April 17, 1956 W. VÖSTER 2,742,299

SHIFTABLE HEEL STRAP TIGHTENER FOR SKI FASTENING

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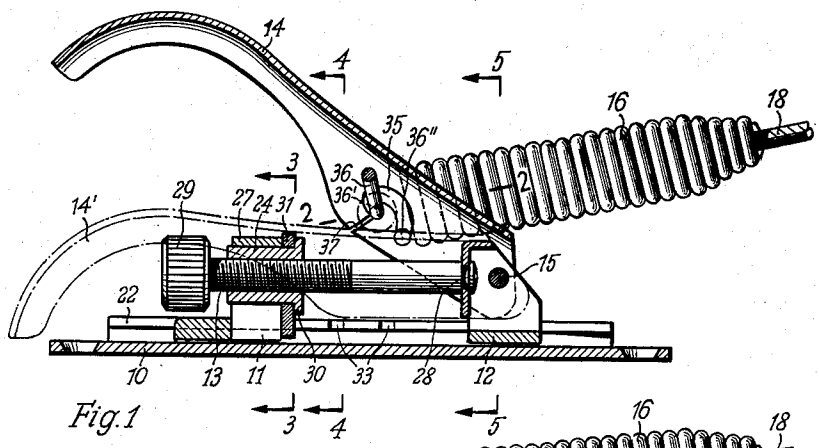

