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Unger

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[54] **RELEASING HEEL RETAINER**

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[52] **U.S. Cl.** ..... **280/11.35 T**

[51] **Int. Cl.** **A63c 9/00**

[58] **Field of Search** ..... 280/11.35 T

[56] **References Cited**

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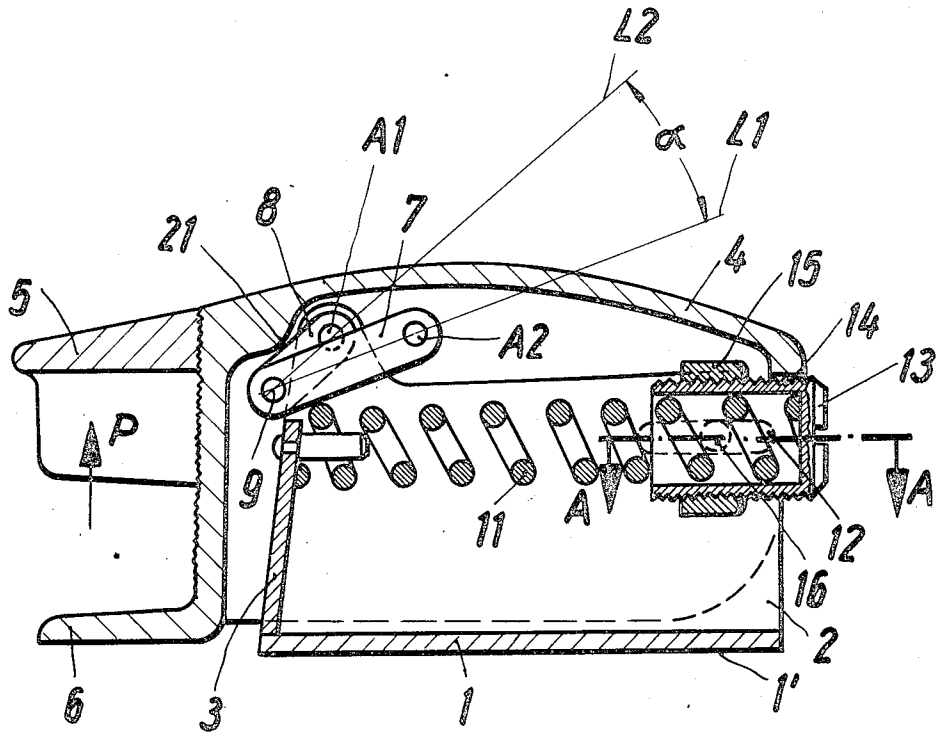
Primary Examiner—Robert R. Song
Attorney—Robert H. Jacob

[57] **ABSTRACT**

Releasing heel retainer with sole retaining part and stepping spur for ski binding that is pivotable in the manner of a sliding crank arrangement on a stationary base about a front axis extending horizontally transversely of the longitudinal extent of the ski and slidably journalled and supported with its rearward end remote from the sole retaining part on the base, where a release acting against spring pressure effects the release of the ski boot in response to excessive load, while the crank-like linkage of the housing of the heel retainer on the base is by way of a linked lever device and the journalling of the rearward housing part on the base is slidable against spring action and is simultaneously formed as a rotatable bearing.

12 Claims, 8 Drawing Figures



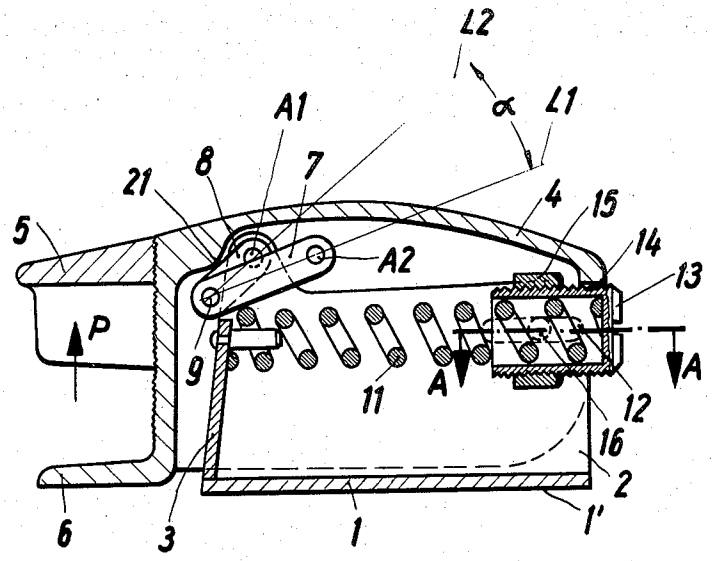

L2
α
L1
A1
8
7
21
4
15
14
13
5
A2
P
9
11
A
A
12
16
2
6
3
1
1'

