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Droz et al.

[11] **3,778,075**

[45] **Dec. 11, 1973**

[54] **SKI BINDING**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **280/11.35 T**
[51] **Int. Cl.** **A63c 9/00**
[58] **Field of Search** ..... 280/11.35 T

[56] **References Cited**

UNITED STATES PATENTS

3,656,774	4/1972	Schriewer	280/11.35 T
3,638,959	2/1972	Reuge	280/11.35 T
3,603,607	9/1971	Marker	280/11.35 T

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[57] **ABSTRACT**

A safety ski binding device comprises a pair of levers pivotally mounted to a base plate about perpendicular axes and a spring outwardly urging the levers against respective stops. Hook shaped parts at the free ends of the levers engage cooperating parts of a boot sole gripping member to normally hold same in operative position. When a certain lateral stress is applied to said member, one of the levers is pivoted freeing the other of said cooperating parts from engagement with hook shaped part of the other lever whereupon the member pivots to a release position. The levers can also be pivoted about a transversal axis and releasably held in position by the action of said spring on cooperating ramp surfaces and rollers on the levers and base plate, or by magnetic means.

4 Claims, 10 Drawing Figures

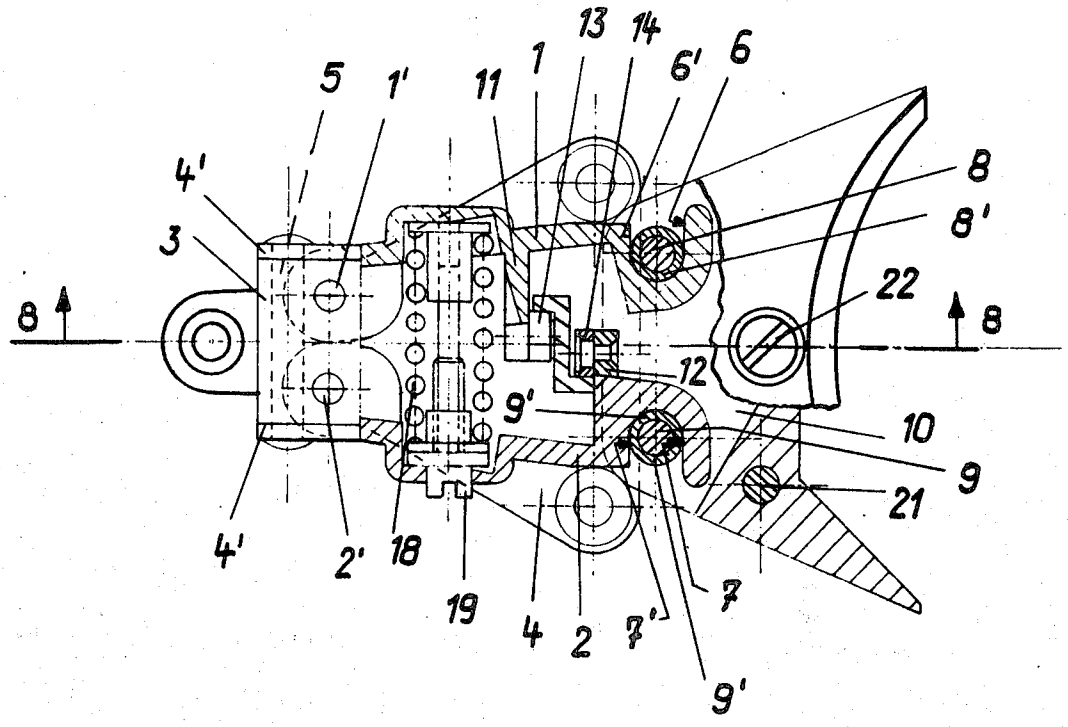
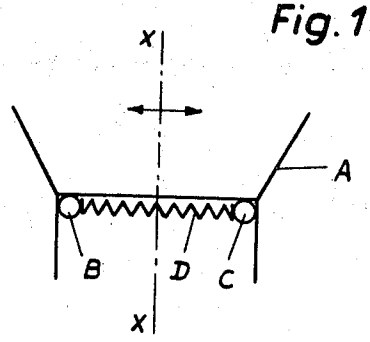