Fig. 1

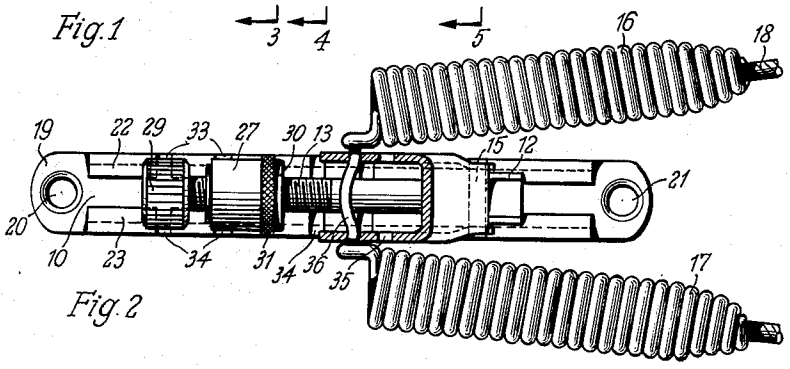

Fig. 2

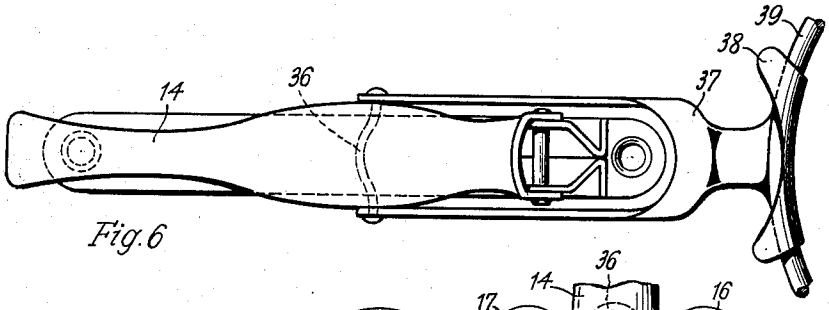

Fig. 6

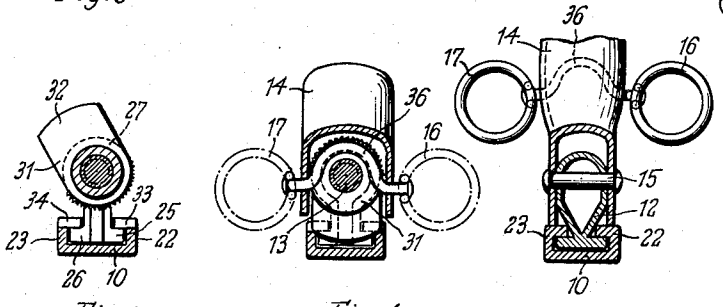

Fig. 3 Fig. 4 Fig. 5

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SHIFTABLE HEEL STRAP TIGHTENER FOR SKI FASTENING

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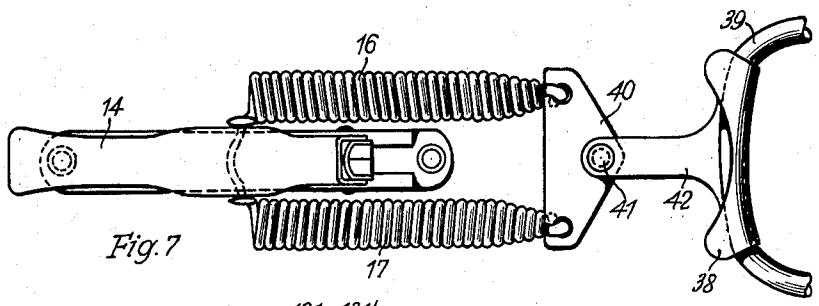

Fig. 7

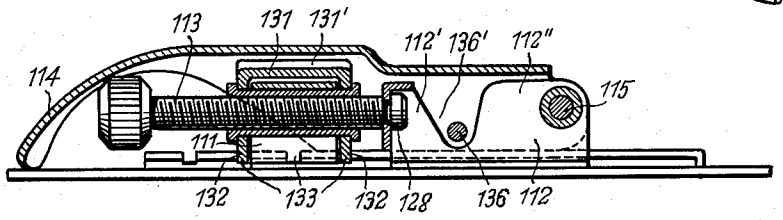

Fig. 8

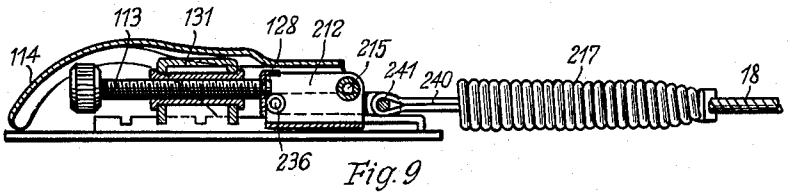

Fig. 9

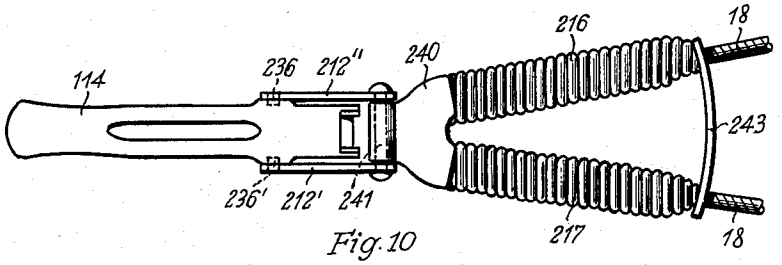

Fig. 10

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SHIFTABLE HEEL STRAP TIGHTENER FOR SKI FASTENING

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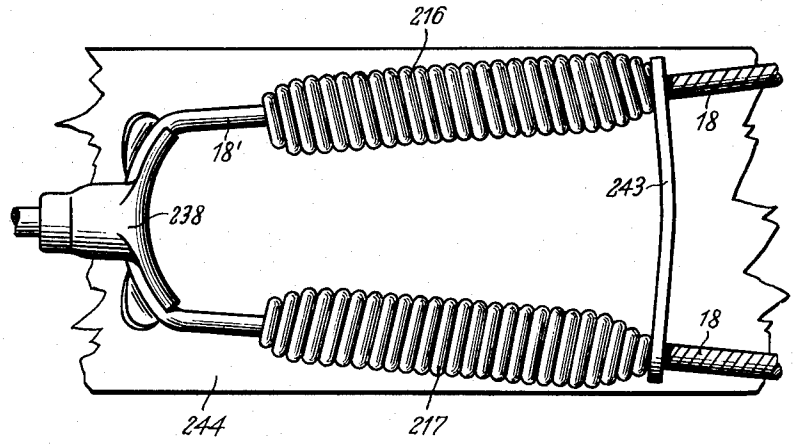

