first forward position to a second rearward position, biased by a resilient reaction.

**[0013]** Preferably, the common centre piece is such that locking the rear ski-boot is possible with a locking movement of the front ski-boot.

**[0014]** Advantageously, means are provided for locking a ski-boot singularly, for catching ski-lifting means. In this case, the common centre piece can slide up to locking in the rearward position of skiing, wherein it can keep locked both the two ski-boots and the single front ski-boot, since after releasing the rear ski-boot the front ski-boot can be locked singularly.

**[0015]** In an advantageous embodiment, the rear binding has a rear plate arranged between ski and ski-boot and a raised portion of predetermined height. This way, the rear ski-boot has the boot sole inclined in longitudinal direction with respect to the ski.

**[0016]** In a preferred embodiment the front and rear plates together with the common centre piece and the ski-boots binding means are provided as a single binding unit, to be mounted integrally on the ski.

**[0017]** According to another aspect of the invention, the rear plate is rotatable about a pin transversal to the ski provided at the common centre piece. In this case the skier can rotate integrally the rear ski-boot and the rear binding integrally to the plate.

**[0018]** Advantageously, the raised portion has predetermined adjustable height. Furthermore, it can be displaced from a raised position to a rest position, in order to allow the rear plate to rest horizontally when the ski is not used.

**[0019]** Even the front binding can have a front support plate that is arranged between the ski and the ski-boot. For skiing easier with stiff ski-boots the rear place and the front plate, or the relative bindings, are mounted so that the ski-boot has an inclination in a transversal direction, and in particular so that each ski-boot is inclined towards outside. This can be done for example with shims arranged between the plates and the support of the ski-boot or making directly inclined plates.

**[0020]** According to a further aspect of the invention, the common centre piece can rotate about an axis orthogonal to the plane of the ski. This way, in case of fall of the skier, the automatic release of the ski-boots is possible. The rotation of the rear toe piece and of the front heel piece is advantageously integral, so that the ski-boots are released at the same time.

### Brief description of the drawings

**[0021]** Further characteristics and the advantages of the monoski according to the present invention and of

the relative ski-boots binding system will be made clearer with the following description of an embodiment thereof, exemplifying but not limitative, with reference to the attached drawings, wherein:

- figure 1 shows a perspective view of a skier on a monoski according to the present invention;
- figure 2 shows an elevational longitudinal partial view of the monoski of figure 1 with ski-boots mounted;
- figure 2A shows an elevational longitudinal partial view of the monoski of figure 1 without ski-boots and rear plate lowered;
- figure 2B shows a perspective partial view of the monoski of figure 1 without ski-boots and with the central piece of the binding in unlocked position;
- Figures 2C, 2D and 2E show the monoski of figures 2 and 2A, with the tip not shown oriented towards the above, with the common centre piece in three respective positions, and respectively a position of skiing, a position rotated of emergency release in case of fall, a position of normal release of the ski-boots ;
- figure 3A shows an elevational longitudinal partial view of another embodiment of the monoski of figure 1 with ski-boots mounted;
- figure 3B shows an elevational longitudinal partial view of the monoski of figure 3A without ski-boots, with rear plate in two possible positions;
- figure 4 shows a perspective view of a monoski that can be used with the invention without bindings;
- figure 5 shows a partial top plan view of the monoski of figure 3B;
- figures 6 and 7 show a partial view respectively in elevational side view and top plan view of the monoski of figure 3A and 3B with a single support plate for both the ski-boots (not shown);
- fiqures 8 and 9 show a cross sectional view of the front plate and of the rear plate of the bindings of the monoski of figure 5 and of the front and rear portion of the plate of the ski-boots bindings of the monoski of figure 7 respectively according to arrows VIII-VIII and XI-XI ;
- figure 10 shows a different embodiment of the monoski of figures 5 and 7 with ski-boots binding having common centre piece that can slide forward and that can be locked.

Description of a preferred embodiment

**[0022]** With reference to figure 1, a monoski according to the present invention, indicated with the numeral 1, is used by a skier 2 that wears a right ski-boot 3 and a left ski-boot 4. The right boot 3 and the left boot 4 are connected to the monoski 1 by a ski-boots binding system comprising respectively a rear binding 5 and a front binding 6.

**[0023]** Ski-boots bindings 5 and 6 are arranged on the monoski 1 aligned longitudinally in rearward position towards tail la and forward position towards tip 1b, respectively.

**[0024]** This way, the skier can ski with right boot behind the left boot so that the ski boots are aligned, like in the position of figure 1. This position allows an ease skiing since when making a turn the right knee follows the left knee.

**[0025]** Obviously, by reversing the binding means so that the front binding is for the right boot and the rear binding is for the left boot, skiing is possible as well. When practising at the beginning, the skier will choose the position with the left boot ahead or behind, that fits best for him/her.

**[0026]** With reference to figures 2, 2A, 2B, 2C, 2D, 2E the rear 5 and front 6 ski-boots bindings are formed by a single unit that comprises respectively a rear toe piece 25 and a front toe piece 26 as well as a front heel piece 35 and a rear heel piece 36 for the ski-boots 3 and 4. More precisely, the rear toe piece 25 and the front heel piece 36 are associated to a common centre piece 40 so that they can:

- slide rearward integrally on a guide not shown (figure 2E) ;
- rotate integrally about a pin 41 (figure 2B and 2D) orthogonal to the plane of the ski 1;
- rotate with respect to each other about a pin 42 that is transversal to the ski (figure 2, 2A).

