

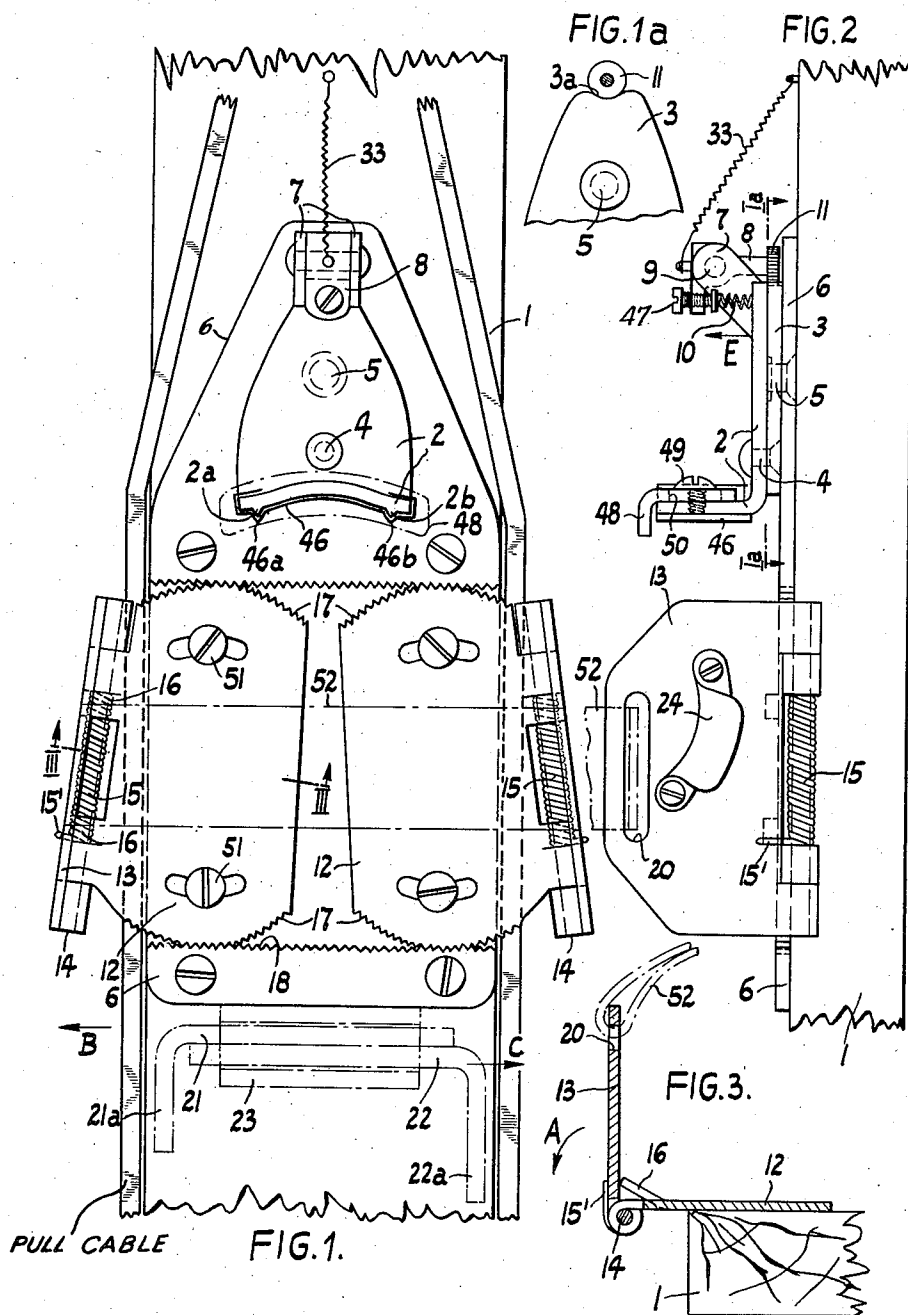
Aug. 11, 1959

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SAFETY SKI BINDING

2,899,210

Filed May 7, 1956

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

FIG. 4.

