

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Carl F. Ettlinger et al.

Serial No.: Not yet assigned

Filed: Herewith

Title: ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR
INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

Examiner: Not yet assigned

Group No.: Not yet assigned

Attorney Docket No.: 12219-00001

**POWER OF ATTORNEY BY ASSIGNEE AND
CERTIFICATION UNDER 37 CFR 3.73(b)**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

As joint partners of Vermont Safety Developments ("assignee"), a Vermont partnership and joint venture between Composite Developments, Inc., a Vermont corporation, and Vermont Ski Safety Equipment, Inc., a Vermont corporation, we hereby certify that to the best of our knowledge and belief Vermont Safety Developments is the assignee of the entire right, title and interest in and to the above-referenced patent application, and represent that the undersigned are representatives authorized and empowered to sign on behalf of the assignee.

We have reviewed the assignment document that evidences the placement of title in the assignee, a true and accurate copy which is attached hereto, and understand and believe that this assignment document will be or has been submitted for recordation in the U.S. Patent and Trademark Office.

Assignee hereby appoints on its behalf the following patent attorney to prosecute the patent application identified above and to transact all business in the Patent Office connected therewith:

LAWRENCE H. MEIER, ESQ., Registration No. : 31,446
MORGAN S. HELLER II, ESQ., Registration No. : 44,756

Pursuant to 37 C.F.R. § 3.71, the assignee hereby states that prosecution of the above-referenced patent application is to be conducted to the exclusion of the inventors.

P226-02/04

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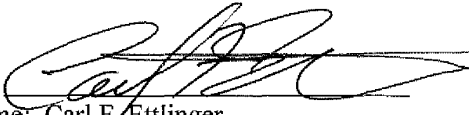
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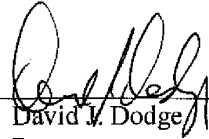
The undersigned hereby declare that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 6 day of August, 2007.

ASSIGNEE:

VERMONT SAFETY DEVELOPMENTS

By: 
Name: Carl F. Ettlinger
Title: Partner

By: 
Name: David V. Dodge
Title: Partner

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FIG. 1

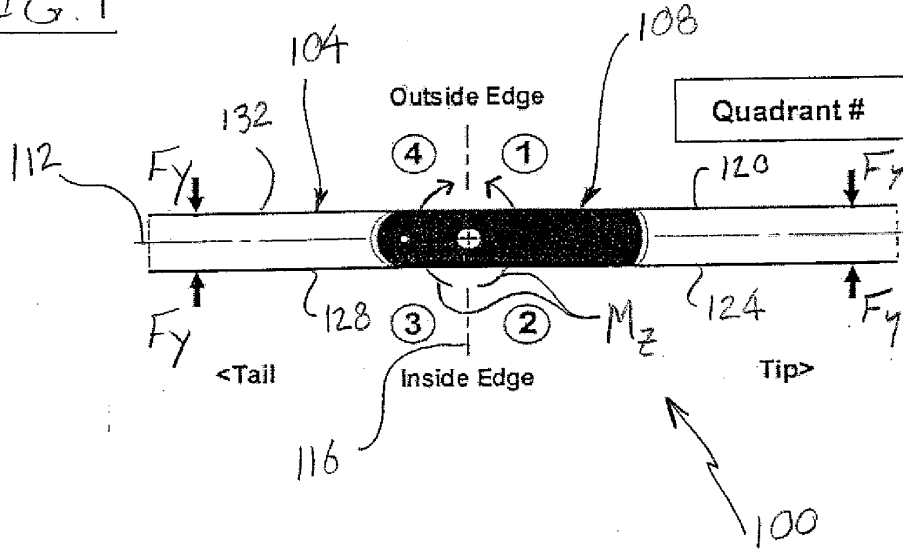
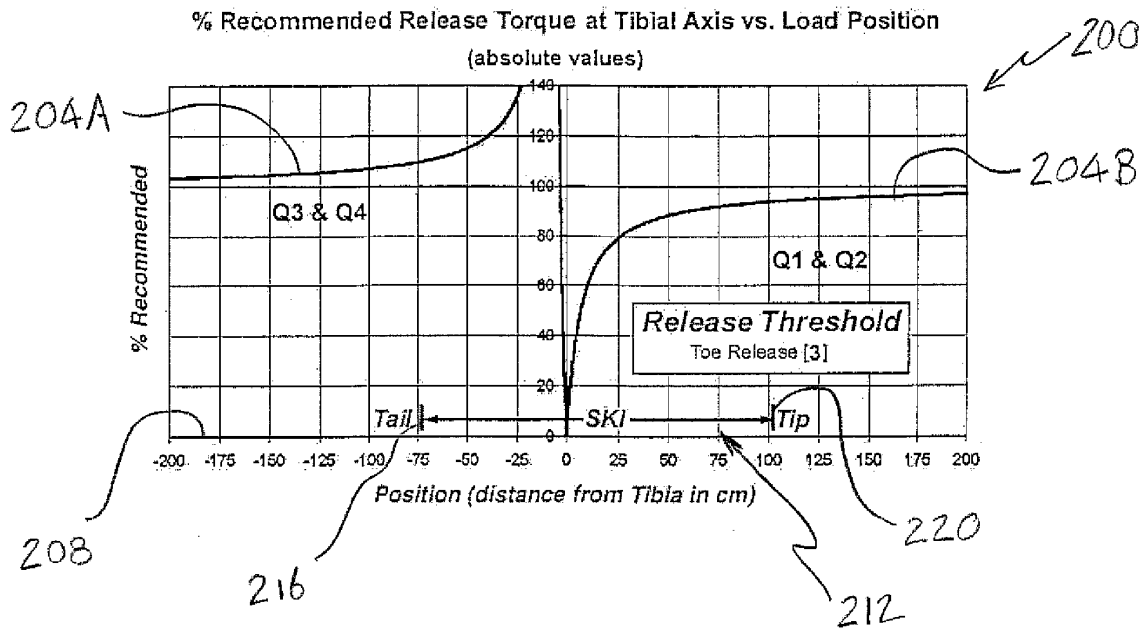


FIG. 2



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FIG. 3

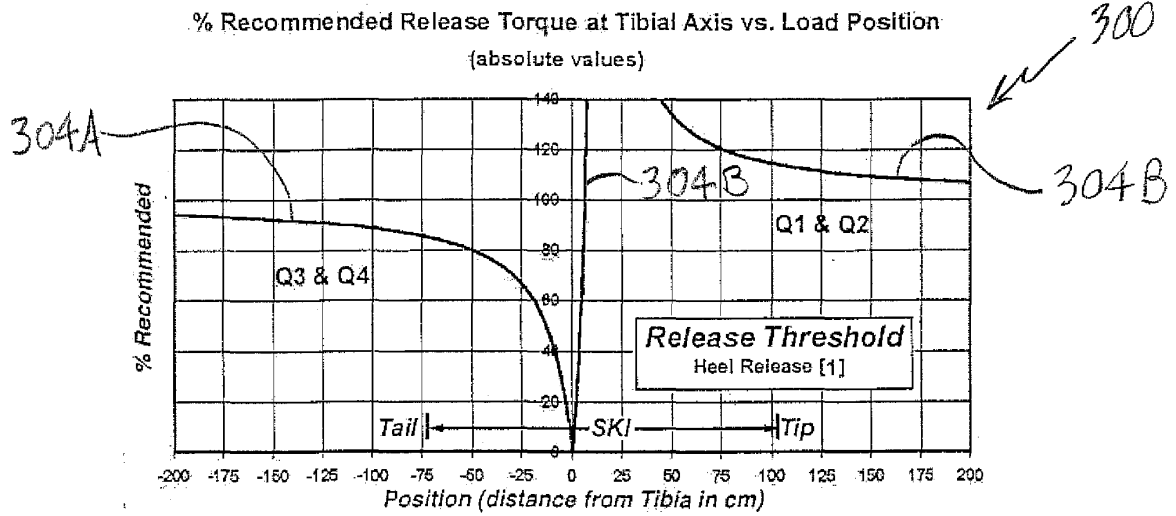
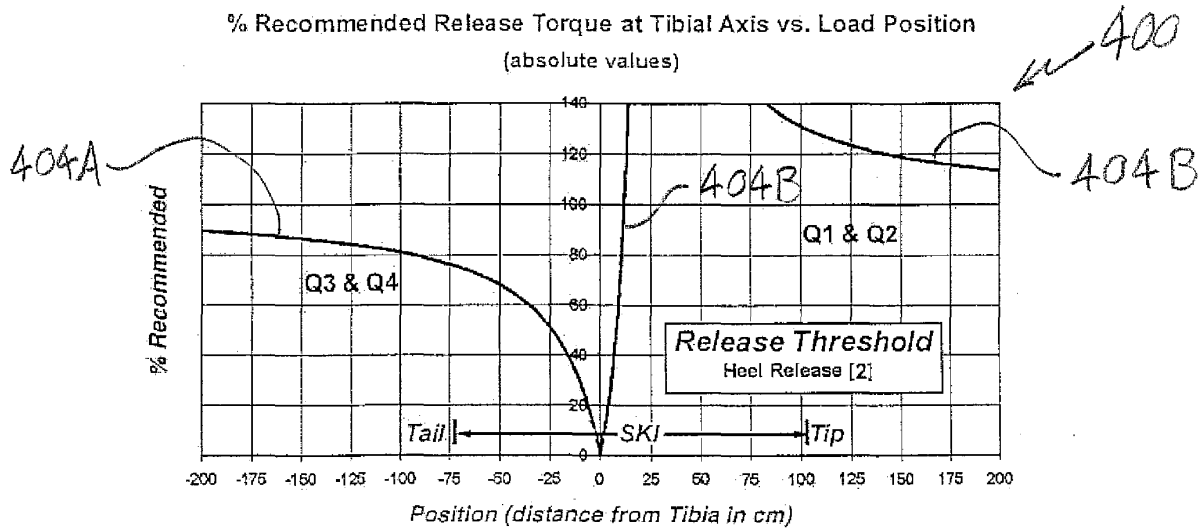