**[0027]** The rear binding 5 has a rear support plate 15 located between ski 1 and rear boot 3. Also front binding 6 has a front support plate 16 that is arranged between ski 1 and front boot 4. Rear plate 15 has a raised portion 15a of predetermined height, whereby the rear ski-boot 3 has the boot sole inclined forward in longitudinal direction with respect to the ski 1. Rear plate 15 can rotate at the common centre piece 40 and raised portion 15a can be rotated in a rest position shown in figure 2A, wherein rear plate 15 is horizontal.

**[0028]** Rear plate 15 can also rotate, during the skiing, up to a position indicated with a light dotted line in figure 2 that is more inclined than that of figures 2 and 2A, , thus allowing the skier to rotate integrally the ski-boot, in order to move the rear knee when skiing.

**[0029]** The common centre piece 40, as above said, further to the rotation of rear plate 15, allows two further movements, shown in figures 2D and 2E. More precisely (figure 2B, 2D) an integral braked rotation of rear toe piece 25 and of front heel piece 36 about pin 41 is allowed. This way, there is an automatic emergency release of the ski-boots in case of fall. Furthermore a longitudinal translation of common centre piece 40 (figure 2E) is possible for:

- locking both ski-boots (figure 2);
- normally releasing the ski-boots;
- locking the single front ski-boot when the rear ski-

boot is released.

**[0030]** In fact, common centre piece 40 can move rearwards longitudinally sliding in a guide not shown provided in front plate 16, in a way biased resiliently up to a stop position. Then, for preparing to skiing, front ski-boot 4 is put against front toe piece 26, so that the heel of front ski-boot 4 engages with front heel piece 36. In this position front ski-boot 4 is released. By means of fastener 27 front ski-boot 4 can be locked. This causes a rearward movement of common centre piece 40, and then integrally to it of front heel piece 36 and of rear toe piece 25, from a first forward position to a second rearward position. In presence of rear ski-boot 3 between rear toe piece 25 and rear heel peace 35, it is locked by the rearward movement of common centre piece 40. Without rear ski-boot 3, front ski-boot 4 remains in any case locked. This allows rear ski-boot to be free for example for catching ski-lifting means. By unlocking fastener 27, front ski-boot 4 is free and moves slightly forward, since the common centre piece 40 is free of moving forward. This allows rear ski-boot 3 to be freed as well.

**[0031]** In figures 2-2E front toe piece 26 and the rear heel piece 35 can be adjusted in distance with respect to common centre piece 40, in order to allow the lock of ski-boots of whichever size. The adjustment is possible by means of adjusting slotted plates available in the market and then not described in more detail.

**[0032]** Plates 15 and 16, and the relative ski-boots bindings are a single binding unit 100 that can be provided as a whole by the manufacturer and directly fastened to the ski 1.

**[0033]** With reference to figures 3A and 3B, rear and front ski-boot bindings 5,6 comprise respectively a rear toe plece 25 and a front toe piece 26 as well as a rear heel piece 35 and a front heel piece 36. The rear binding 5 has also a rear plate 15 located between ski 1 and rear boot 3. Rear plate 15 has a raised portion 15a of predetermined height whereby rear boot 3 is arranged with sole inclined forward in longitudinal diroction with respect to ski 1. Rear plate 15 can rotate about a transversal axis at common centre piece 40, and raised portion 15a can rotate as well to a rest position shown in figure 3B, wherein plate 15, indicated in that position with a dotted line, is horizontal. The difference with respect to the case of figures 2-2E is that the rear pieces 25 and 35 are independent and can have a snap engagement for locking the respective ski-boots against the toe pieces 26 and 36.

**[0034]** As shown in figure 4, ski 1 can be either a standard ski, for example with central width of 6,5 cm, or a special ski with larger width.

**[0035]** For making easier skiing with stiff ski-boots, rear plate 15 and front plate 16 have an inclination on a transversal direction, shown in figures 8 and 9, so that the boot 3 and 4 are always inclined outwardly. In the case wherein ski-boot bindings 5 and 6 are mounted for skiing with right boot 3 ahead and left boot 4 behind, front plate 16 has left thickness 16' larger than right thickness 16", whereas rear plate 15 has right thickness 15" larger than left thickness 15'. The different thicknesses 15', 15", 16' and 16" may also be obtained with appropriate shims arranged on the plates under the ski-boot bindings.

**[0036]** With reference to figures 6 and 7, in a different embodiment with respect to figures 2-2E, toe piece 25 of rear binding 15 and heel piece 36 of front binding 16 are integrated in a single intermediate piece 56. For example, by using a heel piece 36 like that of figures 3A, 3B and 5, toe piece 25 of figures 6 and 7 can be inserted in a recess made in heel piece 36 same, Obviously, spring means for a safety release of the rear boot can be provided that operate by rotating under stress on toe piece 25 similar to those provided in front toe piece 26 of known art.

**[0037]** The front plate and the rear plate can be made, as shown in figures 6 and 7, by a single plate element 100 connected to the ski and shaped in order to have a front plain portion 16 inclined transversally like in fig. 8 and a rear portion 15 raised longitudinally in 15a and inclined transversally in direction opposite to the front portion like in fig. 9.