Fig. 1



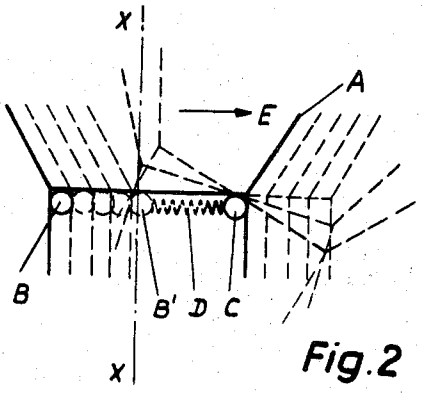
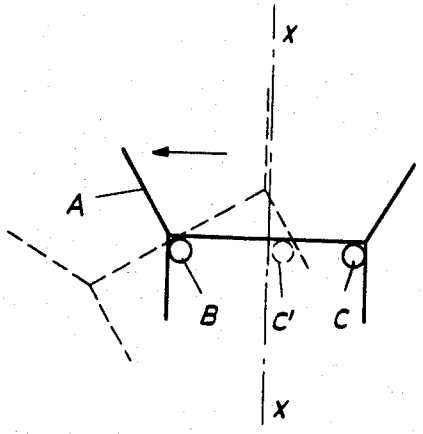


Fig. 2

Fig. 3



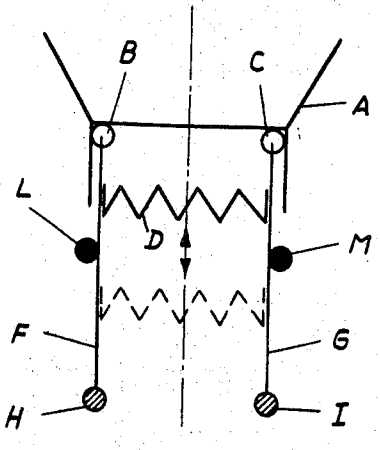


Fig. 4

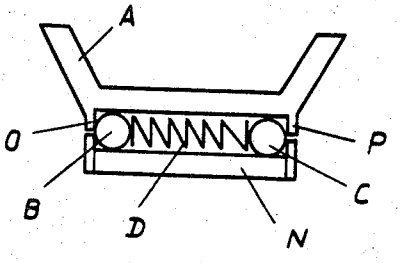


Fig. 5

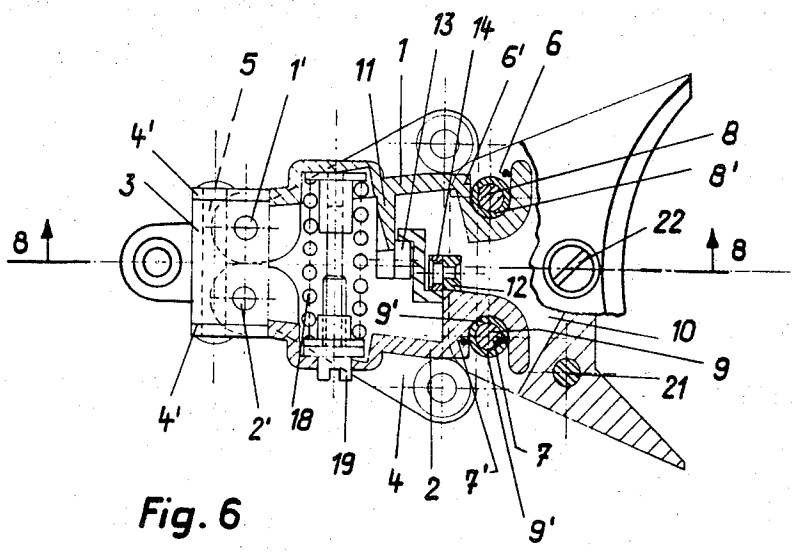

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Fig. 6

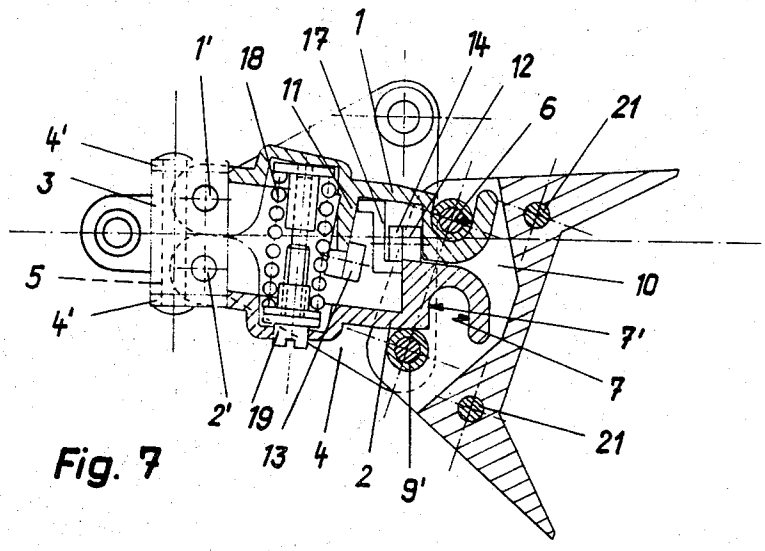
