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SAFETY TOE IRON FOR SKI BINDINGS

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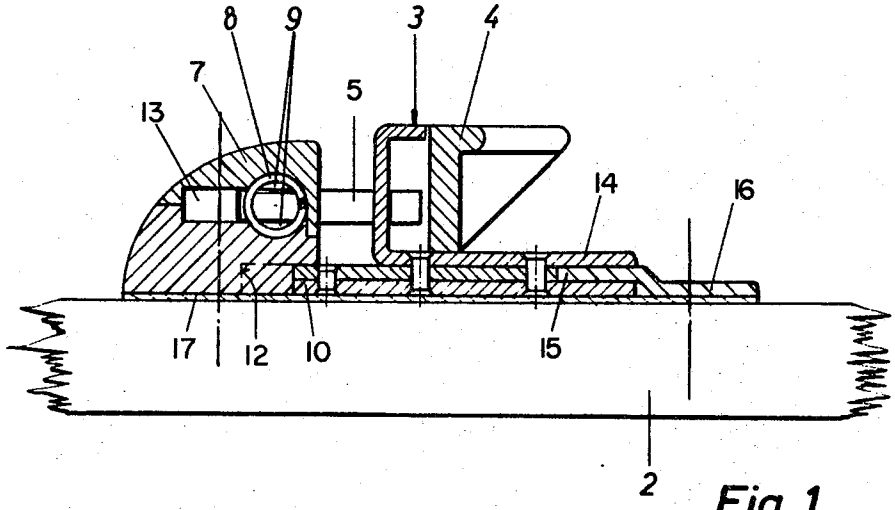

Fig. 1

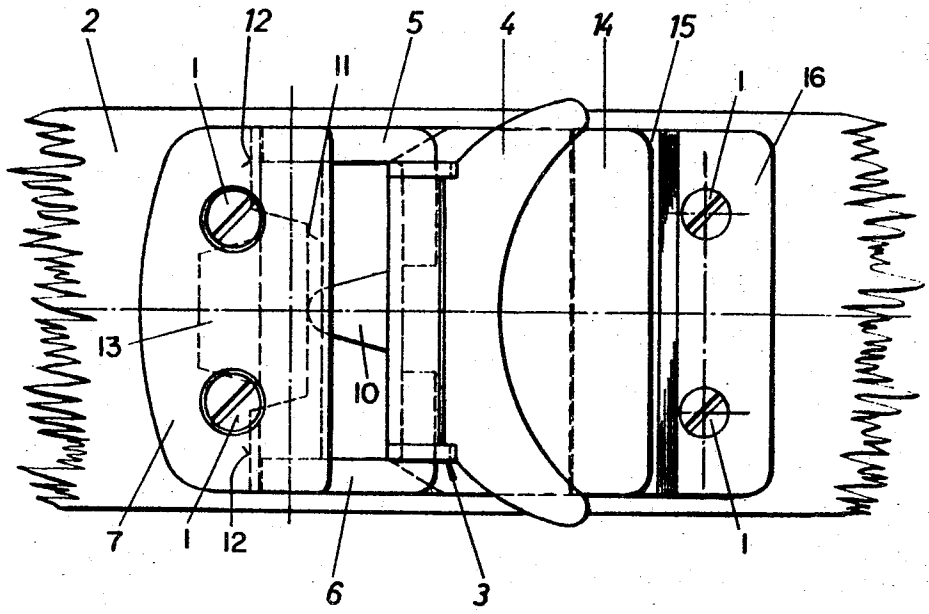

Fig. 2

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SAFETY TOE IRON FOR SKI BINDINGS

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ABSTRACT OF THE DISCLOSURE

The soleholder member is slidably mounted in a guide which extends transversely to the longitudinal direction of the ski and said soleholder member is movable in said guide against the force of at least one spring element and is movable forwardly after a predetermined transverse displacement. The spring element holds the soleholder member in its normal position and returns the soleholder member to said normal position when a displacement has been effected. The soleholder member comprises a pedal, which is arranged to engage the forward end portion of the sole of the skiing boot from below. The free end of the pedal is held on a toe iron member which is fixed to the ski. The free end of the pedal is held on said toe iron member with freedom of sliding movement in a plane which is parallel to the ski.