**[0038]** Similarly, but alternatively to the embodiment of figures 2-2E, as shown in figure 10, intermediate piece 56 can be slidable longitudinally with respect to ski 1, whereby the locking movement of the rear boot 3 causes also the front binding heel piece 4 to move forward, since the intermediate piece is pushed by the rear boot 3 against front boot 4, in turn engaging with front binding toe piece 26. The slidable intermediate piece 56. once reached the locking position indicated with a continuous line in figure 10, is locked automatically by means of a click mechanism not shown, and that can be unlocked by skier 2 once released the rear boot 3. If the rear boot 3 is released, front boot 4 can remain locked for running like on a scooter.

**[0039]** The monoski according to the invention is new with respect to a monoski with parallel bindings and has the following advantages. First of all skiing with sharp turns is allowed owing to the advantageous position of the legs and to the width of the ski. Furthermore, when releasing a boot the movement like a scooter is allowed in case of plain snow fields or slight slopes, or for catching ski-lift means. In fact, the boot that remains fastened to the ski is centred transversally with respect to the ski and does not cause lateral inclination.

**[0040]** In case of fall an automatic release of the ski-boots is assured. In case of not serious falls it is possible to get up easily even when both ski-boots are locked. Finally, with respect to the normal two parallel skis, the advantages of any monoski are present in case of fall, since there is not possibility to sprain the knees because the legs cannot divaricate.

**[0041]** The foregoing description of a specific embodiment will so fully reveal the invention according to the

conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt for various applications such embodiment without further research and without parting from the invention, and it is therefore to be understood that such adaptations and modifications will have to be considered to the equivalent to the specific embodiment. The means and the material to realise the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology employed herein is for purpose of description and not of limitation.

## Claims

1. A binding system of ski-boots to a monoski, wherein a front binding (6) and a rear binding (5) are provided arranged in longitudinal direction with respect to the ski

   (1) one behind the other, comprising a toe piece (26) for the front ski-boot (4), a common centre piece (40) and a heel piece (35) for the rear ski-boot (3), **characterised in that** the common centre piece (40) provides parts (25,36) movable integrally in a longitudinal direction, whereby the lock of a ski-boot (3) is possible with the locking movement of the other ski-boot (4),

2. Ski-boots binding system according to claim 1, wherein the common centre piece (40) can move longitudinally from a first forward position to a second rearward position biased by a resilient reaction, a locking of the rear ski-boot (3) being possible with the locking movement of the front ski-boot (4).

3. Ski-boots binding system according to claim 1, wherein means are provided for locking a ski-boot (4) singularly for catching ski-lifting means, said common centre piece (40) being slidable rearwards up to a stop position wherein either the two ski-boots (3,4) are locked or only the front ski-boot (4) is locked, i.e. after releasing the rear ski-boot (3) the front ski-boot (4) can be locked singularly.

4. Ski-boots binding system according to claim 1, wherein a single ski-boots binding unit (100) is provided to be mounted integrally on the ski (1), comprising a front plate (15) and a rear plate (16) associated to said common centre piece (40) and to all the ski-boots binding pieces (25,26,35,36).

5. Ski-boots binding system according to claim 1, wherein the rear binding (5) has a rear plate (15) arranged between ski (1) and rear ski-boot (3) having a raised portion (15a) of predetermined height, whereby said rear ski-boot (3) is inclined in longitudinal direction with respect to the ski (1).

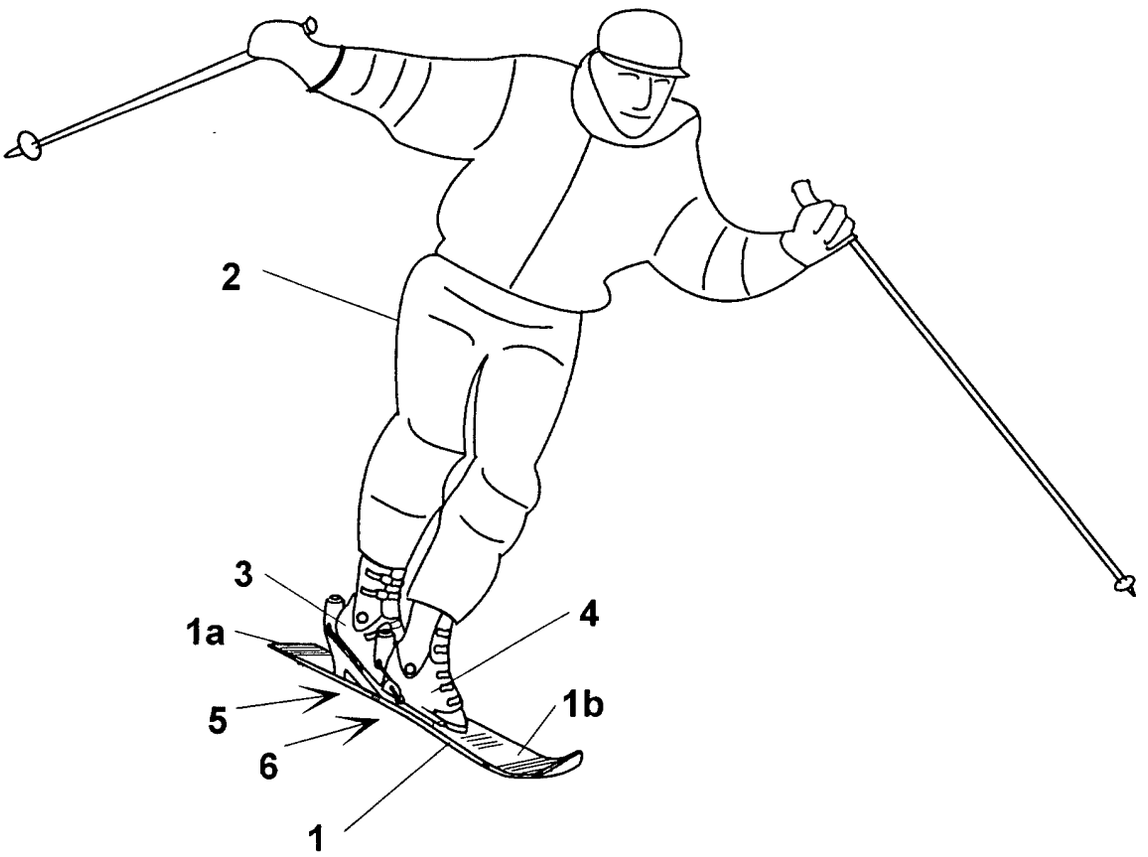
6. Ski-boots binding system according to claim 5, wherein said real plate (15) is rotatable about a transversal pin (42) provided at the common centre piece (40), under said plate said raised portion (15a) of predetermined height being provided.

