Dec. 12, 1961 J. J. A. BEYL 3,012,793

SKI-BINDER SAFETY CABLE-ADJUSTER

Filed March 9, 1960 4 Sheets-Sheet 1

Fig. 1

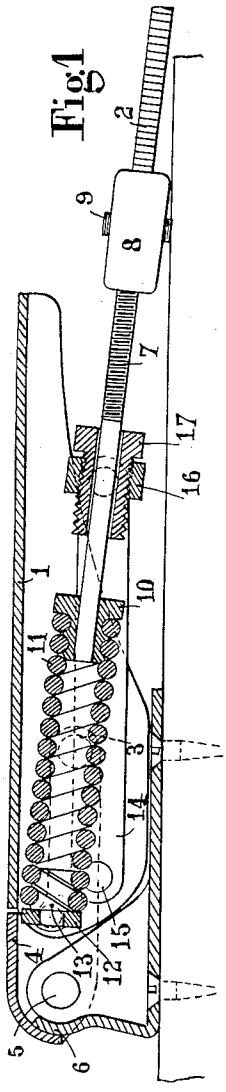


Fig. 2

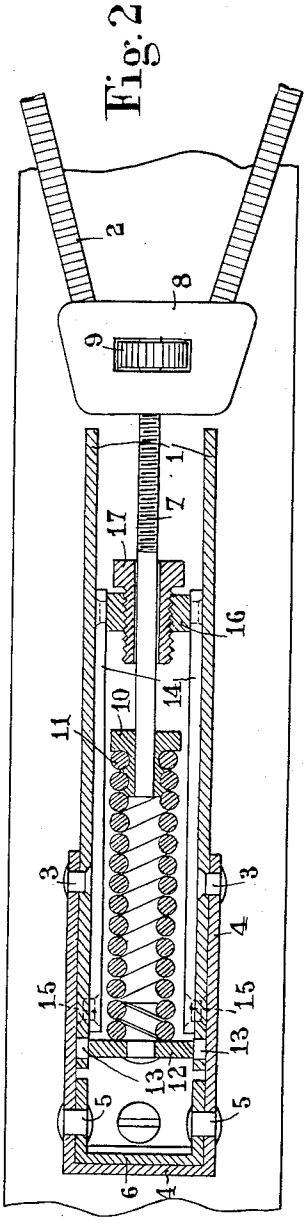
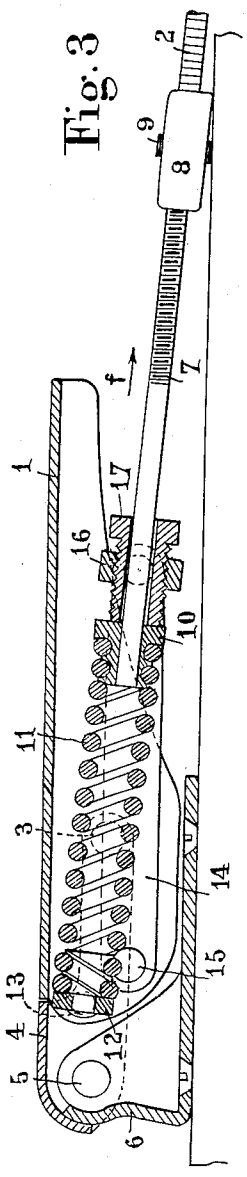