The present invention relates to safety toe irons for ski bindings, in which toe irons the soleholder member is slidably mounted in a guide which extends transversely to the longitudinal direction of the ski and said soleholder member is movable in said guide against the force of at least one spring element and is movable forwardly after a predetermined transverse displacement, the spring element holding the soleholder member in its normal position or returning the soleholder to said normal position when a displacement has been effected.

Compared to so-called ball-locked toe irons, in which a pivoted soleholder carrier is locked relative to a member which is fixed to the ski, such known toe irons have the feature that the forces which act obliquely or transversely to the longitudinal direction of the ski are resiliently taken up by a progressively increasing spring resistance. This feature is generally considered desirable.

In spite of the above-mentioned advantage, these toe irons have not yet been successful in practice because they do not solve the problem of eliminating or at least reducing the friction between the sole of the skiing boot and the ski. In order to reduce the friction between the sole of the skiing boot and the ski, special plates of friction-reducing material have been used; these plates are mounted on the surface of the ski in a stationary position or with a limited freedom of movement. For an adequate function, stationary slide plates are relatively expensive because materials having a low coefficient of friction are highly expensive. The slide plates which are movably mounted on the ski consist of less expensive materials but are more liable to be deranged than the stationary slide plates.

It is an object of the present invention to find a satisfactory solution in this respect.

Specifically, it has been an object of the invention to eliminate or satisfactorily control the above-mentioned friction without need for the previously usual slide plates so that the way is opened for the use in practice of the safety toe irons of the kind described first hereinbefore.

In a safety toe iron for ski bindings, in which the soleholder member is slidably mounted in a guide which extends transversely to the longitudinal direction of the ski and said soleholder is movable in said guide against the force of at least one spring element and is movable forwardly after a predetermined transverse displacement, the spring element holding the soleholder in its normal position or returning the soleholder to said normal position when a displacement has been effected, this object is accomplished according to the invention in that the soleholder member comprises a pedal, which is arranged to engage the forward end portion of the sole of the skiing boot from below and the free end of said pedal is held on a toe iron member which is fixed to the ski, said free end of the pedal being held on said toe iron member with freedom of sliding movement in a plane which is parallel to the ski.

That end face of the free end of the pedal which extends transversely to the longitudinal direction of the ski comprises desirably a groove, which is parallel to the ski and which is engaged by a guide strip of the toe iron part which is fixed to the ski. To enable a simple and inexpensive manufacture of the toe iron, it has proved desirable to provide the groove in a length which corresponds to the width of the pedal.

An embodiment of the invention will now be described more fully and by way of example with reference to the accompanying drawing, in which:

FIG. 1 is a central longitudinal sectional view showing a safety toe iron, and

FIG. 2 is a top plan view showing the toe iron of FIG. 1.

The safety toe iron according to the invention which is shown on the drawing is secured to the ski **2** by means of four screws **1** (FIG. 2). The toe iron comprises a soleholder member **3** having a soleholder **4** proper, which is adjustable in height for adaptation to skiing boot soles differing in thickness. This adjustment is known per se and will not be described in detail. At its two lateral ends, the soleholder member **3** has two arms **5**, **6**, which extend toward the tip of the ski and engage the end faces of a helical compression spring **8**. The spring **8** extends transversely to the longitudinal direction of the ski and is mounted in a toe iron member **7**, which is fixed to the ski. Stops **9** are provided above and below each of the arms **5** and **6** and serve to hold the helical compression spring in the toe iron member **7**. The helical compression spring is under a sufficiently large initial stress and holds the soleholder member **3** in its normal position.

