Feb. 6, 1968 G. P. J. SALOMON 3,367,670

BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE FOR SKI SAFETY HARNESS

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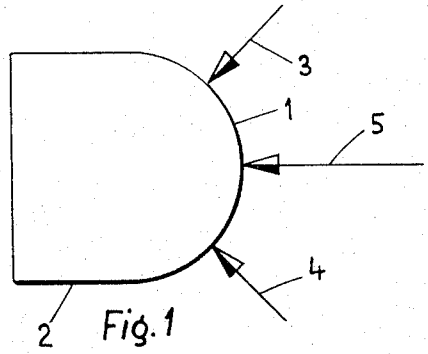

Fig. 1

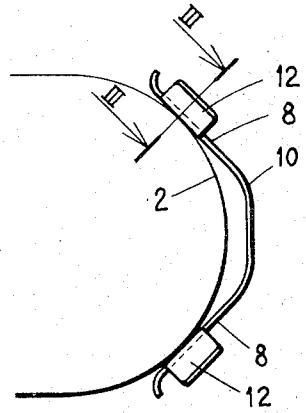

Fig. 2

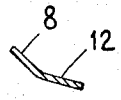

Fig. 3

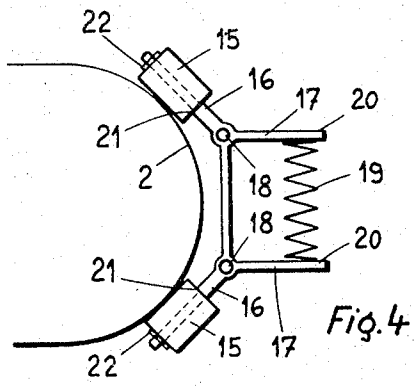

Fig. 4

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Feb. 6, 1968 G. P. J. SALOMON 3,367,670

BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE FOR SKI SAFETY HARNESS

Filed Dec. 24, 1964 5 Sheets-Sheet 2

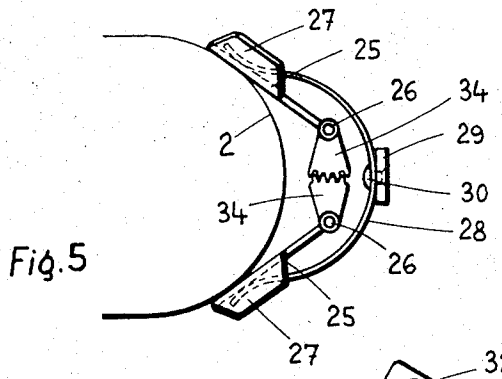

Fig. 5

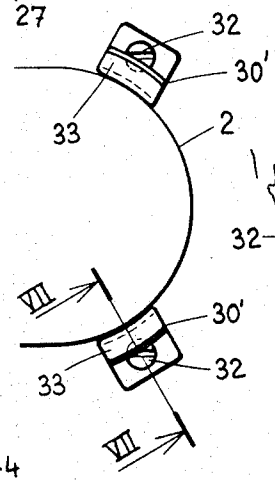

Fig. 6

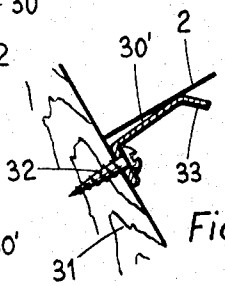

Fig. 7

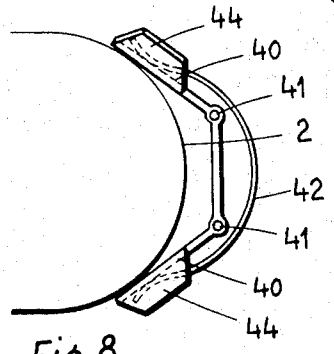

Fig. 8

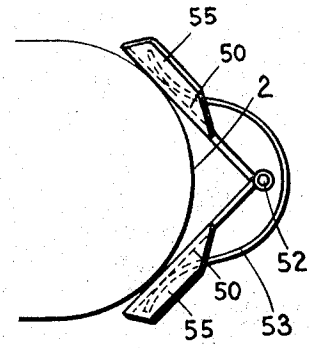

Fig. 9

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Feb. 6, 1968 G. P. J. SALOMON 3,367,670
BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE
FOR SKI SAFETY HARNESS
Filed Dec. 24, 1964 5 Sheets-Sheet 3