Fig. 3



INVENTOR.
JEAN JOSEPH ALFRED BEYL

BY Berman & Berman

ATTORNEYS

Dec. 12, 1961 J. J. A. BEYL 3,012,793

SKI-BINDER SAFETY CABLE-ADJUSTER

Filed March 9, 1960 4 Sheets-Sheet 2

Fig. 4

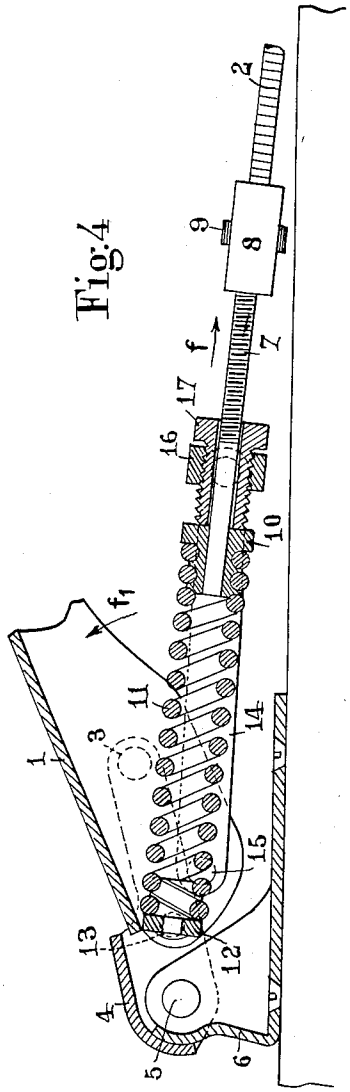


Fig. 5

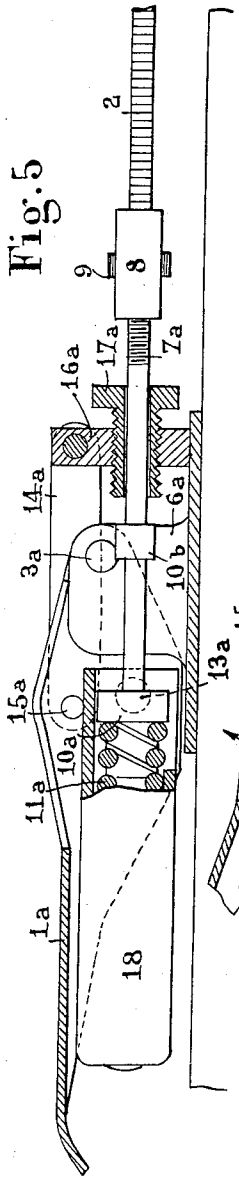
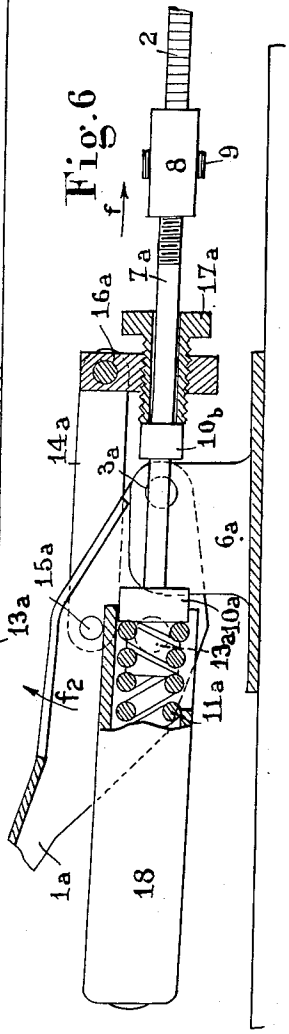


