June 29, 1965 E. PREISIG 3,191,955

SAFETY DEVICE FOR SKI-ATTACHMENTS

Filed April 1, 1963

Fig. 1

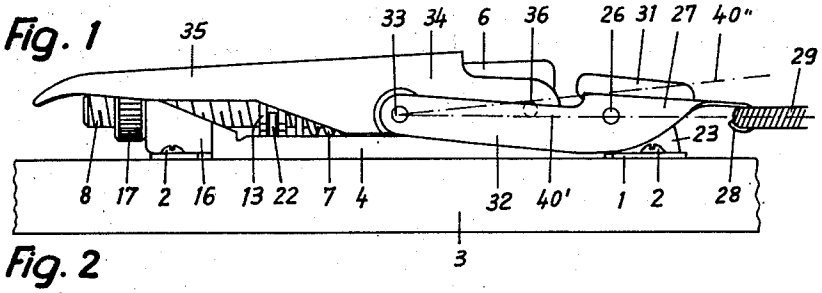


Fig. 2

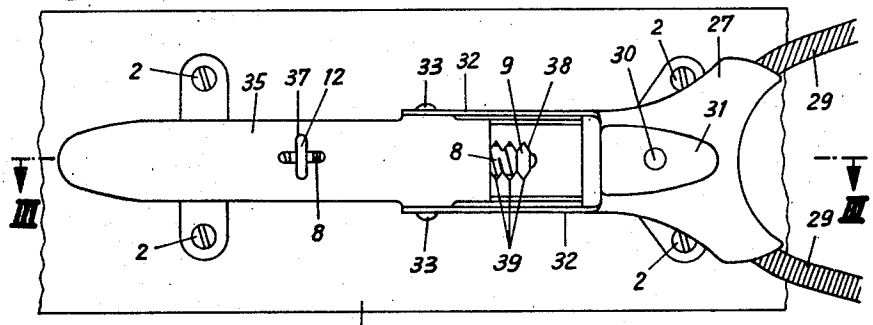


Fig. 3

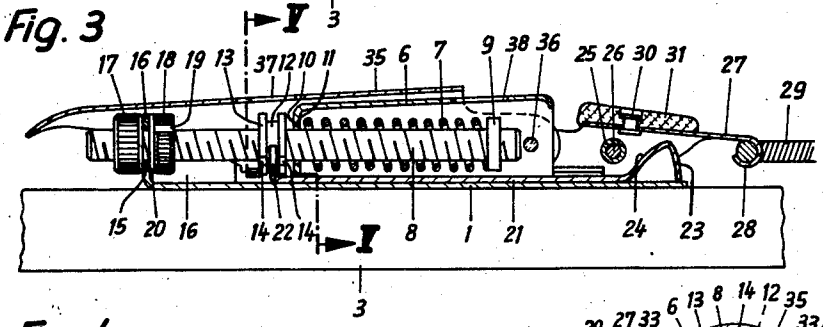


Fig. 4

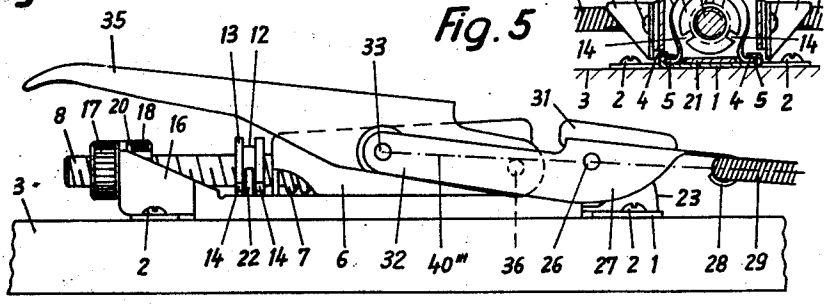


Fig. 5

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SAFETY DEVICE FOR SKI-ATTACHMENTS

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4 Claims. (Cl. 280—11.35)

The present invention relates to a safety device for ski-attachment having a forward buckle and a toggle-lever arrangement constructed so as to automatically open upon an excessive pull applied to the ski-attachment. It is a primary object of the present invention to provide a safety device of the kind referred to the release load and release path of which can be readily adjusted.