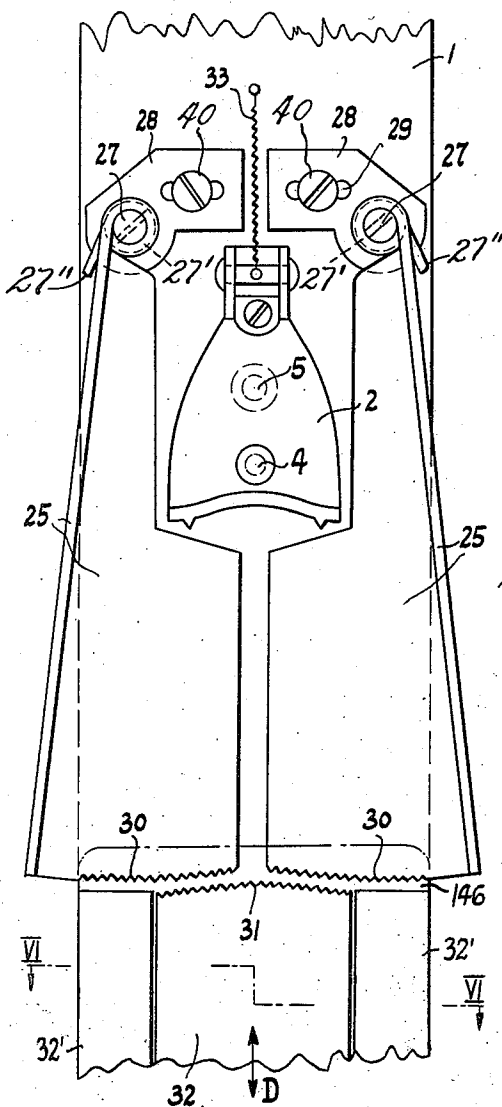


FIG. 5.

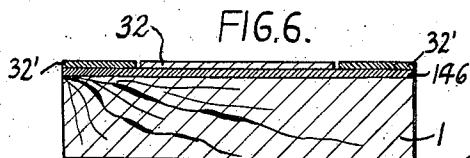
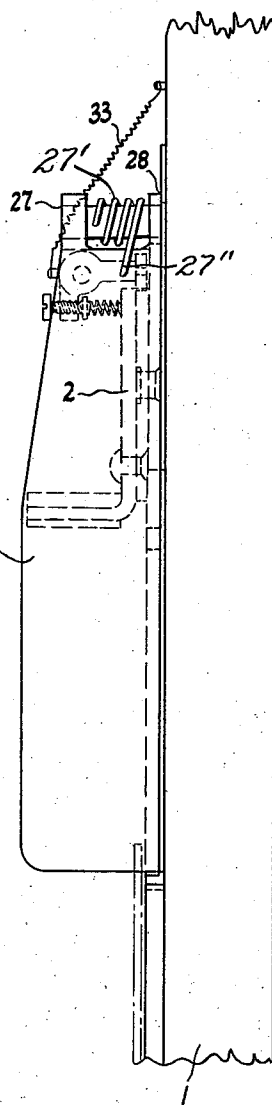


FIG. 6.

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SAFETY SKI BINDING

3 Sheets-Sheet 3

FIG. 7.