7. A binding system of ski-boots to a monoski (1), wherein a front binding (6) and a rear binding (5) are provided arranged in longitudinal direction with respect to the ski (1) one behind the other, comprising a toe piece (26) for the front ski-boot (4), a common centre piece (40) and a heel piece (35) for the rear ski-boot (3), **characterised in that** the rear binding (5) comprises a rear plate (15) rotatable about a pin (42) provided at the common centre piece (40), under said rear plate (15) a raised portion (15a) of predetermined height being provided.

8. Ski-boots binding system according to claims 6 and 7, wherein said raised portion (15a) has a predetermined adjustable height, said raised portion (15a) being displaceable from a raised position to a rest position, in order to allow said rear plate (15) to rest horizontally when the ski (1) is not used.

9. Ski-boots binding system according to the previous claims, wherein a front support plate (16) is provided that is arranged between the ski and the ski-boots, wherein the rear plate (15) and the front plate (16), or the relative binding pieces on them, are mounted so that the ski-boots have an inclination in a transversal direction, and in particular so that each ski-boot is inclined towards outside.

# Fig. 1



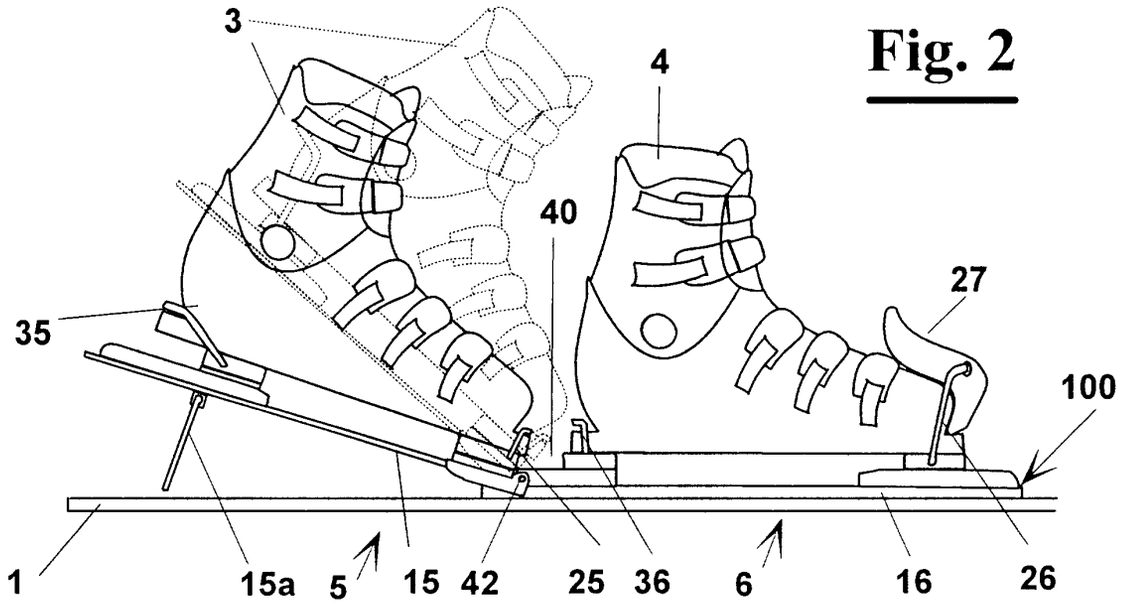



Fig. 2

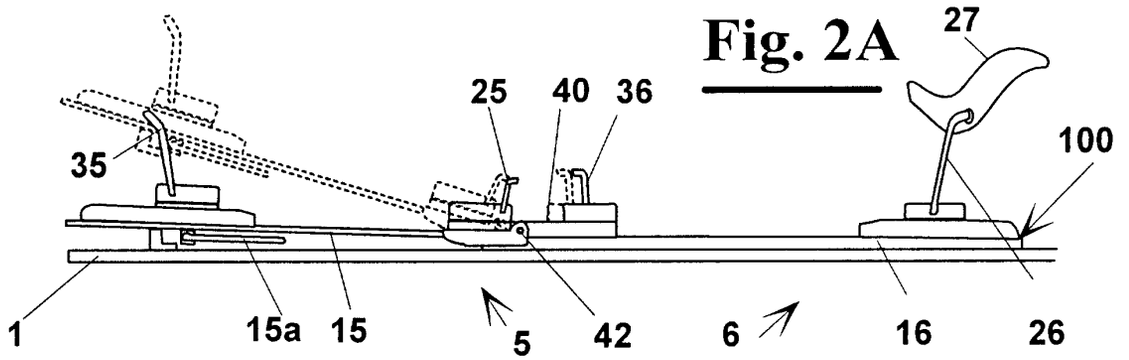



Fig. 2A

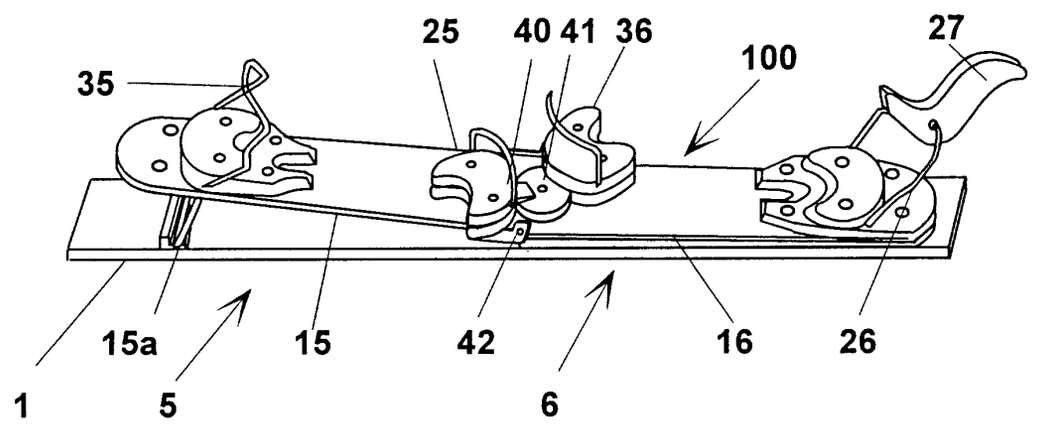



Fig. 2B

Fig. 2C

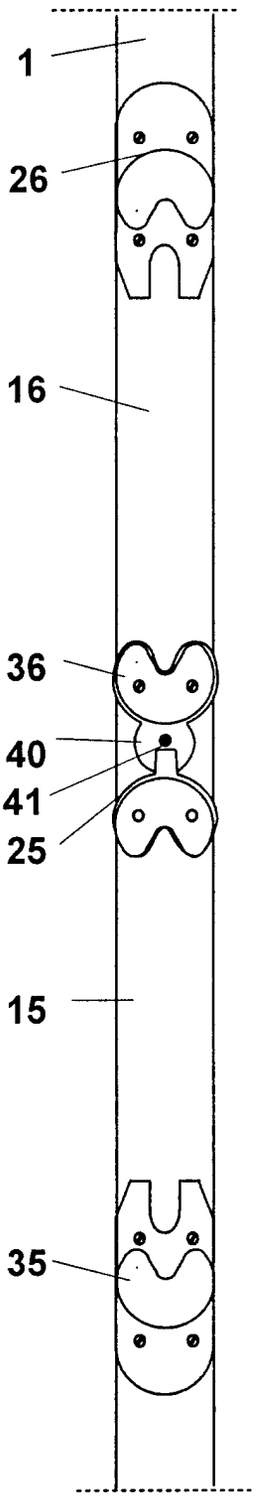



Fig. 2D

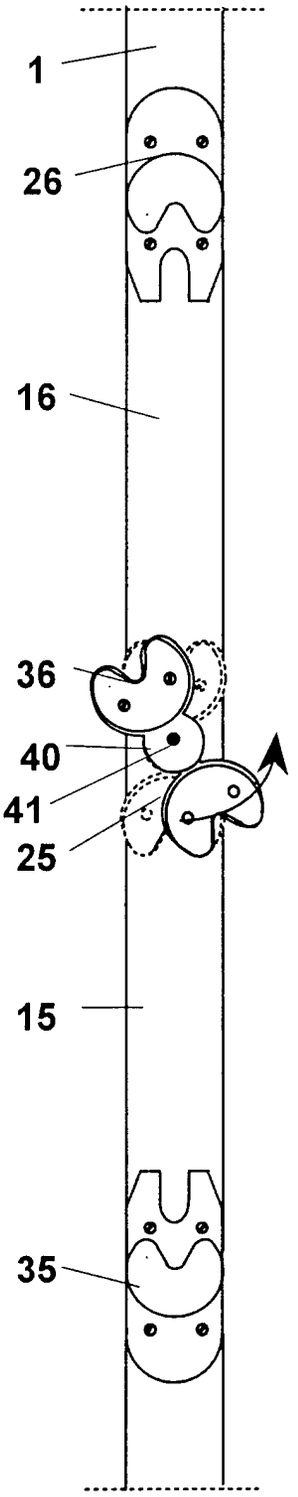
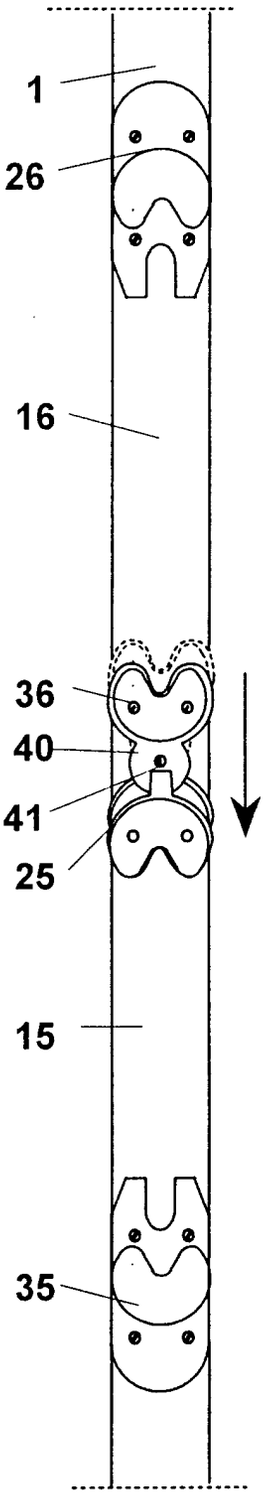
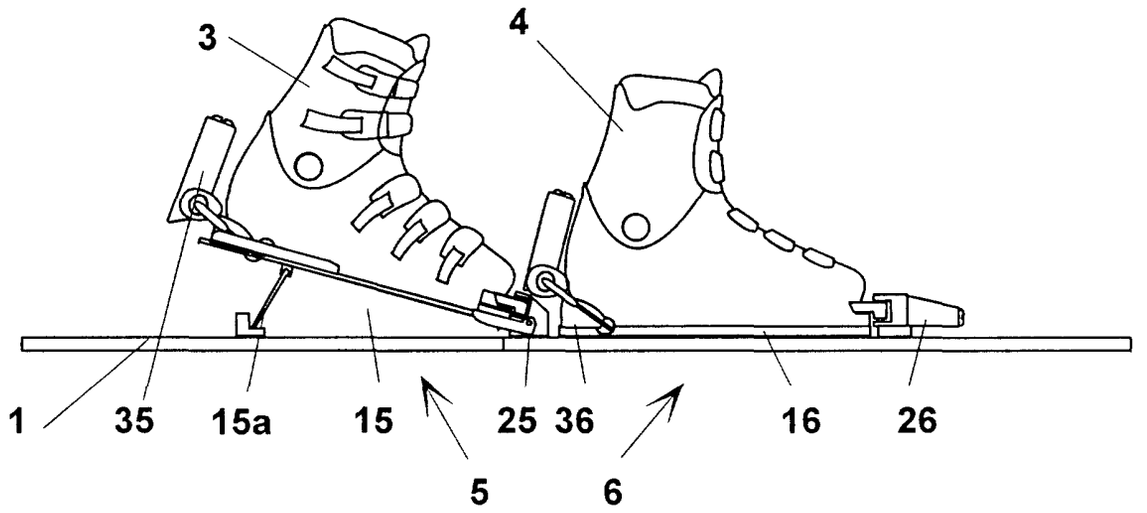


