

- [54] APPARATUS FOR RELEASING A SAFETY
SKI BINDING**

- [75] Inventors: **Ernst Gertsch**, Wengen; **Ulrich Gertsch**, Interlaken, both of Switzerland

- [73] Assignee: **Gertsch AG**, Wengen, Switzerland

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- [58] **Field of Search**...280/11.35 R, 11.35 D, 11.35 E,
280/11.35 A, 11.35 H, 11.35 T

- [56]
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Primary Examiner—David Schonberg

Assistant Examiner—Milton L. Smith

Attorney, Agent, or Firm—Werner W. Kleeman

- [57]
- ABSTRACT**

An apparatus for releasing a safety ski binding comprising an actuation element intended to bear against the shank of the leg above the ankle bone. This actuation element may be operatively coupled directly or indirectly with an automatic release mechanism of the ski binding so that the latter is released through pronounced bending of the leg shank relative to the ski. The actuation element may be constituted as part of a ski boot or as a separate component.

26 Claims, 4 Drawing Figures

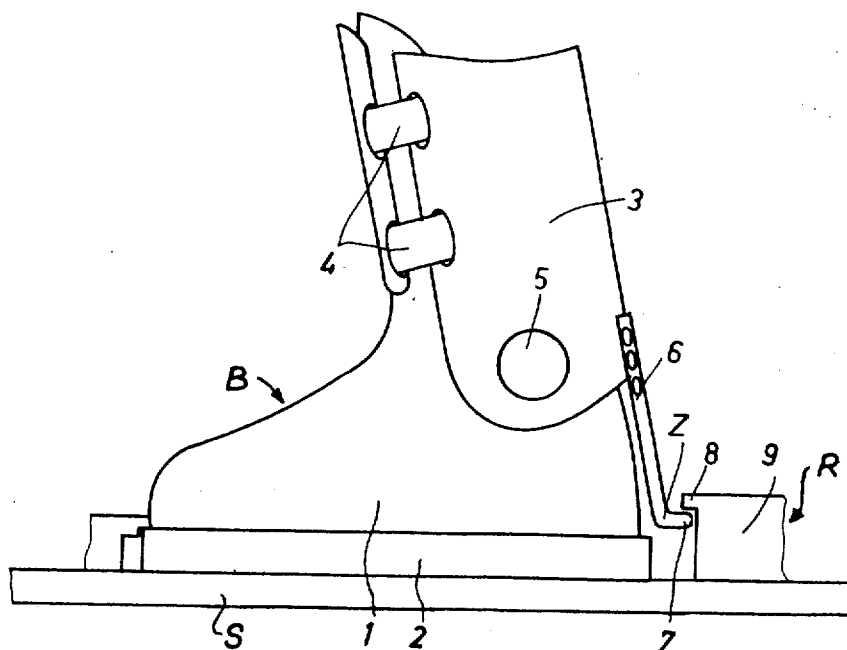


Fig. 1

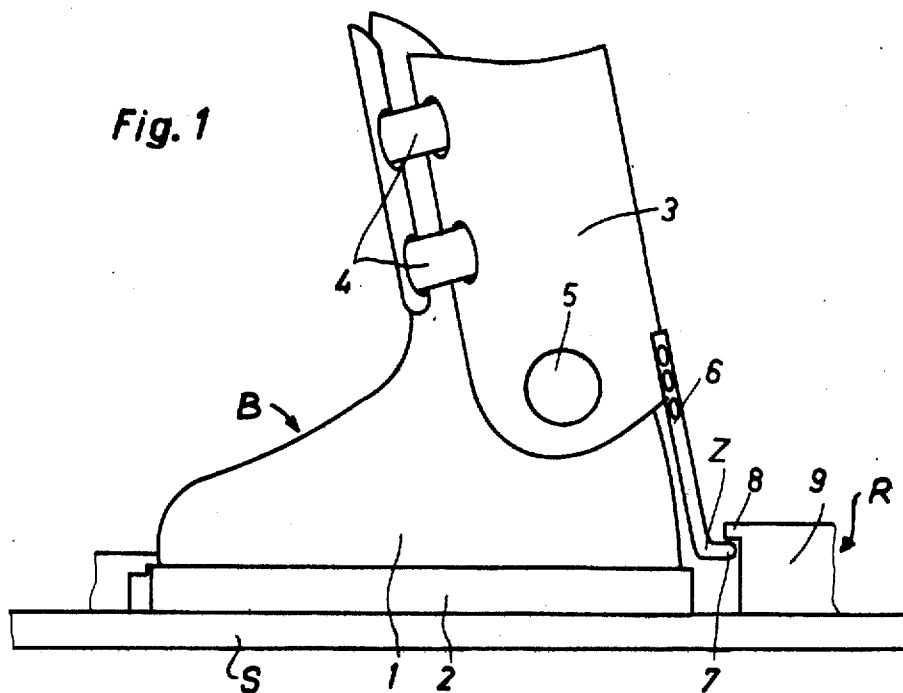
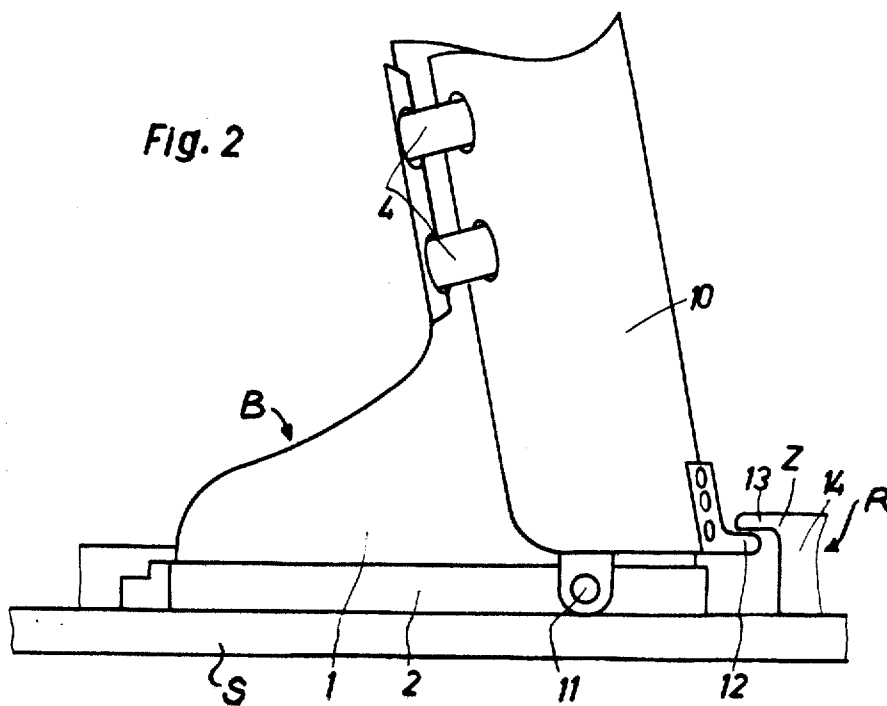
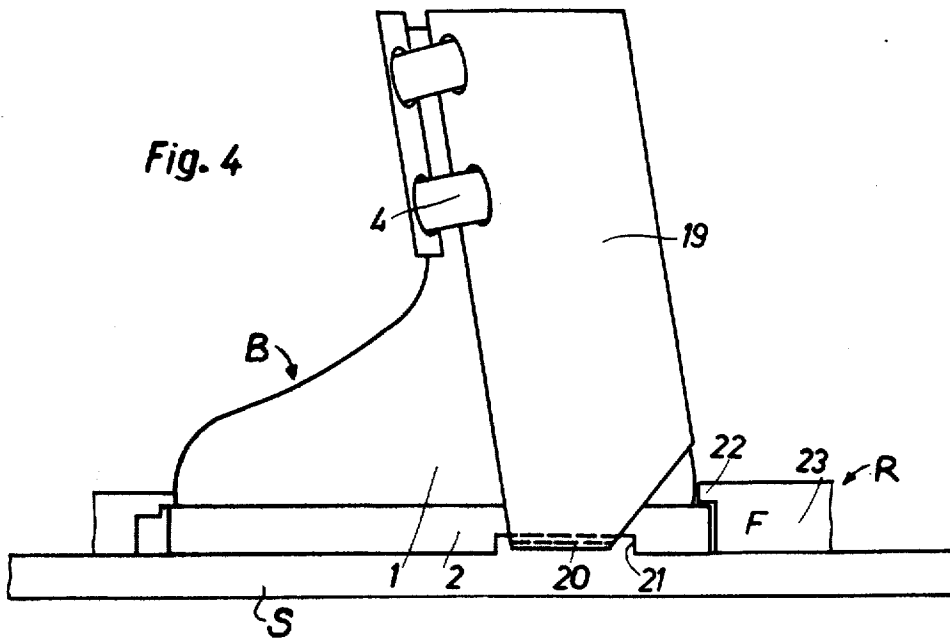
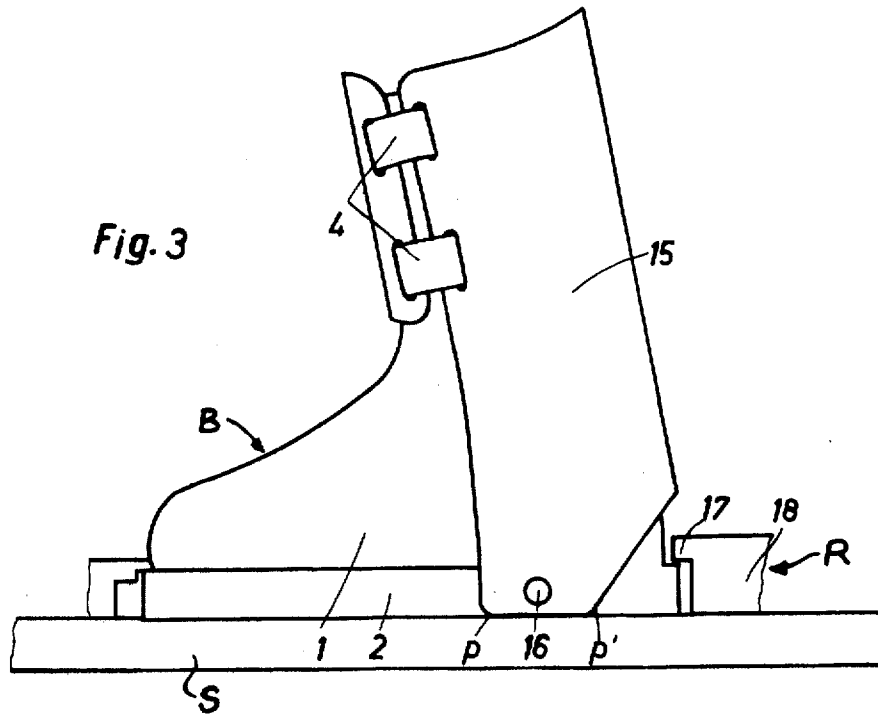


