The anti-friction pad disclosed herein provides a broad upper surface of a low friction material which prevents vertical loading between a skier's boot and the ski from introducing a corresponding increase in the lateral force required to release the ski binding. The anti-friction material is partially recessed in a carrier which prevents it from being lifted from the ski or cut. Further, the carrier is tapered so the angle of the anti-friction upper surface matches the normal inclination of the ski boot sole, thereby minimizing friction. Still further, the elevation of the pad is sufficient to permit the boot toe to rock out from under the toe binding during forward falls.

4 Claims, 4 Drawing Figures
ANTI-FRICTION PAD FOR SKIS

BACKGROUND OF THE INVENTION

This invention relates to an anti-friction pad for skis providing and increased margin of safety.

It has for some time been recognized that the effectiveness of many types of ski bindings in preventing injury may be substantially negated under certain circumstances in which there is a substantial vertical load between the skier's boot and the ski itself. An increased vertical loading, e.g., such as that developed by turning, may produce a frictional force which opposes lateral movement of the skier's boot with respect to the ski. This frictional force may in fact reach a value many times the theoretical preset binding release force.

Among the several objects of the present invention may be noted the provision of an anti-friction pad for use on a ski beneath the skier's boot which substantially reduces frictional forces resisting lateral movement in the presence of vertical load; the provision of such a pad which is highly reliable and which is durable; the provision of such a pad which facilitates binding release in any mode of operation or type of fall; and the provision of such a pad which is of relatively simple and inexpensive construction. Other objects and features will be in part apparent and in part pointed out hereinafter.

SUMMARY OF THE INVENTION

Briefly, the anti-friction pad of the present invention employs a uniform thickness plate of an anti-friction material such as polytetrafluoroethylene recessed into a tapered base or holder of a cut-resistant polymer. Preferably, the pad is substantially the full width of the ski and of greater length than width so as to provide a broad surface area.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view in elevation of a ski with bindings and ski boot attached, showing the location of the anti-friction pad of the present invention;

FIG. 2 is a transverse sectional view taken substantially on the line 2-2 of FIG. 1;

FIG. 3 is a longitudinal sectional view taken substantially on the line 3-3 of FIG. 2; and

FIG. 4 is a plan view of the pad and ski of FIG. 1.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, there is indicated at 11 a ski provided with heel and toe bindings, 13 and 15 respectively. A ski boot 17 is shown retained in the bindings 13 and 15. As is understood by those skilled in the art, modern ski boots typically comprise an essentially rigid sole, indicated at 19, which the bindings engage and hold with a preselectable release force. As is also understood, the operation of most ski bindings causes the boot heel to be slightly elevated with respect to the top surface of the ski. An anti-friction pad constructed in accordance with the present invention is indicated generally at 21 and is positioned so as to be located beneath the ball of the skier's foot.

With reference to FIG. 2, it may be seen that pad 21 comprises a uniform thickness plate 23 of an anti-friction material such as polytetrafluoroethylene (PTFE) set into a close fitting recess 25 in a base or holder 27 molded of a cut- and abrasion-resistant polymer. The thickness of the plate 23 is in the order of 0.030 inches while the depth of the recess is in the order of 0.020 inches. As may be seen in FIG. 2, the pad 21 is, except for minimal margins, the width of the ski 11, i.e., a width greater than two inches. Likewise, as may be seen in FIG. 3, the length of the pad is at least equal and preferably slightly greater than its width, i.e., a length greater than 3 inches. One advantage of the relatively broad area of the plate 23 is that a significant contact area is provided to transmit the feel of the ski action to the skier without any sponginess or squishy feeling.

As may be seen in FIG. 3, the base 27 is tapered from back to front so that the rearmost edge of the low friction material 23 is somewhat higher than the front edge. This inclination or taper is in the order of one part in seventy. This causes the upper surface of the low friction plate to mate closely with the normal inclination of the boot sole 19. This close mating of the upper surface of the friction-reducing pad 23 with the lower surface of the boot sole 19 facilitates the transmission of ski "feel" as noted previously and also tends to reduce friction between the boot and the pad by providing as large a surface contact as possible so that the chance that interlocking deformation will occur between the boot sole and the anti-friction plate is reduced.

As indicated previously, the base 27 is preferably molded of a cut- and abrasion-resistant polymer such as urethane. A preferred material is that sold under the trade name Texin 355D by the Mobay Chemical Co. of Pittsburgh, Pennsylvania. This material has a durometer value of 55 on the Shore D scale.

In the embodiment illustrated, the anti-friction plate 23 is adhesively attached to the base 25 by pressure-sensitive adhesive means such as a double-backed adhesive tape or adhesive film. The entire pad 21 is likewise bonded to the ski by the same means. A suitable adhesive material is that sold by the 3M Company of Minneapolis, Minnesota, under the type designation Y-9408. This material comprises an adhesive on a polyester film carrier together with one or two protective covers. The bottom surface of the low friction plate 23 is etched in conventional manner to permit a sound adhesive bond to be obtained. In manufacturing the ski pads, the protective layer is left on the adhesive material at the bottom of the holder 27 until the pad is ready to be applied to the ski with which it is to be used.