Fig. 11

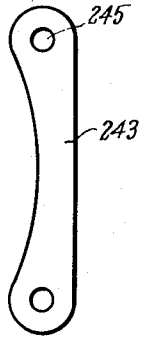

Fig. 12

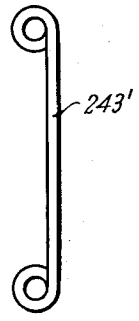

Fig. 13

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SHIFTABLE HEEL STRAP TIGHTENER FOR SKI FASTENING

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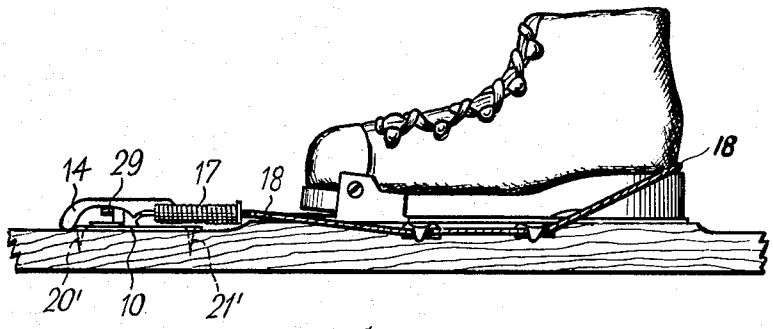

Fig. 14

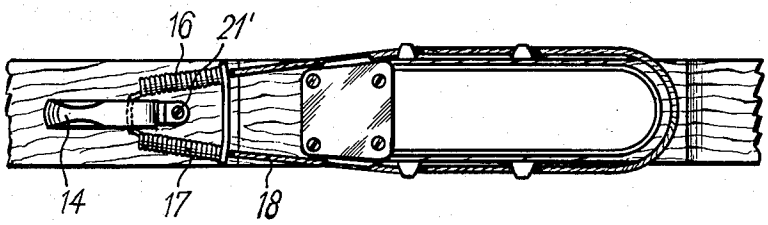

Fig. 15

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agt.

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SHIFTABLE HEEL STRAP TIGHTENER FOR SKI FASTENING

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Application February 13, 1952, Serial No. 271,317

Claims priority, application Germany June 25, 1951

14 Claims. (Cl. 280—11.35)

This invention relates to ski fastenings, and particularly to such fastenings in which the tensioning lever to which the heel strap is attached is articulated to a longitudinally displaceable slide.

One object of the invention is to permit quick adjustment and tightening of the heel strap by simple and reliable means.

Another object of the invention is a simple and compact arrangement of the tensioning device, permitting at the same time a universal adjustability and a good protection against damage.

A still further object of the invention is to attain relatively less strain on the material of the tensioning device and the heel strap and a better fitting of these parts by preventing them from undesirable movements.

In accordance with this a feature of the invention consists in that the slide is provided with a device for coarse adjustment of the heel strap and also with a device for fine adjustment. For this purpose, in particular, this slide may be constucted in two parts in such a manner that one part cooperates with rack devices on the slide guide for coarse adjustment of the slide, while the other part carries the tensioning lever and is displaceable relatively to the first-mentioned part for fine adjustment of the heel strap in the longitudinal direction of the slide, preferably by means of a threaded screw.

According to a further feature of the invention the slide is provided with a locking member rotatable about a longitudinal axis and movable into engagement with spaced racks in the slide guide for the purpose of coarse adjustment of the slide. The rotatable locking member provided for the coarse adjustment may be secured against movement out of its locking position by the tightening lever, which may for example cover over and protect the locking member.