Fig. 1

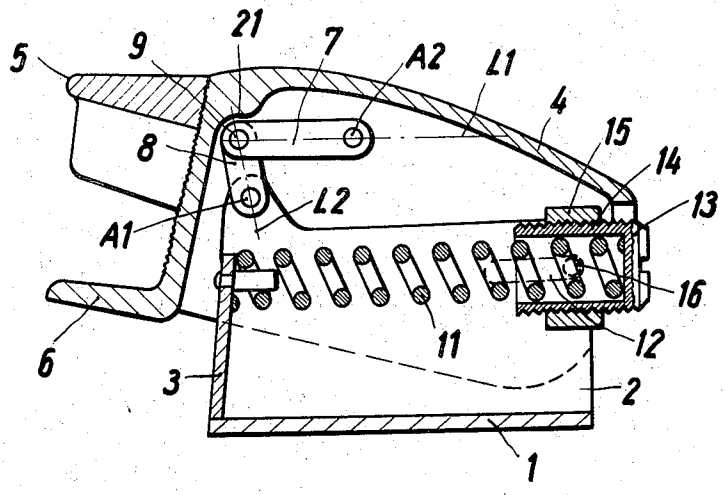

5
9
21
7
A2
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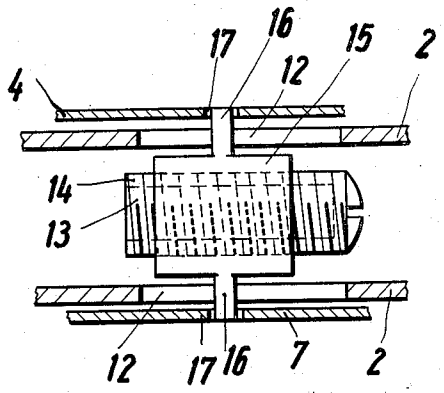
Fig. 2

Fig. 3



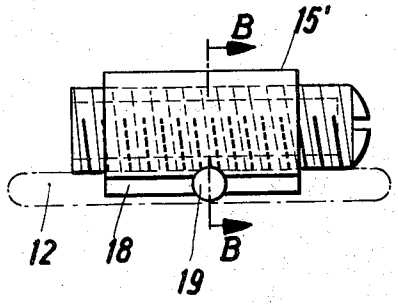


Fig. 4

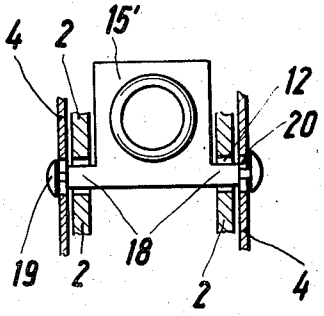


Fig. 5

Fig. 6

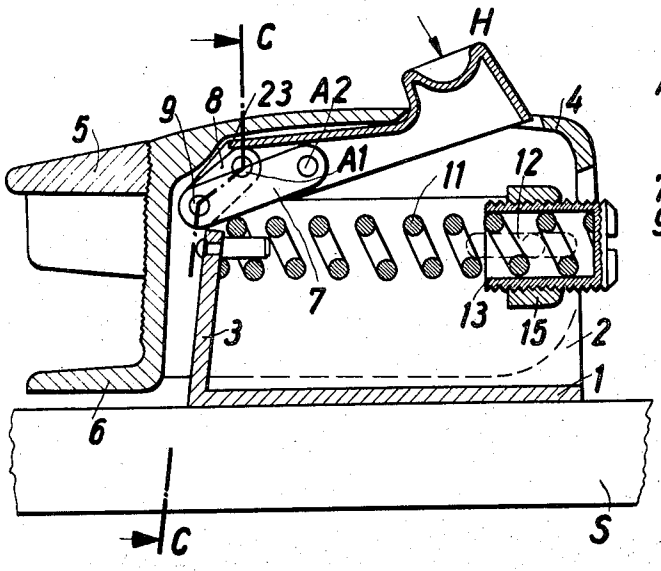
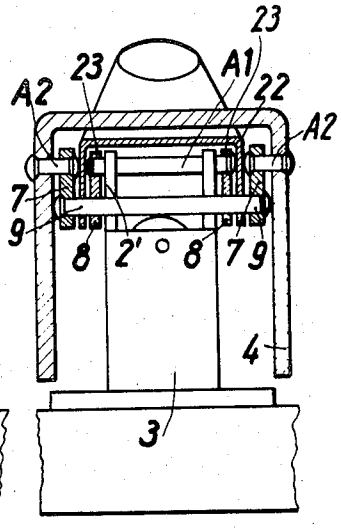


