TENSIONING DEVICE FOR SKI BINDINGS

Filed March 6, 1964 2 Sheets-Sheet 1

FIG. 1

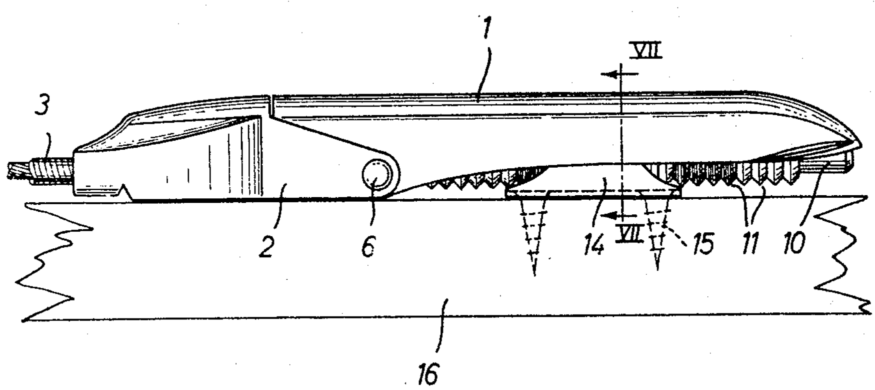


FIG. 2

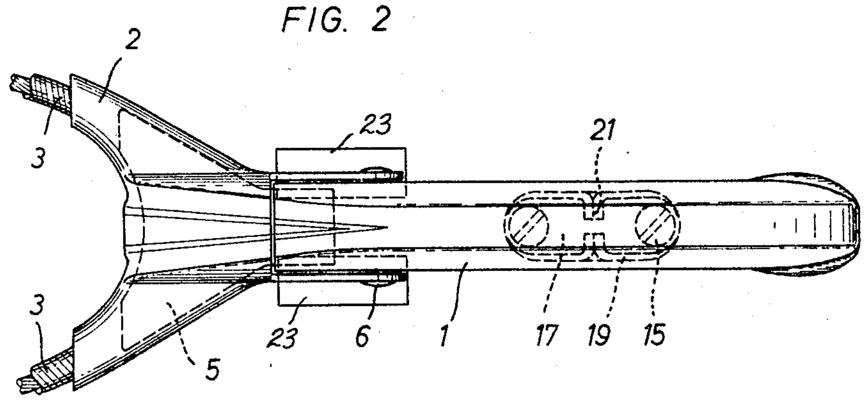


FIG. 6

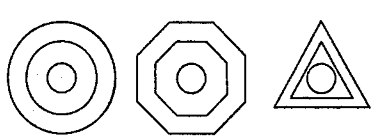
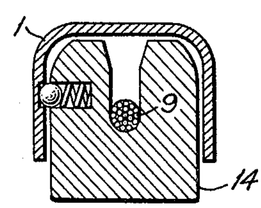


FIG. 7



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Filed March 6, 1964 2 Sheets-Sheet 2