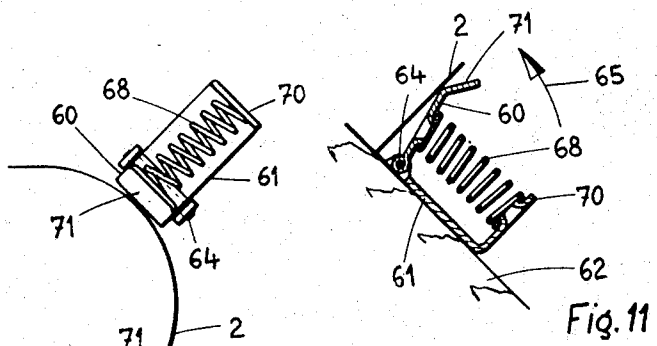

Fig. 11

Fig. 10

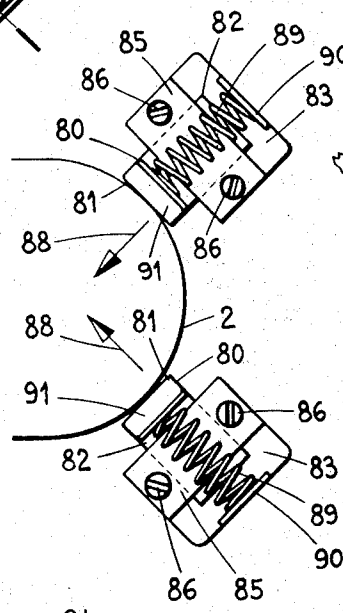

Fig. 12

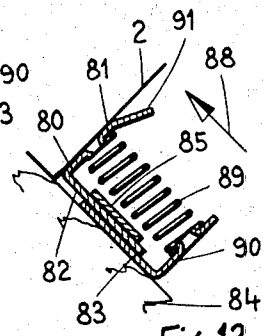

Fig. 13

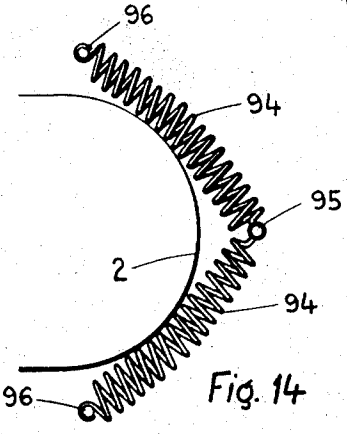

Fig. 14

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Feb. 6, 1968 G. P. J. SALOMON 3,367,670

BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE FOR SKI SAFETY HARNESS

Filed Dec. 24, 1964 5 Sheets-Sheet 4

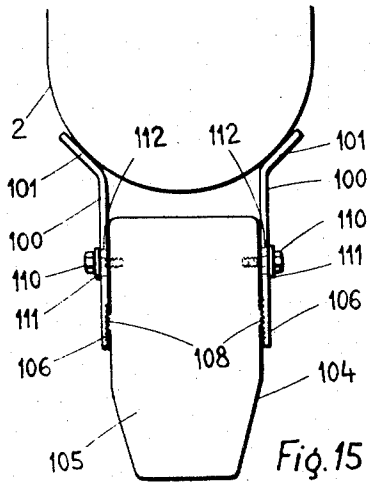

Fig. 15

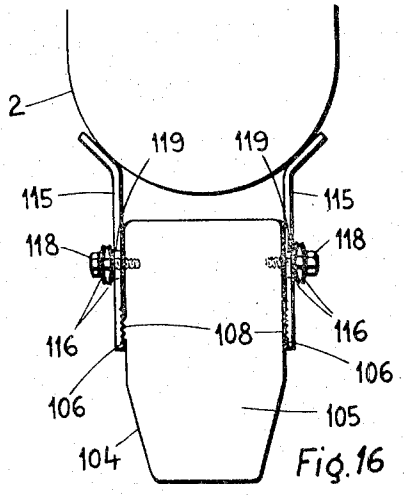

Fig. 16

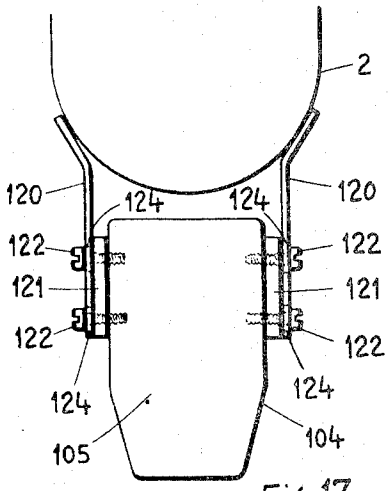

Fig. 17

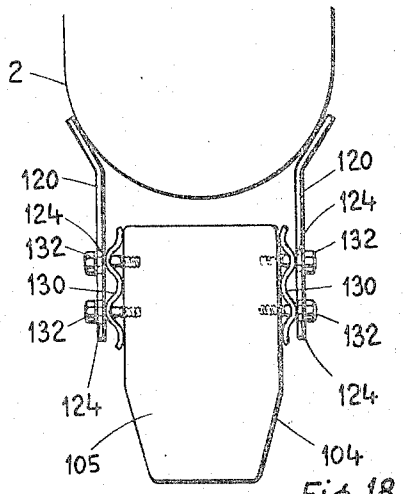

Fig. 18

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Feb. 6, 1968 G. P. J. SALOMON 3,367,670

BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE FOR SKI SAFETY HARNESS

Filed Dec. 24, 1964 5 Sheets-Sheet 5

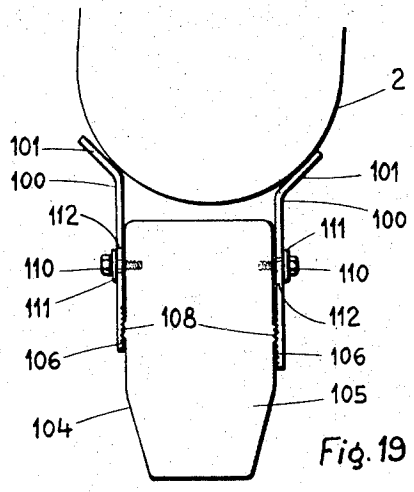

Fig. 19

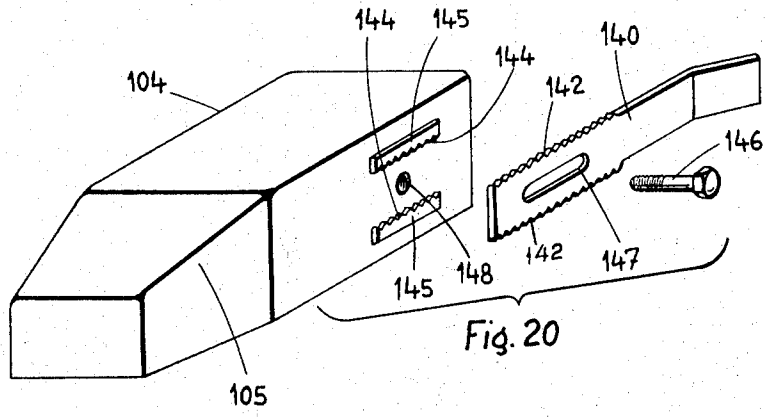

Fig. 20

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United States Patent Office 3,367,670 Patented Feb. 6, 1968

3,367,670

BOOT CENTERING AND FORWARD THRUST APPLYING DEVICE FOR SKI SAFETY HARNESS

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Filed Dec. 24, 1964, Ser. No. 421,756
Claims priority, application France, Dec. 24, 1963, 958,447; Nov. 2, 1964, 993,579
4 Claims. (Cl. 280—11.35)

The object of the present invention is a boot centering and forward thrust applying device for a ski safety harness. This device differentiates from the known devices by the fact that it simultaneously ensures the centering of the heel of the boot on the ski and applies a horizontal forward thrust on the said boot, pressing the latter against a forward abutment.

Another object of this invention consists in the provision of a simple device which can be used independently or in combination with a vertical holding member for a rear holding device, or with any type of safety rear abutment.

According to the invention, the device comprises two means, independent or in combination, applying on the rear edge of the heel of the boot, two substantially equal inclined lateral forces, the resultant of which is a forward directed thrust, substantially along the longitudinal axis of the ski, the said forward thrust ensuring a constant pressure of the boot against the front abutment.