Fig. 2





APPARATUS FOR RELEASING A SAFETY SKI BINDING

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved apparatus for releasing a safety ski binding.

When a standard safety ski binding is used, during a fall of the skier towards the front or rear release of such binding only first then occurs after a vertically or obliquely directed traction force has been exerted upon the ski binding through the agency of the ski boot. This vertically or obliquely directed traction force is oftentimes only first effective when the shinbone has been maximally bent and bears against the joint. In this terminal position of the shin-bone the ankle and the Achilles tendon are exposed to greatest danger, and it is possible for serious injuries to arise.

SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to provide a new and improved apparatus for affording a better and more positive release of a ski binding, thus contributing to the safety of the skier.

It is another object of this invention to provide an apparatus for bringing about a quickly responsive release action at a safety ski binding so as to avoid the type of injuries indicated above.

Still a further significant object of the present invention relates to an improved construction of apparatus for effectively releasing a safety ski binding in a quick, positive and reliable manner and which is relatively simple in construction, economical to manufacture, and extremely easy to use.

Yet another object of importance relates to the provision of an apparatus for effectively releasing a safety ski binding which may be integrated as a component of the ski boot or constitutes a separate component which cooperates with the ski boot.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention contemplates the provision of an actuation element intended to bear against the shank of the leg above the ankle bone. This actuation element can be coupled directly or indirectly with the automatic release mechanism of the ski binding, so that upon pronounced bending of the lower shank of the leg relative to the ski the automatic release mechanism can be released.

Since with the inventive construction of release apparatus for ski bindings the ski binding itself is already released on the occasion of marked bending or flexing of the leg shank or shin-bone and not first following the presence of a vertically or inclined directed traction force exerted by the ski boot, there is realized increased safety for the skier, reducing the danger of accidents.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a schematic side view of a first embodiment of inventive apparatus for releasing a safety ski binding;

FIG. 2 is a schematic side view of a second embodiment of inventive apparatus;

FIG. 3 is a schematic side view of a third embodiment of inventive apparatus; and

FIG. 4 is a schematic side view of a fourth embodiment of inventive apparatus.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, in the embodiment of exemplary apparatus depicted in FIG. 1 there is shown a ski boot B having a lower boot portion 1 equipped with a sole 2 and an upper portion 3, secured through the agency of any suitable closure mechanism 4 to the shin bone or shank of the leg of a skier. In this case the boot upper portion 3 is pivotably connected at hinge location 5 at the region of the ankle joint with the lower portion 1 of the ski boot. Upper portion 3 possesses at its rear region a downwardly depending extension 6 provided with a projection or nose 7 capable of operatively engaging with a standard safety ski binding, generally indicated by reference character R. More precisely, in the embodiment under consideration projection 7 engages with a part 8 of a heel support 9 of such schematically illustrated ski binding. During bending of the leg shank towards the front, the boot upper portion 3 supported via the ski boot B indirectly at the ski S is pivoted or rocked about the hinge joint 5 so that the projection or nose 7 is raised. Now upon reaching a certain degree of pivotal movement of such projection 7, i.e., in an extreme bending position of the leg shank as such would occur during a fall of the skier towards the front, the safety ski binding R is released. The upper portion 3 and the extension 6 equipped with the projection 7 or equivalent structure thus form an actuation element functioning in the manner of a double-arm lever wherein one arm of such double-arm lever i.e. here the upper portion 3 is substantially coextensive with the lower shank of the leg.

Now with the embodiment of FIG. 2 there is shown a ski boot upper portion 10 which likewise can be fixed by means of a suitable closure mechanism 4 with the leg shank or shin bone. Upper portion 10 is here downwardly extended and hingedly connected at the hinge joint means 11 with the sole 2 of the ski boot B. A similar hinge joint would be advantageously provided at the opposite side of the boot. A projection 12 at the rear lower end of the upper portion 10 cooperates with a part of portion 13 of the ski binding R, here for instance an automatic heel release mechanism 14 of such safety ski binding, so that during an extreme bending or flexing of the leg shank or shin-bone during a frontal fall the ski binding R will be released in the same manner as considered above for the first embodiment.

Also in this case the upper portion 10 together with the projection 12 functions, as previously explained, in the manner of a double-arm lever which is indirectly supported at the ski S through the agency of the ski boot sole 2.

