Dec. 3, 1968 G. P. J. SALOMON 3,414,281

VERTICAL HOLDING REAR SAFETY DEVICE FOR SKIS

Filed Feb. 23, 1966 2 Sheets-Sheet 1

Fig. 1

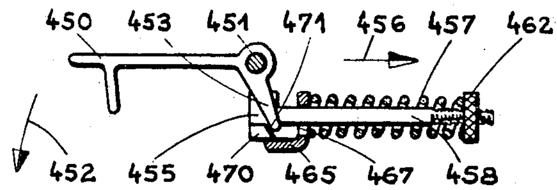


Fig. 2

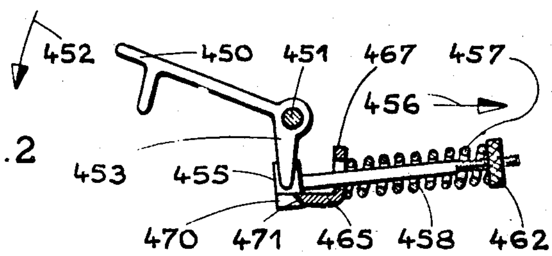


Fig. 3

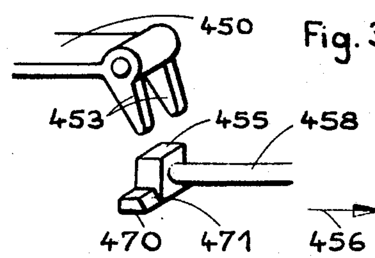


Fig. 4

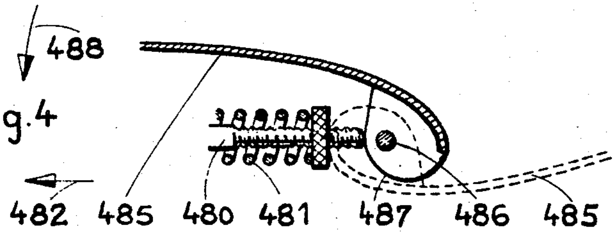


Fig. 5

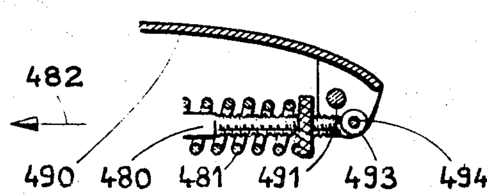


Fig. 6

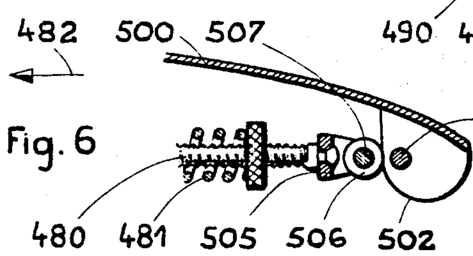
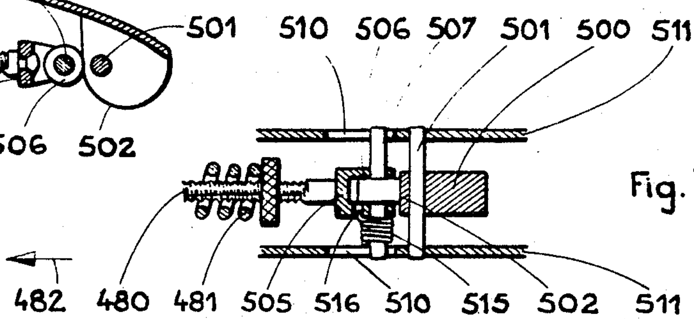


