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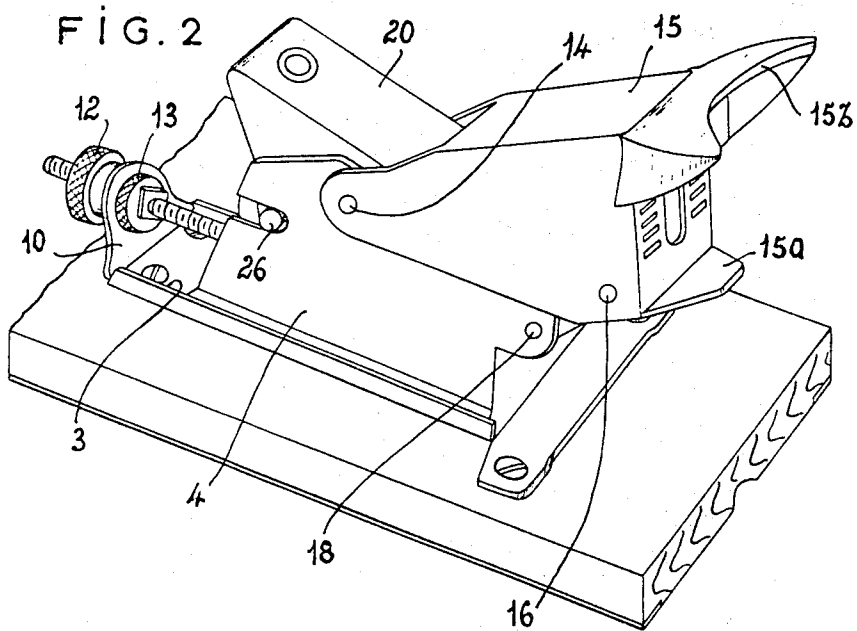
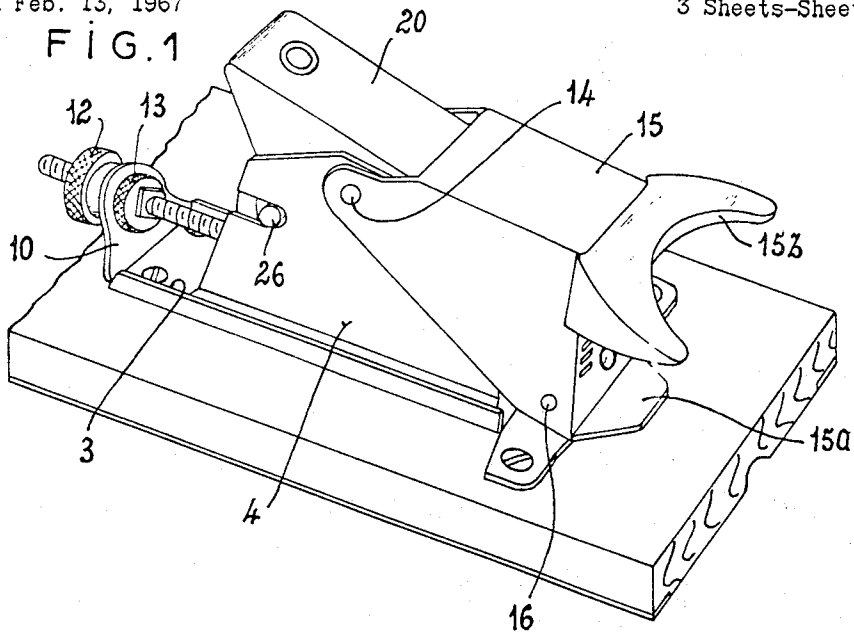
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REAR STOP FOR SKI BINDING

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REAR STOP FOR SKI BINDING
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ABSTRACT OF THE DISCLOSURE

A rear stop for a ski binding comprises a stop body, and a heel-engaging jaw mounted for vertical swinging movement on the stop body by a first pin. A link is pivotally mounted at one end on the stop body by a second pin and at its other end is pivotally connected to the jaw by a third pin. The second pin is urged forwardly by a spring, so that the third pin passes over center through the plane of the first two pins with a snap action, between open and closed positions. The angle of the link in these open and closed positions can be adjusted by shifting the second pin forwardly or rearwardly; and the abutment shoulders between which the spring is compressed travel as a unit with the second pin during this adjustment, thereby to keep the spring strength constant.

The present invention relates to rear stops for ski bindings.