FIG. 4



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FIG. 5

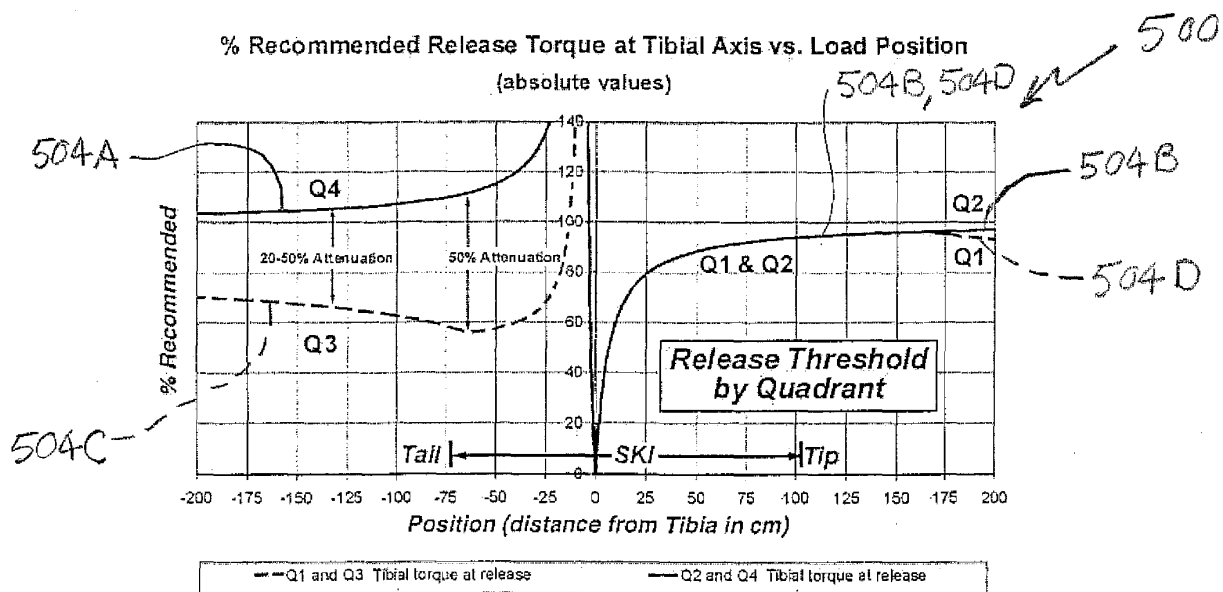


FIG. 6

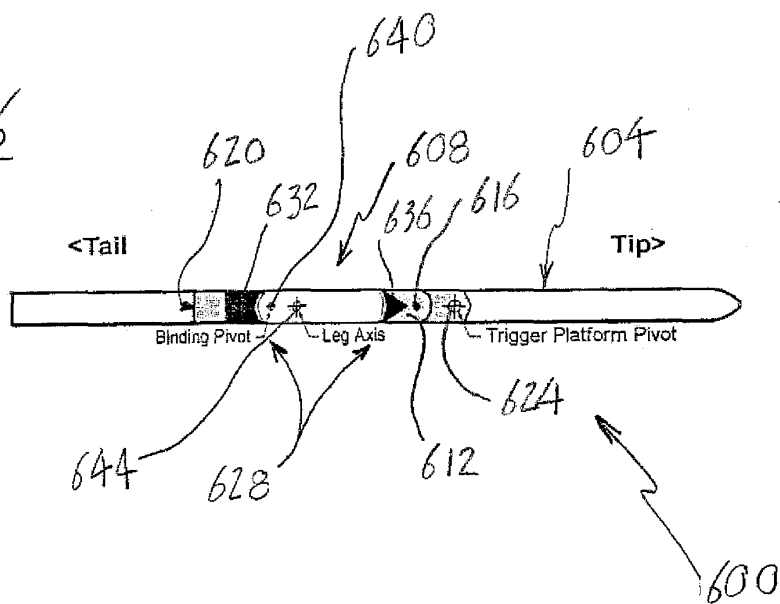


FIG. 7

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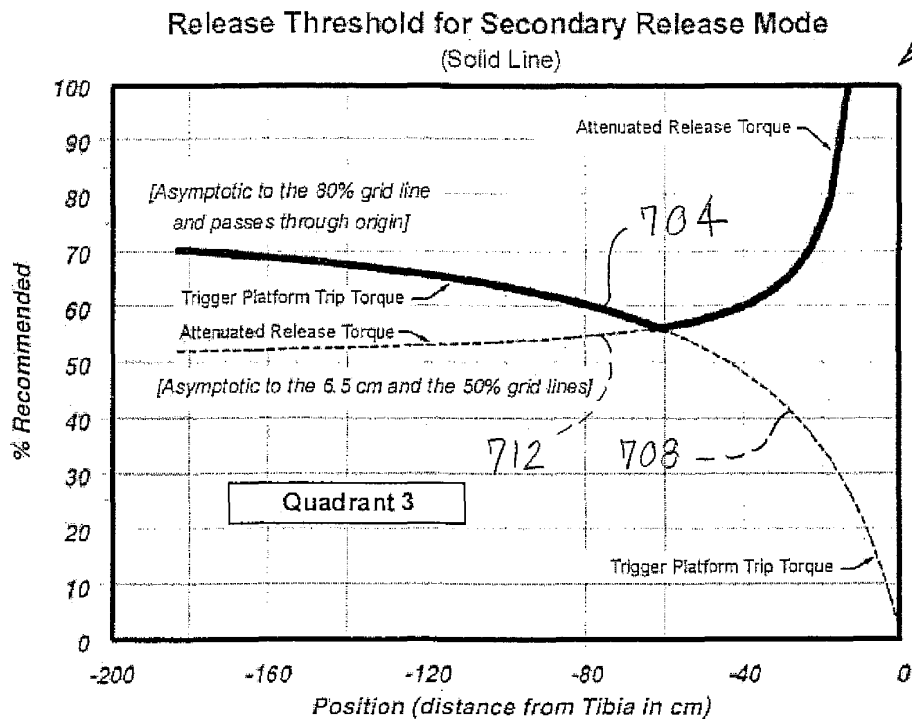
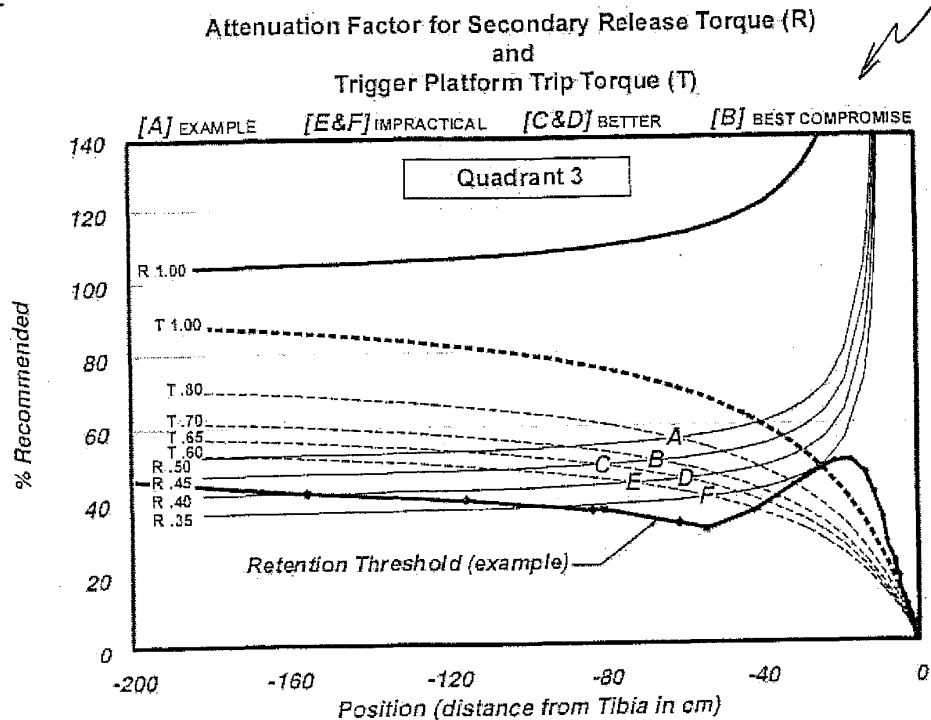
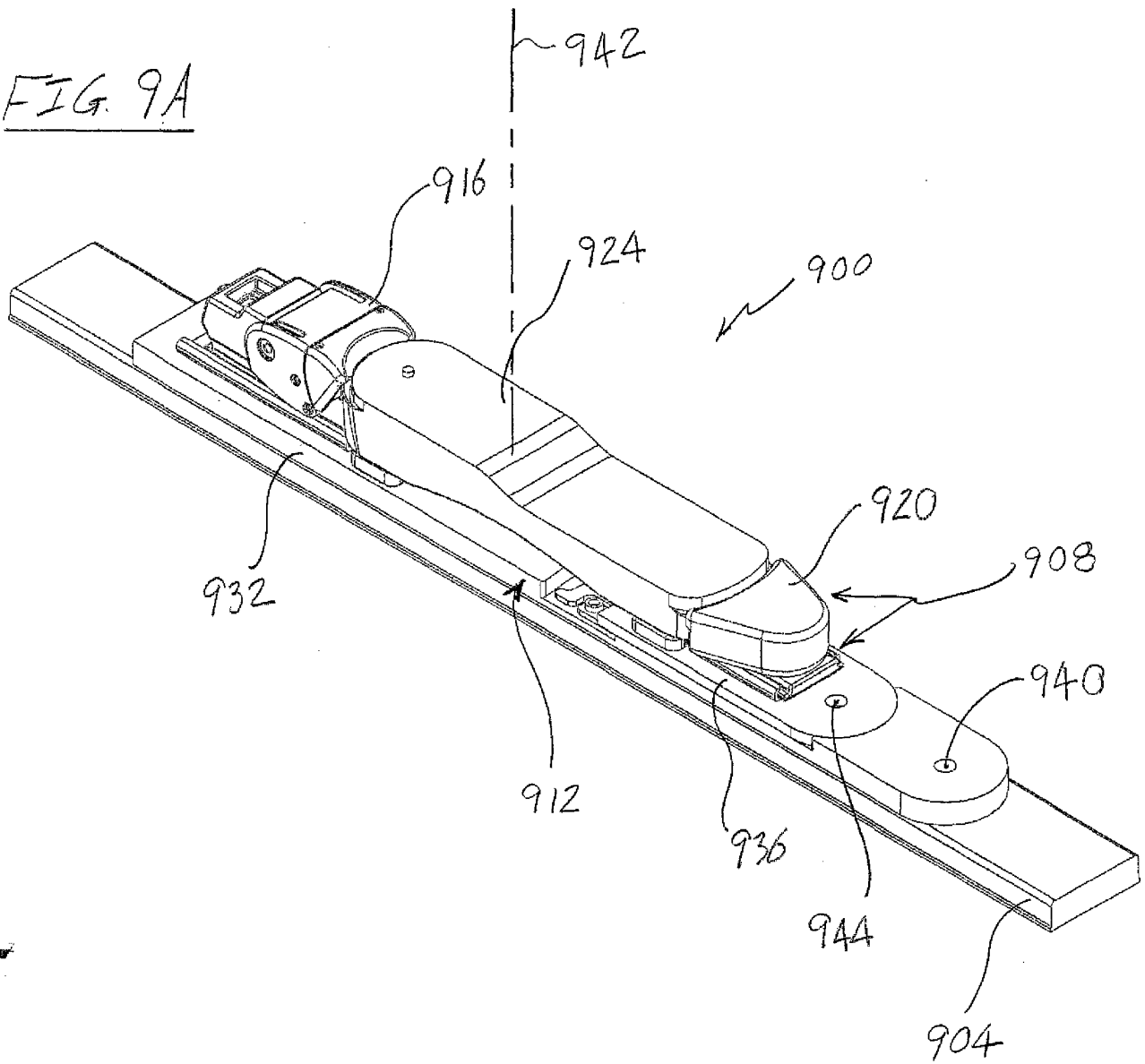


FIG. 8

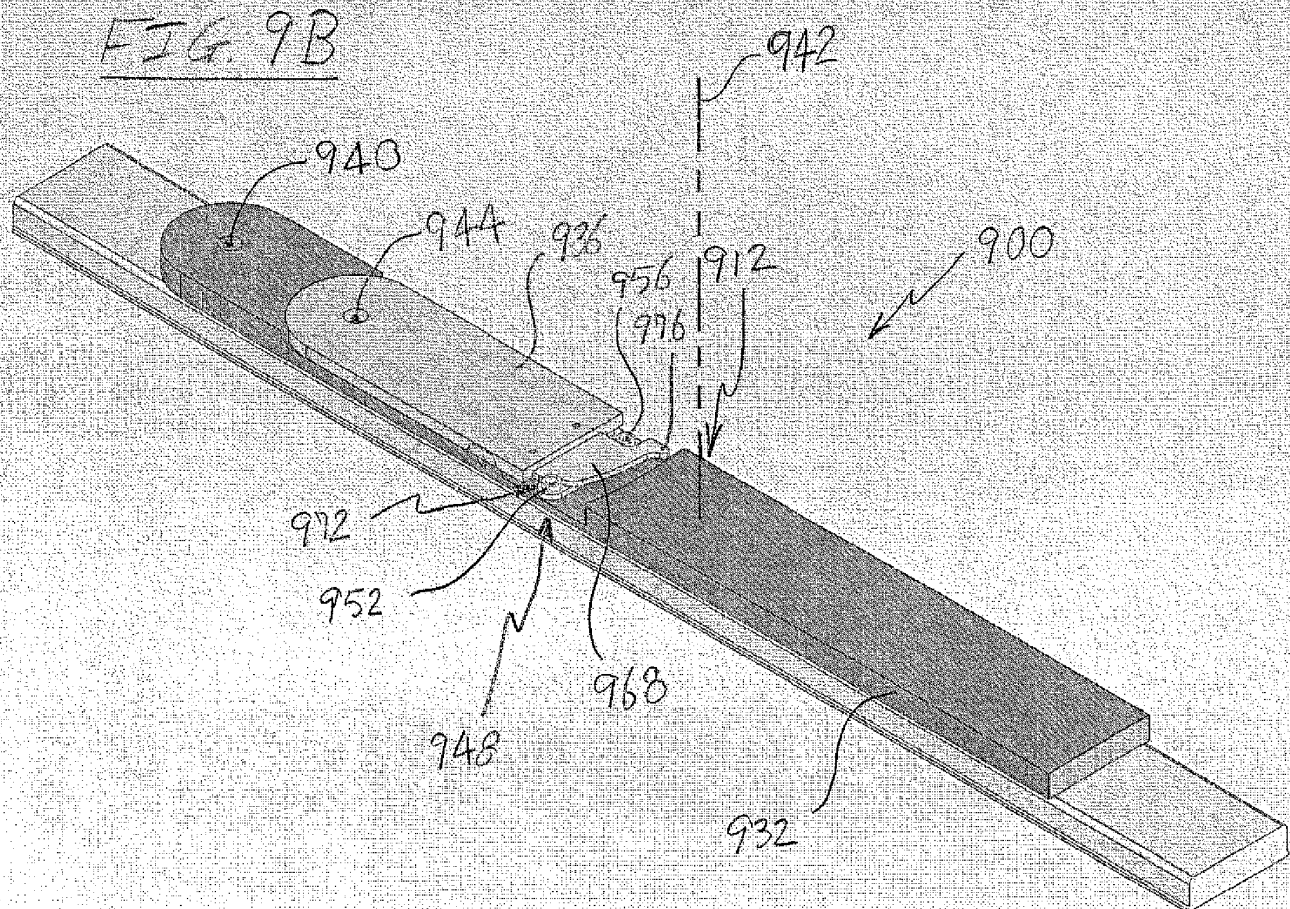


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FIG. 9A



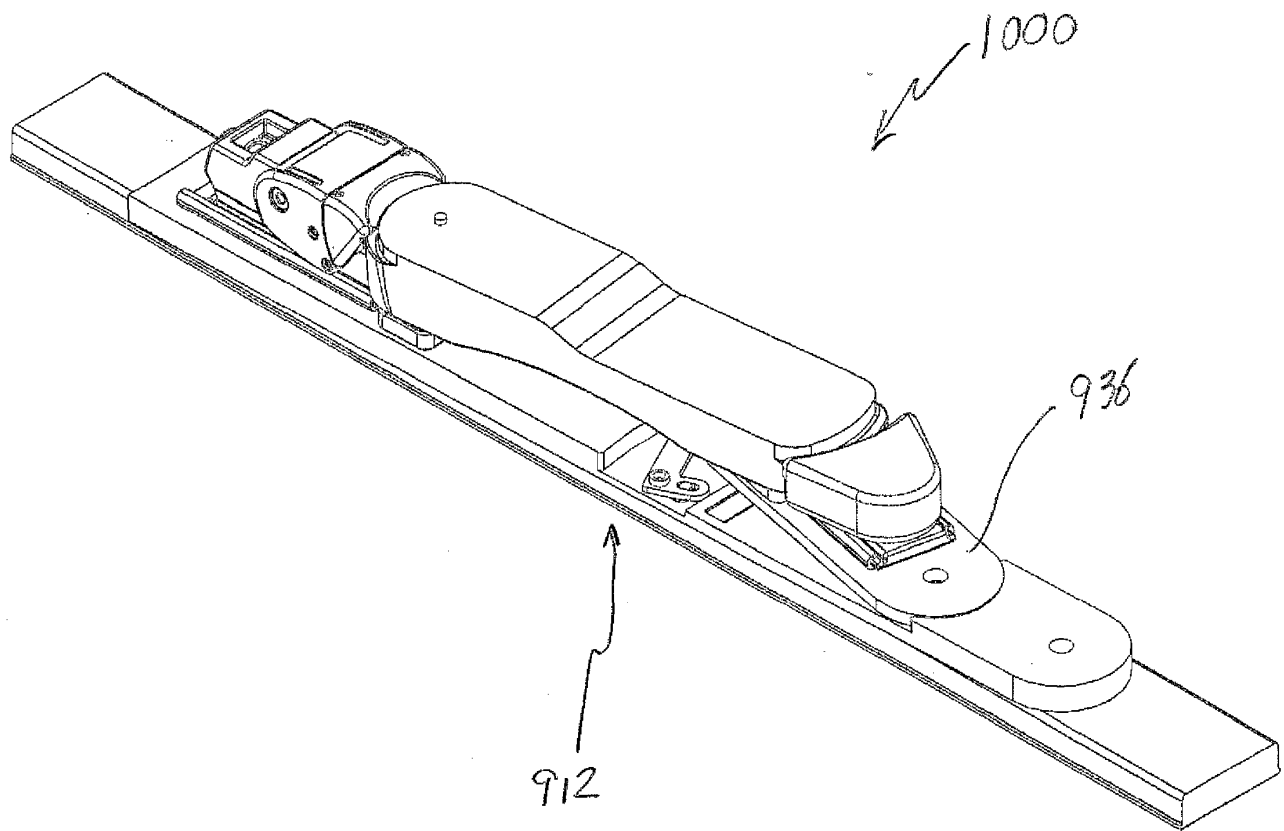
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This is rotated 180°
relative to FIG. 9A.