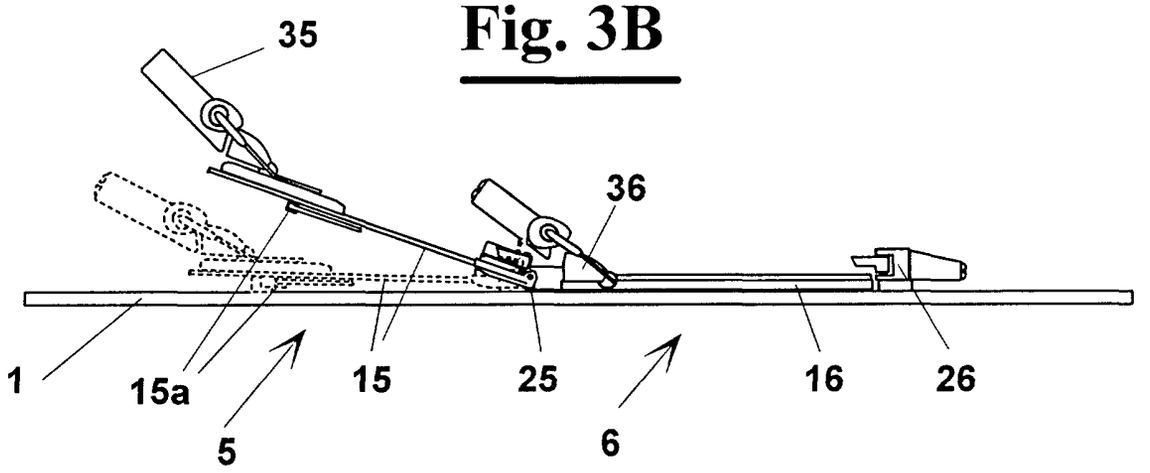

Fig. 2E



# Fig. 3A




# Fig. 3B



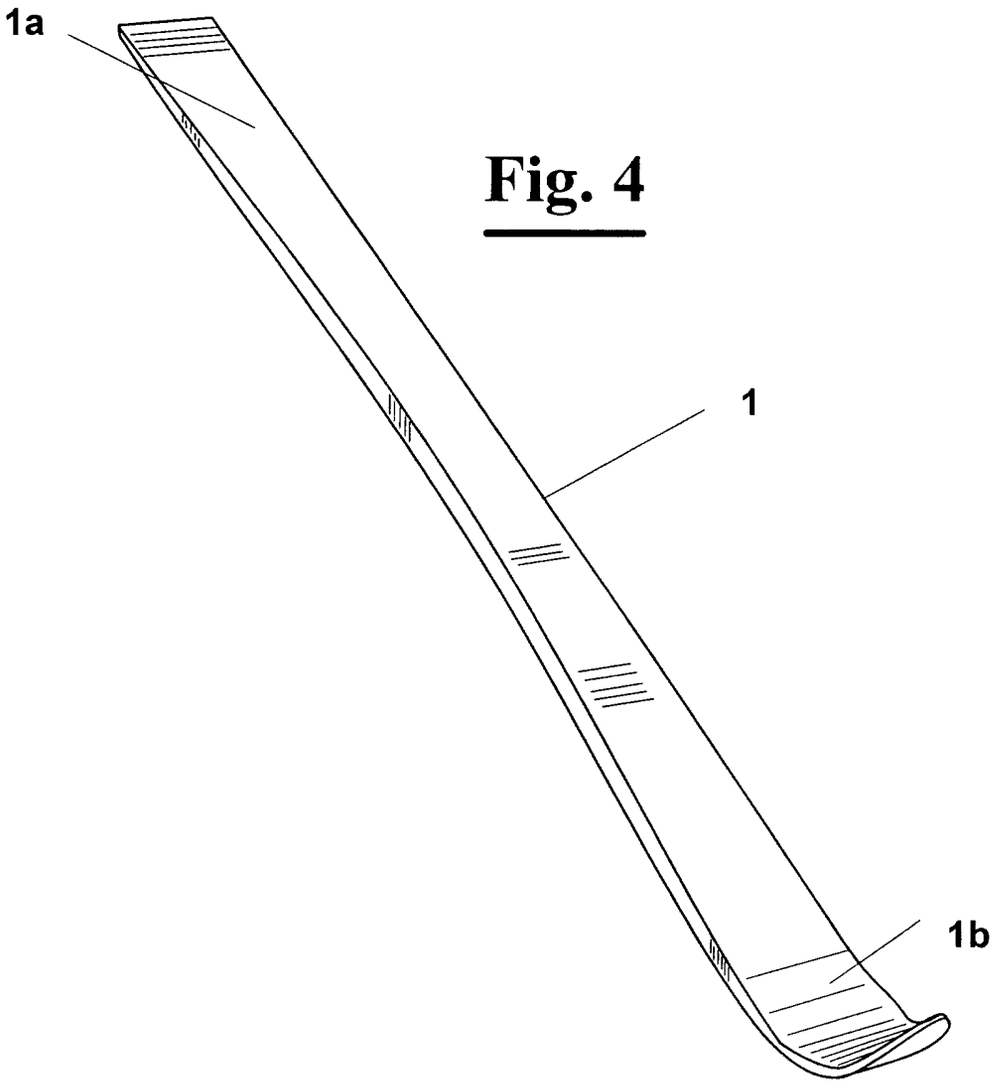