The two means providing the inclined lateral forces are advantageously constituted by two movable arms which spread when the boot is inserted in the harness while causing elastic means to react in an inclined lateral thrust.

According to another embodiment of the invention, the two means to provide the oblique lateral thrust of the device are constituted by two adjustable arms which can move substantially in a longitudinal direction, respectively on one or the other lateral side of the rear abutment of the safety holding device. Flexibility in the gripping of the heel is obtained through the elasticity of the sole of the boot, when the two thrust means are rigid, or by the elasticity of the said thrust means. The elasticity of the said thrust means may be the result of steel springs or elastic assembly of the rear holding device by means of springs, rubber blocks or similar devices.

The invention will be better understood with reference to the description which follows and to the annexed drawings giving as nonlimitative examples various embodiments of the invention.

FIG. 1 illustrates the principle of the centering device having a forward horizontal thrust for a safety rear holding device.

FIGS. 2, 4, 5, 6, 8, 9, 10, 12 and 14 are plan views of various embodiments of the centering device.

FIG. 3 is a cross-section along line *a—a* of an element of the device shown in FIG. 2.

FIG. 7 is a cross-section along line *b—b* of one of the two identical elements of the device seen in FIG. 6.

FIG. 11 is a cross-section along line *c—c* of one of the two identical elements of the device represented in FIG. 10.

FIG. 13 is a cross-section along line *d—d* of one of the two identical elements constituting the device shown in FIG. 12.

FIGS. 15, 16, 17 and 18 are plan views of centering device having forward horizontal thrust for the rear safety holding of skis, according to other embodiments of the invention.

FIG. 19 is a plan view of the device shown in FIG. 15 shown in a gripping position wherein the heel is oblique and decentered in relation to the axis of the ski.

FIG. 20 is a perspective view of a centering and boot heel thrust applying device according to a different embodiment.

In FIG. 1, two substantially equal oblique lateral forces shown by arrows **3** and **4** are applied through appropriate means on the rearward edge **1** of the heel **2** of the boot. The result is that the boot is pushed forwardly on the ski, substantially along the longitudinal axis of the said ski, said push being illustrated by arrow **5**, the boot resting against an abutment in front of the boot. The heel **2** of the boot is automatically maintained in a centered position on the ski.

In FIG. 2, the two oblique lateral forces, along **3** and **4** of FIG. 1, acting on heel **2** of the boot, are obtained through two arms **8** of a leaf spring **10**. Each arm **8** comprises a wing **12** bent at its upper part, as particularly shown in FIG. 3, allowing, when the boot is introduced in the harness, the heel **2** to spread the branches **8** of the leaf spring **10** by causing the branches **8** to open. In the engaged position of the heel **2**, the two oblique lateral forces **3** and **4** of FIG. 1 are obtained by the pulling action of the two branches **8** and the spring **10**, the latter being in an opened position. The embodiment shown in FIG. 2 is particularly simple and economical.

In FIG. 4, the two oblique lateral forces **3** and **4** of FIG. 1, acting on the heel **2** of the boot, are obtained through two rollers **15** freely rotatable on arms **16** of a lever **17** hinged around axles **18**, the said rollers **15** pivotally reacting around the axles **18** through a compression spring **19** which tends to spread the arms **20** forming the levers **17**. The rollers **15** are retained in a longitudinal sliding position on the arms **16** of the levers **17**, on one side by a flange **21**, and on the other side by a fastening ring **22**. When the boot is inserted in the device, heel **2** spreads the rollers **15** and squeezes spring **19**.

In FIG. 5, the two lateral inclined forces **3** and **4** of FIG. 1, acting on heel **2** of the boot, are obtained by two levers **25**, hinged around two axles **26**, comprising each an arm **27** bent at its upper part to facilitate insertion of the boot, heel **2** automatically spreading the said levers **25**. Levers **25** have a tendency to come together around pivotal axle **26** through a leaf spring **28** retained by a support **29** by means of a rivet **30**. Each lever **25** comprises a toothed sector **34**, in mesh with a similar section **34** of the other lever **25**, allowing an automatic centering of heel **2**, the two levers **25** opening and closing along identical opposed angular amplitude.