Fig. 7



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VERTICAL HOLDING REAR SAFETY DEVICE FOR SKIS

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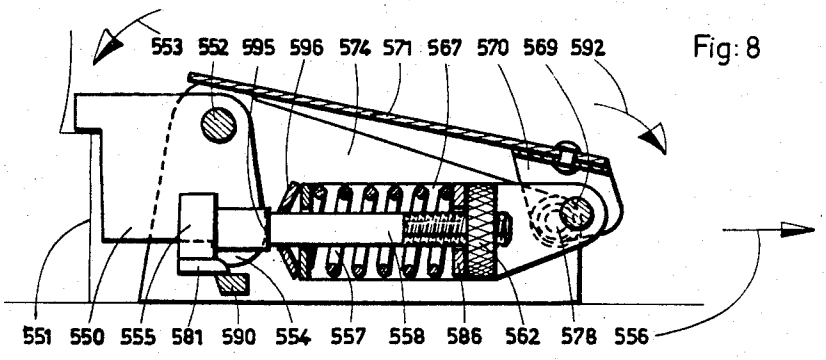

Fig: 8

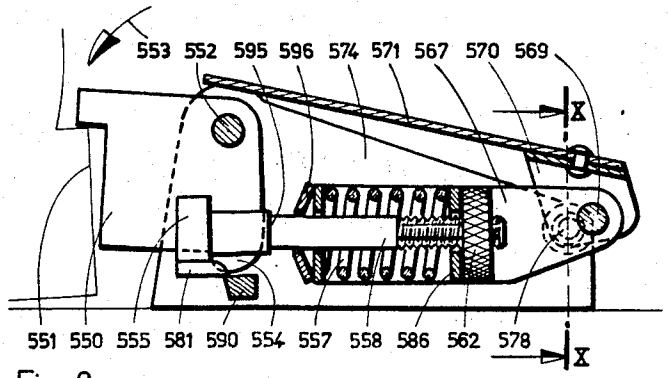

Fig: 9

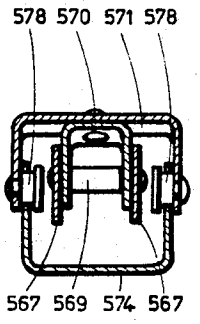

Fig: 10

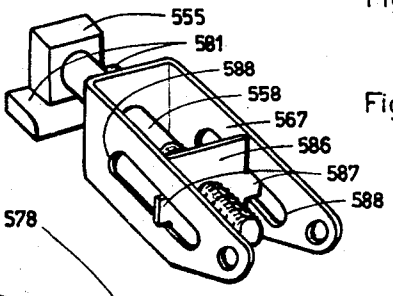

Fig: 12

Fig: 11

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VERTICAL HOLDING REAR SAFETY DEVICE FOR SKIS

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Claims priority, application France, Feb. 24, 1965, 6,924; June 14, 1965, 20,753
3 Claims. (Cl. 280—11.35)

ABSTRACT OF THE DISCLOSURE

A vertical holding rear safety device for skis which comprises a pivotally mounted angle piece having a first arm to hold down the rear on a ski boot and a second arm compressed by a spring to hold down the first arm, the lifting of the boot compresses the spring and actuates a rocking lever which engages a fixed abutment and maintains the spring in the compressed position and liberates the pivoting action of the angle piece.

The present invention relates to a vertical holding rear safety device for skis and more particularly to improvements regarding the safety device described in French Patent No. 1,375,747 of June 10, 1963.

The present invention intends to improve on the functions and the practical aspect of the device as described in the above-mentioned patent. In particular, the releasing device for holding the heel of the boot according to the patent has the disadvantage of presenting a friction problem between various parts. The improvement of the present invention consists of a more simple device which works under better mechanical conditions. The various devices for releasing the boot act generally on the rear portion of a main spring, compressing the latter and forcing the said portion to move forwardly while driving a centrally located rod or rocking lever so as to unable the latter to pass in front of the abutment and hold on to it.