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Fig. 7

Fig. 8

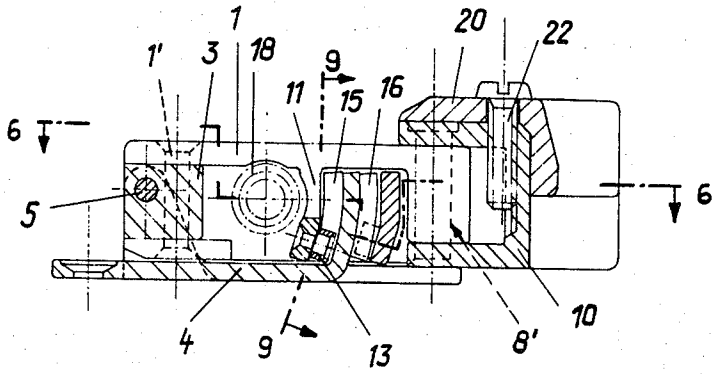


Fig. 9

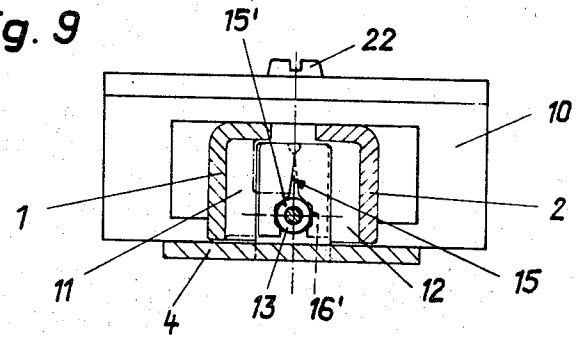
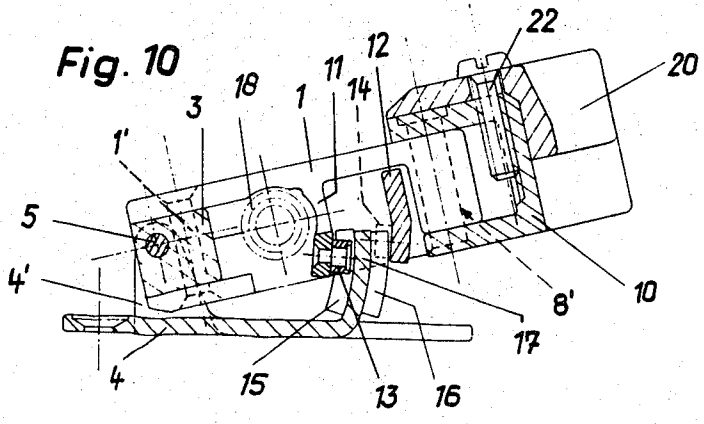


Fig. 10



SKI BINDING

BACKGROUND OF THE INVENTION

The present invention relates to safety ski binding devices.