Fig. 6



INVENTOR.
JEAN JOSEPH ALFRED BEYL
BY Bierman + Bierman

ATTORNEYS

Dec. 12, 1961 J. J. A. BEYL 3,012,793

SKI-BINDER SAFETY CABLE-ADJUSTER

Filed March 9, 1960 4 Sheets-Sheet 3

Fig. 7

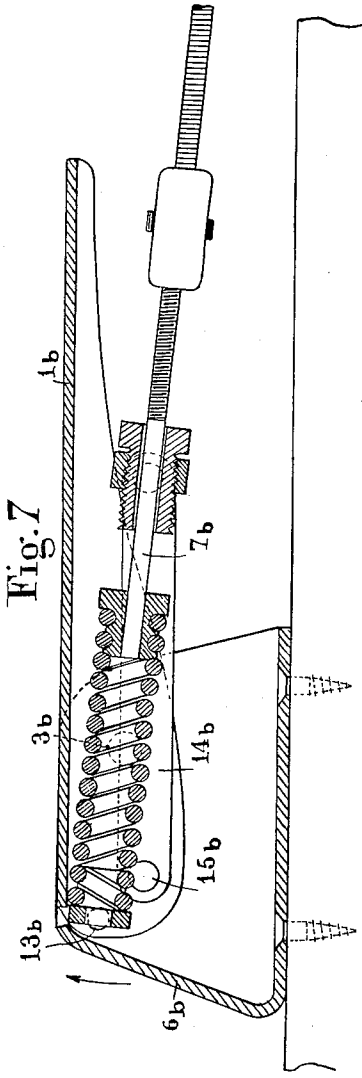
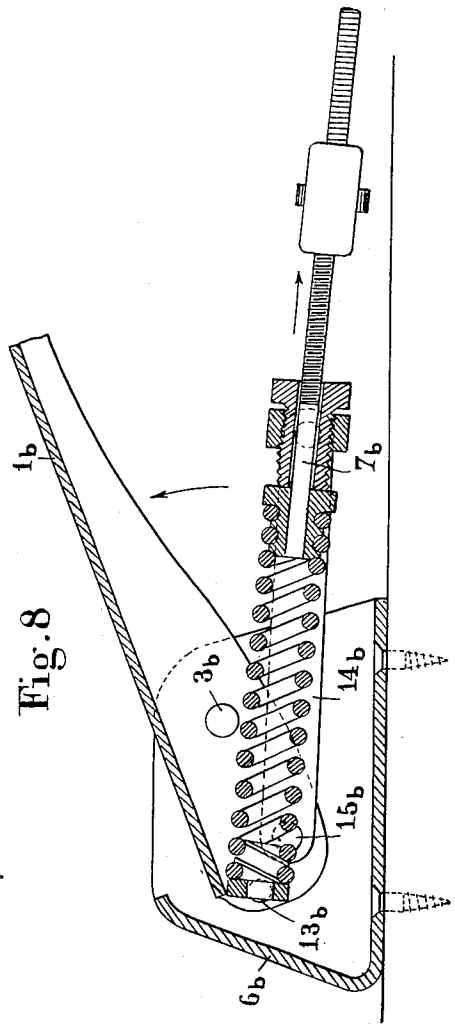


Fig. 8



INVENTOR.
JEAN JOSEPH ALFRED BEYL
BY Bierman & Bierman

ATTORNEYS

Dec. 12, 1961 J. J. A. BEYL 3,012,793

SKI-BINDER SAFETY CABLE-ADJUSTER

Filed March 9, 1960 4 Sheets-Sheet 4

Fig. 9

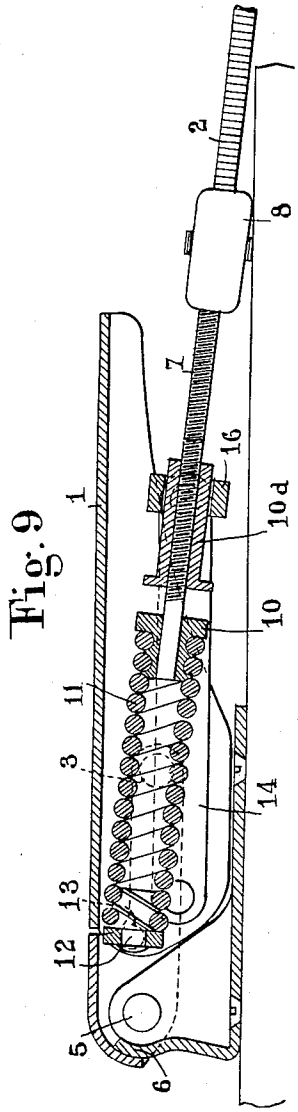
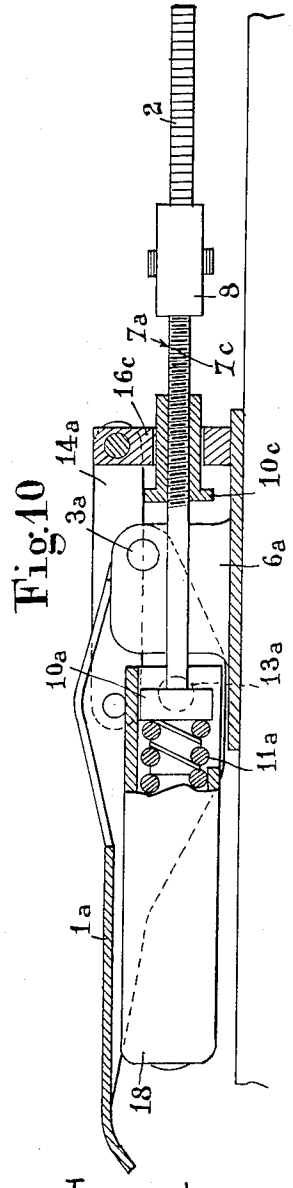