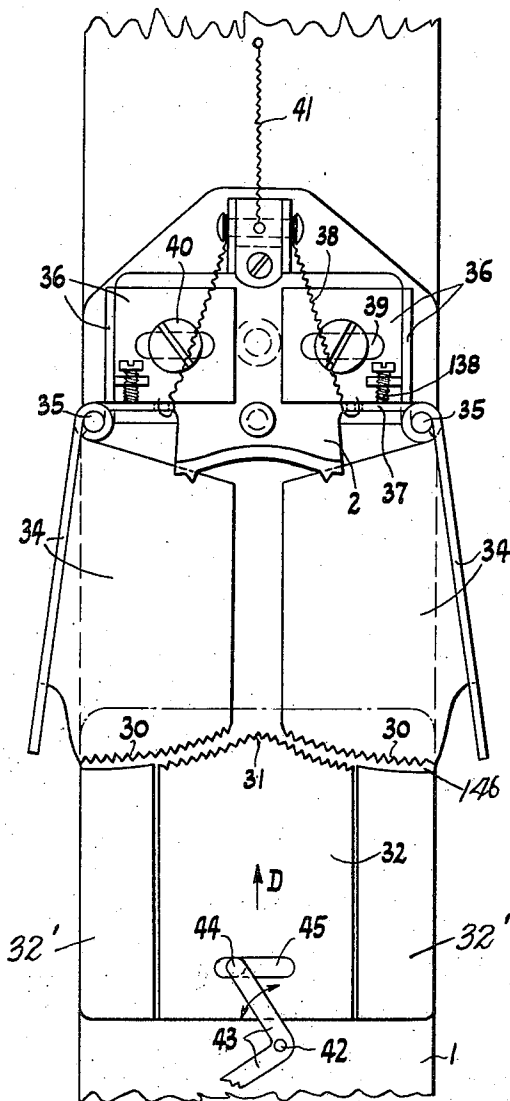
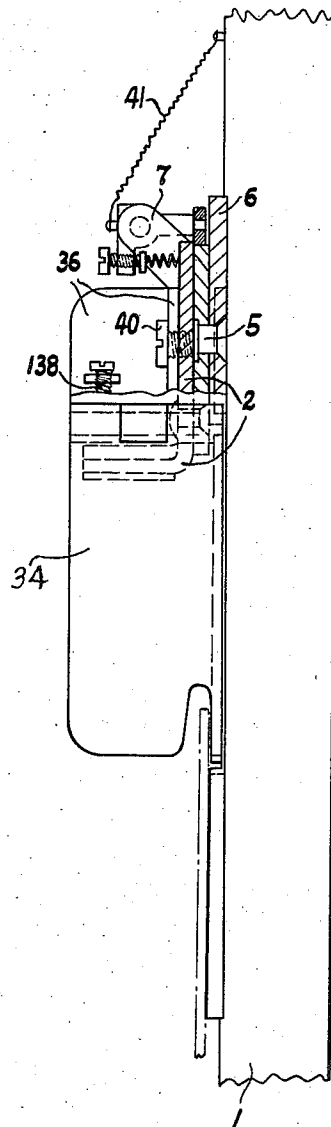


FIG.8.



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2,899,210

SAFETY SKI BINDING

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Application May 7, 1956, Serial No. 583,248

Claims priority, application Germany May 11, 1955

10 Claims. (Cl. 280—11.35)

This invention relates to safety ski bindings of the type having a pivotable front cheek which presses against the front edge of the ski boot and pivots laterally whenever a predetermined torque is exceeded by the shoe which is pressed against the front cheek by a conventional tension cable.

Safety ski bindings of the said type produce a relatively tight seat of the boot on the ski in racing downhill. However, certain difficulties arise when ascending and skiing on level ground owing to the fact that the tension cable in this case is engaged in cable holders provided in a forward position, so that a certain lateral displacement or torsional movement of the boot in relation to the ski is possible, whereby the safe guiding of the ski is impaired or the binding may even be inadvertently released. This lateral displacement can be prevented by adjusting a higher tension and/or a more diagonal direction of the cable whereby, however, the lifting of the heel is hindered and rendered difficult.

It is an object of the invention to provide means for avoiding this deficiency.

With this and further objects in view, according to the present invention there are provided, in addition to the pivotable front cheek, a pair of pivotable side cheeks abutting the flanks of the sole of the boot and being urged into their normal position by a slight spring force in such a way that they can be swung laterally by a torsional movement of the boot with respect to the ski without a noticeable resistance, a locking device being additionally provided for fixing these side cheeks in their normal position.