According to a particular advantage of the invention, the rocking lever being acted upon by a boot holding jaw, this action being caused by the lifting of the said boot and having a tendancy to rotate the rocking lever, first, by displacement against the action of a controlling elastic means, and then, in engagement behind a fixed locking device in releasing position of the said jaw or locking lever, is mounted in one piece with the end of the rod on which is placed the said elastic means eliminating any articulation of the two parts, that is, the rod and the rocking lever. The elastic means is constituted preferably by a spring under compression between an adjusting nut threaded on the free end of the rod and a fixed abutment comprising an aperture or the said rod, the said aperture being sufficiently large to unable the clearance of the said rod. The abutment further comprises the locking device of the rocking lever, the said device being constituted preferably by one or a plurality of catches or teeth behind which the rocking lever is engaged. For example, the jaw comprises two lever arms or fingers located on both sides of the rod of the rocking lever and acting on two inclined planes of the rod and located respectively on both sides of the said rod.

According to another advantage of the invention, the manual removing operation is constituted by a lever or the like acting directly or indirectly on the free end of the rod on which is located an elastic adjusting means for the jaw, in order to tighten the said elastic means as for the opening of the said holding device by the action of the jaw or the like on the rocking lever, and thus, to free the said jaw or the like. For example, the lever

for the removal of the boot acts on the free end of the rod, either by an inclined plane of the lever, to which it is directly connected or by a roller at the end of the rod, or either by a roller mounted on an axle of the said lever, excentrically connected in view of the articulation axle of the latter, directly or indirectly on the end of the said rod.

Another advantage of the present invention consists in that the axle of the roller mounted at the end of the rod is extended and engaged on each side in two lateral apertures or seats of the base which provides the guiding of the said end of the rod. Moreover, the roller mounted on the end of the rod comprises means permitting on one hand, its free rotation by the rolling up of the inclined plane of the lever when the jaw is opened, and on the other hand, its braking action and eventually its blocking while the rotation during the closing action, necessarily involving through fixation of the roller on the said inclined plane, an important slowing down, of the movement of the said lever which controls the closing of the jaw, the said slowing down being capable of eliminating all risks of accident. This arrangement may be constituted by a helicoidal spring coaxially mounted on the axle of the roller, the said axle and roller being solidly fixed together, the said spring having one end held to the base or the cap of the roller, in such a way that the roller is freely driven in rotation when the jaw is opened, the said roller being slowed down and even stopped by the self-tightening of the spring on the axle of the roller when the jaw is closed.

Furthermore, according to another characteristic of the invention, the forward displacement of the rod and a tumbler required for the removal of the boot is obtained from a forward displacement of the forward end of the spring. This is contrary to the boot removing means described above and in the above-mentioned patent which consisted in compressing the spring. The same result is obtained in the present application by untightening the spring. This result is obtained by rendering movable the forward face of the spring and by connecting it to displacement means such as a hand-actuated lever. The skier having the skis fixed to its boot and wanting to remove the said skis manually, operate a lever which decompress the spring instead of compressing it. This action is made without any work from the skier, but on the contrary utilizes the tension of the spring. Accordingly, it appears advantageous that a simple holding effort is required, the skier being in an uncomfortable position. The tightening of the spring for fixing the boot on the ski is made by bringing forward the lever. The retightening of the spring requires some work by the skier, but this operation may be performed without necessarily having the skis attached to the boot of the skier who may have a more favourable position to tighten the spring.

The invention provides a more simple holding means which lead to a decrease in weight and in cost and improve the efficiency.

The invention may be better understood by referring to the following description and drawings by way of examples of various embodiments of the invention in which:

FIGURE 1 is a longitudinal section of a part of the vertical holding rear safety device in a closed position.

FIGURE 2 is a longitudinal sectional view of the device as shown in FIGURE 1 but represented in an opened position,

FIGURE 3 is a perspective view of the two essential parts, partially represented, of the device according to FIGURE 1,

FIGURE 4 is a longitudinal sectional view, partially represented, of a boot removal device for a vertical holding rear safety device for skis,

FIGURES 5, 6 and 7 are longitudinal sectional views, partially represented, of the manual boot removing device according to various embodiments according to the invention,

FIGURE 8 is a longitudinal sectional view of a device, partially represented in a closed position,

FIGURE 9 is a longitudinal sectional view of the device as shown in FIGURE 8 but in a releasing position,

FIGURE 10 is a transversal sectional view of the device as shown in FIGURE 8 along section line A—A of FIGURE 9,

FIGURE 11 is a longitudinal sectional view of the device according to FIGURE 8 when the boot is manually removed,

FIGURE 12 is a perspective view of the main part shown in FIGURE 8.