FIG. 3

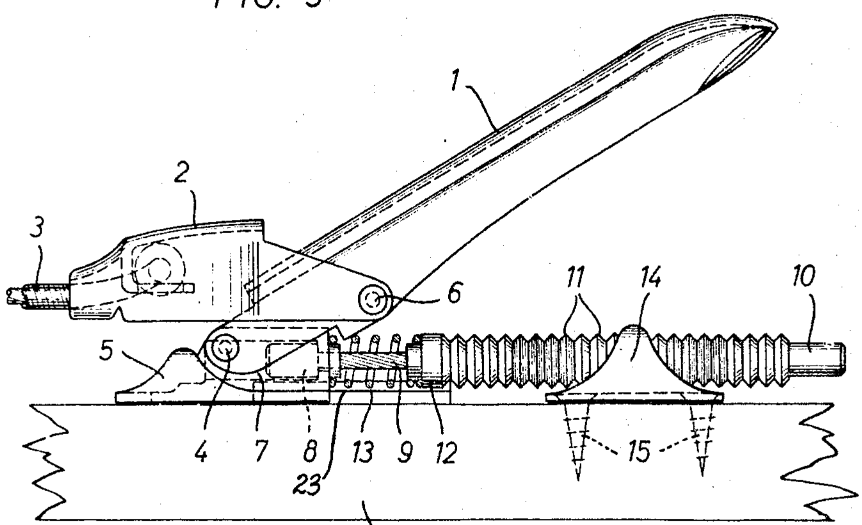


FIG. 4

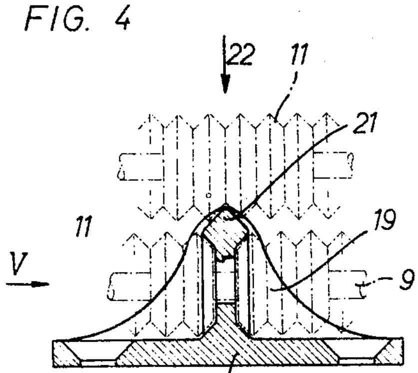
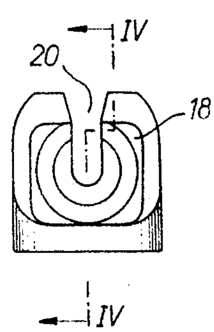


FIG. 5



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TENSIONING DEVICE FOR SKI BINDINGS

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M 56,142
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In the known front tighteners for ski bindings, a relatively long threaded bolt extends forwardly from the bracket which is movable in the longitudinal direction of the ski and carries the tightener lever. This bolt extends through a retaining bracket secured to the ski and is supported against the retaining bracket by a nut in threaded engagement with the bolt. A screwed adjustment of the nut enables an adjustment of the tightener in the longitudinal direction of the ski for adjustment of the binding to different shoe sizes or different cable tensions.

The known tighteners have various disadvantages. It is very difficult and in many cases impossible to turn the nut on the adjusting bolt merely with the fingers when it is very cold, particularly when snow or ice adhere to the tightener. Besides, the threaded bolt is fairly susceptible to external action, such as impact or the like, which is often inevitable during skiing and the manipulation of the skis. When the threaded bolt is only slightly bent or when a single thread turn has been squeezed, the adjusting bolt can no longer serve its function. Continual shakes, such as occur when the skis are being carried on a luggage carrier on the roof of a car, may result in an unintended rotation of the nut so that the setting of the tightener is varied or the nut may even be lost. Besides, the adjustment of the known tighteners is relatively troublesome, particularly when a relatively large adjustment, e.g., by a plurality of shoe sizes is required.

In a front tightener for ski bindings, in which the tightener lever is pivoted to a bracket, which is adjustable in the longitudinal direction of the ski, and from which bracket an adjusting element extends forwardly, which bears on a retaining bracket secured to the ski, these disadvantages are avoided according to the invention in that the adjusting element has a number of supporting discs or the like, which are capable of a limited displacement on the adjusting element in the axial direction of the latter, and that the adjusting element has at its front end an abutment, the retaining bracket is provided with a groove having a width which is larger than the diameter of the adjusting element and smaller than the diameter of the supporting discs, and the retaining bracket is further provided with means for detachably retaining the adjusting element. In a development of the invention, the adjusting element may consist of a wire cable and carry at its front end a supporting nipple. It is particularly suitable if the supporting discs are double-frustoconical and that wall of the retaining bracket which is at right angles to the longitudinal direction of the ski and formed with the groove has a frustoconical recess at least on its front face. A helical compression spring may be disposed between the rearmost supporting disc and the bracket which carries the tightener lever.

It is apparent that the supporting discs mounted on the adjusting element for a limited movement co-act with the retaining bracket to enable a particularly simple adjustment of the position of the tightener in the longitudinal direction of the ski. A prolonged turning of a mitted from the tightener to the retaining bracket by

element with the supporting discs may be removed from the groove of the retaining bracket and may be inserted into the same at any desired other point. As a result, two adjacent supporting discs will be forced apart and the tensile force exerted upon the tightener will be transmitted from the tightener to the retaining bracket by means of the adjusting element, its front abutment, and the supporting discs disposed between the front abutment and the retaining bracket. This force will be effective as a compressive force between the abutment and the retaining bracket. As the supporting discs may have any desired thickness, an adjustment in very fine steps is enabled without involving an increase in the time required for adjustment. The susceptible threaded bolt, which can no longer be operated by hand after the slightest damage, has been eliminated. A spontaneous change of the setting as a result of shakes and the like is no longer possible. Besides, the assembly is greatly facilitated because the retaining bracket can easily be mounted as a separate part of the tightener.