It will be appreciated that my novel ski binding combines the advantages of a safety ski binding with front cheek with the advantages of a binding provided with side cheeks, while avoiding the drawbacks inherent to these two types of bindings. In racing downhill it operates in conventional manner, i.e., the additional side cheeks are ineffective, so that the boot will be released immediately in spite of the side cheeks in case of a heavy fall. During ascending or skiing on level ground the side cheeks bearing against the flanks of the sole with a slight spring pressure are fixed so that they are rigid and prevent lateral displacement or rotation of the boot, with the result that a safe and unobjectionable guiding of the ski is ensured. It is important in this case that the tension of the cable may be small both during ascending and when skiing in the plane, that the heel can be freely and easily lifted and yet the ski is reliably guided by the boot.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and appear in the appended claims forming part of the application.

In the accompanying drawings several now preferred embodiments of the invention are shown by way of illustration and not by way of limitation.

Fig. 1 is a plan view of a safety ski binding having the invention applied thereto, with a pivotable front cheek and additional pivotable side cheeks.

2

Fig. 1a is a detail of Fig. 1, in a section on line Ia—Ia of Fig. 2,

Fig. 2 is a side view thereof,

Fig. 3 is a section on line III—III of Fig. 1,

Fig. 4 is a plan view on a modification,

Fig. 5 is a side view thereof,

Fig. 6 is a section on line VI—VI of Fig. 4,

Fig. 7 is a plan view of a third embodiment, and

Fig. 8 is a side view thereof, partly in a longitudinal section.

Similar reference numerals denote similar parts in the different views.

Referring now to the drawings in greater detail, and first to Figs. 1–3, it will be seen that a pivotable front cheek 2, 3 adapted to engage the front edge of the sole of the boot is mounted on a ski 1. The front cheek may be constructed in any desired manner, but in the preferred embodiment shown in Figs. 1, 1a and 2, this front cheek is constructed according to an operating principle which is the subject of my copending patent application Ser. No. 340,187, filed March 4, 1953, now Patent Number 2,858,137, issued October 28, 1958. The front cheek comprises an abutment member 2 whose vertical lateral edges 2a and 2b are adapted to engage the front edge of the sole of the boot, and a pivotable member 3. The abutment member 2 and the pivotable member 3 are pivotally connected to each other by a pivot 4 or the like and the pivotable member 3 is fulcrumed on a pivot 5 arranged on a base plate 6 fixedly connected to the ski.

Provided between members 2 and 3 is a click stop or detent means which in the example illustrated includes a bifurcated bearing bracket 7 in which a bell crank or angle lever 8 is mounted to swing about a pivot 9 and a small roller 11 is rotatably mounted on the free end of the vertical leg of the lever. The pivotable member 3 is formed with a recess or groove 3a for engagement of the roller 11 which is urged into the groove under action of a compression spring 10 acting on the angle lever 8 in the direction of the arrow E and being adjustable as to its tension by means of a screw 47. Thus the members 2 and 3 are interconnected in such a way that member 2 will be swung about pivot 4 in relation to member 3 only if a predetermined torque between the boot and the ski is exceeded. Secured to the abutment member 2, by means of a screw 49, is a member 48 for holding down the sole, which member is indicated in Fig. 1 in dot-and-dash lines and formed with a longitudinal slot 50 for vertical adjustment.

In the embodiment shown in Figs. 1–3, bipartite angular cheeks 12, 13 are provided whose horizontal part 12 is secured on the ski by screws 51 while their vertical part 13 is linked to the horizontal portion 12 by a horizontal hinge whose hinge pin 14 is surrounded by a helical spring 15. The end 15' of this spring engages the side cheek 13 from outside and presses it against a stop 16 of the plate 12 so that the side cheek 13 is held in its vertical position.