Fig. 4

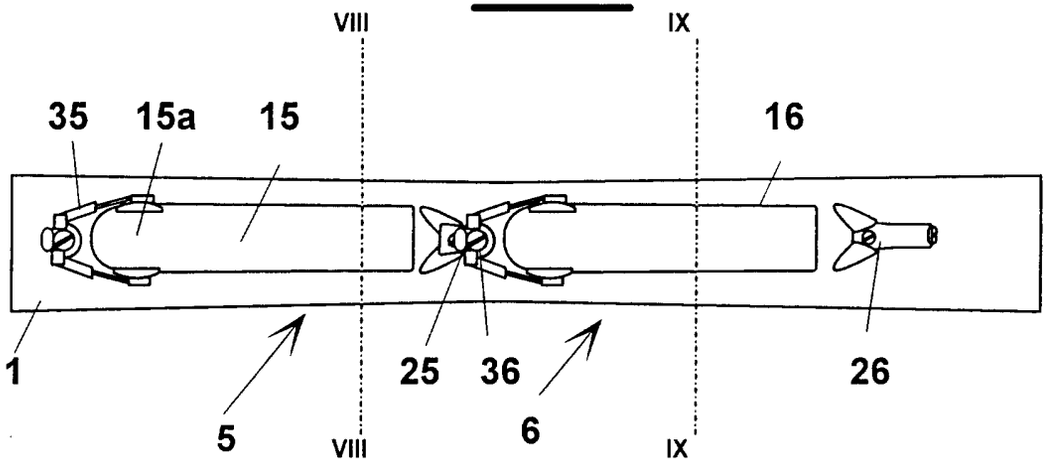
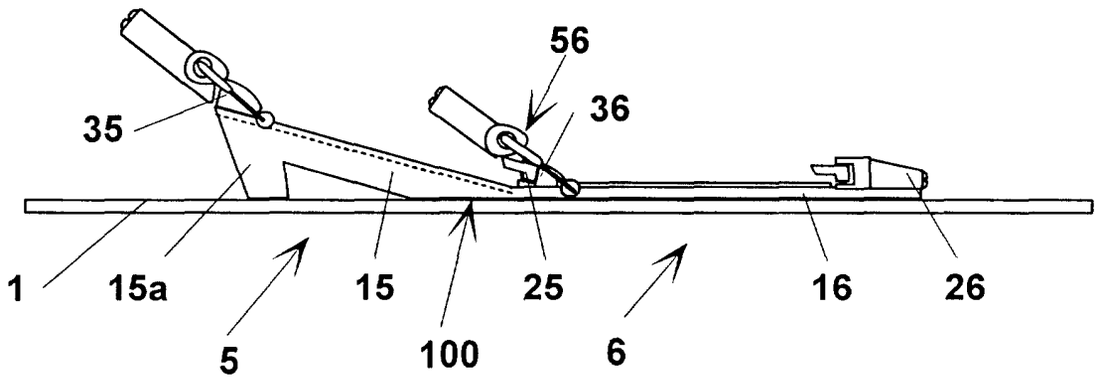