A further feature of the invention consists in that, with the use of a heel strap member extending around the foot, a tension spring is inserted in each side of the heel strap where it is supported by the tensioning device, in which case the two springs may be connected, for the purpose of attachment to the tensioning device, by a universally adaptable resilient member, e. g. a wire cable.

According to a still further feature of the invention, the two tension springs arranged at both sides of the tensioning device have their ends remote from said device connected together by a transverse member which can be made, for example, in its simplest form, of flat strap. The transverse member in such case, on relaxing the tension on the heel strap, acts to prevent the latter from moving undesirably sideways. At the same time the heel strap is prevented from coming out of place and thus, for example, from twisting the springs inserted in the heel strap.

Fig. 1 is a longitudinal sectional view through the tensioning part of the ski fastening.

Fig. 2 is a plan view of the same section on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1 with the tensioning slide unlocked.

Fig. 4 is a section on line 4—4 of Fig. 1 with the tensioning slide locked and the tensioning lever turned downwards.

Fig. 5 is a section on line 5—5 of Fig. 1 with the tensioning lever raised as in Fig. 1.

Fig. 6 is a plan view of another form of the fastening.

Fig. 7 is a plan view of a third form of fastening.

Fig. 8 is a longitudinal section of a fourth form.

Fig. 9 is a longitudinal section of a fifth form of the invention.

Fig. 10 is a plan view of the form shown in Fig. 9.

Fig. 11 is a plan view of a further form of the rotating part.

Figs. 12 and 13 are front views of two constructions of cross members connecting the ends of the springs, and

Figs. 14 and 15 show in side view and plan view, respectively, the heel strap loop for a ski boot and the manner in which the device of the present invention is fixed to a ski.

In the construction according to Figs. 1 to 5, the tensioning device comprises essentially a guide part **10** for the tensioning slide, two slide parts **11** and **12**, which are connected together by a fine adjustment screw **13**, and a lever **14**, which is pivoted by means of the transverse pin **15** on the slide part **12** and carries tension springs **16** and **17** for a cable **18** which serves as the heel strap.

In particular the guide **10** consists of a base plate **19** having holes **20**, **21** therein which serve for fastening the base plate to the ski by means of suitable screws. The guide **10** is provided with side guide cheeks **22**, **23**, which, as seen particularly in Fig. 5, form an approximately dovetail-shaped guide for the slide parts **11**, **12**. The slide part **11** embraces an internally threaded bush **24** fixed in a guide element **27** which is partly slotted and is of inverted U-shape having lateral flanges **25** and **26**, the fine adjustment screw **13** being screwed into the bush **24**. One end of the screw **13** is rotatable by means of a head **28** in the slide part **12** and the other end is provided with a knob **29** for hand adjustment, the arrangement being such that, on turning the fine adjustment screw **13** by means of the knob, the distance of the slide part **12** from the slide part **11** can be varied. On the bush **24** between a collar **30** and the guide element **27** is mounted an externally knurled disc **31** which is rotatable about the axis of the screw **13** and bush **24**. As shown for example in Fig. 3, the disc **31** forms at one side an overlapping projecting locking device **32** which can be engaged in slots **33**, **34** in the guide cheeks **22**, **23**.

The lever **14** articulated to both sides of the slide part **12** by the pin **15** is of U-shaped cross section and is provided in both of its side walls with hook-shaped slots **35** through which passes a transverse element or member **36** for attaching the springs **16**, **17** of the heel strap. The transverse element **36** may be soldered to the ends of the springs **16**, **17** or connected to them in any other manner. Also, it may itself be made of spring wire, in which case both springs **16** and **17** can be made from a single length of wire. The transverse element **36**, as seen particularly in Figs. 4 and 5, is bent upwards in the middle so that in the closed position of the lever (Fig. 4) it does not interfere with the fine adjustment screw **13**. The slots **35** are so formed that the transverse element **36** can be adjusted in the slots and moved from the position shown at **36'** to the position **36''**. In order to fit the transverse element **36** into the slots **35**, the side walls of the lever **14** are slotted at **37** so that the lugs resulting at both sides of the slots can be bent laterally without difficulty for fitting the element **36** in position, after which the lugs can be bent back again into their original

plane and thus prevent the element 36 from springing out of position.