Fig. 10



Inventor
Jean J. A. Beyl
by
Bierman & Bierman
Attorneys

United States Patent Office

3,012,793
Patented Dec. 12, 1961

3,012,793

SKI-BINDER SAFETY CABLE-ADJUSTER

Jean Joseph Alfred Beyl, Rue des Champ Ferrant, Nevers (Nievre), France

Filed Mar. 9, 1960, Ser. No. 13,837
9 Claims. (Cl. 280—11.35)

This invention relates to ski binders and has specific reference to safety cable-adjusters for ski binders, that is, devices for tensioning the binding cable which, in certain types of ski binders, fits around the ski boot and holds the front end of the boot in a yoke or strap, or against a safety abutment adapted to release the front end of the boot in case of abnormal torsional stress. This cable-adjuster is of the type comprising a pivoting control lever on which is pivoted in turn a cable tensioning member, this last-mentioned pivotal mounting being effected on a fulcrum adequately positioned with respect to the pivot axis of said lever with due consideration for the permissible direction of movement of this lever, so that the latter is maintained with a certain resilient force in its cable-tensioning position by the spring provided for exerting this tension.

More particularly, this invention is concerned with a cable-adjuster of the type broadly set forth hereinabove, which is adapted to release the boot-retaining cable in case of forward fall of the skier in order to release the heel and therefore act as a safety device adapted to avoid the serious consequences likely to arise in case of forward fall when the skier's heel is locked in position on the ski. Of course, many safety devices of this character have already been proposed. However, some of these known propositions are of relatively complicated construction. Moreover and more particularly, it is scarcely possible with most cable-adjusters of known designs to effect a separate adjustment of the conditions of operation of the safety system incorporated therein, notably in case of forward fall, and also of the conditions in which the safety cable is tensioned, for these adjustments react with each other, thereby involving delicate and long trial-and-error operations for properly altering the two adjustments, and in addition the final result is not always very accurate and reliable.

Under these circumstances it is the object of the present invention to provide a safety cable-adjuster for ski binder which is characterized by a relatively simple design and construction affording a separate and independent adjustment of the conditions of operation respectively of the safety device and of the cable tensioning conditions.

To this end, the cable-adjuster according to this invention is characterized essentially in that it comprises one or two links pivotally mounted on the control lever at a predetermined location thereof which, with respect to the fulcrum axis of said control lever, is opposite to the pivot axis of the cable tensioning member; coupling means are provided on this cable tensioning member and on the free ends of said pivoted links so that in case of considerable tractive effort transmitted via the fixation cable to the rear, said cable tensioning member, after a predetermined free stroke, may act upon the free ends of said pivoted links and cause same to exert a pull on said control lever, whereby, due to the specific position of the point of application of the tractive effort on said control lever, the latter may be lifted and thus caused to release the boot-retaining cable.