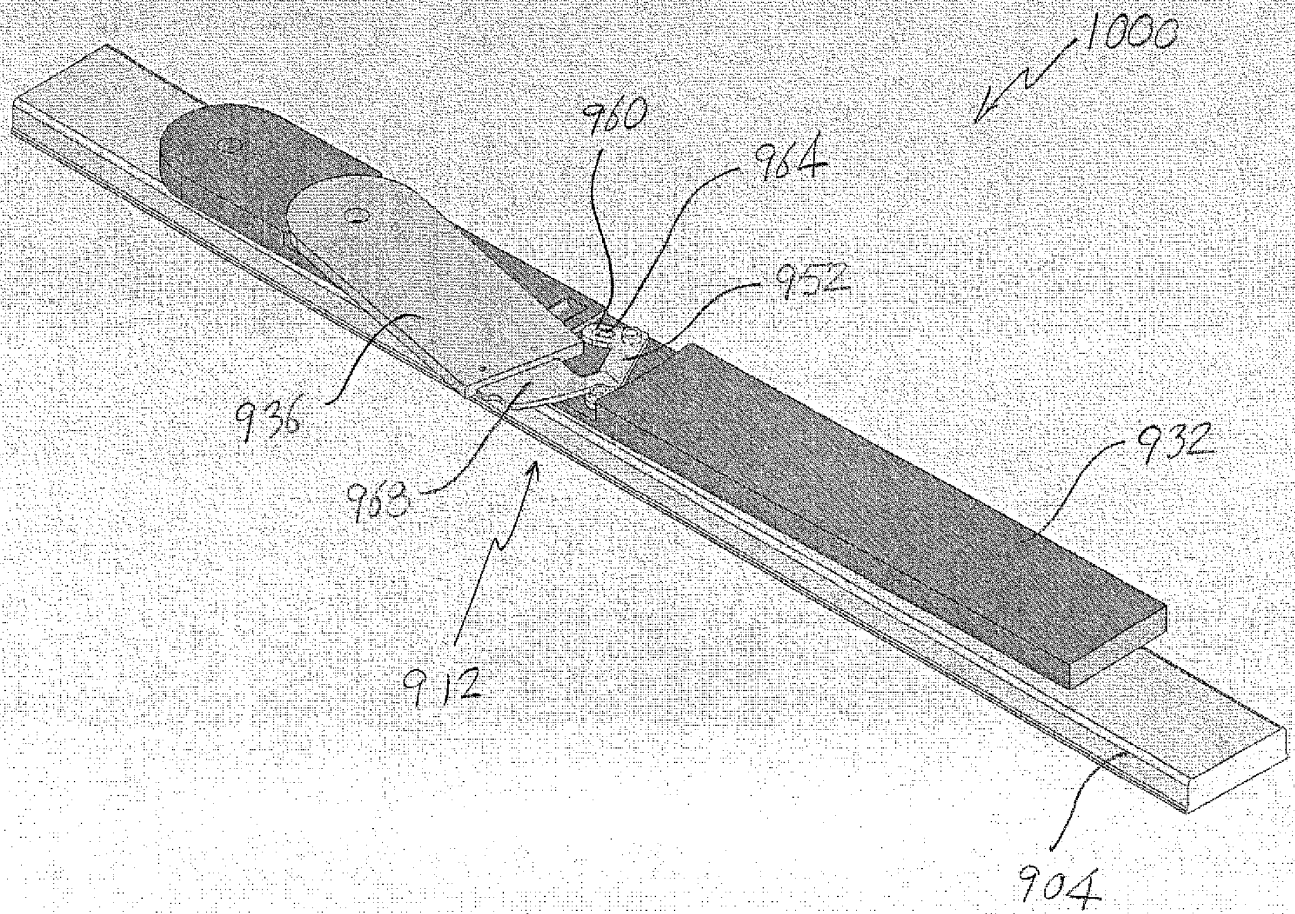
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FIG. 10A

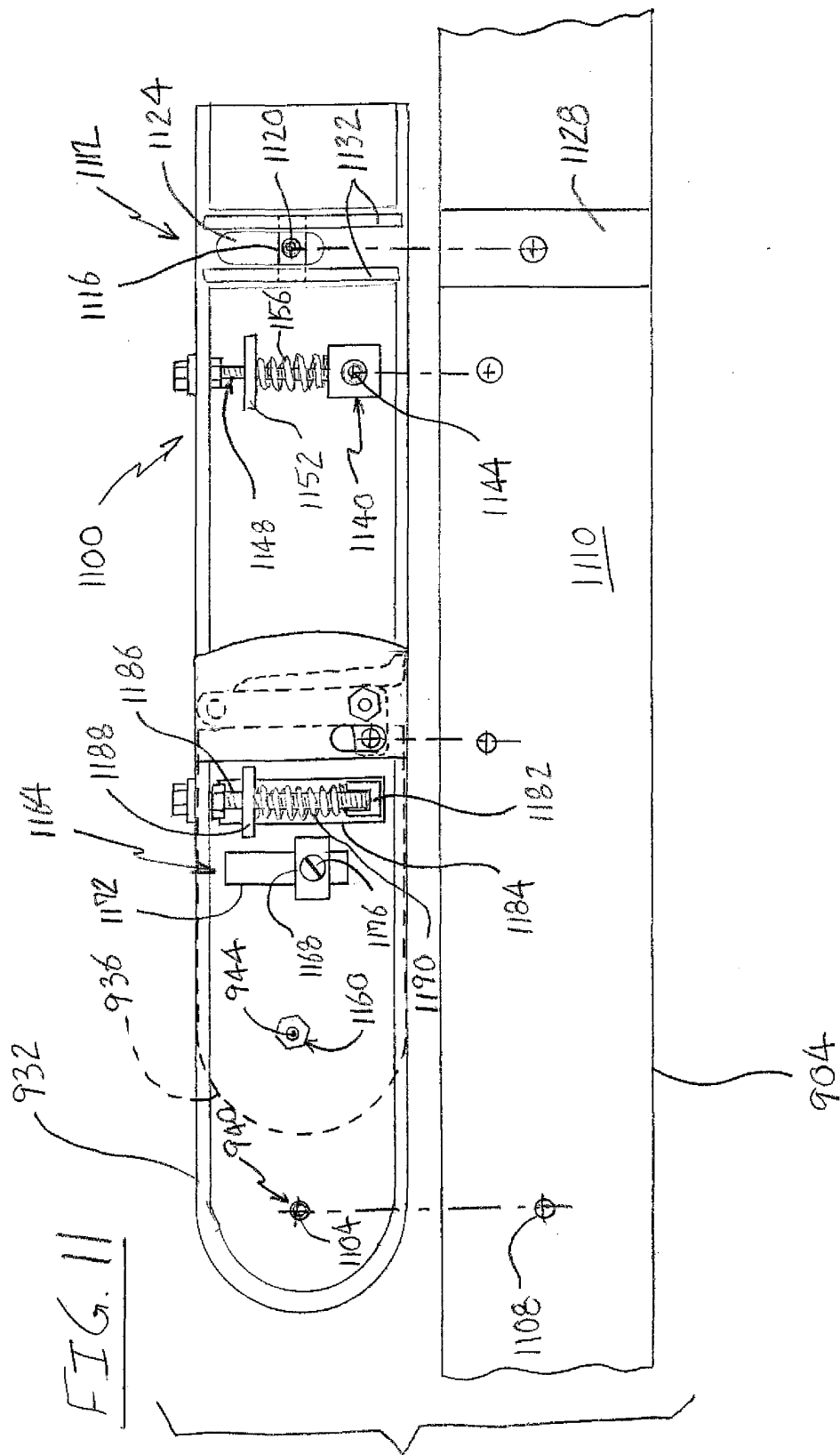


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FIG. 10B

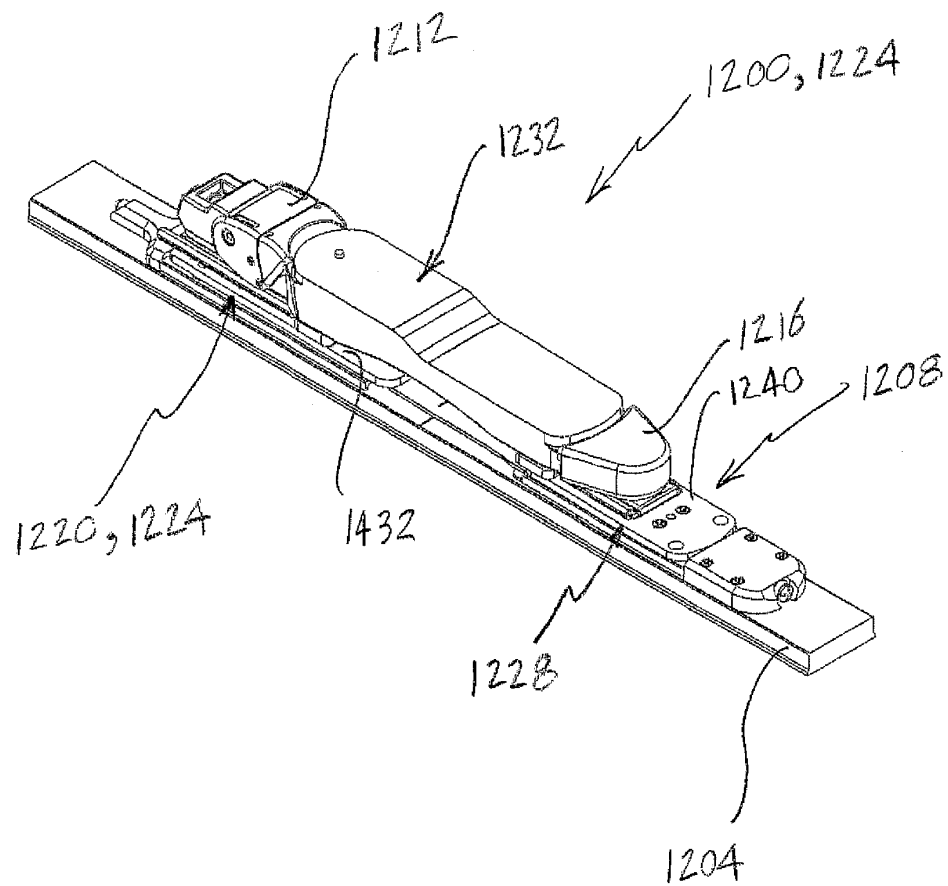


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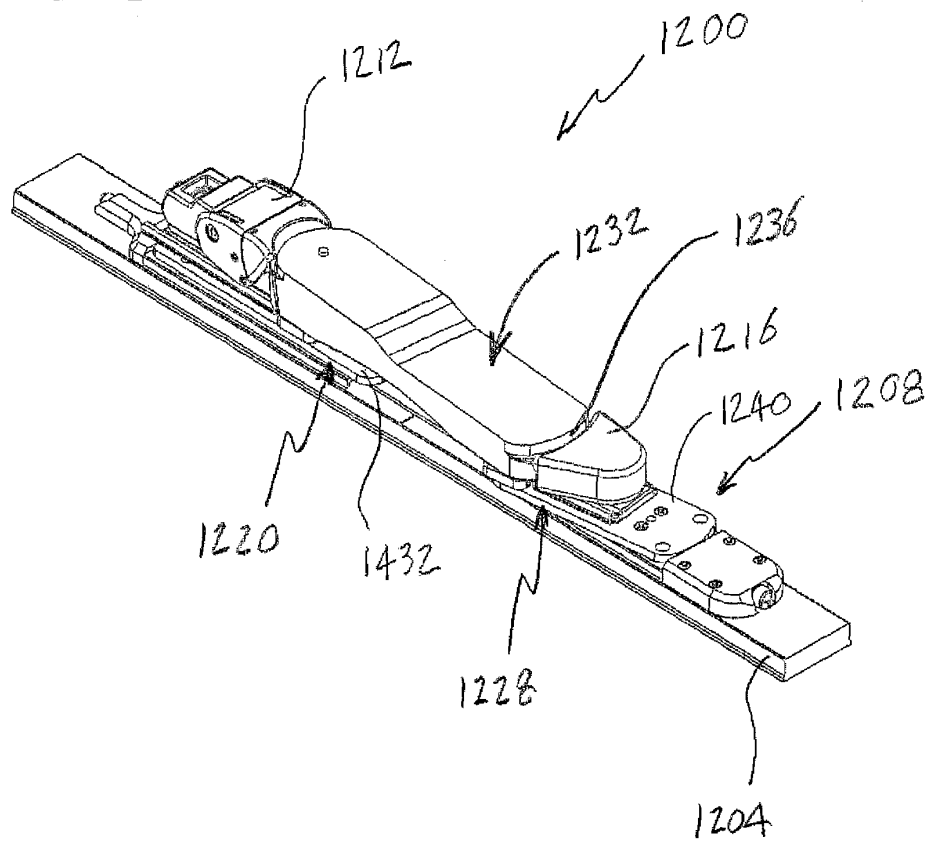
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FIG. 12