The coarse or fine adjustment of the fastening is effected in the raised position of the lever 14. For coarse adjustment the locking disc 31, 32 is turned from engaging the slots 33, 34, for instance into the position shown in Fig. 3, whereupon both slide parts 11 and 12 can be moved together in the longitudinal direction of the slide device. In the examples illustrated, five coarse adjustments are possible corresponding to five slots 33 or 34, so that the locking disc 31 can be brought into line with any desired pair of the five slots 33, 34 at one movement and can thereupon be turned until the locking part 32 engages the relative notches 33, 34 (as in Fig. 4). For fine adjustment of the device, the fine adjustment screw 13 can then be turned by means of the knob 29, when the slide part 12 with the lever 14 is caused to approach or recede from the slide part 12. After adjustment, the lever 14 is turned down into the position 14', whereby at the same time it secures the locking disc 31 in the adjusted position (Fig. 4) and also covers the knob 29.

For quick adjustment of the heel strap, the element 36 can also be adjusted within the slots 35 from the position 36' to the position 36'', which can be effected if necessary by simply swinging over the element 36 with the lever 14 raised. The securing is then effected similarly by folding down the lever, when the transverse element 36 now embracing the fine adjustment screw 13 is held in the position 36' or 36''. Of course in some cases quick adjustment can be omitted. In such case the heel strap tensioning device is directly attached to the lever, for example, by riveting.

The construction according to Fig. 6 differs only from that according to Figs. 1 to 5 merely in that the heel strap tensioning device consists of a stirrup part 37, the stirrup arm of which is pivotally attached to the lever 14 by the transverse member 36 and has a head piece 38 which serves in the usual manner for the reception of a cable serving as the heel strap, with a tensioning spring arranged therein. Otherwise the construction may be the same as in the case of Figs. 1 to 5.

The construction according to Fig. 7 shows principally a combination of the constructions according to Figs. 1 to 6. The springs 16, 17 are not directly connected to the tensioning cable 39, but through a joint device which consists of a crosshead-type connecting piece 40 and a head piece 42 pivoted thereto by means of a pin 41, the part 42 serving to engage the cable 39 as in Fig. 6.

The construction according to Fig. 8 differs from those according to Figs. 1 to 7 principally in that the slide part 112 is extended forwards at one side, the forward end 112' serving for connection to the fine adjustment screw 113 by means of the head 128. At the rear end 112'' of the slide part, the lever 114 is pivotally attached by means of a transverse pin 115 as in the constructions previously described. Between the two ends 112' and 112'' the slide part 112 has a recess 136' in which the transverse member, e. g. a rigid bolt 136 for connection to the heel strap can be entered from above without hindrance from the fine adjustment screw 113 on folding down the tensioning lever. Moreover, the U-shaped locking element 131 which engages around the slide part 111 is so constructed that it has locking parts 132 and 132' which can simultaneously engage in two notches 133. To aid in gripping the locking element 131, it is also provided externally with a rib 131'.

In the case of the constructions according to Figs. 9 and 10, the locking element 131 is similar in general construction to that in Fig. 8. The slide part 212, which supports the lever 114 on a pin 215, is made shorter than in the construction according to Fig. 8. The heel strap tensioning device in this case has no transverse member through it, but is attached to the tensioning lever 114 by two spaced pins 236 and 236' riveted into the walls of the lever 114, so that the point of attachment can be provided directly at both sides of the head 128 of the fine adjustment screw 113. The heel strap tensioning device consists of a tension cable 18, the two ends of which are attached to a joint piece 240 by tension springs 216, 217. The joint piece 240 is pivotally connected by a transverse pin 241 to two side guides 212'', 212', which in turn are pivoted by means of the two side pins 236, 236' to the tensioning lever. In order to prevent the two springs 216, 217 from bending out sideways or spreading out, the ends thereof which are remote from the tensioning lever and connected to the cable 18, are braced by a strap link or cross member 243. By this means, both better mounting of the fastening and also better taking up of the tension forces is ensured.