In order to afford a clearer understanding of this invention and of the manner in which the same may be carried out in practice, reference will now be made to the accompanying drawings forming part of this specification and illustrating diagrammatically by way of example a few forms of embodiment of the invention. In the drawings:

FIGURES 1 and 2 are a vertical section and a horizontal section, respectively, of a first form of embodiment of the cable-adjuster of this invention;

FIGURES 3 and 4 are vertical sections of the same device which show the relative positions of the component elements thereof during two successive steps of its operation as a safety device;

FIGURE 5 is a vertical section of another form of embodiment of a cable-adjuster according to this invention;

FIGURE 6 is a similar view of the cable-adjuster which illustrates the relative positions of the component elements thereof during its operation as a safety device;

FIGURES 7 and 8 are similar views showing a modified form of embodiment of the cable-adjuster of FIGS. 1 to 4 of the drawings, and

FIGURES 9 and 10 are vertical sectional views showing two modifications of the cable adjuster.

The cable-adjuster for ski binder which is illustrated in FIGS. 1 to 4 of the drawings comprises a control lever **1** adapted to be lowered to the rear for tensioning a fixation cable **2** adapted to fit around the boot to be fastened. This lever is pivotally mounted about a pair of pivot pins **3** carried by the two flanges or side walls of a strap **4** pivoted in turn about pivot pins **5** carried by a bottom plate or support **6** secured on the upper face of the ski. The device for tensioning the cable **2** comprises a rod **7** on which the cable is anchored by means of a mechanism for adjusting the cable position, this mechanism consisting for example of a member **8** slidably mounted on the rod **7** and adjustable longitudinally thereto by screwing in one or the other direction a nut **9** engaging a threaded portion of the rod **7**.

The inner end of this rod carries a socket **10** rigid with the rear end of a relatively strong traction coil spring **11** having its front end carried by a transverse plate **12** pivoted on trunnions **13** engaging corresponding holes formed in the control lever ahead of its fulcrum pin **3**. Thus, the traction rod **7** of the boot-retaining cable **2** is somewhat fulcrumed indirectly on the lever **1** about the trunnions **13** through the medium of the relatively strong coil spring **11**.

As will be readily understood from the foregoing the cable **2** is tensioned by turning the control lever **1** to the rear, since this movement will move the trunnions **13** forwards. It may be noted that in the cable-tensioning position (see FIG. 1) these trunnions **13** lie at a level higher than that of the fulcrum of the control lever **1** proper. Thus, this lever is resiliently held in this position by the cable-tensioning spring **11** and cannot be raised normally unless the control lever **1** is moved manually against the resistance of the tension spring **11**.

However, and according to an essential feature of this invention, two links **14** are pivotally mounted on the control lever **1** by means of pivot pins **15** located ahead of the fulcrum **3** and opposite to the trunnions **13** with respect to this fulcrum, therefore at a level lower than that of fulcrum **3**. The rear ends of links **14** are pivotally mounted on a nut **16** constituting a distance-piece and having screwed therein a threaded socket **17** slidably engaged by the rod **7** attached to the cable **2**.

During the movement for tensioning the boot-retaining cable **2** and during the normal operation accomplished for releasing this cable, the rod **7** slides freely through the threaded socket **17** in one and the other direction, and the links **14** do not interfere whatsoever with the normal operation of the cable-adjuster.

However, if as a consequence for example of a forward fall of the skier the latter raises abnormally the heel portion of his or her boot, a considerable tractive effort is applied to the cable **2** in the direction of the arrow *f*, and the rod **7** is pulled backwards against the spring **11** until the socket **10** abuts against the threaded socket **17** (see FIG. 3). From this moment on the tractive effort transmitted from the cable **2** is applied to the nut **16** and links **14**, these links **14** transmitting in turn this effort to the control lever **1** at their pivot points **15** thereon. Due to the specific position of these pivot points below the level of the pivot pins **3** of the control lever, this tractive effort will raise immediately the control lever **1** in the direction of the arrow f_1 (FIG. 4), thereby releasing the cable **2** and consequently the heel portion of the skier's boot.

With this improved cable-adjuster the detrimental consequences of a forward fall are avoided and the device acts as a safety means operating in a trouble-free, reliable manner. It may be emphasized that the structure of the device is particularly simple. However, its essential advantage resides in the independence of the means provided for adjusting on the one hand the tension of cable **2** and on the other hand the safety system. As already explained hereinabove, the tension of cable **2** may be adjusted at will by simply moving the member **8** in which the rear end of rod **7** is anchored, this movement being obtained by rotating the nut **9** in one or the other direction. Of course, these cable tension adjustment means operating through the modification of the position of the front end of the cable **2** may be replaced by any other suitable means.