The springs 15 are relatively weak, so that the function of the safety binding is not impaired, i.e., that in case of a heavy fall of the skier, these side cheeks are urged aside by a boot about the axis 14 in the direction A, without opposing a substantial resistance.

In the embodiment shown the plate members 12 are toothed at 17 for engagement with a complementary toothing 18 of the base plate 6, and held in position by a cover plate (not shown) and the screws 51.

In order to be able to fix the swingable side cheeks 13 during ascent and also when skiing in the plane, the cheek members 13 are provided with a slot 20 for passage of a toe strap 52.

If desired, another mechanical locking of the side

cheeks 13 may be provided. Thus, for instance, in Fig. 1, locking pins 21 and 22 bent at right angles are indicated which are secured on the ski by means of a bearing plate 23 so as to be swingable and longitudinally slidable. These locking pins take up the position shown in Fig. 1 during downhill running. For locking the side cheeks 13 the pins 21 and 22 are drawn out in the directions B and C and the arms 21a and 22a of the pins are swung upwards and connected with the cheeks 13 in a suitable manner, so that the latter are thereby rigidly held in the vertical position. As shown in Fig. 2, members 24 for holding down the cable are provided. When the cable is engaged in these members, a very favorable, low tension of the cable is attained which permits an easy lifting of the heel and thus easy skiing on level ground.

In the embodiment shown in Figs. 4 and 5, two angular side cheeks 25 are provided which are mounted to swing about two vertical pivots 27 arranged laterally and in front of the front cheek 2 and secured on two base plates 28 which are formed each with a transverse slot 29 and in their turn are secured on the ski for transverse adjustment by screws 40. The angular cheeks 25 are provided at their rear end with a toothed edge portion 30 adapted to be engaged with a complementary toothing 31 of a slide 32 which is longitudinally slidable as indicated by arrow D. In the position shown in Fig. 4, the cheeks 25 which are urged against the flanks of the sole by means of a slight spring action are free to swing about the axes 27 (position for racing downhill). The spring action may, for instance be produced by torsion springs 27' wound respectively about pivot pins 27 and anchored at one end thereof on these pins and engaging with the outer end 27'' the cheeks 25, respectively. For the ascent and for skiing on level ground the slide 32 is forced into the toothing 30 of the angle cheeks for locking the same. Means for locking the slide 32 will be hereinafter described with reference to Fig. 6.

It will be understood that when sliding the boot into the binding, the side cheeks 13 or 25 simultaneously form a guide which brings the boot into its proper central position. Moreover, in order to center the boot automatically when sliding it into the binding, a slight tension action is exerted by a tension spring or rubber member 33 urging the cheek into its central position. The swinging out of the front cheek in case of a heavy fall is not impaired by this slight tension exerted by member 33.

The embodiments shown in Figs. 1-3 or 4 and 5 show that the side cheeks 13 or 25 are arranged independently of the front cheek. This arrangement offers the advantage that the numerous safety ski bindings with front cheek already in use can be subsequently fitted with these swingable and lockable side cheeks 13 or 25.

A further advantageous embodiment of the invention in which the front cheek and the side cheeks are combined into a compact unit is shown in Figs. 7 and 8. The two side cheeks 34 which are also angularly shaped, are pivoted each on a vertical pivot pin 35 secured to the front cheek unit 2. To this end, in the embodiment illustrated, two laterally adjustable angular bearing brackets 36 are mounted on the front cheek unit 2 and formed each with a pivot pin 35 for pivotable mounting of the side cheeks 34. The bearing brackets 36 are provided with a transverse slot 39 and connected to the horizontal plate of the front cheek member 2 by a screw 40. The side cheeks 34 are provided with a short angular arm 37 for urging the side cheeks 34 against the sole under action of a tension spring 38, a stop screw 138 on the bearing bracket 36 forming an abutment for the respective arm 37. Thus the side cheeks can be adjusted to fit the sole.

Again, a slight spring action may be exerted upon the front cheek by means of a tension spring 41, for holding the front cheek together with the side cheeks 34 in their central position as shown.