Fig. 8



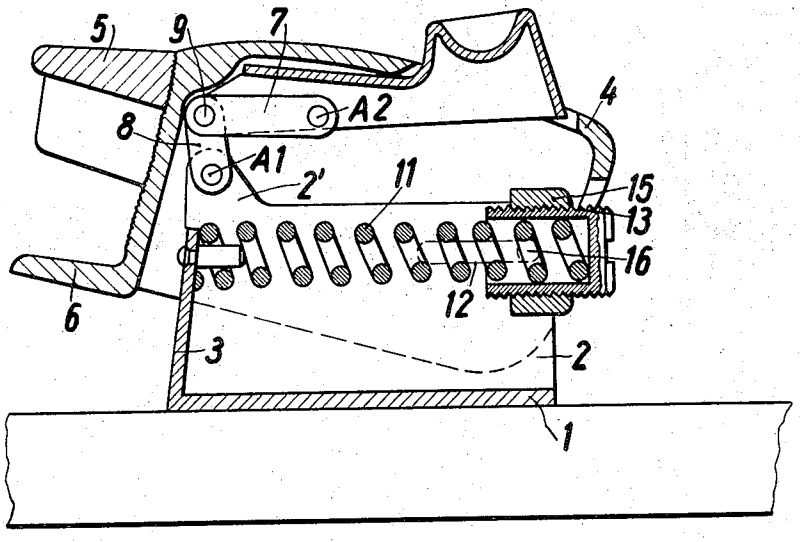


Fig. 7

RELEASING HEEL RETAINER

BACKGROUND OF THE INVENTION

The invention relates to releasable ski bindings and especially to heel retainers for ski bindings.

More in particular, the invention is concerned with a releasing heel retainer having a sole retaining portion and a stepping spur for a ski binding which is pivotable in the manner of a sliding crank device on a stationary ski mounted base about a front axis that extends transversely and horizontally of the longitudinal extent of the ski, as well as slidably journalled and supported at its rearward part remote from the sole retaining part, where a release operating against spring bias effects the release of the ski boot in response to an excessive load or pressure. In this manner it is achieved during the release movement of the binding that the sole retaining part that rests against the heel passes along a path in the form of a rearwardly extending arc which at first leads steeply upwardly, and thereupon flattens out. Thus a relatively large height elasticity is provided in the first part of the release movement. In the second part of the release path an accurate release of the heel of the boot is effected for, after releasing, the housing of the binding with the sole retaining part is correspondingly moved rearwardly, and thus sufficiently frees the heel of the ski boot. On the other hand, however, the housing defines in the release position an angle with the ski surface that is not too steep. For such a steep angle encumbers the stepping down of the housing from the release position to the retaining position, and that especially when the ski assumes an inclined position along a slope.

It is an object of the invention to improve a heel retainer of this type as to the construction of the means serving for release and in the movement of its housing that carries its sole retaining part and the stepping spur during the transition from the retaining position to the release position, and vice versa. In particular, the space is to be increased through which the sole retaining part and the stepping spur pass during movement from the retaining position to the release position to reach the deadpoint position between retaining and release position.