Generally, known types of safety ski bindings comprise a boot sole gripping member which does not exactly follow movement of the end of the boot in the case of frontwards, rearwards or lateral falls. It has already been proposed to provide ski bindings comprising a boot sole gripping member which more or less exactly follows movement of the corresponding end of the boot, but in most of these types the boot sole gripping member has two fixed supports cooperating with guide means, a return device urging the boot sole gripping member into its stable rest position. Such constructions proposed to date have the drawback of being relatively complex and consequently costly to manufacture.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a simplified type of ski binding device in which the sole gripping member rests in alignment with the gripped part of the boot during displacement thereof up to release.

The safety ski binding device according to the invention accordingly comprises a boot sole gripping member borne by two supporting members movable relative to one another when said gripping member is moved, and stop means for limiting movement of said support members.

DESIGNATION OF THE DRAWINGS

FIG. 1 is a schematic plan view of a first embodiment of device according to the invention.

FIG. 2 is a view similar to FIG. 1, showing different positions of the boot sole gripping member.

FIG. 3 is also a view similar to FIG. 1 showing yet another position of the boot sole gripping member.

FIG. 4 is a schematic plan view of another embodiment.

FIG. 5 is a view similar to FIG. 1 for a slightly modified embodiment.

FIG. 6 is a cross-section taken along line 6—6 of FIG. 8, showing in fully detail the construction of another embodiment.

FIG. 7 is a view similar to FIG. 6, but in another position.

FIGS. 8 and 9 are cross-sections respectively taken along lines 8—8 and 9—9 of FIG. 6.

FIG. 10 is a view similar to FIG. 8, but in another position.

DESCRIPTION OF SCHEMATIC EMBODIMENTS

The principle of operation and constructional features of ski binding devices according to the invention will now be described with reference to the simplified embodiments schematically shown in FIG. 1 to 5.

In the embodiment shown in FIGS. 1 to 3, a boot sole gripping member A is guided on two supports B and C held apart by a compression spring D, the longitudinal axis of a ski to which the device is secured being shown by line X—X.

FIG. 2 illustrates operation of the device when the member A is moved towards the right, as indicated by arrow E. The support B is moved relative to the support C, which bears against a stop member and thus remains

fixed, and the spring D is compressed. The various sequential positions of the member A are shown in dashed lines, and it can be seen that when the support B reaches B' and the mid-point of the member A has reached the temporarily fixed support C, the member A pivots to a boot-releasing position.

Moreover, if the torsional stress acting on the member A is released before said pivoting, the member A and a boot gripped thereby are elastically returned to the initial position by the action of the spring D.

Conversely, as shown in FIG. 3, for movement of the member A towards the left, the support C moves along to C' and the support B remains fixed.

In the embodiment of FIG. 4, the boot sole gripping member A is guided on two supports B and C each carried on the end of a lever F, G respectively pivotally mounted at H and I. The spring D holds the levers F and G applied against stops L and M and the levers are therefore only able to move inwards. Operation is the same as for the embodiment of FIGS. 1 to 3.

Adjustment of the release effort takes place by longitudinal displacement of the spring D, as shown in broken lines.

The stops L and M can be cam-shaped, and the levers F and G may be pivotally mounted about a transversal axis at their ends H and I to allow release of the device in the case of lifting the member A, that is, in the case of a toe-stop binding, as a result of a rearward fall. Adjustment of this release effort thus takes place by longitudinal displacement of the stops L and M.

The supports B and C could be rollers mounted on the ends of the levers F and G.

Moreover, the ends of these levers F and G could slide along one or several grooves provided in the member A.