Also, a slide 32 is provided for locking the side cheeks

34 by means of its toothed edge 31 engaging in the toothed edge 30 of the side cheeks. A bell crank or angle lever 43 pivoted at 42 may be provided to operate the slide 32 by means of a journal 44 engaging in a transverse slot 45 of the slide 32. Preferably, the lever 43 is arranged in such a way that it is in its dead center position when the slide 32 is in the locking position, so as to provide a self-locking effect. Lateral guide plates 32' are provided for guiding the slide 32. Guide plates 32' as well as slide 32 are preferably mounted on a common supporting base or plate 146. Guide plates 32' are fastened to plate 146 and the latter to the ski 1 in any known manner, for instance by screws.

A further advantage of my novel safety ski binding consists in the fact that the side cheeks 13, 25, or 34 can be made relatively light and of a thin material since these cheeks have to take up only relatively small forces.

When running downhill, the side cheeks are ineffective and when ascending or skiing on level ground the forces of the tension cable are taken up by the front cheek so that the side cheeks are relieved from the forces of the tension cable and have to take up only the forces for lateral guiding, the lateral forces when skiing on level ground and ascending being relatively small.

My novel safety ski binding permits an easy lifting of the heel when skiing on level ground or ascending with low tension action of the cable. With this type of skiing, a larger displacement of the front edge of the sole occurs in relation to the supporting cheek 2, which may cause a premature wear or injury to the edge of the sole. For this reason it is advantageous, as indicated in Fig. 1, to provide on the front cheek 2 a vertically slidable sheet 46 forming an abutment for the front edge of the sole. If desired, this slidable sheet may be additionally grooved in a transverse direction on the supporting edges 46a, so as to ensure that it is safely taken along by the edge of the sole.

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

I claim:

1. A safety ski binding comprising a front cheek secured to the ski so as to form an abutment for the front edge of the boot and adapted to pivot laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of pivotable side cheeks on opposite sides of the longitudinal axis passing through the pivot of the front cheek gently spring-urged into their normal position in engagement with the flanks of the sole of the boot, so as to yield laterally without noticeable resistance in case of a rotary motion of the boot, and a locking device cooperable with said side cheeks adapted to lock the side cheeks in their normal position.

2. A safety ski binding comprising a front cheek secured to the ski so as to form an abutment for the front edge of the boot and adapted to pivot laterally in case of excessive torsional stress upon the boot, elastic means urging the front cheek into its central position, means urging the boot against said front cheek, a pair of pivotable side cheeks on opposite sides of the longitudinal axis passing through the pivot of the front cheek gently spring-urged into their normal position in engagement with the flanks of the sole of the boot, so as to yield laterally without noticeable resistance in case of a rotary motion of the boot, and a locking device cooperable with said side cheeks adapted to lock the side cheeks in their normal position.

3. A safety ski binding comprising a front cheek secured to the ski so as to form an abutment for the front

edge of the boot and adapted to pivot laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of bipartite angular side cheeks on opposite sides of the longitudinal axis passing through the pivot of the front cheek, each of said cheeks having a horizontal part adjustably secured on the ski and a vertical cheek part linked to the horizontal part by a horizontal hinge and spring-urged into the normal vertical position defined by a stop face, for abutting the flanks of the sole of the boot, and a locking device cooperable with said side cheeks adapted to lock the side cheeks in their normal position.

4. A safety ski binding comprising a front cheek secured to the ski so as to form an abutment for the front edge of the boot and adapted to pivot laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of pivotable side cheeks on opposite sides of the longitudinal axis passing through the pivot of the front cheek gently spring-urged into their normal position in engagement with the flanks of the sole of the boot, so as to yield laterally without noticeable resistance in case of a rotary motion of the boot, each of the side cheeks being formed with a slot, and a toe strap adapted to be passed through the slots for holding the two side cheeks in their normal position.