SUMMARY OF THE INVENTION

In order to solve this problem, it is first proposed in accordance with the invention that the crank-like linking of the housing of the heel retainer is effected at the base portion by way of a joint lever device, and that the bearing of the rearward portion of the housing is slidable against spring action on the base portion and is at the same time constructed as a pivot bearing. This lever joint arrangement can be realized in a constructively simple manner, for example, by two levers which on the one hand are pivotally connected with each other, and on the other hand with the housing and with the base portion that is stationary on the ski. By means of the invention it is possible to attain a very large thrust of 10—20mm, and under circumstances even more, until the sole retaining part and the stepping spur have reached the deadpoint position from the side of the retaining position, after which they ultimately attain the release position under the pressure of the release spring. Thereby a considerable elasticity of height is advantageously attained, by means of which short, sudden loads of the foot can be resiliently balanced in vertical

direction without the release taking place prematurely. The heel retainers known heretofore, to be sure, make possible longitudinal elasticity, i.e,, resilient balancing of shocks rearwardly in the direction longitudinally of the ski. On the other hand, however, the problem of elasticity of height was heretofore neglected.

By changing the linkage point and the length of the parts of the lever arrangement, the path of movement of the sole retaining part and of the stepping spur from the retaining position to the release position or vice versa can be varied. It particular, it is possible by these means to change the position of the deadpoint in relation to the retaining position and the release position.

The heel retainer in accordance with the invention also excels with respect to its remaining structural components by very simple, and therefore robust, construction, while it is at the same time free of operational defects.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages and features of the invention will become apparent from the following description of different embodiments illustrated in the accompanying drawings, in which

FIG. 1 is a longitudinal section of the device in accordance with the invention in retaining position,

FIG. 2 illustrates the embodiment in accordance with FIG. 1 in released position,

FIG. 3 is a partial section along line A—A in accordance with FIG. 1,

FIGS. 4, 5 illustrate in a side view and in a partial section a further variant of the pivotable and slidable journalling of the rearward housing portion in accordance with the invention, where the section of FIG. 5 is taken along line B—B in FIG. 4,

FIG. 6 illustrates in a longitudinal section another embodiment of the invention in the retaining position,

FIG. 7 shows the embodiment of FIG. 6 in released position, and

FIG. 8 is a section taken along line C—C in FIG. 6.

DESCRIPTION OF THE INVENTION

The base portion 1 of the retainer is rigidly secured to the ski. If desired, it can be slidable longitudinally of the ski against the effect of a spring, which is not illustrated. It has side walls 2 and a front wall 3, the function of which will be described more in detail hereinafter.

The housing 4 of this heel retainer carries a sole retaining part 5 and a stepping spur 6. It is pivotable about a forward horizontal axis that extends transversely of the longitudinal extent of the ski in side walls 2. For linking the housing to the axis A1 a lever joint arrangement is provided which comprises a first lever 7 and a second lever 8. In accordance with reference numeral 9 both levers are connected with one another, while the other free end of lever 7 is linked to the housing at axis A2, and the free end of lever 8 is linked at axis A1 to the side walls 2.

The housing 4 is furthermore slidably journalled and supported at its rearward part remote from the sole retaining part at side walls 2 on base 1. In this embodiment slots 12 in the side walls 2 serve for this purpose, where the housing is slidably guided in the longitudinal direction of the ski, as well as rockable about an imaginary axis of this guiding slot disposed at any desired location horizontally and extending transversely of the

longitudinal extent of the ski. This displacement takes place against the effect of the pressure spring **11** that is supported at its forward end against the front wall **3** of the base part and at its rearward end in a sleeve **13** which constitutes a structural component of the pivotable and simultaneously longitudinally displaceable bearing of the rearward part of the housing, respectively the base portion.

In accordance with FIG. **3**, this bearing can be so constructed that the sleeve **13** is screwed with thread portion **14** into the inner thread of a rotary displacement part **15** and is adjustable relative thereto in longitudinal direction by turning. By these means the tension of the spring and thus the force required for release may be changed correspondingly. The rotary displacement part **15** has lateral projections, pins, bolts or the like **16**, that are slidably guided in the slots **12** of the base as well as movably journalled in bores **17** of the housing **4**.

In lieu thereof another arrangement in accordance with FIGS. **4** and **5** would also be possible. The rotary displacement portion identified at **15'** has lateral ridges **18** which are slidably fitted into the slots **12** of the side walls **2**. Rivets **19** are provided on these ridges that pass through bores **20** in the housing **4**, where they are rotatably journalled. The ridges **18** protect the rotatable displacement part against turning within the slots **12**, which in that event must be longer than in the embodiment of FIG. **3** to correspond in this case to the length of the ridges **18**.