Regarding the adjustment of the conditions of operation of the safety device, this may be obtained very simply by screwing more or less the threaded socket **17** left or right in the nut **16** in order to alter at will the position of the abutment member constituted by this socket, and therefore the amplitude of movement of the rod **7** which is necessary for transmitting the tractive effort of the cable **2** to the links **14** for raising the control lever **1**. This adjustment may also be effected to the desired degree by the skier with a view to cause the cable release upon a more or less pronounced movement of the heel away from the ski surface. Of course, the adjustment should be such that in the cable-tensioning position there is always a gap left between the sockets **10** and **17**, and that the resilient adjuster may withstand minor efforts, within the normal range of tractive efforts consistent with normal skiing conditions, without prematurely operating the device by releasing the cable in any inopportune manner.

FIGURES 5 and 6 of the drawings illustrate another form of embodiment of the safety cable-adjuster of this invention. In this embodiment the control lever **1***a* of the cable-adjuster is adapted to be turned forwards for tensioning the boot-retaining cable. This lever is fulcrumed directly on a bottom support **6***a* by means of pivot pins **3***a* carried thereby. The rod **7***a* for pulling the cable **2** carries on its front end a block **10***a* rigid with the rear end of a relatively strong traction coil spring **11***a* having its front end anchored to the bottom of a cylinder **18** pivotally mounted in the lever **1***a* by means of side trunnions **13***a* carried by said cylinder and engaging the side walls of the lever **1***a*.

Considering the direction of the pivotal movement of this control lever **1***a* these trunnions **13***a*, which lie ahead of the pivot pins **3***a*, are disposed at a lower level than these pins **3***a* and therefore the control lever **1***a* is normally held by a resilient force in a cable-tensioning position resulting from the interposition of the traction spring **11***a* (see FIGURE 5).

According to this invention, the cable-adjuster comprises in addition a pair of links **14***a* having their front ends pivotally mounted on the lever **1***a* by means of pivot pins **15***a* disposed forwards and on the side opposite to that of the aforesaid trunnions **13***a*, therefore above these trunnions. The rear ends of links **14***a* are pivotally mounted on a nut **16***a* of which the lower end rests normally on the upper face of the bottom plate or support **6***a*. The tapped hole of this nut is engaged by a threaded socket **17***a* formed with a plain longitudinal bore through which extends freely the cable tensioning rod **7***a* formed with a shouldered portion or collar **10***b* adapted to engage endwise the aforesaid threaded socket **17***a*.

Thus, in case of forward fall of the skier the cable **2** exerting a substantial tractive effort on the rod **7***a* in the direction *f* will cause the shoulder or collar **10***b* to engage the threaded socket **17***a*. From this moment on the tractive effort is transmitted to the links **14***a* and through these to the control lever **1***a* at **15***a*, thus causing this lever to rotate in the direction of the arrow f_2, and thus the boot-retaining cable is released.

Of course, the conditions of operation of the safety device may be adjusted very easily and with the maximum precision by simply moving the abutment consisting of the threaded socket **17***a*, that is, by turning this socket in the nut **16***a* in one or the other direction. If desired, the threaded socket **17***a* may be dispensed with, and in this case the shoulder or collar **10***b* is replaced by a member longitudinally adjustable along the rod **7***a*, for example in the form of a nut **10***c* screwed on a threaded portion **7***c* of this rod and adapted to abut directly against the distance piece **16***c* between the rear ends of links **14***a* (see FIG. 10). Again, in the form of embodiment illustrated in FIGURES 1 to 4 of the drawings the threaded socket **17** may be dispensed with and in this case a longitudinally adjustable member, such as nut **10***d*, is provided on the rod **7** for bearing directly against the distance piece **16** (see FIG. 9) instead of the socket **10** which engages the threaded socket **17**.