In FIG. 6, the two oblique lateral forces **3** and **4** of FIG. 1 acting on heel **2**, are obtained by means of two leaf springs **30'** fixed to ski **31** by means of screws **32**, springs **30'** bent at an angle appreciably over 90°, whose upper part **33** is also bent, as particularly shown in FIG. 7. When the boot is inserted in the device, heel **2** takes place between the two bent parts **33** and spreads the two free extremities of the leaf springs **30'**. The force acting upon the two free extremities whch are under tension, ensures the centering of the heel **2** on the ski **31** and its forward thrust substantially in the longitudinal axis of the said ski **31**.

In FIG. 8, the two oblique lateral forces **3** and **4** of FIG. 1, acting on heel **2**, are obtained by means of two levers **40**, hinged around two axles **41**, and pulled together by pivoting around the axles **41**, through a leaf spring **42** under tension, in the engaged position of the heel **2**. Each lever **40** comprises, in addition, an arm **44** bent at its upper part, facilitating the engagement of the heel **2** when the boot is inserted in the device.

The device represented in FIG. 9, differentiates from the one shown in FIG. 8 only in that the two oblique

lateral forces 3 and 4 of FIG. 1, acting on heel 2, are obtained by means of two levers 50, similar to 40 of FIG. 8, hinged around a single axle 52. A leaf spring 53 tends to pull together, by pivoting around axle 52, the two levers 50 comprising each an arm 55, folded at its upper part in a manner to facilitate the insertion of the boot in the device.

In FIG. 10, the two oblique lateral forces 3 and 4 of FIG. 1, acting on heel 2, are obtained by means of two levers 60, substantially vertical, hinged at one end on a support 61, for example fixed to ski 62, around an axle 64, the levers 60 being caused to rock in the direction shown by 65 (FIG. 11), causing the free ends to come together, to a compression spring 68 under tension between on one side, each lever 60, and on the other side, the bent end 70, substantially vertical, of the corresponding support 61. The free end 71 of each lever 60 is bent in a manner to ease engagement of heel 2 in the device.

In FIG. 12, the two oblique lateral forces 3 and 4 of FIG. 1, acting on heel 2, are obtained by means of two sliding parts 80 horizontally guided by means of a bent foot 82 sliding between a support 83, for example fixed to the ski 84, and a plate 85 securely fixed to the said support 83 by means of a screw 86, as particularly shown in FIG. 12. The said sliding parts 80 tend to slide in the direction 88, causing the said parts to come closer together, by means of a compression spring 89 located between flange 81 of each sliding part 80 and a bent end 90, generally vertical in relation to the corresponding support 83. The free end of each sliding part 80 is bent as at 91 in a manner to facilitate engagement of the heel 2 on the device.

In FIG. 14, the two lateral inclined forces 3 and 4 of FIG. 1 acting on heel 2, are obtained by means of two traction coil springs 94, each under tension between a common gripping post 95, located in the longitudinal axis of the ski at the rear of heel 2, and a second post 96, laterally located in relation to the said heel 2. During harnessing, heel 2 comes in contact with the inner part of coiled springs 94, inside the acute angle formed by the two longitudinal axes thereof, pushes the said springs outwardly to allow free passage for heel 2. The latter, after engagement, is properly centered and under a forward thrust, the two springs 94 being under lateral tension.

In FIG. 15, the two oblique lateral forces acting on the heel 2 of the boot are obtained by means of two arms 100 comprising two bent flanges 101 resting on the said heel 2. The two arms 100 are fixed to the outer casing 104 of the rear abutment of the safety holding device 105. According to a feature of this invention, arms 100 can be moved and locked in a direction generally along the longitudinal axis of the ski, thereby making the invention usable on various types of boots, by means of ridges 106 located on the inner face of the said arms 100 coming in contact with the ridges 108 formed on the lateral sides of the casing 104 of the rear abutment, stability in the desired adjusted position being obtained by means of a screw 110, advantageously provided with a washer 111, the screw 110 passing through a slot 112 and fixed to the casing 104. The arms 100 may be rigid, the flexibility of the gripping of the heel 2 being obtained by the elasticity of the sole of the boot, or they may be resilient, for example, made of spring steel, giving an automatic flexibility to the gripping means.