This provides the advantage that the pressure spring can engage part **13** off-center with respect to the axis of the housing linkage of the rotatable sliding part **15'**, while nevertheless no rocking of the rotatable sliding part **15'** relative to the side walls **2** is possible. Merely rocking of the housing **4** relative to the side walls **2** and to the rotatable sliding part **15'** is possible. For simplification of the illustration parts **2,4** are not shown in FIG. **4**, but only the position of the slot **12** is indicated in dot and dash lines.

In the example in accordance with FIG. **3** the effect is the same as with the example of FIGS. **4,5**. In each case a slidable bearing of the housing in the slots **12** and furthermore a rotatable journalling about the studs **16** or the rivet **19** is provided, and this immaterial of the places of the slots in which they are located.

The levers **7,8** are in such a position that they assume either the retaining position (FIG. **1**) or, upon passing through the deadpoint, the released position, under the effect of the pressure spring or of several pressure springs. This will be explained more in detail hereinafter with reference to the embodiment of FIGS. **1** and **2**.

In the retaining position of FIG. **1**, spring **11** presses the housing to the position illustrated by way of sleeve **13**, housing **4**, linkage position **A2**, levers **7,8** and the linkage point **A1**, while a downwardly directed force is exerted against the forward part of the housing. It can be seen that in this position the longitudinal axis **L1** of the first lever relative to the surface of the ski, which here corresponds to the bottom surface **1'** of the base portion, defines a smaller angle than the longitudinal axis **L2** of the second lever. At the same time the angles that are defined by these two levers with the surface of the ski open rearwardly. Besides, the first lever **7** is longer than the second lever **8**, and its longitudinal axis **L1** is disposed below the linkage location **A1** of the second lever and at the side walls **2**. The studs **16** or the ridges **18** are disposed in the center area of the slots **12**.

If an upwardly directed force P in accordance with the arrow in FIG. **1** is exerted on the sole depressing member **5**, the first lever **7** pivots upwardly about the pivot point **9** in counterclockwise direction until the angle α defined by the longitudinal axes **L1, L2** has become zero. With this the deadpoint position already explained is reached. It thereby pulls the housing somewhat upwardly, while it rocks upwardly simultaneously across the linkage point **A2** in the longitudinal direction of the ski against the force of the spring **11** until the explained deadpoint position has been reached. During this movement the linkage point **9** rests on a counterbearing which in this embodiment is defined by the upper end surface of the forward end wall **3**. When the deadpoint has been exceeded, the shorter lever **8** effects an arcuate movement in clockwise direction about the linkage axis or location **A1**, and the housing together with the sole retaining part and the stepping spur is pulled backward by the force of spring **11**. The height elasticity of the binding, i.e., the stretch which the sole retaining part and the stepping spur pass through from the retaining position until reaching the deadpoint position, is greater than in known heel retainers, for example 10—20 mm, and in given cases still more. While the linkage point **A2** passes through the area of angle α, the sole retaining part is not yet pulled back, but as explained above, it is pressed forwardly and thus keeps the boot firmly in any position of this section of movement. Since spring **11** is continuously pressed together more strongly until the deadpoint position is reached, the counter-pressure is also steadily increased. After exceeding the deadpoint the spring, the lever and the housing arrive suddenly in the release position of FIG. **2**, and thereby are displaced rearwardly under the effect of the spring. In this position the longitudinal axis **L1** of the first lever is above the linkage point **A1** and the stud **16**, or the ledges **18** are in engagement at the rearward end of the slots **12**.

In order to move the retainer backwardly out of the position of FIG. **2** into the position of FIG. **1**, the stepping spur **6** is employed. A catch is provided on the inside of the housing, for example a shoulder **21**, which is so arranged that as the housing is stepped on, it moves to the operating engagement against levers **7,8**, preferably at their common connecting link **9**. A further advantage of this arrangement resides in that the spring always remains in the same position in the lower area of the retainer. Thus, it is not moved up and down as the housing is rocked at its forward end, and thus it is not bent.

Furthermore, a hand release may be provided, which preferably acts against the lever **8**. In this connection an extension of this lever can itself serve as the hand release, so that by pressing down this extension (not shown), the linkage point **9** is moved out of the position of FIG. **1**, upwardly into the release position of FIG. **2**.