In its normal position, a nose **10** of the soleholder member **3** bears on a guiding surface **11** of the toe iron part **7** which is fixed to the ski when there is a skiing boot in the binding. At both ends of the guiding surface **11**, the latter is offset at **12** toward the tip of the ski to an extent which determines the range of movement of the soleholder member toward the tip of the ski. For a reason which will be described in detail below, the transition is not in the form of a right-angled step. On the level of the arms **5**, **6**, the toe iron member **7** that is secured to the ski has a central horizontal recess **13**, which serves to receive one of the arms when the soleholder member is displaced toward the tip of the ski.

According to the invention, the soleholder member **3** comprises a pedal **14**, which serves to engage the forward end portion of the sole of the skiing boot from below. That end face of the free end of the pedal which is transverse to the longitudinal direction of the ski has a groove which is parallel to the ski and which receives a guiding strip **15** of a toe iron member **16** which is fixed to the ski. The toe iron members **7** and **16** which are fixed to the ski are interconnected by a relatively thin spacing plate **17**. This plate consists of a material having a low coefficient of friction. During a transverse displacement of the soleholder member **3**, the latter is positively guided. The materials of the parts which slide on each other may be selected for minimum friction. Besides, at least two rolling elements may be provided betwen the pedal **14**,

specifically, between the bottom of its transverse groove, and the end face of the guiding strip **15**. In the present embodiment, in which the length of the groove corresponds to the width of the pedal **14**, the rolling elements will suitably be provided in the pedal at the ends of the groove. Alternatively, a backing roller may be mounted at the free end of the nose **10** so that the soleholder member **3** can roll on the guiding surface **11**.

If the soleholder member **3** is subjected to a force acting transversely to the longitudianl direction of the ski and overcoming the initial stress of the spring **8**, said force will cause the soleholder member to be displaced transversely to the longitudinal direction of the ski so that the spring **8** is more highly stressed. As the force decreases, the soleholder member under the action of the spring **8** automatically returns to its intermediate position. If the soleholder member **3** is subjected to a force which is dangerous to the leg of the skier, the soleholder member will be tranversely displaced initially by one half of the length of the guiding surface. Owing to the step **12**, the soleholder member will subsequently be displaced toward the tip of the ski so that the skiing boot is released by the soleholder **4**. Owing to the oblique transition between the guiding surface **11** and the step **12**, the spring **8** can automatically return the soleholder member **3** to its normal position when the skiing boot has been released.

I claim:

1. A safety toe iron for ski bindings comprising: toe iron means fixed to a ski and serving as a mount for a soleholder; soleholder means mounted on said toe iron means and slidably guided thereby in a direction transverse to the longitudinal dimension of the ski and in a plane parallel to the ski; a biasing spring for urging said soleholder means toward a rest position and for returning said soleholder to its rest position; said soleholder means

comprising a pedal of substantial width provided in the rearward portion of said soleholder means and serving to support the forward region of the skiing boot at the bottom thereof; first guide means for guiding the forward region of said soleholder means, said guide means being of such a configuration that said soleholder means is guided in a direction transverse to the longitudinal dimension of the ski until a predetermined transverse displacement of said soleholder means and is then guided in a direction parallel to the longitudinal dimension of the ski after said predetermined transverse displacement; and second guide means for guiding said pedal in a direction transverse to the longitudinal dimension of the ski.

2. The toe iron recited in claim **1**, wherein the rearward portion of said pedal extends transverse to the longitudinal dimension of the ski and has a transverse groove defined therein, and wherein said toe iron member is provided with a transverse guiding strip adapted to engage in said transverse groove thereby guiding said soleholder means in a direction transverse to the longitudinal dimension of the ski.

3. The safety toe iron defined in claim **2**, wherein the length of said transverse groove is substantially equal to the width of said soleholder means.

4. The toe iron recited in claim **1**, wherein the rest position of said soleholder means is substantially centered with respect to said toe iron means.

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