With this and other objects in view, which will become apparent later from this specification and the accompanying drawings, I provide a safety device for ski-attachments automatically detaching itself upon a predetermined overload, comprising in combination: a base plate, a sleeve mounted longitudinally slidable on said base plate, a toggle lever arrangement including a forward buckle lever pivoted on said sleeve and a cable clamp member pivoted to said buckle lever, an abutment member adjustable longitudinally relative to said base plate, a spring enclosed in said sleeve and abutting the latter at one end and said adjustable abutment at the other end, the loading of said spring thus being determined by the adjustment of said abutment, a scale provided on said sleeve in conjunction with said abutment and indicating the position of the latter relative to said sleeve, a ramp connected with said abutment for longitudinal adjustment and a release member connected with said clamp member in operative juxtaposition with said ramp, said release member upon a pull on said clamp member exceeding a predetermined loading of said spring running up said ramp and after a predetermined release path jerkily opening said toggle-lever arrangement.

These and other features of my said invention will be clearly understood from the following description of a preferred embodiment thereof given by way of example with reference to the accompanying drawing, in which:

FIG. 1 is a side elevation of a forward buckle provided with the safety device in the closed position;

FIG. 2 is a plan view of FIG. 1;

FIG. 3 is a longitudinal section on the line III—III of FIG. 2;

FIG. 4 is a side elevation of the same buckle immediately after response of the safety device to an overload, and

FIG. 5 is a section on the line V—V of FIG. 3.

The forward buckle illustrated has an oblong base plate 1, which is attached to a ski 3 by means of four screws 2. The longitudinal edges of the base plate 1 are turned upwardly and inwardly, and form two guides 4 for two marginal ledges 5 arranged on the bottom of a spring sleeve 6 forming a slider shoe. In this spring sleeve 6 a loaded compression spring 7 is enclosed, which is pushed over a threaded bolt 8 and bears at one end on a nut 9 and at the other end on a forward lug 10 of the sleeve 6. The nut 9 contacts laterally the sleeve 6 in a manner not shown in detail, in such a way that it cannot rotate. The lug 10 has a hole 11, through which passes the said threaded bolt 8. A collar 13 fixedly arranged on the threaded bolt 8 and provided with an annular groove 12 has radial recesses 14, which allow the threaded bolt to be turned by the aid of a screw driver, coin or the like, and thus to vary the pre-loading of the spring 7.

The forward end of the threaded bolt 8 is passed through a hole 15 of a bracket 16 provided on the forward end of the base plate 1, and is retained there by means of a forward and a rear knurled nut 17 and 18, respectively. Between the said rear knurled nut 18, which is provided with radial recesses 19 similar to the recesses 14, and the bracket 16 a washer 20 is provided. By adjusting the nuts 17 and 18, the threaded bolt 8, and with it also the spring sleeve 6 and spring 7 may be displaced in the longitudinal direction.

Upon a longitudinal movement of the threaded bolt 8 an oblong plate 21 is also shifted, which lies between the two marginal ledges 5 on the base plate 1. This longitudinally shiftable plate 21 has at its forward end a fork 22 extending upward which engages into the annular groove 12 of the collar 13 of the bolt 8, and serves for carrying the same along. At its rear end the plate 21 has a nose 23, which forms a ramp 24 for a roller 25.