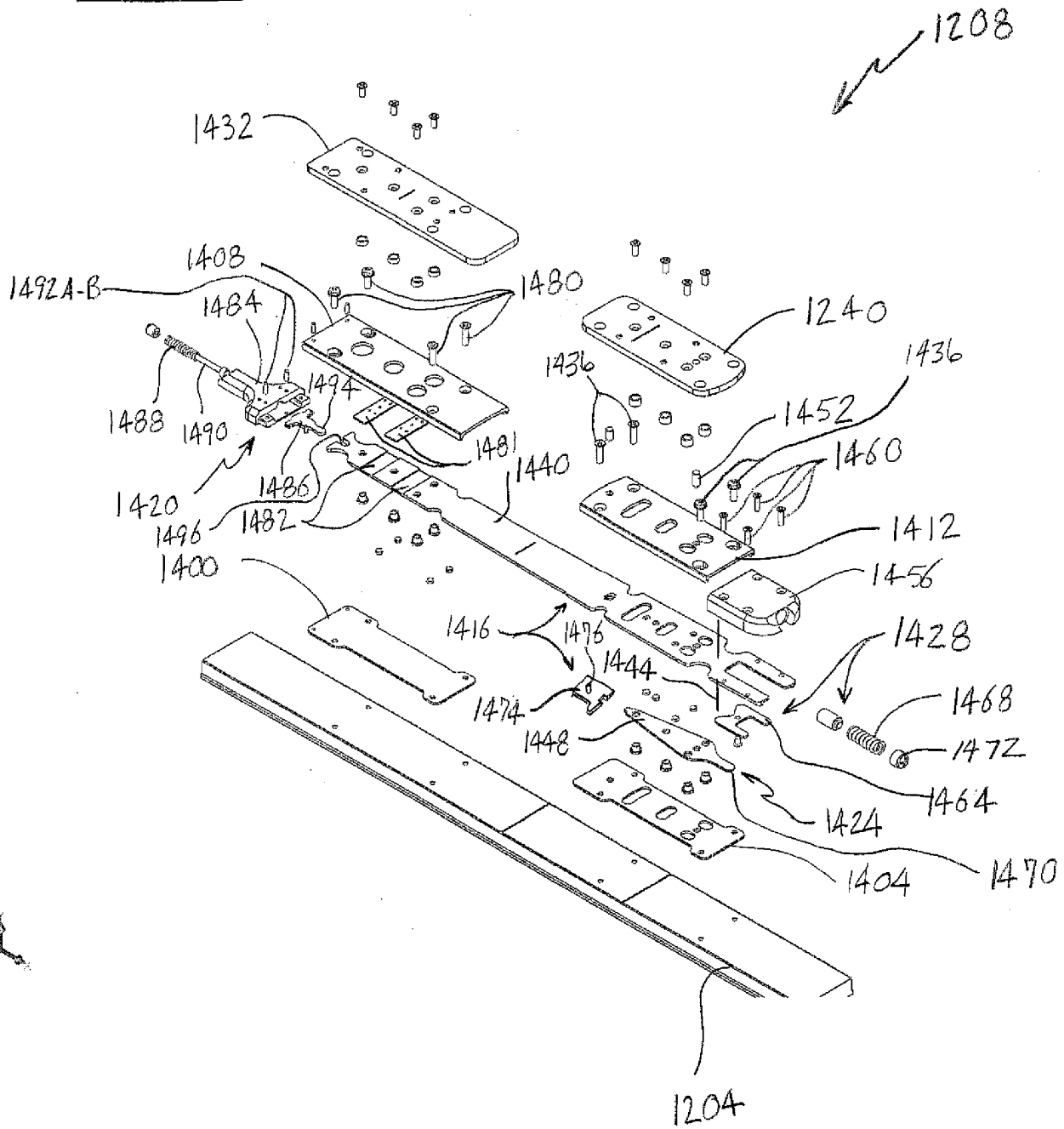
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FIG. 13



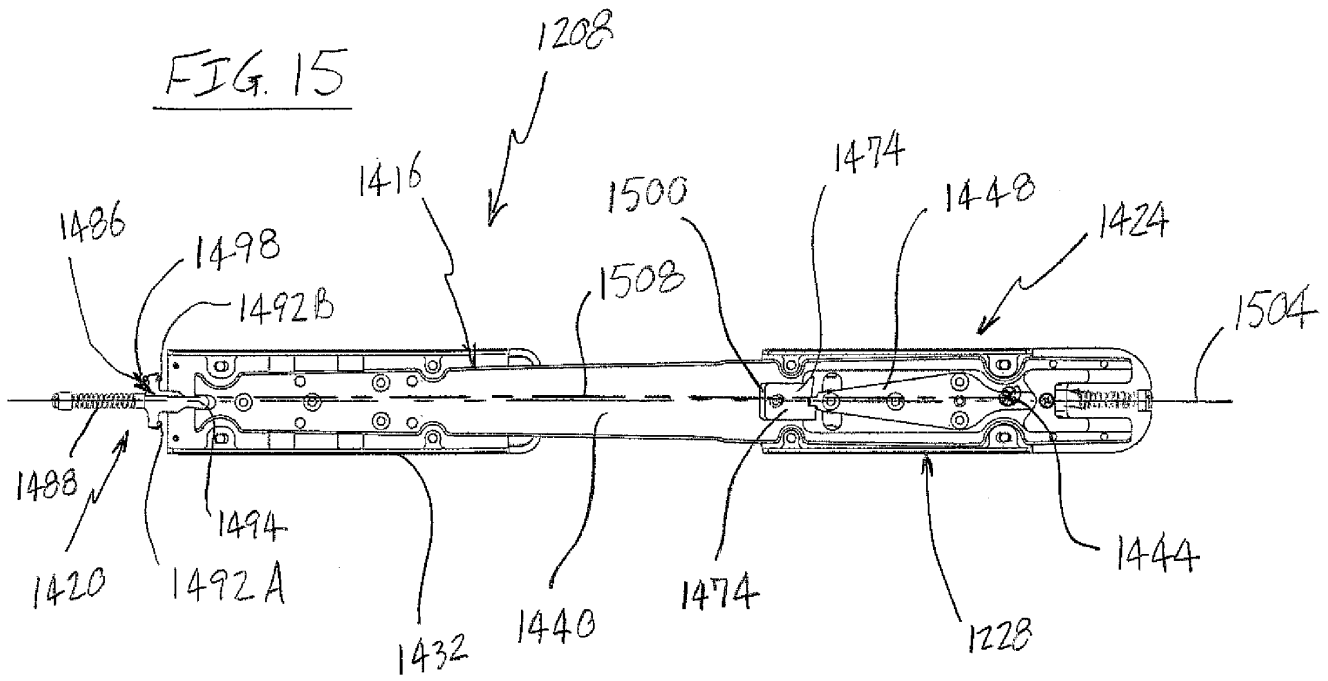
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FIG. 14



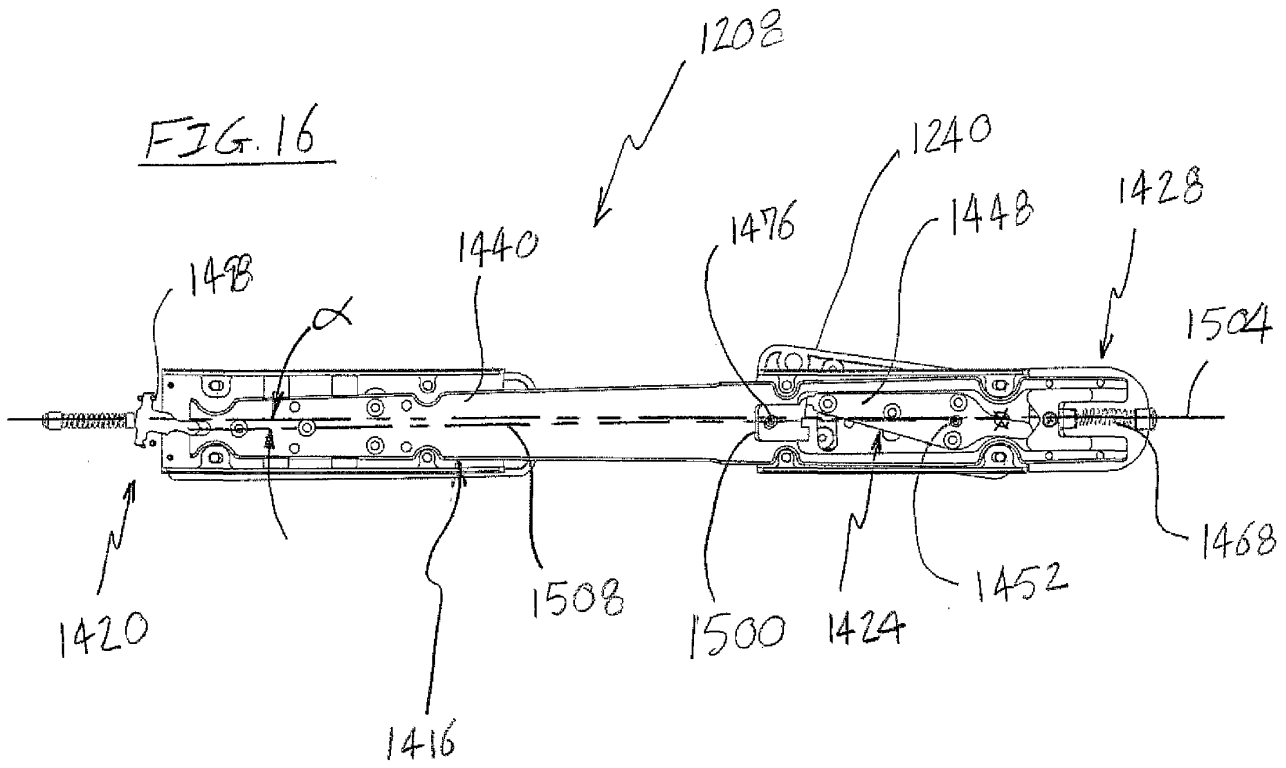
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FIG. 15



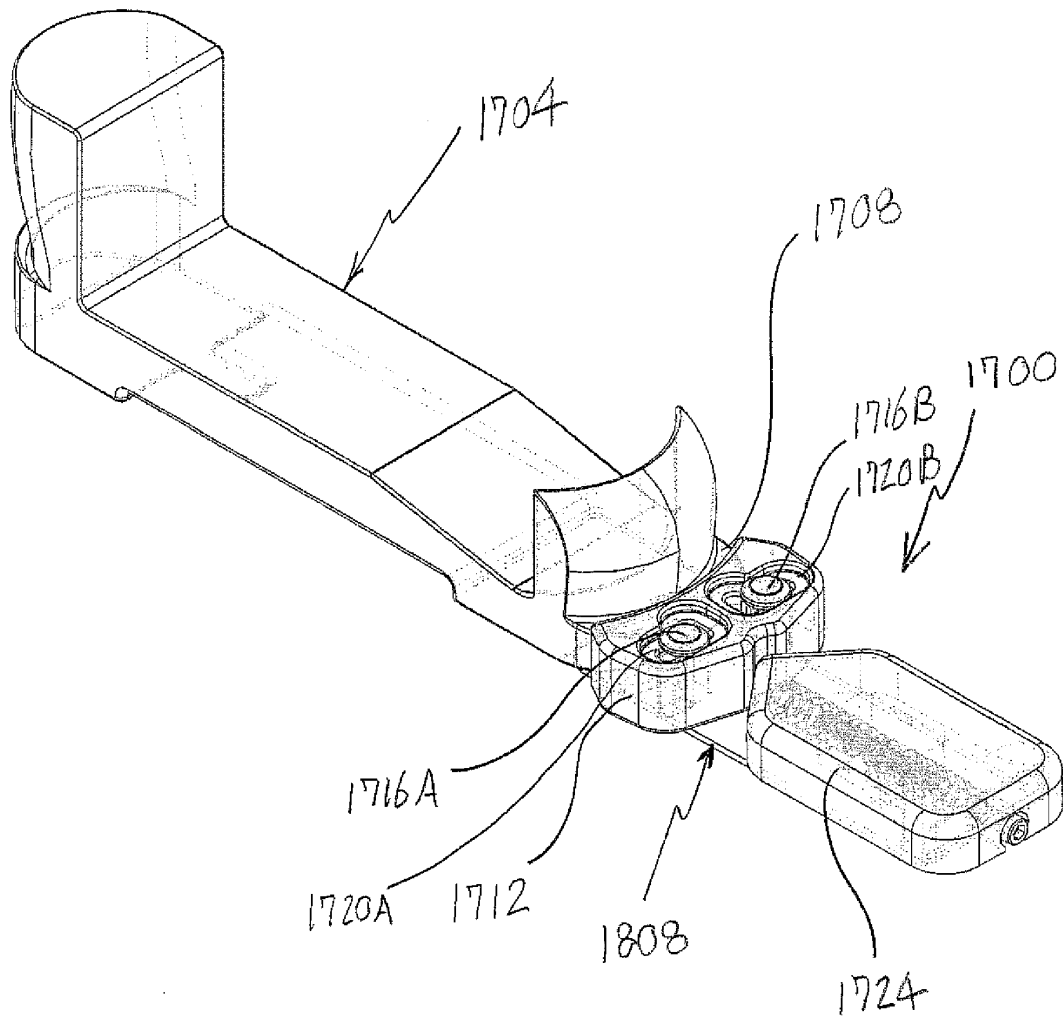
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FIG. 16