The constructional forms of the heel strap tensioning members shown in the various figures of the drawings can of course be interchanged with one another. For example, the construction of the heel strap member according to Figs. 9 and 10 can also be combined with the clamping part of the fastening according to Figs. 1 to 6, Fig. 7 or Fig. 8. Thus, for instance, in Fig. 11 the heel strap tensioning member on the ski 244 and constructed as a part passing around the usual cheeks at both sides of the sole plate and consisting of the cable 18, the springs 216, 217, and the wire cable 18' connecting the springs at their forward ends, is led at the front over a stirrup 238, which in any suitable manner is articulated to the pivoted tensioning lever of a front stretcher device.

The connection of the helical springs to the cable can be effected in any desired manner, e. g. by means of a sleeve which is clamped on the cable end and is held by winding the end of the helical spring to a small diameter.

The ends of the springs 216, 217 remote from the tensioning lever are connected together by a cross member 243, e. g. in the form of a flat iron strap on edge, in which case the cable is passed through openings 245 in the strap (Fig. 12), which may be secured against movement on the cable by the end of the cable sheath. Instead thereof, as shown in Fig. 13, the cross member can be made of wire 243' or the like.

Figs. 14 and 15 show in side view and plan view, respectively, the manner in which the entire fastening device of the present invention is attached to a ski. Fig. 14 shows the ski boot already tensioned in the binding, while Fig. 15 shows the binding in the tensioned position, the ski boot having been omitted from the drawing. It can be seen that the member 10 is screwed to the ski by means of screws 20' and 21'. The lever 14 is shown in its closed position in both views, springs 16 and 17 being in tension and cable 18 being fixed in the groove provided therefor in the boot, so as to firmly hold the latter.

What is claimed is:

1. A ski fastening comprising, in combination, an elongated supporting means adapted to be fastened to a ski and formed with a plurality of notch means; a first slide part; a second slide part; means for attaching said slide parts to said supporting means movable in longitudinal direction with respect to the ski; a heel strap device including means for securing the same to said second slide part; first coarse adjusting means including a locking member turnably mounted on said first slide part non-slidable in longitudinal direction and being turnable into a locking position engaging one of said notch means for locking in an adjusted position said first slide part; and second fine and continuous adjusting means connecting said first and second slide parts for moving said second slide part toward and away from said first slide part.

2. A ski fastening comprising, in combination, an elongated supporting means adapted to be fastened to a ski and provided with a plurality of longitudinally spaced notch means; a first slide part; a second slide part; means for attaching said slide parts to said supporting means movable in longitudinal direction with respect to the ski; a tensioning lever pivotally mounted on said second slide part turnable about a transverse axis; a heel strap device;

fastening means for fastening said heel strap device to said tensioning lever spaced from the axis of the same; a threaded spindle rotatably secured to one of said slide parts; a bushing having an inner thread engaging said threaded spindle and being secured to the other of said slide parts; a manually operated knob secured to said threaded spindle; and a locking member rotatably mounted on said bushing rotatable and non-slidable in longitudinal direction and having at least one projecting portion turnable into a locking position engaging one of said notch means whereby said first and second slide parts may be moved together for adjustment, and locked.

3. A ski fastening as claimed in claim 2 wherein said means for attaching said slide parts include laterally arranged channel-shaped rails, and wherein said slide parts are provided with lateral flanges guided in said channel-shaped rails.

4. A ski fastening as claimed in claim 2 wherein said tensioning lever in operative position engages said projecting portion when the same engages one of said notches for locking said locking means.