This roller 25 is mounted rotatably on a transverse pin 26 of a cable clamp 27, into the rear turned up margin 28 of which the forward part of a closed-loop pull cable 29 is engaged, the rear part of which (not shown) surrounds in the usual manner the heel of the skier's shoe and pulls this shoe forward against the toe-lugs (likewise not shown) of the ski-attachment. On top of the cable clamp 27 a resilient buffer 31 is attached by means of a rivet 30. The cable clamp 27 has two arms 32 extending forward parallel to one another, the ends of which are pivoted by means of grooved pins 33 on two turned down side walls 34 of a buckle lever 35, which is in turn connected pivotally to the spring sleeve 6 by means of a transverse pin 36.

The buckle lever 35 is provided on top with a cross-shaped aperture 37 through which the position of the collar 13 can be watched when fitting the attachment to the ski-shoe, the annular groove 12 being preferably painted red. When the attachment has been correctly adjusted by adjustment of the nuts 17 and 18, the said annular groove 12 is just in the middle of the aperture 37 when the buckle lever 35 is closed, i.e., in alignment with the transverse branch of the cross-shaped aperture. Moreover at the rear end of the spring sleeve 6 an aperture 38 is provided therein, the edge of which has three pairs of mutually opposite incisions 39. Through the opening 38 the nut 9 is visible, which is preferably colored red on top, in order that its position relative to the incisions 39 forming a scale can be viewed.

The safety device described operates as follows:

When the buckle lever 35 is closed (see FIGS. 1 to 3), the pull of the cable 29 acts on the toggle lever system formed in the usual way by the buckle lever 35 and the cable clamp 27 in the direction of the line 40′ (indicated in FIG. 1 in chain-dotted lines) lying below the pivot pin 36 of the buckle lever 35. The toggle lever system 27, 35 is beyond its dead center position, and the pull of the cable tends to keep the buckle lever in the closed position. As long as the pull of the cable does not exceed the existing loading of the spring 7 while the buckle lever is in the closed position, the attachment holds the ski-shoe fast during a run.

When in a fall the attachment is so strongly loaded that the pull of the cable exceeds this loading magnitude, the spring sleeve 6 is pulled back by the pivot pin 36 of the buckle lever 35, while the threaded bolt 8 is held fast by the nuts 17, 18 on the forward bracket 16 of the base plate 1 and cannot move; accordingly the longitudinally slidable plate 21 remains likewise stationary. The roller 25 therefore meets the ramp 24 of the nose 23 and runs up the same so that the margin 28 of the clamp holding the cable loop 29 is likewise raised, and the line of action 40′ (FIG. 1) of the toggle lever system 27, 35 turns about the pin 33 in the counter-clockwise sense of FIG. 1, and moves through the dead center position into the position 40″, FIG. 1. Then the pull of the cable acts in the sense of opening the buckle

lever 35, so that the same begins to open. The line of action 40''' in FIG. 4 shows that after a slight opening move of the buckle lever 35 the pivot pins 33 are raised, so that the torque applied by the pull of the cable to the buckle lever 35 quickly increases as the opening of the lever 35 grows, and that the later is moved jerkily to the fully open position, until it abuts the buffer 31. Thereby the cable clamp 27 is pulled far back, so that the cable loop 29 releases the ski-shoe.

The pre-loading of the spring 7 is selected in accordance with the weight of the skier. When by turning the screw threaded bolt 8 by the aid of the recesses 14 of the collar 13 the spring 7 is loaded more strongly (the nuts 17 and 18 having obviously been previously loosened), the nut 9 can be observed moving forward, through the aperture 38. The pre-loading is determined by the position of the nut, which can be easily ascertained on the incisions 39, when the buckle lever 35 is in the open position. In accordance with the desired harshness of the release, the pre-loading may for example be varied in such a manner, that the pull of the cable, at which the toggle lever system is released, may be varied at will within the limits of 50 to 180 kilograms. It should be emphasized that the release path of the device, i.e., the path of the roller 26 before running up the ram 24 so far that the buckle lever 35 is opened, has always the same length of say 4 millimetres, provided the annular groove 12 is correctly adjusted to the middle of the aperture 37, quite regardless of the preloading of the spring 7.