FIG. 5 shows how the supports B and C together with the spring D are mounted in an envelope-like casing N preventing escape of the supports B and C to the exterior. An opening enables the passage of the protruding nose portion O or P of the member A, which portions drive one or the other of the supports B or C according to the direction of movement of the member A.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The device shown in FIGS. 6 to 10 is a safety ski binding toe piece operating according to the same principle as the schematic embodiments described above. With several minor modifications, notably in the shape of the boot heel gripping member, this device could also be used as a heel binding.

The device comprises two levers 1, 2 each pivotally mounted at one end to a hinge block 3 about shafts 1', 2' normally perpendicular to the ski surface (not shown), this block 3 being pivotally mounted about a transversal shaft 5 mounted in lugs 4' made integrally with a base plate 4 adapted to be fixed onto a ski. The other end of each lever 1, 2 has an outwardly facing hook shaped part 6, 7 respectively cooperating with hooking members 8, 9 fixed on a boot sole gripping member 10. Each hooking member 8, 9 is formed by a pin with a sleeve or roller 8', 9' freely rotatably mounted thereon.

The hook shaped parts 6, 7 of the levers 1 and 2 each have a ramp surface 6', 7' respectively for guiding the corresponding roller 8', 9'.

In the vicinity of their median parts, the levers **1, 2** each respectively comprise an inwardly protruding part **11, 12** on which is mounted a roller **13, 14** respectively contacting ramp surfaces **15, 16** (FIG. **9**) on an upwardly protruding part **17** of the base plate **4.** Each ramp **15, 16** has at its base a housing **15', 16'** respectively forming a cam for positionally retaining the corresponding roller **13, 14.**

A compression spring **18** is disposed between the levers **1** and **2** in a manner to elastically urge the hook shaped parts **6** and **7** respectively into engagement with the rollers **8',9'** of a support block part of the member **10.** The compression of the spring **18** can be adjusted from the exterior by means of a screw **19.**

The boot sole gripping member **10** has a rear part **20** which comes directly into contact with the boot sole and is partially shown in plan in FIG. **6.** This part **20** is slidably mounted on two pins **21** fixed on the member **10** and a screw **22** enables adjustment of the height of part **20** according to the thickness of the boot sole.

The described device operates as follows :

In the normal use position, the levers **1** and **2** are in engagement with the hooking members **8** and **9** of the support block **10,** as shown in FIG. **6.**

In the case of a fall of the skier, the boot, under the effect of a torsional effort over and above a given value moves laterally, for example into the position shown in FIG. **7.** The roller **9',** after rolling over the ramp surface **7'** of the hook shaped part **7,** comes to bear on the outer side surface of the lever **2** whilst the lever **1** has pivoted inwardly against the force of the spring **18** which bears against the lever **2.** In the position shown in FIG. **7,** the member **10** with its part **20** has pivoted to release the boot which can thus be freed. The axial component f of the return force F acting along the line joining the axes of the rollers **8'** and **9'** acts on the roller **9'** such that it is automatically returned into the corresponding hook shaped part **7,** the member **10** thus returning to its normal use position shown in FIG. **6.**

In the case of a rearward fall, the effort exerted by the boot sole on the part **20** of member **10** causes the rollers **13** and **14** to leave their respective housings **15'** and **16'.** These rollers thus roll over their respective ramp surfaces **15** and **16** into the position shown in FIG. **10** in which the boot is freed. It is to be noted that simultaneous lateral and axial displacements are possible during a rearward fall, since the levers **1** and **2** are pivoted together as in the case of FIG. **7.**

VARIANTS

Instead of having ramp surfaces **15** and **16** made integrally with the protruding part **17** of the base plate **4,** it would be possible to provide these ramp surfaces in the form of separate, appropriately fixed pieces. Moreover, of course, instead of a compression spring, it would be possible to use a traction spring or springs acting outside the levers **1** and **2.**

In a variant, and conversely to the above described embodiment, the base plate **4** could carry rollers against each of which a ramp surface carried by the levers **1** and **2** would bear, these ramp surfaces moving over the rollers against the force of the spring **18** when the support block **10** is lifted up in the case of a rearward fall.