Owing to the fact that some skiers prefer not to use cables for tying their shoes to their skis, many types of rear stops have been proposed to be used in combination with the various types of front stops acting as bearings for the shoe toes. When selecting rear stops, the users want to find the following advantages: automatic fitting of the skis on the feet, merely by depressing the heels and without any use of the hands; a device enabling the bindings to be readily unlocked with a view to taking off the skis, whatever may be the position of the user; accurate and convenient adjustments both of the horizontal thrust and of the rising movement of the stop jaw which holds the shoe by bearing on the welt of the heel of the latter; adjustability of the height of said jaw holding the shoe heel; upon automatic releasing, when for instance the skier falls head first, a movement of the rear stop jaw in a direction perpendicular to the ski or even following temporarily the very slight curve described in a forward direction by the shoe heel when the latter rises above the ski, such vertical or curved rising of the stop being intended to prevent the jaw from sliding against the shoe heel, which sliding would quickly damage the shoe welt; the substantially instantaneous freeing of the shoe after the short shifting of the stop perpendicularly with respect to the ski or even forward; lastly, maximum strength and lightness combined with a minimum bulk.

Now, heretofore, no rear stop has met all the above-mentioned requirement. The object of the present invention is to meet this need by providing a rear stop for ski binding in which two pins connect hingedly the jaw for the shoe heel with the stop body and with a link respectively, said link being in turn hinged on said stop body through a pin which is out of line with respect to the two pins for the jaw and passes through an elongated hole in said stop body, said latter pin being urged by a constant force spring which tends to oppose the sliding of said pin rearwards within said elongated hole and thus the angular shifting of the link and the jaw, the disalignment angle of the three above-mentioned pins defining the lower limit of the force required for the opening of the stop, said angle being adjustable by shifting transversely the intermediate

pin, that is, that on which the link only is hinged, the two shoulders for the above-mentioned spring movement moving together with said intermediate pin.

Since the three above-mentioned pins are not in alignment, when the stop is closed the spring keeps the jaw bearing firmly on the shoe heel but after a first stage of angular shifting of the jaw and the link, which stage is damped by the spring being compressed, the pin through which the jaw is hinged on the link passes beyond the plane passing through the two other pins, with the result that the second and last stage of angular shifting of the jaw takes place instantaneously, while the shoe is completely released.

Since the stop has to exert not only a downward vertical thrust on the shoe heel to apply the latter against the ski, but also a forward longitudinal thrust to apply it against the front stop of the binding, the present invention provides an arrangement for obtaining such a longitudinal thrust. According to said arrangement, the body of the stop of the invention is mounted on a base plate integral with the ski, said base plate forming a slide over which said stop body is adapted to slide lengthwise, while a spring is inserted between a shoulder on the stop body and a nut on a screw on the head of which said shoulder bears when the stop is at rest but from which it moves away, while increasing the compression of said spring, when the stop is being used, the amount by which said screw is screwed in said nut defining the amount of compression of said spring and thus the amount of the thrust exerted on the shoe by the stop. It is possible to make the nut integral with the base plate. In order, however, to allow shifting lengthwise over the stationary base plate the area where the longitudinal thrust takes place and setting thus the stop accurately according, on the one hand, to the size of the shoe and, on the other hand, to the amount of gripping between the front stop and the rear stop desired for said shoe, the screw which receives said nut passes rearward through a lug integral with the slide-forming base plate for the stop body, and on either side of said lug said screw receives a nut and a check nut respectively, which enables said screw and thus said stop to be given the longitudinal position wanted.

Lastly, the rear stop of the invention includes means for the controlled release thereof when the user wants to take off his skis. To this end, the heel-retaining jaw of said stop has a rear extension in the shape of a lever pivotally secured to the stop body by the same pin as said jaw, which lever carries two flanges provided with two curvilinear slots facing each other, through which the fingers of a nut pass. The threaded shoulder of a rod is screwed adjustably in said nut, said shoulder acting as a bearing for the spring controlling the opening and closing operations of the jaw, which spring is guided by said rod. The shape of the slots in the flanges of said lever is such that, depending on the position given to said lever, said screw is allowed or not allowed to move back and thus to permit or prevent the opening of the stop.

The invention will now be explained in further detail in the following description, with reference to the appended diagrammatic drawing which illustrates, by way of non-limiting example, an embodiment of the rear stop for ski binding of the invention. In said drawing:

FIGURES 1 and 2 are perspective views of said rear stop, in closed condition and in open condition respectively;

FIGURE 3 is a longitudinal section of same in its open position;

FIGURE 4 is a cross-section along line 4—4 of FIGURE 3;

FIGURES 5, 6, 7 are diagrammatic figures illustrating the arrangement and the operation of the device enabling the user to take off his skis.