The vertical holding rear safety device for skis shown in FIGURES 1 and 2, comprises a jaw **450** for holding the boot, pivoted on a fixed horizontal axis **451** and bias in the direction of the arrow **452** corresponding to the holding of the boot, by two solidly fixed arms or fingers **453**, through the action of a locking lever **455** bias in the direction of the arrow **456** by a spring **457** mounted on a rod **458** which is made in one piece with the rocking lever **455**. The spring **457** is a compression spring compressed between an adjusting screw **462** threaded of the free end of the rod **458**, and a fixed abutment **465**. The abutment **465** having an L-shaped section comprises in its vertical arm an aperture **467** for receiving the rod **458**; the opening **467** permitting the clearance of the rod **458**. The forward end of the horizontal arm of the abutment **465** is inclined in order to constitute a locking member for the rocking lever **455** for the opened position for the vertical holding device.

The action of the locking lever **455** on the arms **453** of the jaw **450**, in the closing direction of the latter is produced by two lateral legs **470** of the said rocking lever, the arm or finger **453** adapted to rest on the inclined plane **471** of the corresponding leg **470** of the rocking lever, as it is particularly shown in FIGURE 3.

In closed position, the rocking lever **455**, under the action of spring **457** and by means of the rod **458**, maintains, by acting on the arms **453** of the jaw **450**, the said jaw in a holding position for the heel of the boot. When the heel of the boot is suddenly pulled, the jaw **450** opens and its arms **453** drive the rocking lever **455** in a direction opposite the arrow **456** by sliding on the upper face of the horizontal arm of the abutment **465**, which tightens the spring **457**, until the rearward edges of the legs **470** reach the forward end of the horizontal arm. The rocking lever **455**, under the action of the arms **453**, falls upon the inclined planes **471** and locks itself on the abutment **465** in a positive manner due to the fact that the inclined plane of the rocking lever **455** corresponds to the inclined plane at the forward end of the said abutment **465**. The rod **458** is the in an inclined position. In order to return to the position of FIGURE 1, to unlock the rocking lever **455**, as for example, by listing it by any appropriate means.

By comparison, to the known vertical holding rear safety device such as the one described in the abovementioned patent, the operation of the present device is obtained without friction, therefore obtaining a better security without wear.

In FIGURE 4, according to an embodiment of the invention for manually removing the boots, the operation for the said removing of the boot is obtained by acting on the free end of the rod **480** on which is mounted elastic means reacting on the jaw in the holding position, such as the spring **481**, in such a way as to bring the said rod **480** along the arrow **482**, by tightening the spring **481**, to disengage and lock the rocking lever and, to free the retaining jaw of the boot. This movement of the rod **480** along the arrow **482** is obtained, for example, by a lever **485** pivoted along an horizontal axle **486** and through the action of a ramp **487** acts by friction on the free end of the rod **480**. By pivoting, the lever **485**, along the arrow **488**, the opening of the holding jaw of the boot is obtained and, inversely, the closing is obtained by rocking the lever **485** in the opposite direction.

The device for manually removing the boot as shown in FIGURE 5, differenciates from the one shown in FIGURE 4 only by the driving means of the rod **480** along the arrow **482** which is obtained by a lever **490** pivoted on a fixed horizontal axle **491**, and by a roller **493** freely rotating on a axle **494** solidly fixed to the lever **490**, the axle **494** moving around an arc around the axle **491** during the pivoting of the lever **490**, acting on the free end of the said rod **480** by rolling means and not by sliding means as described in the device shown in FIGURE 4. The rolling means is considered an improvement over the sliding means.