A further possibility for the hand release is illustrated in FIGS. **6—8**. The structural elements **1—16** shown there correspond exactly to the same structural elements of FIGS. **1** and **2**. In addition, a hand release lever **22** is provided which by means of the joint **9** is pivotally connected with the two levers **7,8**. Besides, lever **22** is supported against the linkage point **A1** or it engages the point **23** of lever **8** which is above it. By exerting a pressure force in accordance with arrow H

upon the hand lever **22**, the linkage point **9** is rocked clockwise about the linkage point **A1** until the dead-point is passed and the spring **11** further moves the retainer or its parts into the release position in accordance with FIG. **7**. The moving of the binding out of the release position into the retaining position of FIG. **6** is effected also here by pressing down the stepping spur **6**.

The section C—C in accordance with FIG. **8** shows in detail the construction and connecting of levers **7,8** of the linkage points or pivots **A1**, **A2** and **9**, as well as of the release lever **22**, which are here in the form of pins or bolts. In this arrangement the levers **7,8** may comprise a pair of levers. The upwardly extending lugs **2'** of the side walls **2** carry the linkage pin **A1**. A part of the ski is identified by S.

As to the rest of the retainer of the embodiments of FIGS. **1–5**, with the exception of the additionally provided hand release lever **22**, corresponds in section exactly to the illustration in accordance with FIG. **8**.

Having now described my invention with reference to the embodiments illustrated, what I desire to protect by letters patent is set forth in the appended claims.

1. Releasing heel retainer for ski binding comprising a base portion for securement on a ski, a housing having a forward end and a rearward end mounted on said base portion, a sole retainer and a stepping spur at said forward end of said housing, said housing having a portion extending rearwardly of said spur and above said base portion, an adjustable biasing spring extending in said base portion from proximate the forward end of said base portion to the rearward end of said base portion and said housing, means connecting the rearward portion of said housing with said spring, a linked lever joint having one arm pivotally connected at one axis to the forward end of said housing and having another arm pivotally connected to said base portion at another axis extending transversely of the longitudinal extent of the ski, said one arm and said other arm being pivotally connected to one another, and a sliding pivot connection means intermediate the rearward end of said housing and the rearward end of said base portion, said linked lever joint and said sliding pivot connection constituting with said housing a sliding crank device operative in response to pressure on said spring to permit upward movement of said housing, said sole retainer and stepping spur to heel releasing position.

2. Releasing heel retainer in accordance with claim **1**, where in the retaining position the longitudinal axis of said one arm defines a smaller angle with the bottom surface of said base portion than the longitudinal axis of said other arm and where the angles defined by both arms with said bottom surface open towards the rear.

3. Releasing heel retainer in accordance with claim **1**, where said one arm is longer than said other arm, and where in the retaining position the longitudinal axis of said one lever is below said one pivot axis connecting said second lever to said base portion.

4. Releasing heel retainer in accordance with claim **3**, where in the released position the longitudinal axis of said one arm is disposed above said other pivot axis defined between said second lever and said base portion.

5. Releasing heel retainer in accordance with claim **4**, comprising a shoulder inside said housing proximate said adjacent ends of said linked lever joint, said shoulder engaging said linked lever joint during movement of said housing from the released position to the retaining position.

6. Releasing heel retainer in accordance with claim **1**, where said biasing spring is a pressure spring disposed generally horizontally in said base portion in engagement at its forward end with a wall of said base portion and at its rearward end in engagement with said sliding pivot connection means.

7. Releasing heel retainer in accordance with claim **6**, comprising a sleeve around said spring proximate said other end of said base portion and a threaded member for engagement by said sleeve permitting adjustment of said sleeve.

8. Releasing heel retainer in accordance with claim **7**, where said threaded member is displaceably mounted on said base portion and rotatable relative to said housing.

9. Releasing heel retainer in accordance with claim **8**, comprising slots at the other end of said base portion and pins on said threaded member in engagement with said slots and bores in said housing for engagement by said pins.

10. Releasing heel retainer in accordance with claim **9**, where said threaded member is provided with laterally extending ridges in sliding engagement with said slots in said base member, said ridges presenting projections in engagement with said bores in said housing.

11. Releasing heel retainer in accordance with claim **10**, comprising a release member for operative engagement with said other arm.

12. Releasing heel retainer in accordance with claim **11**, where said release member is a manually operative member linked to said linked lever joint between said two arms and supported proximate said second pivot axis.

* * * * *