As distinguished from a safety device disclosed in the Swiss patent specification No. 340,749 of the applicant there results the further great advantage, that the present safety device may be adjusted to an accurately determined preloading of the spring 7, which can be read off the scale 39, i.e., to a predetermined pull of the cable, in accordance with the weight or with the wish of the skier, to make the safety device respond to a lower or higher overload. In the previously known device the loading of the buckle spring, which was formed by a tension spring, had to be adjusted by touch, screwing the forward end of the tension spring forward or back by means of an adjustment nut, whereby at the same time the position of the cable clamp was varied.

Moreover the release path was adjustable by longitudinal displacement and arresting of the ramp. The maximum cable pull at which the device responded, then depended on the adjustment made by touch of the tension spring, as well as on the magnitude of the release path adjusted so that it required great experience to adjust the device correctly.

Moreover, with a short release path in certain circumstances even the formation of a thin crust of snow or ice under the shoe, particularly under the heel, sufficed for effecting a premature response of the device.

The present invention may be correctly adjusted even by an inexperienced skier to his shoes and to his weight, without having to rely on touch when regulating the loading of the spring and the length of the release path. Moreover it has been found that the force-path characteristic of the compression spring 7, the maximum utilised compression path of which is, e.g., 15 millimetres, approaches linearity better than that of the previously used tension springs of comparative size.

While I have herein described and illustrated in the accompanying drawing what may be considered a typical and particularly useful embodiment of my said invention, I wish it to be understood, that I do not limit myself to the particular details and dimensions described and illustrated; for obvious modifications will occur to a person skilled in the art.

What I claim as my invention and desire to secure by Letters Patent is:

1. A safety device for ski-attachments adapted to automatically detach itself upon a predetermined overload, comprising in combination: a base plate attached to the ski having longitudinal guides, a sleeve having an integral guide shoe slidably mounted in said guides, a toggle lever arrangement including a forward buckle lever pivotally mounted on said sleeve and a cable clamp member pivotally connected to said buckle lever, a threaded bolt extending into said sleeve having one end adjustably connected to said base plate, an adjustable nut on the other end of said bolt forming a non-rotatable abutment member, a spring on said bolt enclosed within said sleeve having one end abutting said sleeve and the other end engaging said nut, the loading of said spring being determined by the adjustment of said nut along said bolt, said sleeve being provided with a longitudinal aperture on the edge of which is a scale with which said nut is adapted to register to indicate the position of the latter relative to the sleeve, a ramp connected with said bolt for longitudinal movement relative to said sleeve, an actuating collar on said bolt adapted to be rotated therewith to adjust the loading of said spring and the adjustment of said ramp, and a clamp engaging release member connected with said clamp member in operative juxtaposition with said ramp, said release member being adapted to release said clamp member when the pull exerted thereon exceeds a predetermined loading of said spring and moving upwardly along said ramp after a predetermined release path and opening said toggle lever arrangement.

2. A safety device for ski-attachments adapted to automatically detach itself upon a predetermined overload, comprising in combination: a base plate affixed to the ski, longitudinal guide ribs on said base plate, a sleeve having an integral guide shoe slidably mounted in said guide ribs, a toggle lever arrangement including a forward buckle lever pivotally connected on said sleeve and a cable clamp member pivotally connected to said buckle lever, a threaded bolt projecting into said sleeve and slidably mounted therein, an adjustable nut on the end of said bolt within said sleeve forming a non-rotatable abutment member, a spring on said bolt enclosed in said sleeve having one end abutting said sleeve and the other end engaging said abutment, the loading of said spring being determined by the adjustment of said nut along said bolt, the other end of said bolt being adjustably connected to said base, a plate member slidably mounted relative to said base having a ramp portion at one end in juxtaposition to said clamp member and provided at its other end with an upturned fork, a collar arranged on said threaded bolt forward of said sleeve having an annular groove receiving said fork and having radial recesses for turning said bolt about its axis, said sleeve being provided with a longitudinal aperture on the edge of which is a scale with which said nut is adapted to register to indicate the position of the latter relative to the sleeve, and a clamp engaging release member connected with said clamp member in operative juxtaposition with said ramp, said release member being adapted to release said clamp member when the pull exerted thereon exceeds a predetermined loading to open said toggle lever arrangement, adjustment of said bolt by said collar simultaneously adjusting the loading of said spring and the position of said ramp relative to said clamp engaging release member.