5. A ski fastening as claimed in claim 2 wherein said tensioning lever has a U-shaped cross section and constitutes a hood adapted to cover said slide parts, and wherein said fastening means include a transverse member passing through said tensioning lever and having an arcuate center portion passing around said threaded spindle when said tensioning lever is in operative position.

6. A ski fastening as claimed in claim 2 wherein said locking member has a U-shaped cross section including two longitudinally spaced projecting portions so as to engage simultaneously two notch means.

7. A ski fastening as claimed in claim 6 wherein said locking member is provided with a reinforcing rib extending in longitudinal direction and wherein said locking member embraces said first slide part.

8. A ski fastening as claimed in claim 2 wherein said heel strap device includes two longitudinally extending spring means arranged laterally of said supporting means and attached at the front ends thereof to said tensioning lever at points spaced from said transverse pivoting axis of said lever; a transverse member pivotally connected to the rear ends of said spring means; a longitudinally extending link pivoted to the center portion of said transverse member; and a heel strap loop secured to said link.

9. A ski fastening as claimed in claim 2 and including a pair of link members arranged on both sides of said tensioning lever and pivotally connected to the same; a cross pin connecting said link members; a transversal member having a tubular portion surrounding said cross pin; and said heel strap means being attached to said transverse member.

10. A ski fastening comprising, in combination, an elongated supporting means adapted to be fastened to a ski and provided with a plurality of longitudinally spaced transverse notch means; a slide part; means for attaching said slide part to said supporting means movable in longitudinal direction with respect to the ski; a tensioning lever pivotally mounted on said slide part turnable about a transverse axis; a heel strap device; fastening means for fastening said heel strap device to said tensioning lever spaced from the axis of the same; a shaft element extending longitudinally with respect to the ski and secured to said slide part; and a locking member mounted on said shaft element rotatable and non-slidable in longitudinal direction and having at least one projecting portion turnable into a locking position engaging one of said notch means whereby said slide part may be moved for adjustment, and locked.

11. A ski fastening as claimed in claim 10 wherein said locking member has a U-shaped cross section including two longitudinally spaced projecting portions so as to engage simultaneously two notch means.

12. A ski fastening as claimed in claim 11 wherein said tensioning lever has a U-shaped cross section and constitutes a hood, and wherein said fastening means include a transverse member passing through said tensioning lever and having an arcuate center portion passing around said shaft element when said tensioning lever is in operative position.

13. A ski fastening comprising in combination, an elongated supporting means adapted to be fastened to a ski and provided with laterally arranged channel-shaped rails and with a plurality of longitudinally spaced notch means; a first slide part; a second slide part formed with a notch, said first and second slide parts being guided in said channel-shaped rails; a tensioning lever pivotally mounted on said second slide part turnable about a transverse axis; fastening means for fastening a heel strap device to said tensioning lever and including a transverse pin located spaced from said transverse axis of said tensioning lever, said pin being located in said notch in said second slide part when said lever is in tensioning position; a threaded spindle rotatably secured to said second slide part; a bushing having an inner thread engaging said threaded spindle and being secured to said first slide part; a manually operated knob secured to said threaded spindle; and a locking member turnably mounted on said bushing nonmovable in longitudinal direction, said locking member having a U-shaped cross-section and a closed top provided with a longitudinally extending reinforcing rib, said locking member including two longitudinally spaced projecting portions for simultaneously engaging two notch means in said supporting means.

14. A ski fastening comprising, in combination, an elongated supporting means adapted to be fastened to a ski and provided with a plurality of longitudinally spaced transverse notch means; a slide part; means for attaching said slide part to said supporting means movable in longitudinal direction with respect to the ski; a tensioning lever pivotally mounted on said slide part turnable about a transverse axis; a heel strap device; fastening means for fastening said heel strap device to said tensioning lever spaced from the axis of the same; and a locking member mounted on said slide part pivotable about an axis extending in said longitudinal direction, said locking member being non-slidable in longitudinal direction and having at least one projecting portion turnable with said locking member into a locking position engaging one of said notch means whereby said slide part may be moved for adjustment, and locked.

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