The embodiment of ski boot depicted in FIG. 3 likewise possesses an upper portion 15 hingedly connected at the hinge joints or pivot means 16 with the boot sole 2 and which can be connected about the shin bone or shank of the leg through the agency of the closure mechanism 4 or equivalent. The upper portion 15 extends to the region of the top surface or face of the ski S and possesses two contact or impact points or regions P and P' which during rocking of such boot upper portion 15 about pivot means 16 cooperate with the top

surface of the ski. Furthermore, in this embodiment the portion 17 of the heel support 18 of the safety ski binding R engages over the heel region of the ski boot B, so that upon lifting such ski boot heel the safety ski binding will be released. Thus with this embodiment, when, during a frontal fall, the leg shank is bent forwardly, then, the upper portion 15 of the boot will be correspondingly rocked. Owing to the cooperation of the contact or impact point P with the top surface of the ski S the rear part of the ski boot B will be raised from such top surface, and thus, the boot heel acts upon the portion 17 of the heel support 18 of the binding and releases such safety ski binding. During a rearward fall the shank is first bent towards the rear and the upper portion 15 is correspondingly rocked, so that the other impact point P' now cooperates with the top surface of the ski S and the rear part of the ski boot will be raised from the top surface of the ski and the safety ski binding likewise released. In this case release of the ski binding occurs both during a frontal fall as well as a rearward fall of the skier, whereas for the embodiments of FIGS. 1 and 2 the safety ski binding will only be released during a forward fall.

The upper portion thus provides an actuation element in the form of a double-arm lever which is indirectly supported at the ski via the ski boot sole 2 and is indirectly coupled with the automatic heel release mechanism of the ski binding R via the heel of the ski boot B.

Finally, considering now the embodiment of FIG. 4, where there is provided a ski boot upper portion 19 which again can be fixed about the shin-bone or shank of the leg of the skier through the agency of the closure mechanism 4 or equivalent. This ski boot upper portion 19 possesses a part or component 20 defining for instance at least one but preferably two flexed portions which extend beneath the sole 2 of the bottom portion 1 of the ski boot B and rest in at least one, but preferably two recesses 21 provided at opposite sides of the boot sole 2 at the region of the top surface of the ski S. Moreover, a part 22 of the heel support 23 of the ski binding R engages over the heel of the ski boot. Thus, now if during a frontal fall of the skier the leg shank is bent towards the front, then, the upper portion 19 will be correspondingly pivoted and component 20 in cooperation with the recesses 21 and the top surface of the ski S raises the rear part of the ski boot B away from such top surface of the ski so that in the same manner as for the embodiment of FIG. 3 here also the safety ski binding R is released. Also in the case of a rearward fall the rear end of the ski boot will be raised in the same manner and the ski binding released. In this case the actuation element defined by the upper portion 19 and also forming a double-arm lever, as previously explained, is directly supported at the ski and indirectly coupled via the heel with the automatic heel release mechanism of the ski binding. Such type actuation element can be constructed as a unit which is independent of or separate from the ski boot.

In all of the embodiments disclosed the upper portion can form the actual upper of the ski boot or, for instance, can constitute an additional sleeve or collar.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced

within the scope of the following claims. ACCORDINGLY,

What is claimed is:

1. An apparatus for releasing a safety ski binding comprising actuation means adapted to be affixed to the lower shank of the leg above the ankle joint in co-operating relation with a ski boot, said actuation means further adapted to be operatively connected to an automatic release mechanism of a safety ski binding for releasing said automatic release mechanism upon pronounced bending of the lower shank of the leg relative to the ski, said actuation means comprising a double-arm lever and further adapted to be pivotally retained on the ski boot at a location spaced from the point of operative connection of said actuation means with said automatic release mechanism.

2. The apparatus as defined in claim 1, wherein said actuation means includes means for facilitating direct connection of said actuation means to said automatic release mechanism of the ski binding.