If the adjusting element consists of a wire cable, which carries a supporting nipple at its front end, any damage to the adjusting element will be virtually precluded because the element can yield to any external action. The flexibility of the wire cable greatly facilitates its removal from and insertion into the retaining bracket. The flexible design of the adjusting element has the further advantage that any ice covering which may have formed will readily be broken during the adjustment. If the supporting discs are double-frustoconical, as has been mentioned above, and that wall of the retaining bracket which is formed with the groove has a frustoconical recess, a particularly simple retention of that supporting disc which engages the bracket will be achieved. During the insertion into the groove, the supporting discs must be widely spaced apart and will then snap into the recess which is provided at least on the front face so that the discs can no longer detach spontaneously, particularly if the above-mentioned helical compression spring is arranged between the rearmost supporting disc and the bracket which carries the tightener lever.

In a development of the invention, successive groups of supporting discs may have different features. These different features may consist, e.g., of different colors, different forms of the rims, or the like, and greatly facilitate the adjustment because they result in a clear arrangement of the entire adjusting range. The various groups may correspond each, e.g., to a shoe size.

The wire cable may have at its rear end a cylindrical nipple, which can be introduced through a corresponding opening of the bracket which carries the tightener lever into a guide bore, which is formed in this bracket and the front end of which is provided with a constriction for retaining the nipple. In this way, a reliable retention of the adjusting element on the tighener bracket is ensured in such a manner that the adjusting element is parallel to the axis. The bracket which carries the tightener lever need not be guided on the ski. If it is not guided, its bottom face has suitably rearwardly flaring extensions. Alternatively, the bracket carrying the tightener lever may be guided in known manner in a sliding guide secured to the ski.

Finally, the returning bracket may contain according to the invention a spring-loaded detent ball, which coacts with a longitudinal groove formed in the inner side wall of the tightener lever so that the tightener lever is effectively locked against an unintended opening.

Further features of the invention will be explained hereinafter with reference to the drawing, which shows an embodiment by way of example. In the drawing

FIG. 1 is a side elevation showing the front tightener according to the invention in closed position.

FIG. 2 is a top plan view showing the tightener of FIG. 1 the retaining bracket below the tightener lever being indicated by broken lines.

FIG. 3 shows the front tightener according to the invention in a partly open condition.

FIG. 4 is a detail sectional view taken on line IV—IV of FIG. 5 and showing the retaining bracket and a portion of the adjusting element with the supporting discs shortly before their insertion into the retaining bracket and in the supporting position on the retaining bracket.

FIG. 5 shows the retaining bracket in an elevation taken in the longitudinal direction of the ski.

FIG. 6 illustrates plan views of typical shapes for the supporting elements which may be used for coding.

FIG. 7 illustrates a section taken along line 7—7 of FIG. 1.

Pivoted to the tightener lever **1** is a yokelike tension member **2**, which carries the tension cable **3**. The tightener lever **1** is pivoted by a pin **4** to a bracket **5**. In the closed position of the tightener, the pin **4** lies above the pivot points **6** of the tension element **2**. In the embodiment shown by way of example, the bracket **5** shown in broken lines in FIG. 2 has a supporting surface, which flares rearwardly in triangular configuration and is not connected to the ski by screws or the like. Alternatively, the bracket **5** may be guided in a sliding guide **23** known per se.

The bracket **5** has an open-topped opening **7**, which opens into a vertical groove in the front face of the bracket **5**. This groove is not apparent from the drawing. The opening **7** has a borelike portion, which is formed with a constricted front end and accommodates a nipple **8** carrying a flexible steel wire cable **9**. The cable **9** is provided at its front end with a supporting nipple **10**. Supporting discs **11** are arranged on the cable **9** like beads on a string. This means that the discs are not connected to each other. The discs are urged forwardly towards the supporting nipple **10** by a helical spring **13**, which is provided between the bracket **5** and the rearmost supporting disc **12**, which is reinforced. As is apparent from the drawing, each group of four supporting discs **11** differs in color from the succeeding group of four.