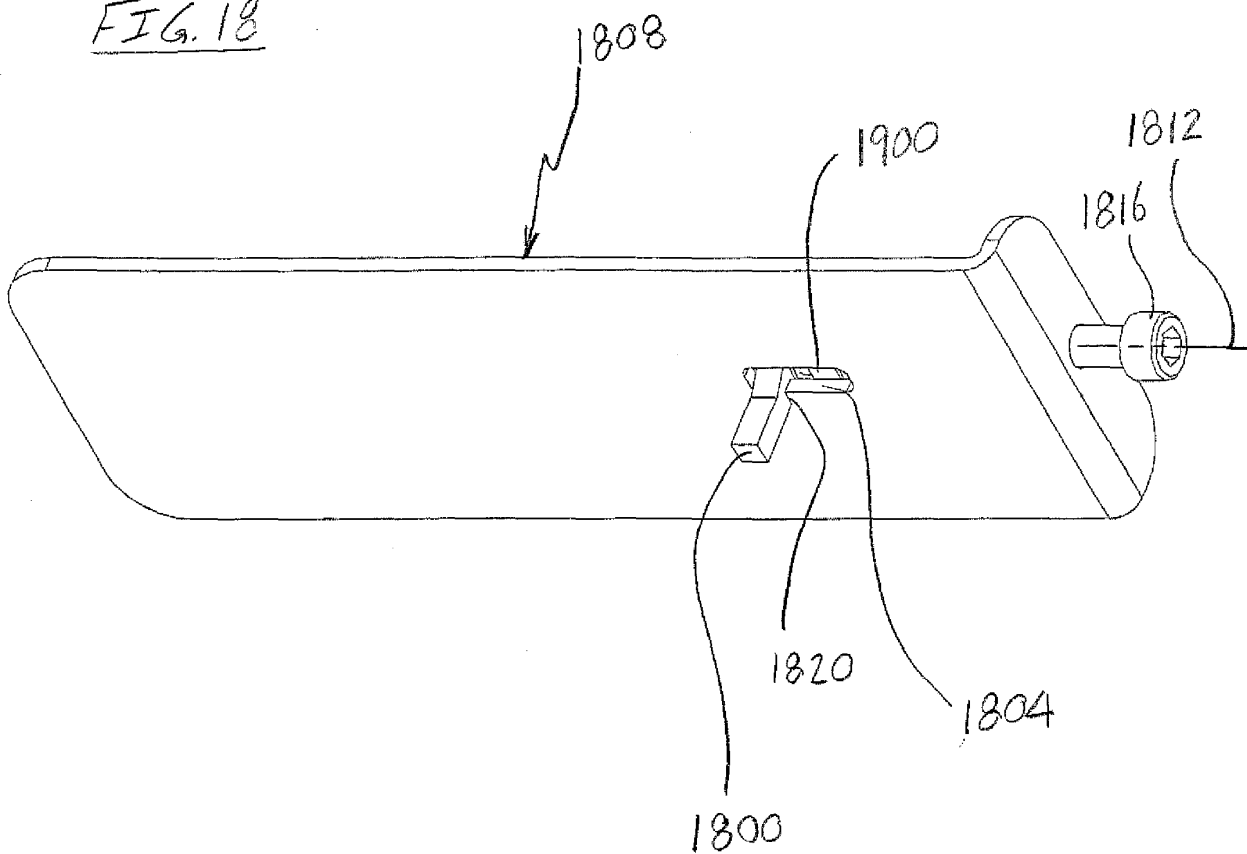
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FIG. 17



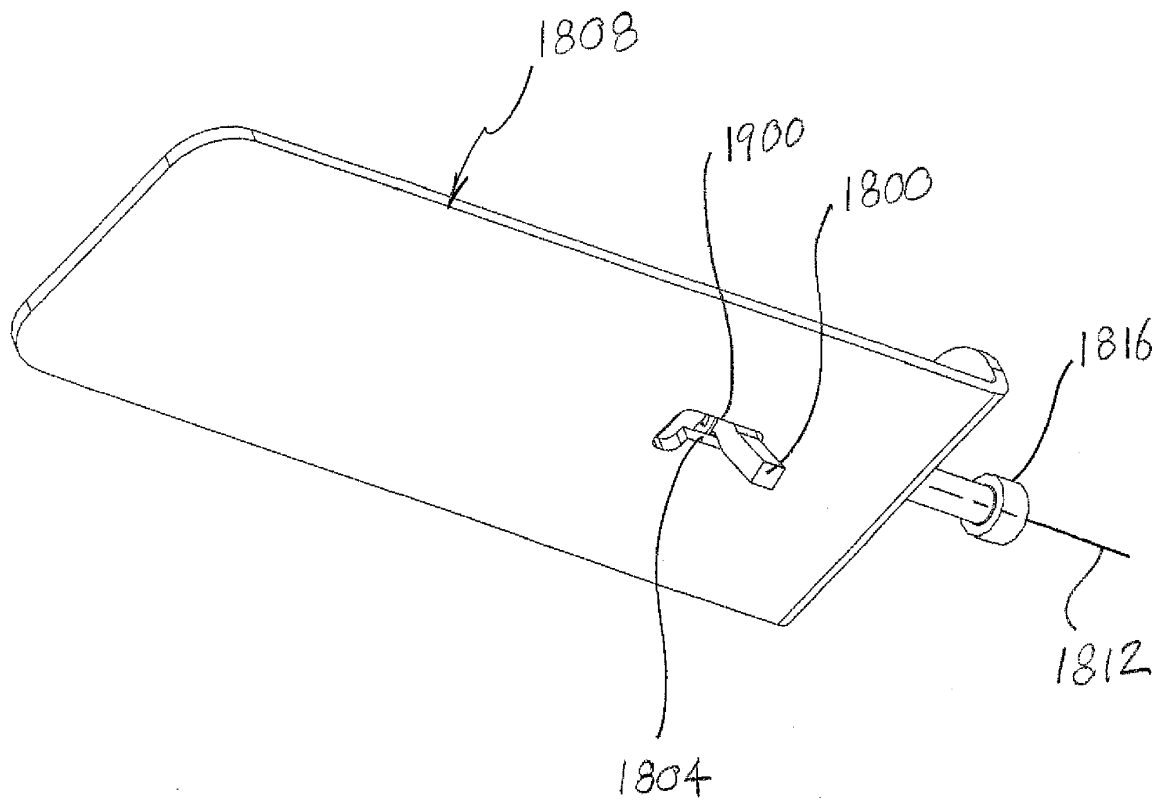
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FIG. 18



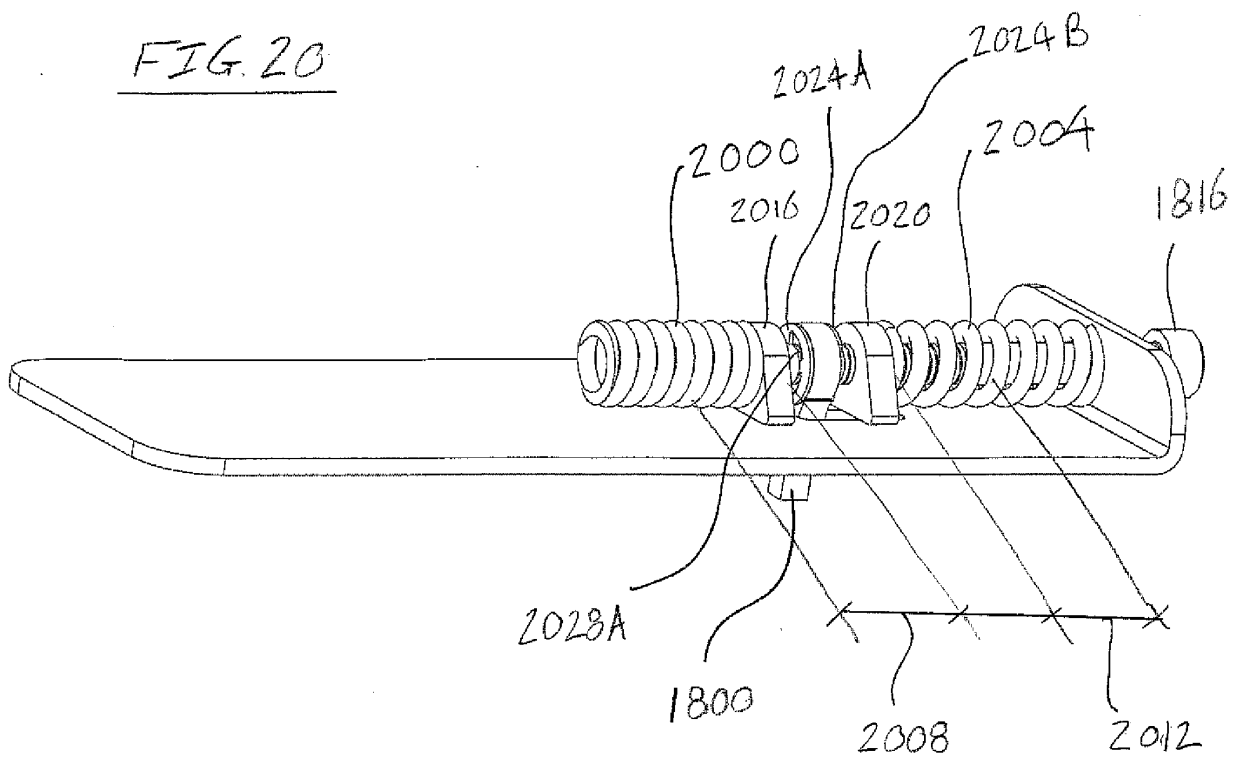
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FIG. 19



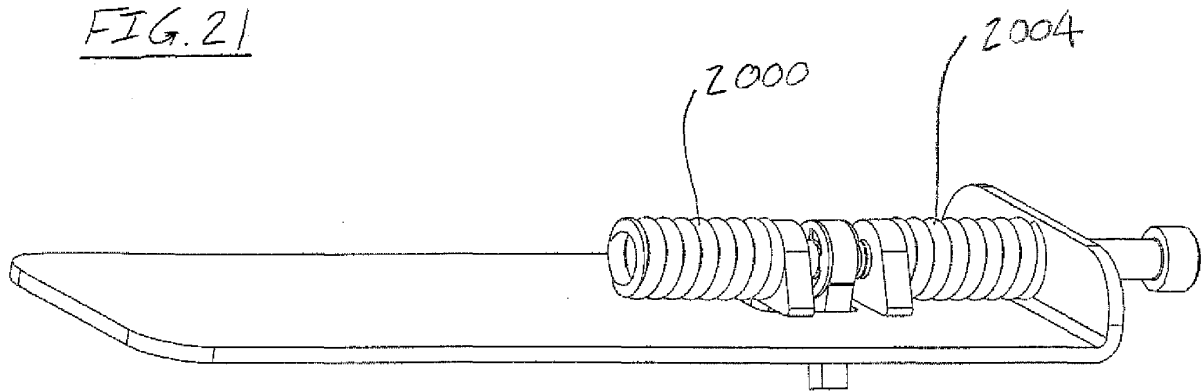
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FIG. 20



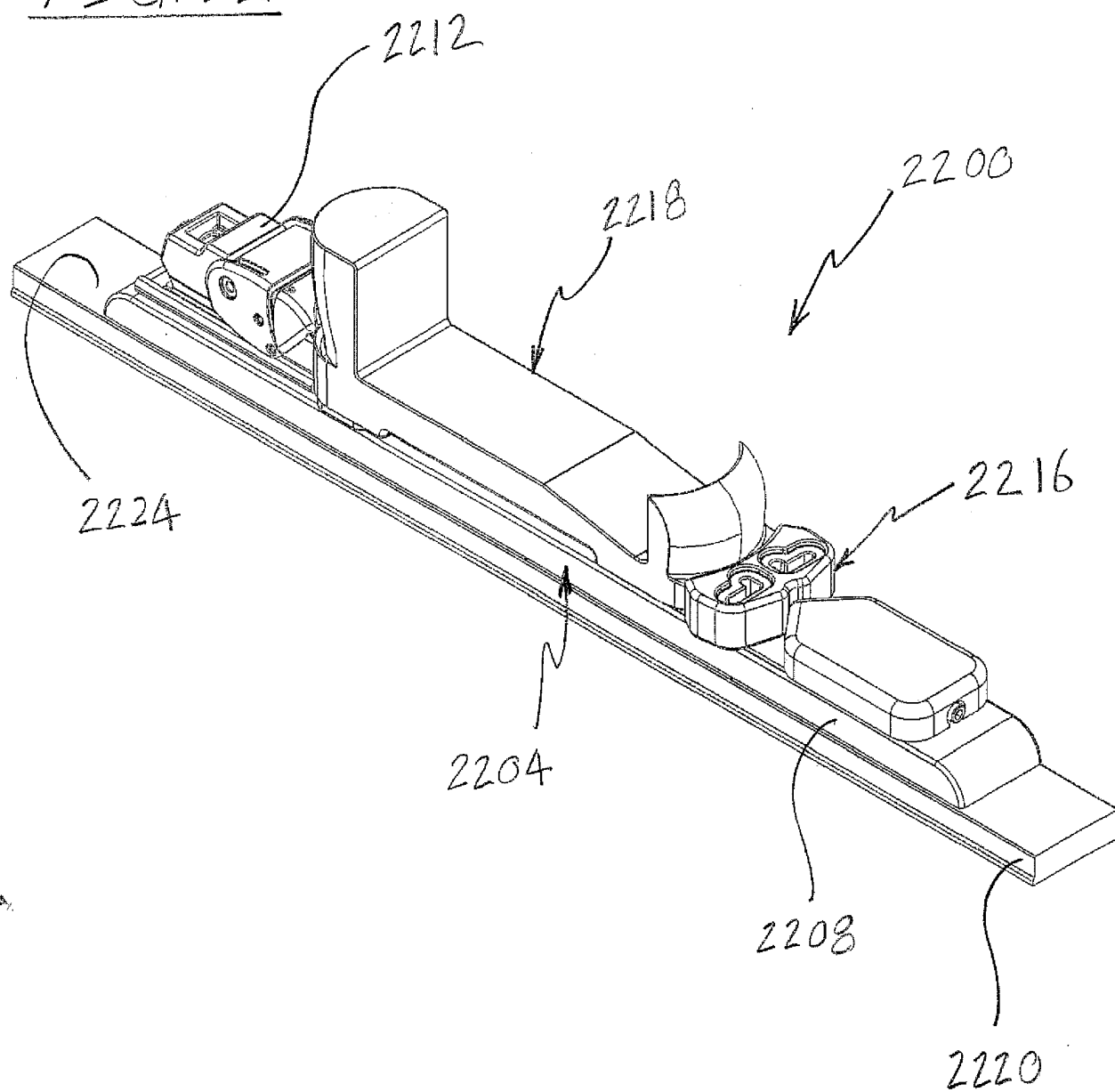
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FIG. 21