In addition to providing the desirable inclined orientation as described previously, the base 27 serves to protect the anti-friction plate 23 in use. As is understood, the steel edges of one ski may be expected to frequently contact and abrade the other ski and boot, particularly in racing when a skier falls and the boot is released from the binding. By selecting the holder material for its cut-resistant and abrasion-resistant properties, the anti-friction pad can be made quite long lasting even under heavy usage. Since the relatively easily cut polytetrafluoroethylene plate 23 is recessed into this tougher base, chances of this pad being lifted by contact with a ski edge or other sharp edge are greatly reduced.
Also in addition to providing the desirable inclined orientation of the anti-friction plate 23 as described previously, the overall thickness of the base 27 is selected to provide a sufficient total height so that the toe of the ski boot 17 is raised from the surface of the ski. Thus, in a forward fall where the skier’s heel comes loose first and the toe must then come out of the toe binding 15, clearance is provided by rocking over the front edge of the pad so that the front of the sole 19 rotates downward about the anti-friction plate 23 as an axis and is not caught under the binding 15. An overall thickness at the front of the pad in the order of 1/8 inch is preferred.

In view of the foregoing, it may be seen that several objects of the present invention are achieved and other advantageous results have been attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it should be understood that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An anti-friction pad for use between a skier’s boot and a ski provided with heel and toe binding to facilitate release of the boot from the bindings under vertical load, the heel of the boot being raised relative to the toe by the heel binding, said pad comprising:
   a uniform thickness, generally rectangular plate of polytetrafluoroethylene, said plate being greater than two inches wide and of length not less than the width;
   a base molded of a cut- and abrasion-resistant polymer supporting said plate, said plate being adhesively joined to said base, said base being tapered from back to front at a rate of about one part in seventy to cause the upper surface of said plate to mate with the bottom of said boot.

2. An anti-friction pad for use between a skier’s boot and a ski provided with heel and toe binding to facilitate release of the boot from the bindings under vertical load, the heel of the boot being raised relative to the toe by the heel binding, said pad comprising:
   a uniform thickness, generally rectangular plate of polytetrafluoroethylene, said plate being greater than two inches wide and of greater length than width;
   a base molded of a cut- and abrasion-resistant polymer, said base having in its upper surface a shallow recess contoured to closely fit said plate and to receive a portion only of the thickness of said plate whereby said plate projects substantially above said base to present an anti-friction surface to the skier’s boot, said plate being adhesively joined to said base, the bottom surface of said polytetrafluoroethylene plate being etched to facilitate an adhesive bond, said base being tapered from back to front at a rate of about one part in seventy to cause the upper surface of said plate to mate with the bottom of said boot, the thickness of said pad at the front being in the order of one-eighth inch permitting the boot toe to rock downwardly with respect to the toe binding when the heel binding is released.

3. In a ski provided with a toe binding which retains the toe of the boot and a heel binding which retains the heel of the boot at a location raised relative to the toe, an anti-friction pad to facilitate release of the bottom from the bindings under vertical load, said pad comprising:
   a uniform thickness, generally rectangular plate of polytetrafluoroethylene, said plate being greater than two inches wide and about 3 inches in length;
   a base molded of a cut- and abrasion-resistant polymer, said base having in its upper surface a shallow recess contoured to closely fit said plate and to receive a portion only of the thickness of said plate whereby said plate projects substantially above said base to present an anti-friction surface to the skier’s boot, said plate being adhesively joined to said base, the portion of said base around said recess forming a rim protecting said plate from being lifted from said base.

4. An anti-friction pad for use between a skier’s boot and a ski provided with heel and toe binding to facilitate release of the boot from the bindings under vertical load, the heel of the boot being raised relative to the toe by the heel binding, said pad comprising:
   a uniform thickness, generally rectangular plate of polytetrafluoroethylene, said plate being greater than two inches wide and greater than three inches in length;
   a base molded of a urethane polymer, said base having in its upper surface a shallow recess contoured to closely fit said plate and to receive a portion only of the thickness of said plate whereby said plate projects substantially above said base to present an anti-friction surface to the skier’s boot, the portion of said base around said recess forming a relatively narrow rim protecting said plate from being lifted from said base, said plate being joined to said base by a pressure-sensitive adhesive material, the bottom surface of said polytetrafluoroethylene plate being etched to facilitate an adhesive bond, said base being tapered from back to front at a rate of about one part in seventy to cause the upper surface of said plate to mate with the bottom of said boot, the thickness of said pad at the front being in the order of one-eighth inch permitting the boot toe to rock downwardly with respect to the toe binding when the heel binding is released.

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