FIG. 16 differentiates from FIG. 15 only in that the two arms 115, similar to arms 100 of FIG. 15, are resiliently fixed on the casing 104 of the rear abutment 105 by means of two flexible washers 116, of the Belleville type, symmetrically opposed, located under the head of the screw 118 similar to screw 110 of FIG. 1, and causing arms 115 to rest on casing 104. The two arms 115, having holes 119, are longitudinally adjustable on the ski, in the same manner as the arms 100 of FIG. 1, by means of ridges 106 of the said arms 115 and 108 of the casing 104. A relatively strong thrust of the heel 2 against one or the other arm 115 causes the spreading of one or two arms 115 of the casing 104 by compression of the washers 116.

In FIG. 17, arms 120 corresponding to arms 100 in FIG. 15, are resiliently fixed on the casing 104 of the rear abutment 105 by means of elastic plugs 121, for example, of rubber, located between the said arms 120 and casing 104, and screws 122 of the slotted-head type. Arms 120 do not comprise positional locking means but nevertheless comprise longitudinal slots 124 permitting their adjustment substantially along the longitudinal direction of the ski. The resting edges of the heel 2 cause the spreading, due to a given force, of the arms 120 of the casing 104 by squeezing the rearward part of the resilient plugs 121, the said arms 120 tilting around a surface constituted by the interior face of the forward screws 122.

The device shown in FIG. 18 differentiates from the one shown in FIG. 17 only in that the resilient plugs 121 of FIG. 17 are replaced by springs 130, for example, of sinusoidal form, acting in a similar way as the said plugs 121. In comparison with the device shown in FIG. 7, the tightening screws 132 of the arms 120 have an hexagonal shaped head.

According to a different embodiment (not shown) of the device of FIG. 18, the springs 130 are located between the arms 120 and the heads of the screws 132.

FIG. 19 illustrates the centering and horizontal thrust applying device of FIG. 15, the arms 100 being adjustable in a gripping position of the boot, the heel 2 of which is off-centered and oblique in relation to the longitudinal axis of the ski. Accordingly, the two arms 100 are solidly fixed to casing 104 in such a way as to come in contact with the heel 2, in a slanted position in relation to the axis of the ski. This FIG. 19 points out the facility with which this device allows centering and gripping of any type of heels.

In FIG. 20, the locking of the arms 140 (only one shown), corresponding to arms 100, 115 and 120 of the preceding figures, is obtained by engagement of the ridges 142 located on the upper and lower longitudinal edges of the arm 140, between the ridges 144 of two appropriate parts 145 solidly fixed to the casing 104 of the rear abutment 105, the tightening screw 146 passing through the slot 147 of the arm 140 and being fastened at 148, in the casing 104.

It is obvious that arms 100, 115, 120 or 140 could be fixed on any member or parts other than the rear abutment of a safety holding device, for example, on an appropriate plate comprising two lateral wings.

A change in the number, form, dimensions and proportions of the various constitutive parts of the device will fall within the embodiment of this invention, regardless of the means used permitting to obtain two oblique lateral forces substantially equal on the heel of the boot, regardless of the strength and orientation of the lateral force and the location of their contacting points on the heel of the boot, and regardless of the means to adjust and lock the arms acting on the heel.

Similarly, the two oblique lateral forces could be independent or combined, the device could be fixed to the ski, to the rear abutment or to one of the fixed or adjustable elements of the said rear abutment, the different parts constitutive of the device could also be made in any material or/and combinations of material, could also present any adherence, be submitted to any physical, chemical or other treatment, and the device could also be adapted to any type of safety harness or skis without departing from the embodiment of the invention.

I claim:

1. A foot centering and forward thrust applying device for a ski comprising a resilient member fixedly

mounted to a ski intermediate its length adjacent the locus of a boot heel, said resilient member including flexible arms extending obliquely to one another for engagement with the rear face of the boot heel, said flexible arms exerting forwardly and inwardly directed pressure on the boot heel for directing the boot in a forward horizontal direction substantially along the longitudinal axis of the ski.

2. A device as recited in claim 1, wherein the flexible arms consist of leaf springs.

3. A device as recited in claim 2, wherein the leaf springs are vertically disposed.

4. A device as recited in claim 3, wherein the upper edge of the leaf springs are backwardly bent to facilitate the introduction of the heel.

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