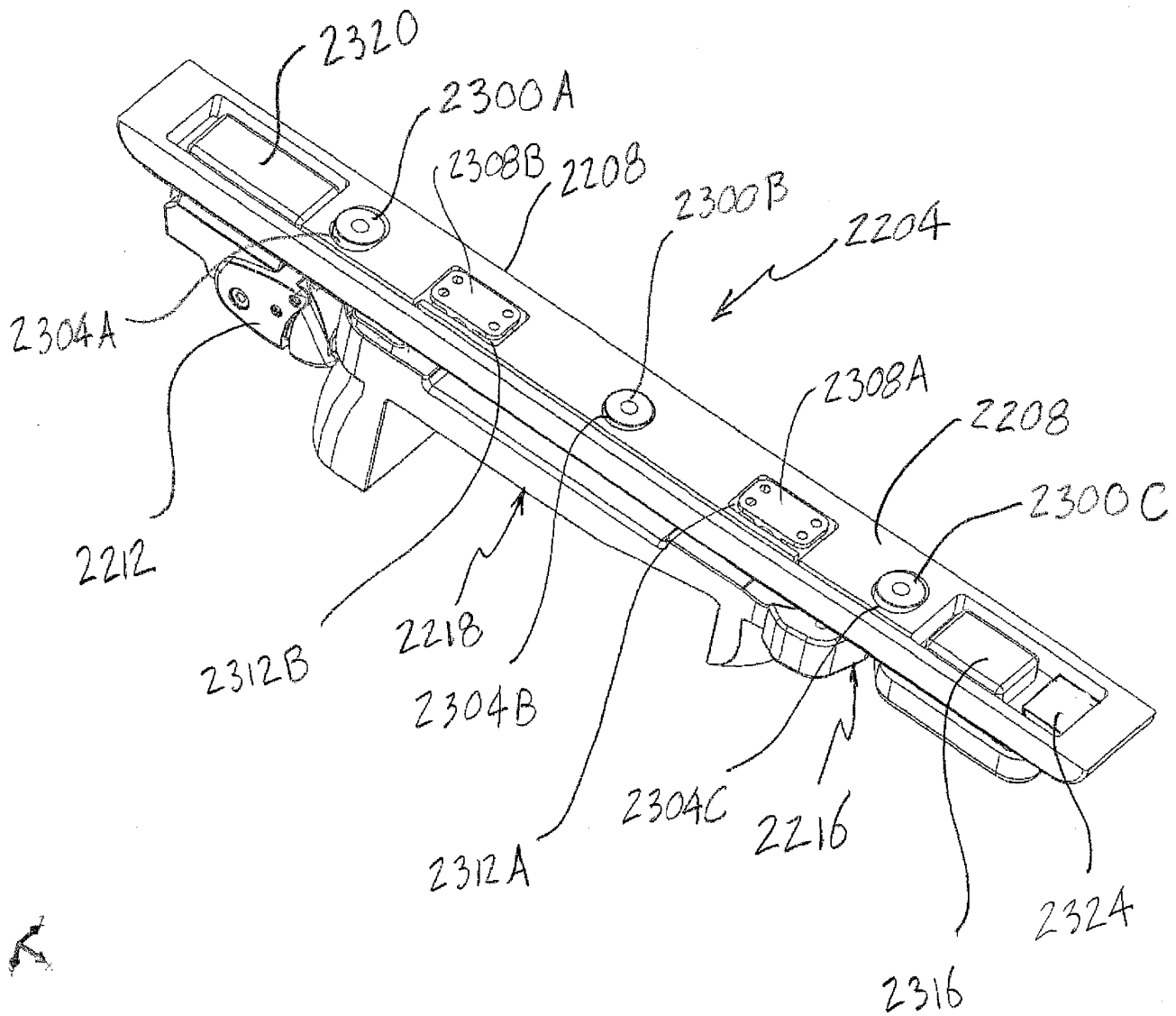
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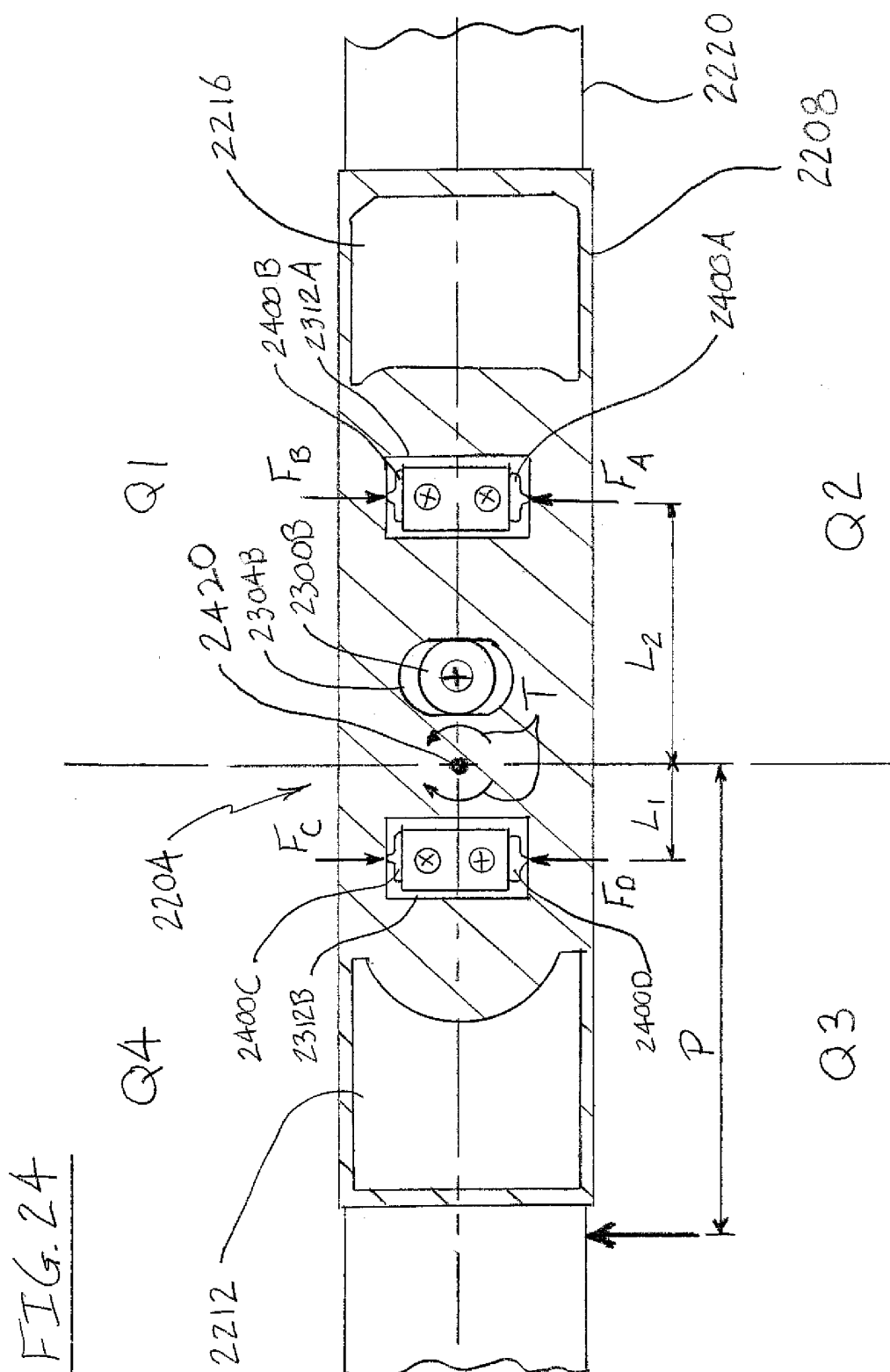
FIG. 22



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FIG. 23





ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

RELATED APPLICATION DATA

[0001] This application claims the benefit of priority of U.S. Provisional Patent Application Serial No. 60/836,454, filed August 8, 2006, and titled “Knee-Friendly Ski Binding,” which is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0002] The present invention generally relates to the field of alpine ski bindings. In particular, the present invention is directed to an alpine ski binding system having release logic for inhibiting anterior cruciate ligament injury.

BACKGROUND

[0003] Sprains and other injuries of the anterior cruciate ligament (ACL) of the human knee are painful, debilitating, and expensive and time consuming to repair and rehabilitate. In skiing, the incidence of ACL injury began to rise in the late 1970s to become the sport’s most common serious injury by the late 1980s. Since the early to mid 1990s the risk of sustaining this injury has stabilized and then declined modestly. However, at 15% to 20% of all ski-related injuries, it still remains the most common injury, with more than 20,000 per year in the U.S. alone. From 1983 on, changes in the incidence of ACL injury have been tracked by a series of “Trends” papers published as Special Technical Publications (STPs) by the American Society for Testing and Materials (ASTM).

[0004] In October, 1995, the American Journal of Sports Medicine published a paper titled “A Method To Help Reduce The Risk Of Serious Knee Sprains Incurred In Alpine Skiing.” The paper documented the results of a training program for on-slope ski-area employees at 20 ski areas in the U.S. and compared injury rates for the group with both a historical control group (the same ski areas for the two prior seasons) and an ad hoc control group of 20 ski areas that had not yet joined the training regime. The training involved a highly structured, video-based discussion format. Actual footage of ACL injuries was used to create a kinesthetic awareness of the events leading to the most common types of ACL injury. The program reported a 62% reduction in ACL injuries overall, and for ski patrollers, the highest risk subgroup, the reduction was 76%. This program identified the

“phantom foot” scenario as the most likely mechanism of ACL injury. In this scenario the skier is off-balance to the rear with most of the weight on the downhill (outside) ski.

[0005] In later studies published in ASTM STPs, it was shown that the equipment associated with ACL injuries was comparable in quality and overall release performance to the equipment of the general population at risk but superior in every quality to equipment associated with sprains and fractures below the knee. These studies show that contemporary ski bindings, regardless of their condition, are not capable of reducing the risk of ACL injuries.

SUMMARY OF THE DISCLOSURE

[0006] One aspect of the present invention is a ski binding configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant edge, a second-quadrant edge, a third-quadrant edge, a fourth-quadrant edge and a trailing end, the ski binding comprising: a heel piece for releasably engaging the heel of the ski boot; a toe piece for releasably engaging the toe of the ski boot, wherein the toe piece and the heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when: the ski binding is mounted to the snow ski; the skier is wearing the ski boot; and the ski boot is properly captured in the ski binding; and release logic providing the ski binding with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location along the third-quadrant edge.

[0007] Another aspect of the present invention is a ski binding system configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end, the ski binding system comprising: an attenuated release logic mechanism for being secured to the snow ski and being configured to fixedly receive a heel piece and a toe piece, the attenuated logic mechanism including: a secondary toe release for providing, when the ski binding system is secured to the snow ski, the heel and toe pieces are fixedly secured to the attenuated release logic mechanism, and the ski boot is properly engaged between the heel and toe pieces: an attenuated release in response to lateral shear loads applied to the snow ski in the third-quadrant of the snow ski; and a non-attenuated release in response to lateral shear forces applied to the snow ski in the fourth-quadrant of the snow ski; a trigger operatively configured, when the ski binding system is secured to the snow ski, to trigger the secondary toe release to switch from

the non-attenuated release to the attenuated release in responses to a triggering third-quadrant shear force.