In the figures, 2 indicates a base plate secured to the ski and acting as a longitudinal slide 3 for the stop body 4. The lower portion of said body 4 houses longitudinally a helical spring 5 which is in compressed condition between an annular bearing 6 on the body 4 and a nut 7 screwed on a screw 8 which passes through the bearing 6, the spring 5 and the nut 7. Said screw 8 is provided with a head 9 which, when the stop is at rest, bears on the front surface of the bearing 6. The nut 7 is adapted to move longitudinally inside the stop body 4, but not to rotate therein, so that, by rotating the screw 8, it is possible to vary the amount of compression of the spring 5 and thus the thrust of said spring on the annular bearing 6 on the stop body 4.

The rear end of the screw 8 passes through a vertical lug 10 integral with the base plate 2. On either side of said lug 10 the screw 8 is provided with a nut 13 adapted to rotate freely, and with a check nut 12 respectively. After loosening the nut 13 and the check nut 12, it is possible to move the screw 8 longitudinally and thus to shift the stop body 4 backward or forward over the base plate 2.

The upper portion of the stop body 4 carries a horizontal pin 14 on which the jaw proper 15 and a lever 20 are pivotally mounted, said lever forming a rear extension of said jaw 15. As is known per se, the jaw 15 is provided with two horizontal wings, 15a, 15b respectively, adapted to grip around the protruding end of the shoe heel. Moreover, the upper wing 15b is adjustable to allow setting the spacing between the two wings 15a, 15b, according to the thickness of the shoe heel.

Said jaw 15 is pivoted not only on the stationary pin 14 but also on a pin 16 carried by a link 17 which is pivoted on a pin 18 the ends of which pass through two horizontal elongated slots 19 provided in the lateral surfaces of the stop body 4. The central portion of said pin 18 is in the shape of a shoulder 21 through which a rod 22 passes freely, the rear end 23 of said rod extending beyond the rear surface of the stop body 4. A helical spring 24 is guided by the rod 22, the ends of said spring bearing on the shoulder 21 and on a further shoulder 22a on said rod 22 respectively. The rear extension of said shoulder 22a is threaded and carries a nut 25 provided with two coaxial fingers 26.

Said fingers 26 pass through two elongated slots 27 facing each other which are provided in the two flanges of the lever 20 pivoted on the same pin 14 as the jaw 15. Said lever 20 is continually subjected to the action of a spring 28 which tends to keep it in its uppermost position, that is, in the position illustrated in FIGURES 3, 5 and 7. Each elongated slot 27 has the curvilinear outline shown in FIGURES 5-7, that is, each slot comprises two portions meeting at an angle. When the lever 20 is in its normal position as shown in FIGURES 4, 5 and 7, the fingers 26 of the nut 25 are housed at the bottom of the lower portions 27a of the two slots 27. In said position, the fingers 26 and consequently the nut 25 and the rod 22 are immobilized longitudinally, that is, they cannot move backward or forward.

In FIGURES 1 and 5, the rear stop of the invention is shown in its normal position of use, in which the heel of the skier's shoe is firmly applied to the ski by the jaw 15, the latter being subjected to a vertical downward thrust by the pin 16, the link 17, the pin 18 and the spring 24. Screwing or unscrewing the rod 22 in the nut 25 makes it possible to shift said rod axially together with the shoulder 21 which is held against the bearing 22b by the spring 24, which results in a corresponding shifting of the pin 18 and thus a variation of the angular position of the link 17. When the heel of the skier's shoe tends to rise above the ski, as a result for instance of the skier falling head first, the jaw 15 tends to rise by rocking around the pin 14, while pushing back the spring 24 through the link 17 and the shoulder 21. During said movement, the pivot 16 connecting the link 17 with the jaw 15 tends progressively to aline itself with the pivots

14 and 18 which connect the jaw 15 and the link 17 respectively to the stop body 4, after which said pivot 16 reaches a position disalined with respect to said pivots 14, 18, while the spring 24 is released again and shifts suddenly the link 17 and the jaw 15 upwards, as is apparent from FIGURES 2 and 3. The shoe is thus released instantaneously, and the stop body 4 moves then forwards as a result of the release of the spring 5.