5. A safety ski binding comprising a front cheek secured to the ski so as to form an abutment for the front edge of the boot and adapted to pivot laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of angular side cheeks spring-urged into their normal position abutting the flanks of the sole, a pair of vertical pivot pins mounted for lateral adjustment forward of the front cheek and respectively on opposite sides of the longitudinal axis passing through the pivot of the front cheek for pivotal mounting of the side cheeks whose horizontal rearward edges are circularly curved around the pivot as a center axis and toothed, and a lockable slide having a complementary toothed and curved front edge adapted to be engaged with the toothed rearward edges of the side cheeks for locking the side cheeks in their normal positions.

6. A safety ski binding comprising a front cheek unit forming an abutment for the front edge of the boot and pivotally mounted on the ski so as to yield laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of vertical pivot pins secured on the front cheek unit respectively on opposite sides of the longitudinal axis passing through the pivot of the front cheek, a pair of side cheeks of angular shape each pivoted on one of said pivot pins and spring-urged into its normal position abutting the flanks of the sole of the boot, and a locking member provided on the ski for locking the side cheeks in their normal position by means of complementary toothed portions of the end edges of the horizontal legs of the angular cheeks and of the locking member, respectively.

7. A safety ski binding comprising a front cheek unit forming an abutment for the front edge of the boot and pivotally mounted on the ski so as to yield laterally in case of excessive torsional stress upon the boot, means urging the boot against said front cheek, a pair of laterally adjustable pivot holders with vertical pivot pins mounted on the front cheek unit respectively on opposite sides of the longitudinal axis passing through the pivot of the front cheek, a pair of side cheeks of angular shape each pivoted on one of said pivot pins and spring-urged into its normal position abutting the flanks of the sole of the boot, and a locking member provided on the ski for locking the side cheeks in their normal position by means

of complementary toothed portions of the end edges of the horizontal legs of the angular cheeks and of the locking member, respectively.

8. A safety ski binding comprising a front cheek unit forming an abutment for the front edge of the boot pivotally connected to the ski to yield laterally in the event of excessive torsional stress upon the boot, means urging the boot against the front cheek, a pair of vertical pivot pins secured to the front cheek unit respectively on opposite sides of the longitudinal axis passing through the pivot of the front cheek, a pair of angular side cheeks each pivoted on one of said pivot pins and spring urged into its normal position abutting the flank of the boot sole, and a locking device cooperable with the side cheeks adapted to lock the side cheeks in their normal position.

9. A safety ski binding comprising, in combination, a front cheek secured to the ski so as to form an abutment for the front edge of a boot and adapted to pivot laterally in case of excessive torsional stress upon the boot; a pair of pivotal side cheeks on opposite sides of the longitudinal axis passing through the pivot of the front cheek permanently slightly spring-urged into operative position in engagement with the flanks of the sole of the boot so as to yield laterally without noticeable resistance in case of a rotary motion of the boot when the same is subjected to excessive torsional stress and when said front cheek of the boot pivots laterally; a locking device adapted to releasably lock said side cheeks in their operative position; and means urging said boot against said front cheek with a tension adjustable between a low tension in which said boot is tiltable relative to said front cheek in a manner so that the heel of the boot can move toward and away from the ski and a high tension in which the boot is substantially not tiltable relative to said front cheek but held superimposed upon the ski, whereby for uphill climb said side cheeks may be locked by said locking device in operative position preventing unwanted lateral movement of the boot and the tension of said urging means may be adjusted to a low tension permitting the tilting of the boot relative to said front cheek necessary for uphill climbing and whereby during downhill run said side cheeks may be unlocked permitting lateral yielding of said side cheeks in case of rotary motion of the boot when the same is subjected to excessive torsional stress and the tension of said urging means may be adjusted to a high tension in which the heel of the boot is substantially non-liftable from the ski but fixed to the ski as necessary for downhill run.

10. A safety ski binding as defined in claim 9 in which said urging means includes a cable loop extending over the heel portion of the boot.

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