[0008] Still another aspect of the present invention is a method of releasing a ski boot from an alpine ski binding system, comprising: sensing lateral shear forces applied to a snow ski having a first-quadrant, a second-quadrant, a third-quadrant and a fourth-quadrant; determining when a virtual net shear force present in the third-quadrant exceeds a threshold value; in response to the net virtual shear force applied to the snow ski in the third-quadrant exceeds the threshold value, triggering a secondary toe release; and releasing via the secondary toe release the ski boot from the binding system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] For the purpose of illustrating the invention, the drawings show aspects of one or more embodiments of the invention. However, it should be understood that the present invention is not limited to the precise arrangements and instrumentalities shown in the drawings, wherein:

FIG. 1 is a partial top view of a conventional left-leg ski illustrating conventions used in the present disclosure;

FIG. 2 is a graph of a theoretical release envelope, as seen relative to the tibial axis of a skier's leg, illustrating release/retention characteristics typical of a contemporary conventional ski binding having a binding pivot point located between the heel piece and the tibial axis of the skier's leg;

FIG. 3 is a graph of a theoretical release envelope, as seen relative to the tibial axis of a skier's leg, illustrating release/retention characteristics typical of a contemporary conventional ski binding having a binding pivot point located between the tibial axis of the skier's leg and the toe of the ski boot;

FIG. 4 is a graph of a theoretical release envelope, as seen relative to the tibial axis of a skier's leg, illustrating release/retention characteristics typical of a contemporary conventional ski binding having a binding pivot point located forward of the toe of the ski boot;

FIG. 5 is graph of a theoretical release envelope, as seen relative to the tibial axis of a skier's leg, illustrating release/retention characteristics typical of a ski binding system having a third-quadrant attenuated secondary toe release;

FIG. 6 is a top view/diagrammatic view of an exemplary ski system having the theoretical release envelope of FIG. 5;

FIG. 7 is a graph of the release threshold for the secondary release mode of the binding system of FIG. 6;

FIG. 8 is a graph of the attenuation factor for the secondary release torque and trigger platform trip torque for the binding system of FIG. 6;

FIG. 9A is an isometric partial top view of a ski system that includes a third-quadrant release-logic mechanism of the present disclosure mounted to a left-leg ski, showing the mechanism in an unreleased state; FIG. 9B is an isometric partial top view (rotated 180° relative to FIG. 9A) of the third-quadrant release-logic mechanism of FIG. 9A with the boot sole and the heel and toe pieces removed for clarity;

FIG. 10A is an isometric partial top view of the ski system of FIG. 9A showing the third-quadrant release-logic mechanism in a released state; FIG. 10B is an isometric partial top view (rotated 180° relative to FIG. 10A) of the third-quadrant release-logic mechanism of FIG. 10A with the boot sole and the heel and toe pieces removed for clarity;

FIG. 11 is an enlarged plan view of the ski system of FIGS. 9A-10B showing the upper surface of the ski and the trigger platform (and the secondary toe release) removed and placed upside-down next to the ski so as to illustrate exemplary components that may be used to make the third-quadrant release-logic mechanism work;

FIG. 12 is an isometric partial top view of a second embodiment of a ski system that includes a third-quadrant release-logic mechanism of the present disclosure mounted to a right-leg ski, showing the mechanism in an unreleased state;

FIG. 13 is an isometric partial top view of a second embodiment of the ski system of FIG. 12 showing the third-quadrant release-logic mechanism in a released state;

FIG. 14 is an isometric exploded partial view of a second embodiment of the ski system of FIGS. 12 and 13 showing the various components of the system;

FIG. 15 is a bottom view of a second embodiment of the third-quadrant release-logic mechanism of FIG. 12 with bottom plates removed to illustrate the state of components of the mechanism when the mechanism is in its unreleased state;

FIG. 16 is a bottom view of a second embodiment of the third-quadrant release-logic mechanism of FIG. 13 with bottom plates removed to illustrate the state of components of the mechanism when the mechanism is in its released state;

FIG. 17 is an isometric top view of a boot sole and a dual-release-threshold toe assembly that can be substituted for the secondary to release mechanisms of FIGS. 3A-5 and FIGS. 12-16, respectively;

FIG. 18 is an isometric bottom view of the base of the toe assembly of FIG. 17 showing the actuator in its unreleased position;

FIG. 19 is an isometric bottom view of the base of the toe assembly of FIG. 17 showing the actuator in a released position;

FIG. 20 is an isometric top view of the toe assembly showing the housing, toe retainer and toe retainer studs removed, illustrating the unreleased state of the toe assembly;

FIG. 21 is an isometric top view of the toe assembly showing the housing, toe retainer and toe retainer studs removed, illustrating the unreleased state of the toe assembly;

FIG. 22 is an isometric partial top view of a ski system that includes an electronic third-quadrant release-logic binding system;

FIG. 23 is an isometric bottom view of the electronic third-quadrant release-logic binding system of FIG. 22; and

FIG. 24 is a partial top view/cross-sectional view/diagrammatic view of the electronic third-quadrant release-logic binding system of FIGS. 22 and 23 illustrating the operation of the binding.

DETAILED DESCRIPTION

[0010] The present disclosure is directed to an alpine ski binding system having release logic configured to have an attenuated release torque when a shear force is applied to the medial side of the ski, rearward of the tibial axis of the leg of a skier. As discussed below, this region is denoted for convenience “quadrant 3,” “Q3,” “third quadrant,” or a like term. During skiing maneuvers there are many lateral shear forces acting simultaneously along the physical edge of the ski as well as inertial forces between the various masses of the skier and his equipment that generate lateral shear forces between the boot and binding. All these lateral shear forces can be resolved to one virtual force at one location along a virtual, infinitely long, ski plus a couple (pure torque). In the discussion below any references to “shear force” are meant to describe this virtual force acting on a virtual ski. As mentioned in the Background section above, it is believed that certain third-quadrant loadings, when applied to skiers’ legs via current generation bindings, are frequently implicated in injuries to the skiers’ anterior cruciate ligaments (ACLs). The studies cited in the Background section above, careful analysis of video footage of skiers as ACL injuries occurred, tests of contemporary release bindings, results of skier strength in near ACL postures and measurements of the loads applied to a

ski during actual skiing maneuvers have led the present inventors to develop a computer model for a ski binding with selective release characteristics and working prototypes of several examples of the underlying principles of the present disclosure, which are discussed below. The computer model uses a coordinate system based on FIG. X1.4 of the Appendix to ASTM Test Method F504 and creates a partial release envelope as described in that Appendix. (ASTM Test Method F504 and its Appendix are incorporated herein by reference in their entireties.) Using the computer model, the present inventors can shape the release envelope to accommodate the retention requirements of skiers so that a narrow but predictable margin of retention is provided in the area of the envelope associated with the most common mechanism of ACL injury.

[0011] An alpine ski binding system of the present disclosure provides a reduced retention in areas of the release envelope that may influence ACL injury. Such a binding system creates a depression in the portion of the release envelope most likely to be associated with ACL injury. The location of the depression and the magnitude of its effect are adjustable, as described in more detail below. To the best of the present inventors' knowledge, no one has yet devised a binding having release logic designed to provide a reduced release threshold (relative to contemporary conventional bindings that have a fixed release threshold regardless of the location of the shear load on the ski) only when the net shear force on the ski resolves to a load in the third quadrant. With such a reduced third-quadrant release threshold, a binding made in accordance with the present disclosure can advantageously release before a skier's ACL is put at risk of injury. As seen below, such release threshold logic may be implemented in a number of ways using various mechanisms and/or electronics. In addition, with these mechanisms and/or electronics, the release envelope for third-quadrant loadings can be shaped to accommodate the retention requirements of skiers so that a narrow but predictable margin of retention is provided in the area of the envelope associated with the most common mechanism of ACL injury. However, prior to describing several ski binding systems that include unique release-threshold logic, it is beneficial to understand the release-threshold profile of most current ski bindings.

[0012] Referring now to FIG. 1, this figure illustrates a naming convention used throughout the following disclosure and in the appended claims. FIG. 1 shows a ski system 100 that includes a left ski 104 having a boot region 108 that receives a ski boot (not shown) during use of the ski. The dark boot region 108 represents the area of ski 104 confronted or overlain by the sole of the ski boot when the boot is properly engaged in a binding (not shown) affixed to the ski. In this figure, the tail end of ski 104 is located out of the view of the figure to the left along longitudinal central axis 112 of the

ski, and the leading tip of the ski is located out of the view of the figure and to the right along longitudinal central axis 112. It should be noted that quadrants 1 and 2 extend to infinity beyond the tip of the ski and quadrants 3 and 4 extend to infinity beyond the tail of the ski. While not shown, those skilled in the art can readily envision the heel and toe pieces of a conventional alpine binding being generally located, respectively, to the immediate left and right of boot region 108. The location of the longitudinal central axis of a skier's tibia bone (i.e., tibial axis) along ski 104 is represented by dashed line 116.

[0013] For convenience, left ski 104 is parsed into four shear loading quadrants, i.e., quadrants 1 through 4, with tibial axis 116 and longitudinal central axis 112 demarcating the differing quadrants. Each net resolved lateral shear force (or "virtual" force) (F_y) applied in a corresponding quadrant 120, 124, 128, 132 of ski 104 and the corresponding moment (M_z) this force causes at tibial axis 116 are related by the basic equation, Force times Distance equals Torque. Here, the Force is the net resolved lateral shear force F_y , the Distance is the distance of shear force F_y from tibia axis 116 and the Torque is the tibial moment M_z .

[0014] Forces on ski 104 during skiing in each quadrant 1-4 produce a unique combination of force F_y and moment M_z at tibial axis 116, i.e., on the leg of the skier. A ski binding system made in accordance with the present invention is designed to recognize when loads on a ski are in quadrant 3 and respond by enabling release of the ski binding at a lower than normal release torque, as represented here as tibial moment M_z . In the following FIGS. 2-5, 7 and 8, the twisting moment M_z on the leg is expressed in terms of "(%) of Recommended," as defined by section 5 of ASTM standard F939, "Selection of Release Torque Values for Alpine Ski Bindings," which is incorporated herein by reference in relevant part. While only the left ski 104 of a pair of skis is shown, it will be readily appreciated that for consistency of the noted convention, the convention for the right ski (not shown) would be a mirror image of the convention shown for the left ski about a line (not shown) parallel to longitudinal central axis 112 and spaced from the left ski. That is, quadrants 1 and 4 would be located on the outside (lateral side) of the right ski when worn by a skier, and quadrants 2 and 3 would be located on the inside (medial side) of the right ski.

[0015] FIG. 2 is a graph 200 of a release envelope 204A-B, as seen by a skier's leg, of a conventional "toe release" type alpine ski binding having a binding pivot point at the center of the radius of the heel piece, here 6.6 cm behind the tibial axis of the skier. Again, graph 200 is of the type shown in ASTM F504, FIG. X1.4 and relates torque (M_z of FIG. 1) about the reference axis of

the leg (here, tibial axis 116 of FIG. 1) at release to the position of the single force (F_y of FIG. 1) on the ski that creates that torque. The “Position” (i.e., the horizontal axis 208) in FIG. 2, and in FIGS. 2-5, 7 and 8, refers to the virtual position of the single force F_y on an infinitely long ski that replaces all loads on the finite ski and produces the moment M_z . Here, position is measured from the tibial axis of the skier’s leg. In the graph 200 of FIG. 2, as well as in the graphs 300, 400, 600 of FIGS. 3, 4 and 6, respectively, virtual “position” is plotted from (-)200 cm to +200 cm from the tibial axis, which is located at “0” on the horizontal axes of the corresponding respective graphs. Changes in the tibial moment M_z beyond these distances along the virtual ski are small in comparison to changes within these distances. The relationship of this virtual ski to an actual typical ski can be seen by the representation 212 of a ski placed in proper relation to the tibial axis, with the tail and tip of the ski being indicated by vertical lines 216, 220, respectively.

[0016] In conventional binding designs, the release envelope of the ski binding about the binding’s pivot axis, which in the example is at the center of the heel radius 6.6 cm behind the tibial axis, is symmetrical in all four quadrants Q1-Q4. However, as seen in FIG. 2 the release torque on the skier’s leg as indicated by release envelope portion 204A is much higher for loads applied to the after body of the ski than release envelope portion 204B for loads applied to the fore body of the ski. The reason for this difference is the offset (here, 6.6.cm) in the location of the binding pivot axis from the location of the tibial axis. That said, it is readily seen from after-body release envelope portion 204A that the release envelope is symmetrical for loadings in quadrants Q3 and Q4 and from fore-body release envelope 204B that the release envelope is symmetrical for loadings in quadrants Q1 and Q2.

[0017] Whereas FIG. 2 shows graph 200 for a conventional toe release type ski binding, FIGS. 3 and 4 illustrate graphs 300, 400, respectively, for two contemporary heel release type ski bindings. In FIG. 3, the binding has a pivot axis located forward of the tibial axis (“0” on the horizontal axis of graph 300) but behind the boot toe, and in FIG. 4, the binding has a pivot axis located forward of the boot toe. As seen from each of envelopes 304A-B (FIG. 3) and 404A-B, the release torques on the leg are symmetrical for after body loadings in quadrants Q3 and Q4 and for fore body loadings in quadrants Q1 and Q2. In each of the examples of FIGS. 2-4, the binding senses the same torque at release with respect to its own pivot axis, while the skier’s leg, which has a different reference axis, senses a release torque that is dependent on the position of the load on the ski. It is noted that the foregoing analyses ignore the effects of friction and combined loading that may influence individual bindings in actual skiing.

[0018] Each of the above graphs 200, 300, 400 of FIGS. 2-4, respectively, demonstrates a different problem. The toe release type binding of FIG. 2 fails to sense the true load on the skier's leg in quadrant Q3. The heel release type binding of FIG. 3 fails to sense the true load on the skier's leg in quadrant Q1 and Q2. Although the binding of FIG. 3 does lower the release threshold in quadrant Q3, it does not lower it sufficiently near the tail of the ski, which is the area of greatest risk to the ACL. The other heel release type binding of FIG. 4 demonstrates the same problems as the binding of FIG. 3. Although it does lower the release threshold in quadrant Q3 more than the binding of FIG. 3, the improvement is insufficient. Bindings of this type also lack an adequate margin of retention in response to loads applied to the after body of the ski near the tibial axis.

[0019] In contrast to graphs 200, 300, 400 of FIGS. 2-4, respectively, FIG. 5 contains a graph 500 illustrating a release envelope 504A-D achievable using a ski system made in accordance with the present invention. As seen in FIG. 5, the ski system is able to distinguish loads applied in quadrant Q3 and provide an attenuated release (represented by release envelope portion 504C) relative to the non-attenuated release (represented by release envelope 504A) relative to loads applied in quadrant Q4. As is readily seen by comparing graph 500 to graph 200 of FIG. 2 for a conventional toe release type binding, it is seen that release envelope portions 504A-B are nearly identical to release envelope 204A-B of FIG. 2. In this case, this is so because graph 500 of FIG. 5 is based on a ski system that utilizes the conventional toe release type binding of graph 200 of FIG. 2. However, it is seen from FIG. 5 that augmentations made to such a conventional binding in the exemplary ski system used to generate graph 500 provide the ski system with an attenuated release envelope portion 504C for loads in quadrant Q3, which appears to be the quadrant most implicated in ACL injury. Release envelope portion 504D for a small portion of quadrant Q1 is an artifact of the configuration of the particular ski system used to generate graph 500. FIG. 6 illustrates an alpine ski system 600 that can be used to achieve release envelope 504A-D of FIG. 5.