To maintain the levers **1** and **2** against the base plate **4,** the ramp surfaces **15** and **16** and the rollers **13** and **14** could be replaced by magnetic means, for example a magnet whose force can be adjusted by modifying the pole-gap.

In another variant, the pivoting shafts **1', 2'** at the ends of levers **1, 2** could be staggered longitudinally in a manner to obtain an asymetric effect in release of the described device, which would take place more easily in one lateral direction than in the other.

What is claimed is:

1. A safety ski binding device comprising:

two levers, each of said levers at a first end thereof being pivotally mounted about an axis prependicular to a ski surface, and each of said levers at a second end thereof having a hook-shaped portion with a laterally outwardly facing opening;

a ski boot sole gripping member supported by said two levers, said gripping member having mounted thereon a pair of laterally spaced hooking members; means for holding said boot gripping member in an operative boot holding position; said means including

elastic means mounted to pivot said two levers outwardly around said axes at said first ends thereof to urge said outwardly facing openings of said second ends of said levers into an operative hooking member receiving position wherein each of said hooking members is received in one of said outwardly facing openings and wherein said gripping member is in a boot gripping position; and

each of said outwardly facing openings of said hook-shaped portions of said levers having an inner surface means for guiding the corresponding hooking member out of said opening into a position in which said gripping member is in a boot releasing position when said gripping member is laterally moved as a result of the application of a lateral force above a predetermined value.

2. A device as claimed in claim **1,** further comprising a base plate mounted on said ski surface, said levers at said first ends therof further being jointly pivotally mounted about a transverse axis parallel to said ski surface, said base plate having a member extending upwardly therefrom, said member having first and second protruding ramp surfaces, each of said levers having an inwardly extending roller urged by said elastic means into contact with one of said ramp surfaces, said two levers and said gripping member being pivotable about said transverse axis to a further boot releasing position upon the application to said gripping member of a vertical force, said ramp surfaces having cam means thereon for urging said levers against said elastic means as said rollers contact said ramp surfaces during pivotting about said transverse axis.

3. A device as claimed in claim **1,** further comprising a base plate mounted on said ski surface, said levers of said first ends thereof further being jointly pivotally mounted about a transverse axis parallel to said ski surface, said base plate having a pair of rollers extending upwardly therefrom, each of said levers having an inwardly extending protrusion bearing a ramp surface urged by said elastic means into contact with one of said rollers, said two levers and said gripping member being pivotable about said transverse axis to a further boot releasing position upon the application of said gripping member of a vertical force, said ramp surfaces having cam means thereon for urging said levers against said elastic means as said rollers contact said

ramp surfaces during pivotting about said transverse axis.

4. A safety ski binding device comprising:

a base plate member adapted to be attached to a ski surface;

two levers, each of said levers at a first end thereof being pivotally mounted about an axis perpendicular to said ski surface, and each of said levers at a second end thereof having a hook-shaped portion with a laterally outwardly facing opening;

a boot sole gripping member supported by said two levers, said gripping member having mounted thereon a pair of laterally spaced hooking members; means for holding said boot gripping member in an operative boot holding position; said means including

elastic means mounted to pivot said two levers outwardly around said axes at said first ends thereof to urge said outwardly facing openings of said second ends of said levers into an operative hooking member receiving position wherein each of said hooking members is received in one of said outwardly facing openings and wherein said gripping member is in a boot gripping position; and

said gripping member being laterally movable under the application thereto of lateral force by engagement of one of said hooking members with its respective hook-shaped portion, the other of said hooking members being guided by the surface of the outwardly facing opening of its respective hook-shaped portion to retain said gripping member in said boot gripping position up to a predetermined lateral movement of said gripping member, while thereafter said other hooking member is free from its said respective hook-shaped portion, said gripping member thus being pivotable about said one hooking member to a boot releasing position.

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