The device for manually removing the boots according to FIGURE 6 differenciates from the one shown in FIGURE 4 in that the actuation of the rod **480** along the direction of the arrow **482** is obtained by a lever **500** pivoted on a fixed horizontal axle **501**, the lever **500** comprising a ramp **502** progressively acting during the pivoting of the lever **500** on the free end of the rod **480**. A cap **505** is preferably fixed at the end of the rod **480**, the said cap comprising a roller **506** freely rotating on an axis **507** on the cap **505**. The trust acting on the free end of the rod **480** is similar to the one of the device shown in FIGURE 4 except that instead of obtaining a sliding movement, a rolling movement is obtained which constitutes an improvement.

The device for manually removing the boot according to FIGURE 7 is identical to the one shown in FIGURE 6 but comprises few additional particular details. First, the axle **507** of the roller **506** mounted at the free end of the rod **480** is extended in such a way that both ends of the axle **507** freely slide into longitudinal apertures **510** located in the two sides **511** of the casing of the vertical holding device of the boot comprising the device for manually removing the boot. The free end of the rod **480** is preferably maintained and guided against the action of the ramp **502** of the lever **500** which has a tendency during the opening and the closing of the holding jaw, to raise or lower the said free end of the rod **480**. The roller **506** and its axle **507** are made in one piece and pivot in the opening of the cap **505**. On one side of the cap **505**, on the side of the axle **507** comprised between the side of the cap **505** and the internal face of the casing, a coil spring **515** is mounted to provide a light tension, one end **516** of which is held in a hole in the cap **505** and the other free end on the axle **507**. The direction of the winding of the coil **515** is made so that the rotation of the axle **507** and of the roller **506** during the opening of the jaw obtained by the action of the ramp **502** against the said roller **506** has a tendency by friction of the free end of the spring **515**, to unwind the said coil **515**, unabling a practically free rotation of the roller **506**; the opposite movement of the lever **500** in order to close the jaw, tending to drive the roller **506** to the opposite direction, stops the said roller **506** in rotation by self-tightening of the spring **515** on the axle **507**, compelling the ramp **502** of the lever **500** to move by friction on the roller **506** in the closing direction of the jaw. An efficiently braking action on the pivoting on the lever **500** is obtained which corresponds with the closing of the jaw, the said pivoting being a positive action obtained by the unlocking of the rocking lever, eliminating any risk of accident due to the displacement of the lever **500**.

It is obvious that two braking springs could be used, each one on both sides of the cap **505**, and that the stopped end of the spring **515** could be the one located on the side **511** through the corresponding opening **510**.

The vertical holding rear safety device for skis according to FIGURES 8 to 11 comprises a holding jaw

550 of the boot 551, pivoted on a fixed horizontal axle 552 and bias in the direction of the arrow 553 corresponding to the holding of the boot, through the action of two projections 554, solidly fixed to or integral with the jaw 550, responsive to the action of a rocking lever 555 which is actuated in the direction of the arrow 556 by a spring 557 located on a rod 558 made in one piece with the rocking lever 555.

The spring 557 is a compression spring tightened between, an adjusting nut 562 threaded on the free end of the rod 558 and the end of a stirrup-piece 567 pivoted on an axle 569, on a cover 570 solidly fixed on a lever 571 which is pivoting around two axles consisting of rivets 578 on the lateral sides of the casing 574 of the device.

In the closed position of the holding device according to FIGURE 8, the axle 569 is located slightly above the horizontal plane of the axle 578. From this arrangement, the reaction of the spring 557 in the stirrup-piece 567 provides a torque on the lever 571 in a counter-clockwise direction 580, applying the forward end of the lever 571 in abutment on a fixed part of the casing 574 of the holding device and limiting the possible movement of the bottom of the stirrup-piece 567, and therefore to the forward resting face of the spring 557.

When the heel of the boot receives a sudden pull, as shown in FIGURE 9, the jaw 550 pivots upwardly, around the axle 552 driving by the action of the projections 554, the lateral legs 581 of the rocking lever 555 and then, the rod 558 and the nut 562 threaded on the said rod. The nut 562 transmits the pressure to the rear end of the spring 557 by means of a plate 586 guided by the lugs 587 in the apertures 588 of the stirrup-piece 567, as shown in FIGURE 12.