3. A safety device for ski-attachments adapted to automatically detach itself upon a predetermined overload, comprising in combination: a base plate affixed to the ski, longitudinal guide ribs on said base plate, a sleeve having an integral guide shoe slidably mounted in said guides, a toggle lever arrangement including a forward buckle lever pivotally mounted on said sleeve and a cable clamp member pivotally connected to said buckle lever, a threaded bolt extending into said sleeve with its outer end adjustably connected to said base plate, said bolt being slidably mounted in said sleeve, an adjustable nut on the end of said bolt within said sleeve forming a non-rotatable abutment member, a spring on said bolt enclosed

in said sleeve having one end abutting said sleeve and the other end engaging said abutment, the loading of said spring being determined by the adjustment of said nut along said bolt, a plate member slidably mounted relative to said base having a ramp portion at one end in juxtaposition to said clamp member and provided at its other end with an upturned fork, a collar secured to said threaded bolt forward of said sleeve having an annular groove receiving said fork and having radial recesses for turning said bolt about its axis, said sleeve being provided with a longitudinal aperture on the edge of which there is provided a scale adapted to register with said abutment to indicate the position of the latter relative to the sleeve, said buckle lever being provided with an aperture through which in its closed position of said buckle lever said collar is visible, allowing the adjustment thereof to a predetermined position defining the same release path for any selected preloading of said spring, and a clamp engaging release member connected with said clamp member in operative juxtaposition with said ramp, said release member being adapted to release said clamp member when the pull exerted thereon exceeds a predetermined loading to open said toggle lever arrangement, adjustment of said bolt by said collar simultaneously adjusting the loading of said spring and the longitudinal position of said ramp relative to said base plate.

4. A safety device for ski-attachments adapted to automatically detach itself upon a predetermined overload, comprising in combination: a base plate affixed to the ski, longitudinal guide ribs on said base plate, a sleeve having an integral guide shoe slidably mounted in said guides, a toggle lever arrangement including a forward buckle lever pivotally mounted on said sleeve and a cable clamp member pivotally connected to said buckle lever, a threaded bolt extending into said sleeve with its outer end adjustably connected to said base plate, said bolt being slidably mounted in said sleeve, an adjustable nut on the end of said bolt within said sleeve forming a non-rotatable abutment member, a spring on said bolt enclosed in said sleeve having one end abutting said sleeve and the other end engaging said abutment, the loading of said spring being determined by the adjustment of said

nut along said bolt, a plate member slidably mounted relative to said base having a ramp portion at one end in juxtaposition to said clamp member and provided at its other end with an upturned fork, a collar secured to said threaded bolt forward of said sleeve having an annular groove receiving said fork and having radial recesses for turning said bolt about its axis, said sleeve being provided with a longitudinal aperture on the edge of which there is provided a scale adapted to register with said abutment to indicate the position of the latter relative to the sleeve, said buckle lever being provided with a cross-shaped aperture having transverse portions through which when said buckle lever is in its closed position the annular groove of said collar is visible and is adjustable to coincide with the transverse arms of said cross-shaped lever, the adjustment of said collar to a predetermined position defining the same release path for any selected preloading of said spring, and a ramp engaging release member connected with said clamp member in operative juxtaposition with said ramp, said release member being adapted to release said clamp member when the pull exerted thereon exceeds a predetermined loading to open said toggle lever arrangement, the adjustment of said bolt longitudinally by said collar simultaneously adjusting the loading of said spring and the position of said ramp relative to said base plate member.

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