3. The apparatus as defined in claim 1, wherein said actuation means includes means for facilitating indirect connection of said actuation means to said automatic release mechanism of the ski binding.

4. The apparatus as defined in claim 1, wherein said actuation means includes means for directly supporting said actuation means on the ski.

5. The apparatus as defined in claim 1, wherein said actuation means is indirectly supported on the ski by the ski boot.

6. The apparatus as defined in claim 1, wherein said actuation means includes a member substantially comparable to at least part of the upper portion of the ski boot, said member adapted to encircle the lower shank of the leg above the ankle joint.

7. The apparatus as defined in claim 6, wherein said member comprises at least part of the upper portion of the ski boot.

8. The apparatus as defined in claim 6, wherein said member is a separate unit adapted to be associated with the ski boot.

9. The apparatus as defined in claim 6, wherein said member extends from both sides of the ski boot substantially to the region of a ski when supported thereon, said member being adapted to engage the upper supporting surface of the ski on both sides of the ski boot.

10. The apparatus as defined in claim 9, wherein the sole of the ski boot is provided with recesses at both sides thereof, said member having at each side of the ski boot a flexed portion engaging with an associated one of said recesses.

11. The apparatus as defined in claim 1, wherein said actuation means is a unit adapted to be operably connected to the ski boot.

12. The apparatus as defined in claim 1, wherein said actuation means is fixedly connected to the ski boot.

13. The apparatus as defined in claim 1, wherein said means for pivotally retaining said actuation means is affixed to both sides of the sole of the ski boot.

14. The apparatus as defined in claim 13, wherein said actuation means is provided laterally of the pivot locations with impact point means through which the actuation means is adapted to be supported on the ski.

15. The apparatus as defined in claim 14, wherein said impact point means are arranged forwardly of the pivot locations.

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16. The apparatus as defined in claim 14, wherein said impact point means are arranged rearwardly of the pivot locations.

17. The apparatus as defined in claim 1, wherein said actuation means includes projection means for engaging a release element of an automatic heel release ski binding.

18. The apparatus as defined in claim 1, wherein said actuation means is constructed to form the upper of a ski boot.

19. An apparatus for releasing a safety ski binding comprising an actuation element intended to be fixed with the lower shank of the leg above the ankle joint and capable of being connected with an automatic release mechanism of a safety ski binding, so that said automatic release mechanism will be released upon pronounced bending of the lower shank of the leg relative to the ski, and means for articulating said actuation element to the lower portion of a ski boot, said actuation element including a projection intended to engage with a release element of an automatic heel release ski binding.

20. An apparatus for releasing a safety ski binding, comprising actuation means adapted to be pivotally mounted to a ski boot for acting upon a releasable ski binding such that during undesired positional shifting or loading of said actuation means the releasable ski binding will be actuated to assume a ski boot release

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position, said actuation means including a portion extending essentially coextensive with the lower shank of the skier's leg when inserted into the ski boot.

21. The combination with a ski having a releasable ski binding for a ski boot, of an apparatus for releasing such ski binding, said apparatus comprising an actuation element incorporating means responsive to bending of the lower shank of the skier's leg relative to the ski into a position requiring release of the ski binding, said responsive means acting upon the releasable ski binding for opening same, said actuation element including a portion extending substantially coextensive with the lower shank of the skier's leg.

22. The combination as defined in claim 21, wherein said actuation element further incorporates means for operatively associating same with a ski boot.

23. The combination as defined in claim 21, wherein said actuation element constitutes a part of a ski boot.

24. The combination as defined in claim 23, wherein said part of the ski boot defines at least a portion of the upper thereof.

25. The combination as defined in claim 21, wherein said actuation element constitutes a separate unit operatively associatable with a ski boot.

26. The apparatus as defined in claim 1, wherein one arm of said double-arm lever extends substantially coextensive with the lower shank of the skier's leg.

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