On the other hand, it will be readily understood that the present invention should not be construed as being limited to the forms of embodiments shown and described herein, as many modifications and alterations may be brought thereto without departing from the spirit and scope of the invention. Thus, the cable traction member may consist, instead of a rod, of a pivoted link or a yoke also pivoted on the control lever. The pair of links **14** or **14***a* through which the lever-raising movement is transmitted may be replaced by a single link having the same function. As to the coupling means between the rod (or other member for pulling the traction cable **2**) and the rear end of said link or links, they may also differ from those illustrated, provided that they permit the proper adjustment of the free movement of the rod or other traction member before this coupling.

On the other hand, in the case of a device wherein the control lever is adapted to pivot rearwardly, this lever **1***b* may also be pivoted directly on a transverse axis consisting of a pivot pin mounted directly on the bottom plate or support **6***b*, the intermediate strap **4** being dispensed with (see FIGURES 7 and 8 of the drawings). In this case, however, the bottom plate or support **6***b* should be higher than in the form of embodiment shown in FIGURES 1 to 4, in order to permit the upward movement of the control lever. In this alternate embodiment the mounting and relative positions of the different component elements (links **14***b*, pivot pins **15***b* thereof, pivot pin or trunnions **13***b* of the traction rod **7***b*) are identical with those of the form of embodiment shown in FIGURES 1 to 4. The operation is also identical therewith (see FIG. 8).

What I claim as new is:

1. A safety cable-adjuster for a cable type ski binder, comprising a support adapted to be secured on a ski top, a control lever pivotally mounted on pivot pins carried by

said support, said control lever being adapted to be folded against said support on the side opposite to the boot-retaining cable, a cable-pulling member including a cable tensioning spring pivotally mounted on said control lever at a fulcrum point remote from said pivot pins of said control lever, said fulcrum point being nearer to said support than are said pivot pins when said control lever is folded against said support on the side opposite to said boot-retaining cable, at least one link having one end pivotally mounted on said control lever at a pivot point more spaced from said support than are said pivot pins when said control lever is folded against said support on the side opposite to said boot-retaining cable said fulcrum point and said pivot point being on the side of said pivot pins opposite to said cable when said lever is folded against said support, complementary coupling means provided on said cable-pulling member and on the other end of said link said means being on the cable side of said pivot pins, said means being adapted to provide a coupling action between said cable-pulling member and said one end of said link, after said cable-pulling member has accomplished a free movement under the influence of a tractive effort, whereby, due to said coupling action, said link may exert on said control lever a traction causing same to pivot and to move away from said support in order to release said cable.

2. A safety cable-adjuster for a cable type ski binder, comprising a support adapted to be secured on a ski top, a control lever pivotally mounted on pivot pins carried by said support, said control lever being adapted to be folded down against said support on the side pointing towards the boot-retaining cable, a cable-pulling member including a cable tensioning spring pivotally mounted on said lever at a point spaced from said pivot pins and more spaced from said support than are said pivot pins when said control lever is folded down against said support on the side pointing towards said cable, at least one link having one end pivotally mounted on said control lever at a point nearer to said support than are said pivot pins of said control lever when said control lever is folded down against said support on the side pointing toward said cable said fulcrum point and said pivot point being on the side of said pivot pins opposite to said cable when said lever is folded against said support, complementary coupling means provided on said cable-pulling member and on the other end of said link said means being on the cable side of said pivot pins, said means being adapted to provide an operative connection between said cable-pulling member and said first-named end of said link after said cable-pulling member has performed a free movement under the influence of a tractive effort, whereby, on account of the aforesaid coupling means, said link may exert on said control lever a traction adapted to cause same to pivot and move away from said support with a view to release said cable.