For the adjustment of the front tightener in the longitudinal direction of the ski, the double-frustoconical supporting discs **11** of the adjusting element **9** co-act with a retaining bracket **14**, which is secured to the ski **16** by the screws **15**. The retaining bracket **14** consists of a baseplate **17**, an intermediate wall **18**, which is at right angles to the longitudinal direction of the ski, and two triangular side walls **19**. The wall **18** has frustoconical recesses on both sides, as is shown particularly in the sectional view of FIG. 4. The wall **18** has a groove **20**, which extends from the top beyond the center of the frustoconical recess. The upper portion of the wall **18** tapers to a cutting edge **21**.

When it is desired to secure the front tightener to the bearing bracket **14** by locking the cable **9** at the supporting discs **11**, the latter are first laid on the cutting edge **21** at the selected point, as is shown at the top in FIG. 4. In response to pressure exerted in the direction of the arrow **22**, the cutting edge **21** will then force two adjacent supporting discs **11** apart and the supporting discs disposed between the wall **18** and the bracket **5** will be moved rearwardly against the pressure of the spring **13**. As soon as the adjusting cable **9** with the supporting discs **11** has been moved sufficiently downwardly, the double-frustoconical supporting discs **11** snap under the pressure of the spring **13** into the frustoconical recesses in the wall **18**. The adjusting cable **9** is now reliably anchored to the retaining bracket **14** and can be detached from it only by a strong upward pull in conjunction with a compression of the helical compression spring **13**.

FIG. 6 illustrates typical shapes for the supporting elements, the circular shape being the preferred embodiment.

FIG. 7 illustrates a means whereby the tightening lever may be locked in the closed position. This locking means comprises a detent ball mounted in the retaining bracket directed outwardly to one side thereof. A corresponding innerside wall of the lever is provided with a groove which coacts with the detent ball.

It is readily apparent that the position of the front tightener according to the invention on the ski can be adjusted in a particularly simple and space-saving manner. The overall height of the tightener is less than that of the previously known tighteners. The manufacture of the tightener is extremely inexpensive. The entire length of the tightener lever **1** may be utilized for the adjusting range. As a result, the tightener is of universal application and may even be used for different shoe sizes, particularly for hired skis. The cable **9** can be inserted into the bracket **5** in any desired length, which may even exceed the length of the tightener lever **1**. In this case the cable **9** with the supporting discs **11** and the supporting nipple **10** protrudes forwardly beyond the tightener lever **1**.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A front tightener for ski bindings comprising a bracket which is adjustable in the longitudinal direction of the ski, a tightener lever pivotedly mounted on said bracket to move in the longitudinal direction of the ski, a flexible wire cable attached at one end to and extending forwardly of said bracket, a retaining bracket secured to said ski at a point spaced forwardly of said adjustable bracket, a number of supporting elements mounted on said wire cable to have limited longitudinal displacement, an abutment at the front end of said wire cable, a groove in said retaining bracket having a width which is larger than the diameter of the wire cable and smaller than the diameter of the supporting elements, said retaining bracket detachably retaining said wire cable.

2. A front tightener for ski bindings according to claim **1** wherein said supporting elements are double-frusto conical discs and said retaining bracket is at right angles to the longitudinal direction of the ski with said groove formed transversely therein and having a frusto-conical recess on at least its forward face.

3. A front tightener for ski bindings according to claim **2** wherein a helical compression spring is mounted on said wire cable between the rear-most supporting element and said adjustable bracket.

4. A front tightener for ski bindings according to claim **1** wherein successive groups of the supporting elements have distinctive characteristics.

5. A front tightener for ski bindings according to claim **4** wherein the successive groups of said supporting elements are color coded.

6. A front tightener for ski bindings according to claim **4** wherein the successive groups of said supporting elements are coded by varying their shape.

7. A front tightener for ski bindings according to claim **1** wherein said wire cable has at one end a cylindrical nipple which can be extended through a corresponding opening and guide bore in the adjustable bracket with the front end of said bore being constructed for retaining said nipple.

8. A front tightener for ski bindings according to claim **1** wherein said adjustable bracket rests freely on the ski and is preferably provided with rearwardly flaring extensions.

9. A front tightener for ski bindings according to claim **1** wherein the adjustable bracket received by and slidably guided in a guide which is rigidly secured to said ski.

10. A front tightener for ski bindings according to claim **1** wherein a spring loaded detent ball is provided in the retaining bracket and coacts with a longitudinal groove in an innerside wall of the tightener lever.

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