The adjustment just described of the angular position of the link 17 by screwing or unscrewing the rod 22 in the nut 25 allows varying the angle initially formed by the three pivots or pins 16, 18 and 14, and thus the value of the component of the stress exerted by the link 17 on the pin 18, which component is directed towards the pins 18, 14. Such adjustment makes it thus possible to vary the lower limit of the stress required for releasing the shoe.

When the skier wants to put his skis on again, he only has to engage the front end of his shoe against the front stop and to lower the heel of said shoe to exert a vertical downward thrust on the lower wing 15a of the jaw 15. Said thrust causes the jaw 15 and the link 17 to move downwards, while recompressing the spring 24, and when the pin 16 has passed beyond the theoretical straight line passing through the pins 14 and 18, the spring 24 is released instantaneously and pushes back the jaw 15 downwards, whereby the heel of the shoe is applied on the ski. At the same time, the fitting of the shoe between the front stop and the rear stop causes the stop body 4 and the jaw 15 to move backwards, while compressing the spring 5. As previously mentioned, the strength of the longitudinal thrust of said spring 5 is adjustable by means of the screws 8-9.

For taking a ski off voluntarily, it is only necessary for the skier to depress slightly the lever 20 in the direction of the arrow 30 of FIGURE 6, by means, for instance, of the tip of his stick, whereby said lever 20 is shifted angularly and the upper portion 27b of its slot 27 is brought to a horizontal position, so that the fingers 26 are no longer retained longitudinally. Said release of the fingers 26 allows the skier to lift his heel while shifting the jaw 15 upwards, that is, in the direction of the arrow 29 of FIGURE 6, since the assembly including the fingers 26, the rod or screw 22, the pin 18 and the link 17 is allowed to move backwards without compressing the spring 24. Lastly, the rear stop comes to its open position shown in FIGURE 7, the lever 20 is released, and the rear stop is again ready to be used.

According to the provisions of the patent statutes, I have explained the principle of my invention and have described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:

1. A rear stop for a ski binding, comprising a stop body adapted to be mounted on a ski, a first pin carried by the stop body, a heel-engaging jaw mounted for vertical swinging movement on said first pin, a second pin extending through and movable lengthwise of elongated slots in said stop body, a link mounted for vertical swinging movement on said second pin, a third pin pivotally interconnecting said link and said jaw, said second pin being disposed rearwardly of said third pin and said first pin being disposed rearwardly of said second pin, a spring continuously yieldably urging said second pin forwardly whereby said third pin passes over center of the common plane of said first and second pins with a snap action to define open and closed positions of said jaw, a pair of abutment shoulders between which said spring acts, and means for moving said second pin and said abutment shoulders together as a unit forwardly or rearwardly thereby to alter the angle that said link makes with said common plane in said open and closed positions while at the same time maintaining constant the strength of said spring.
2. A rear stop as claimed in claim 1, and a plate on

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which said stop body is forwardly and rearwardly slidably mounted, said stop body having a shoulder thereon, a screw that passes through said shoulder, said screw having a head that bears against said shoulder when the rear stop is not in use and that is spaced from said shoulder when the rear stop is in use, said screw having a nut thereon, a second spring that acts between said nut and the opposite side of said shoulder from the head of the screw, the amount by which said screw is screwed into said nut defining the amount of compression of said second spring and therefore the amount of thrust exerted on the heel of a shoe by said rear stop.

3. A rear stop as claimed in claim 2, said plate having an integral lug through which said screw passes, a nut on said screw on one side of said lug and a check nut on said screw on the opposite side of said lug whereby said screw and stop body may be shifted longitudinally relative to said plate.

4. A rear stop as claimed in claim 1, and a rearwardly extending lever pivotally mounted on said first pin for vertical swinging movement relative to said jaw, said lever having two flanges thereon which have confronting slots therein, a rod passing through said spring, said rod having screw threads thereon, a nut screw-threadedly mounted on said rod, outwardly extending fingers on said nut slidably disposed in said flange slots, one of said abutment

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shoulders being carried by said nut, said flange slots in one vertically swung position of said lever having portions parallel to said rod to permit said rod to move rearwardly without substantial compression of said spring thereby to facilitate voluntary opening of said jaw.

5. A rear stop as claimed in claim 4, each of said flange slots having portions disposed at obtuse angles to each other.

6. A rear stop as claimed in claim 4, and a shoulder that slidably encircles said rod, the other said abutment and said second pin being carried by said shoulder.

7. A rear stop as claimed in claim 6, and a stop member carried by said rod on the side of said shoulder opposite said spring, thereby to limit forward movement of said shoulder relative to said rod under the influence of said spring.

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