Fig. 5

# Fig. 6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15a
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# Fig. 7

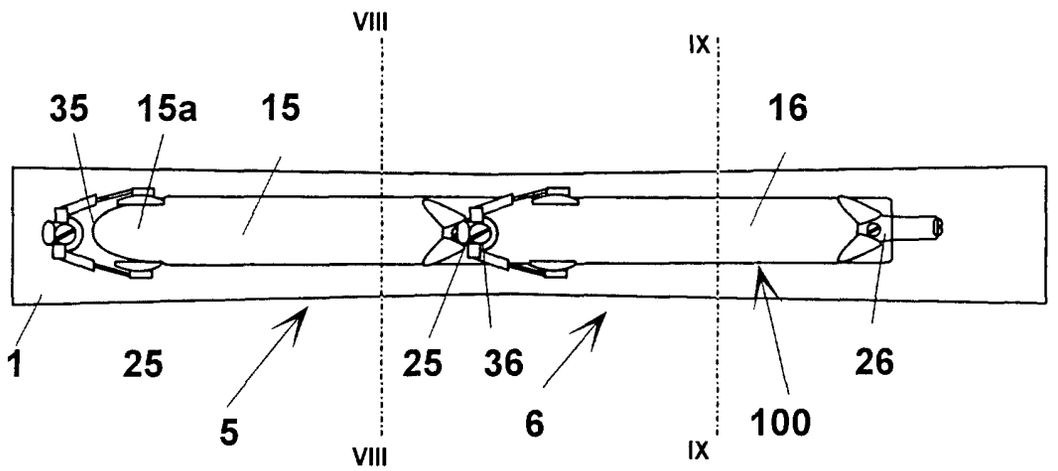
VIII
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Fig. 8

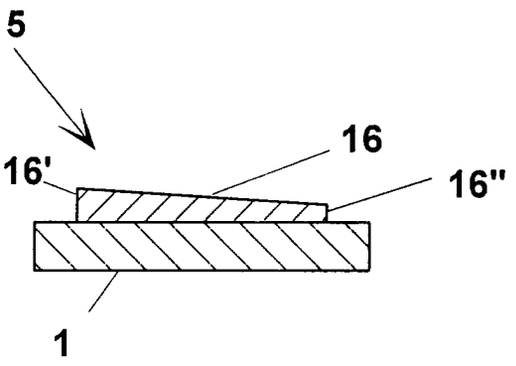



Fig. 9

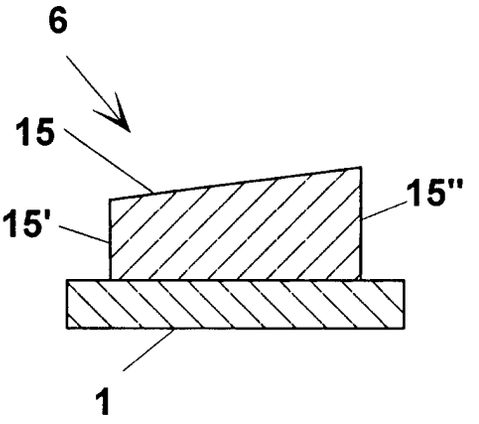
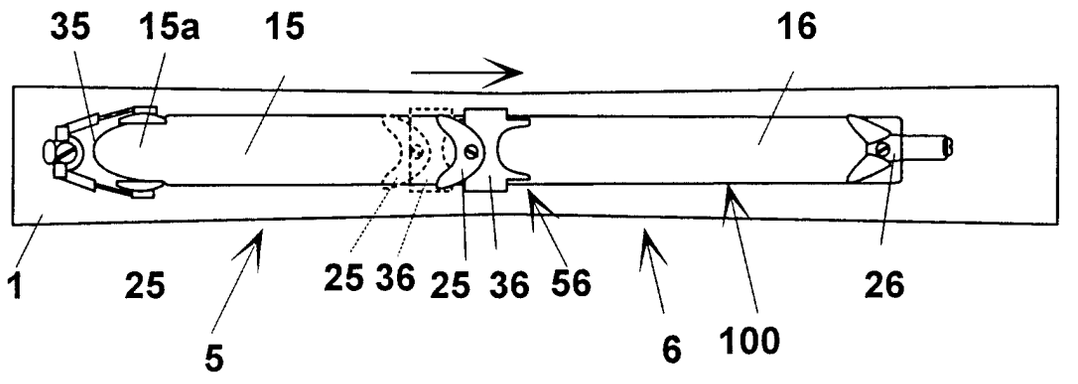



Fig.10



European Patent Office

# EUROPEAN SEARCH REPORT

Application Number
EP 01 10 1254

## 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.7) |
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