3. A safety cable-adjuster for a cable type ski binder, comprising a bottom support adapted to be secured on a ski top, a member mounted for tilting movement on said support, a control lever pivotally mounted on pivot pins carried by said tilting member and adapted to be folded down against said bottom support on the side pointing towards the boot-retaining cable, a cable-pulling member including a cable tensioning spring pivotally mounted on said control lever at a point spaced from said pivot pins and more remote from said bottom support than are said pivot pins when said control lever is folded down against said bottom support on the side pointing towards said boot-retaining cable, at least one link having one end pivoted on said control lever about a fulcrum nearer to said bottom support than are said pivot pins when said control lever is folded down against said bottom support on the side pointing towards said cable said fulcrum point and said pivot point being on the side of said pivot pins opposite to said cable when said lever is folded against said support, complementary coupling means provided

on said cable-pulling member and on the other end of said pivoted link said means being on the cable side of said pivot pins, said means being adapted to provide an operative connection between said cable-pulling member and said end of said pivoted link after said cable-pulling member has performed a free stroke under the influence of a tractive effort, whereby, due to said coupling means, said pivoted link may exert on said control lever a traction adapted to cause same to pivot and move away from said bottom support, thereby releasing said boot-retaining cable.

4. A safety cable-adjuster for a cable type ski binder, comprising a support adapted to be secured on a ski top, a control lever pivotally mounted on pivot pins carried by said support and adapted to be folded down thereagainst on the side opposite to the boot-retaining cable, a cable-pulling rod, a tension spring between said lever and the end of said rod remote from said cable, said spring being pivotally mounted on said control lever about a fulcrum spaced from said pivot pins and nearer to said support than are said pivot pins when said control lever is folded down against said support on the side opposite to said boot-retaining cable, a pair of parallel links each having a first end pivotally mounted on the control lever at a point more remote from said support than are the pivot pins of said control lever when said control lever is folded down against said support on the side opposite to said boot-retaining cable said fulcrum point and said pivot point being on the side of said pivot pins opposite to said cable when said lever is folded against said support, a distance-piece disposed between the ends of said links which are opposite to those mounted on said control lever said distance piece being on the cable side of said pivot pin, a perforation formed in said distance-piece and receiving said cable-pulling rod in free sliding engagement, a projection on said rod, said projection being adapted to bear against said distance-piece.

5. A safety cable-adjuster as set forth in claim 4, wherein the position of said projection on said cable-pulling rod is adjustable along said rod.

6. A safety cable-adjuster as set forth in claim 4, wherein a socket adapted to be adjusted in the axial direction is mounted in said perforation of said distance-piece between said two links, said cable-pulling rod being slidably engaged in said socket.

7. A safety cable-adjuster for a cable type ski binder, comprising a support adapted to be secured on a ski top, a member mounted for tilting movement on said support, a control lever pivotally mounted on pivot pins carried by said tilting member and adapted to be folded down against said support on the side pointing towards the boot-retaining cable, a cable-pulling rod, a tension spring between said lever and the end of said rod remote from said cable, said spring being pivotally mounted on said control lever at a point spaced from said pivot pins of said control lever, said point being more remote from said support than are said pivot pins when said control lever is folded down against said support on the side pointing towards said boot-retaining cable, a pair of parallel links having one end pivotally mounted on said control lever about a fulcrum nearer to said support than are said pivot pins of said control lever when said control lever is folded down against said support on the side pointing towards said boot-retaining cable said fulcrum point and said pivot point being on the side of said pivot pins opposite to said cable when said lever is folded against said support, a distance-piece interconnecting those ends of said links which are opposite to those mounted on said control lever said distance piece being on the cable side of said pivot pin, a perforation formed in said distance-piece and receiving in free-sliding engagement said cable-pulling rod, a projection carried by said rod and adapted to bear against said distance-piece between said two links.

8. A safety cable-adjuster as set forth in claim 7, wherein the position of said projection on said cable-pulling rod is adjustable along said rod.

9. A safety cable-adjuster as set forth in claim 7, wherein a longitudinally adjustable socket is mounted in said perforation of said distance-piece between said links, said cable-pulling rod being slidably and freely engaged in said socket.

References Cited in the file of this patent

UNITED STATES PATENTS

2,176,226	Reed	Oct. 17, 1939
2,793,046	Eckel	May 21, 1957

FOREIGN PATENTS

840,647	France	Jan. 23, 1939
538,351	Italy	Jan. 23, 1956