The spring 557 transmits the pressure to the bottom of the stirrup-piece 567 which, supported on the knuckle-joint constituted by the axles 569 and 578 and the fixed support of the forward end of the lever 571, is substantially still, reacting to the lifting pressure of the heel by compression of the spring 557 until the rear lower edge of the legs 581 of the rocking lever 555 coincides with the forward upper edge of the abutment 590. Reacting to the inclination of the legs 581 of the rocking lever 555, the projections 554 of the jaw 550, exerting until then a force on the said legs 581 are liberated, which enables the pivoting of the opening of the said jaw 550 and thus driving the assembly consisting of the stirrup-piece, the spring 557, the rod 558, and the rocking lever 555 in a pivoting motion around the axle 569.

The skier having his skis on his feet and wanting to manually remove the said skis, forces the lever 571 in a rotation represented by arrow 592. This rotation of the lever 571 results in the passage of the axle 569 below the horizontal plane of the axle 578. Starting from this position, the spring 557 applies to the lever 571 a torque in the direction of 592, similar to the one for the removal of the boots which results in the automatic opening of the lever 571 under the action of spring 557 which is slightly compressed. This opening movement is limited by the abutment at the bottom of the stirrup-piece 567 on the shoulder 595 of the rod 558, as for example through a "Belleville" disc 596. Then, the rod 558, which has been upwardly driven, is no more bias by the action of the spring 557. The forward movement of the rod 558 has been obtained by the fact that the axle 569 having rotated approximately 180° has passed from the rear to the front of the axle 578, this forward movement corresponding substantially to twice the eccentric value between the axles 569 and 578. The jaw 550 may then easily open without meeting any resistance.

The holding device then reaches its manually opened position, represented in FIGURE 11; the boot is freed and, to enable the next installation of the boot on the ski, the skier must retighten the holding device by bringing the lever 571 in the direction of the arrow 580. From this arrangement, the axle 569 is brought from the front to the rear of the axle 578, driving the stirrup-piece 567 which compressed the spring 557 against the plate 586 held to the nut 562 which cannot go back because the rocking lever 555 is then hooked on the forward face of the abutment 590.

The holding device is then ready for the reinstallation of the boot on the ski as for example as described in the above-mentioned patent.

It should be obvious that the lever 571 can be directly connected on the stirrup-piece 567 and on the casing 574 through only one axle comprising eccentric bearing surfaces corresponding to the distance between the axles 569 and 578.

It should be obvious and within the embodiment of the present invention to change the number, the shape, the dimensions, the proportions and the dispositions of the different constituent elements of the vertical holding rear safety device and in particular, the elastic adjusting means of the jaw and of the manual removing operation arrangement.

I claim:

1. In a vertical holding rear safety device for skis comprising:
- an abutment fixed relative to the ski, having a substantially vertical and horizontal member, the vertical member having an aperture therein, and the horizontal member projecting towards the front of the ski,
- a rod passing through said aperture and adapted to rock therein,
- a rocking lever, comprising a block solidly fixed to one end of the rod on the side of the horizontal member of the abutment, the said block having two lateral legs,
- a coil spring mounted on the rod,
- adjustable compression means mounted on the other end of said rod and adapted to compress the spring and to urge the rocking lever in the direction of the vertical member of the abutment,
- a boot holding jaw formed by an angle piece pivoted about an axle located substantially above the rocking lever, the said jaw consisting of a boot engaging arm and a rocking lever engaging arm whereby the operation of the removal of the boot will compress the spring and lock the lever to the forward edge of the horizontal member in order to free the pivoting action of the jaw.

2. A device as recited in claim 1, wherein the forward edge of the horizontal member and the rear edge of the legs of the lever have forwardly and upwardly sloping surfaces adapted to engage each other when the compression means is compressed.

3. A device as recited in claim 1, wherein the rocking lever engaging arm consists of a fork-like arm adapted to contact the rear surface of the lateral legs of the rocking lever when the jaw is in the boot holding position.

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