[0020] Referring now to FIG. 6, and also to FIG. 5, FIG. 6 shows ski system 600 as including a ski 604 and a binding system 608. Binding system 608 includes, in this example, a pivotable secondary toe release 612 pivotable about a pivot axis 616 and a pivotable trigger, here a trigger platform 620, pivotable about a pivot axis 624. Binding system 608 also includes a toe release type boot binding 628 that includes a heel piece 632 and a toe piece 636 and has a binding pivot axis 640 close to the heel piece. Not shown, but readily envisioned as being captured between heel and toe pieces 632, 636, is a ski boot, which may be a conventional ski boot. Also shown for context is the location of the tibial axis 644 of a skier when ski system 600 is properly secured to the skier's boot.

Graph 500 of FIG. 5 was created using ski system 600 as a model and using the particular input and calculated values shown in the following table.

Input Values for Example Calculations

Ski Length	175.0	cm
Ski Tip length	14.0	cm
Ski Tail Length	5.0	cm
Boot Length	30.3	cm
Boot Heel to Binding Pivot	3.5	cm (+ forward - rearward)
Boot Heel to Tibial Axis	10.1	cm (+ forward - rearward)
Boot Toe to Plate pivot	7.5	cm (+ forward - rearward)
Release Torque	100	% of recommended release torque
Plate Trip Torque	80	% of recommended release torque
Release Attenuation	50	% of recommended release torque

Calculated Values:			From tibial axis
Tail	-72.9	cm	
End of running surface	-67.9	cm	
Mid running surface	10.1	cm	
Boot Heel	-10.1	cm	
Boot Toe	20.2	cm	
Binding pivot	-6.6	cm	
Tibial axis	0.0	cm	
Plate pivot	27.7	cm	
Start of surface	88.1	cm	
Tip	102.1	cm	

[0021] In ski system 600 of FIG. 6, distinguishing quadrant Q3 loads is accomplished by isolating the boot and binding 628 from ski 604 by means of trigger platform 620 that pivots about pivot axis 624 forward of tibial axis 644. In this example, pivot axis 624 of trigger platform 620 is also located forward of the toe of the ski boot. The performance of binding system 608 is controlled by a number of factors, including the location of the trigger platform pivot axis 624, the location of the binding pivot axis 640, the nominal release torque setting, the trigger platform trip torque setting, and the release attenuation setting. Until trigger platform 620 senses the trip torque specified in the table above, binding 628 functions in its primary release mode. However, once the specified trip torque is reached, trigger platform 620 enables an attenuated release when the torque specified in Table 1 is reached (Fig. 5). Therefore the logic for a secondary release of the present invention requires two criteria to be met before release can take place. For ACL protection, this capability is limited to quadrant Q3. Although a small effect is created in quadrant Q1 (as represented by release

envelope portion 504D of FIG. 5), it does not cause a retention problem and may in fact reduce excess retention.

[0022] The example graph 500 shown in Figure 5 describes a complex release threshold for quadrant Q3 with a 50% attenuation in torque sensed by the leg at release over the full length of the after body of the finite ski 604 (FIG. 6). Beyond that point the complex load on the leg simplifies and approaches a pure couple, a load not associated with the principle mechanism of ACL injury. Therefore, in the example of FIG. 5, the release threshold is programmed to go asymptotic to the 80% grid line as it approaches infinity (a pure couple).

[0023] FIG. 7 is a graph 700 illustrating the secondary release threshold 704 (solid line) provided by ski binding system 608 of FIG. 6, i.e., the torque sensed by the skier's leg for loads in quadrant Q3 when the trip torque and attenuated release torque criteria are met. As seen, the secondary release threshold 704 follows a portion of the trip torque profile 708 of trigger platform 620 and a portion of the attenuated release torque profile 712 of secondary toe release 612 (FIG. 6). Graph 700 demonstrates how binding system 608 makes use of portions of both the heel release type binding of FIG. 4 and the toe release type binding of FIG. 2 in its logic for a secondary release in quadrant Q3. FIG. 7 also shows that the release logic of binding system 608 calls for a series, not a parallel solution. This means that the criteria for both actuation of trigger platform 620 and attenuated release of secondary toe release 612 must be met for the attenuated release to take place.

[0024] FIG. 8 is a graph 800 that introduces the concept of a retention threshold and various combinations of inputs of the table appearing above. A goal of the process of selecting the attenuated release torque threshold, the trigger platform trip torque, and the locations of the trigger platform and secondary toe release pivot axes 616, 624 is to provide the lowest practical secondary release threshold in areas of quadrant Q3 associated with the greatest risk of ACL injury, while providing an appropriate margin of retention in all other areas of the quadrant. Line A in FIG. 8 refers to the example solution shown in FIGS. 5-7 and in the foregoing table, above. It is noted that line B may be a better compromise. Note that the threshold shown in this figure is for example only. As the requirements for retention in quadrant Q3 are refined, changes will be required to the input values of the foregoing table of inputs and the resulting architecture of an ideal "knee-friendly" binding.

[0025] As those skilled in the art will appreciate, the principles outlined above could also be used to modify the release threshold in other quadrants should the need arise.

[0026] Whereas FIGS. 5-8 address general concepts of the present invention, the following FIGS. 9A-24 illustrate examples of binding system configurations that can be used to achieve the release logic that provides an attenuated release in response to substantially only loads applied in the third quadrant. Referring now to FIGS. 9A-11, FIG. 9A illustrates an alpine ski system 900 made in accordance with the present invention. Ski system 900 includes a left ski 904 and a binding system 908 that includes a third-quadrant release-logic mechanism 912 and heel and toe pieces 916, 920, respectively. In this example, heel and toe pieces 916, 920 are contemporary conventional heel and toe pieces available from manufacturers such as Tyrolia, Marker, Salomon, Atomic, Rossignol, etc. The selection of conventional heel and toe pieces for this example serves to clearly illustrate the general concept of the third-quadrant release logic (here provided by third-quadrant release-logic mechanism 912) and its relation to current conventional bindings that consist essentially only of heel and toe pieces 916, 920. This selection also serves to illustrate that third-quadrant release-logic mechanism 912 could readily be sold as a retrofit component for conventional ski systems or otherwise separately from conventional skis and binding. FIG. 9A also illustrates, for the sake of context, a ski-boot sole 924 clamped into binding system 908 in a conventional manner between heel and toe pieces 916, 920. Third-quadrant release-logic mechanism 912 is essentially configured to change the release-threshold envelope 204A-B (FIG. 2) for shear forces applied to ski 904 in the third quadrant.

[0027] Referring now to FIG. 9B, which is similar to FIG. 9A but shows ski system 900 without ski-boot sole 924 and heel and toe pieces 916, 920 for the sake of illustration, FIG. 9B shows two primary components of release-logic mechanism 912, i.e., a trigger platform 932 and a secondary toe release 936. Heel piece 916 (FIG. 9A) is fixedly secured to trigger platform 932, and toe piece 920 is fixedly secured to secondary toe release 936. As will be described below in detail, trigger platform 932 is pivotably secured to ski 904 at a pivot point 940 located forward (toward the tip of the ski) of the toe end of ski-boot sole 924 (FIG. 9A) and, since ski 904 is a left-leg ski, is secured to the ski so as to be pivotable relative to the ski only in a counterclockwise direction from the position shown in FIG. 9B. For a right-foot ski (not shown), a comparable trigger platform would be secured to the right-foot ski so as to be pivotable only in a clockwise direction. In addition to being pivotable only in the counterclockwise direction, trigger platform 932 is constrainably pivotable in the counterclockwise direction such that a non-zero threshold shear force, which translates into a

“trigger trip torque”, is needed in the third quadrant before the trigger platform begins to move appreciably and provide its triggering effect. One example of a trigger trip torque mechanism for providing this trigger threshold is an adjustable trip torque mechanism 1100, described below in connection with FIG. 11. As discussed below, this trip torque is a function of the location of pivot point 940 relative to tibial axis 942, as well as the setting of the trip torque mechanism. For the present discussion, however, it is necessary only to understand that trigger platform 932 is constrainably pivotable only in the counterclockwise direction. Otherwise, trigger platform 932 is secured to ski 904 so that substantially no movement occurs between these two components in a direction normal to the width of the ski.

[0028] Secondary toe release 936 is secured to trigger platform 932 so as to be constrainably pivotable about a pivot point 944 located between the toe end of ski-boot sole 924 (FIG. 9A) and pivot point 940 of the trigger platform and to be pivotable substantially only in a clockwise direction relative to the trigger platform from the position shown in FIG. 9B. Third-quadrant release-logic mechanism 912 also includes an attenuated release threshold mechanism, such as adjustable release threshold mechanism 1104 of FIG. 11, that provides secondary toe release 936 with a constrained pivoting action. The resistance torque of secondary toe release 936 caused by the secondary-release threshold mechanism is referred to herein as “attenuated release torque.” When trigger platform 932 is in a non-triggering position, such as shown in FIG. 9B, secondary toe release 936 is held in the unreleased position shown in FIG. 9B by a triggerable latch mechanism, such as latch mechanism 948. Latch mechanism 948 includes a latch 952 pivotably secured to trigger platform 932 at a pivot point 956. Latch 952 includes an opening 960 (FIG. 10B) that receives a pin 964 (FIG. 10B), which is fixed relative to ski 904. In the unreleased position of secondary toe release 936 shown, latch 952 engages a catch 968 that is fixed to the secondary toe release.

[0029] When trigger platform 932 pivots counterclockwise relative to ski 904 in response, for example, to a threshold-exceeding torque in response to a shear force in the third quadrant (see FIG. 1), latch 952 and its pivot point 956 (which is fixed relative to the trigger platform) move, thereby causing stationary pin 964 (FIG. 10B) to pivot the latch about its pivot point and cause the distal end 972 of the latch to move out of engagement with catch 968 on secondary toe release 936. With distal end 972 of latch 952 out of the way, secondary toe release 936 is free to pivot in response to a torque exceeding the secondary release torque clockwise relative to trigger platform 932, thereby releasing ski-boot sole 924 (FIG. 9A) from binding system 908 (FIG. 9A). If desired, secondary toe release 936 may be provided with a secondary catch 976 for engaging distal end 972 of latch 952

when third-quadrant release-logic mechanism 912 is in a released state so as to limit the pivoting of the secondary toe release. FIGS. 10A-B each show third-quadrant release-logic mechanism 912 in a released state 1000, with trigger platform 932 pivoted counterclockwise relative to ski 904, latch 952 pivoted counterclockwise out of engagement with catch 968 and secondary toe release 936 pivoted clockwise relative to the trigger platform. Again, this released state 1000 is substantially only achieved from the unreleased state upon application of a shear force to the third-quadrant of ski 904 that exceeds both the trip plate trigger torque and the secondary toe release torque.

[0030] Referring now to FIG. 11, it was mentioned above that trigger platform 932 is secured to ski 904 so as to be constrainably pivotable about pivot point 940. FIG. 11 illustrates examples of mechanisms that can be used to provide this type of securement. In this example, trigger platform 932 is fastened to ski 904 by a threaded fastener 1104 that threadedly engages a matching threaded opening 1108 in the ski. The engagement of fastener 1104 with trigger platform 932 and ski 904 is such that when the trigger platform is properly secured to the ski it is substantially freely pivotable about pivot point 940 but constrained from moving away from the upper surface 1110 of the ski. In other embodiments, a fastener other than a threaded fastener may be used. In addition, if desired, a torsion mechanism (not shown) or other pivot-constraining connection may be provided to provide a desired amount of resistance to pivoting.

[0031] Trigger platform 932 is also held down by a sliding hold-down mechanism 1112 that, when the trigger platform is properly installed on ski 904, allows the trigger platform to pivot about pivot point 940 but not substantially move away from upper surface 1110 of the ski. In this example, hold-down mechanism 1112 includes a slidable hold-down 1116 that is fixedly secured to ski 904, for example, using a threaded fastener 1120. Hold-down 1116 is movable within a generally T-shaped slot 1124 on trigger platform 932 that is preferably, but not necessarily, sized to limit the range of pivot of the trigger platform. The T-shape of slot 1124 generally conformally receives the combination of hold-down 1116 and fastener 1120 that largely forms a like T-shape. To reduce friction, ski 904 may be provided with a low-friction bearing plate 1128 and/or trigger platform 932 may be provided with one or more low-friction bearings 1132.

[0032] As mentioned, the resistance to pivoting of trigger platform 932 relative to ski 904 that provides the trigger platform with a trigger trip torque threshold is provided by adjustable trip torque mechanism 1100. In this example, trip torque mechanism 1100 includes a fixed screw-guide bracket 1140 that is fixedly secured to ski 904, for example, using a threaded fastener 1144. Screw-

guide bracket 1140 receives an adjustment screw 1148 in a manner that secures the adjustment screw to the bracket, but allows it to rotate freely in a non-threaded way. A rectangular threaded adjustment nut 1152 is threadedly engaged with adjustment screw 1148 so that when the trigger platform is properly secured to ski 904 and the adjustment screw is turned, the adjustment nut moves longitudinally along the screw (the rotation of the adjustment nut is inhibited by its engagement with the underside of the trigger platform). A spring, here a coil spring 1156, is provided between fixed screw-guide bracket 1140 and threaded adjustment nut 1152 such that the spring can be selectively compressed/decompressed by turning adjustment screw 1148 so that the adjustment nut moves closer to or farther away from the screw-guide bracket. With this trip torque mechanism 1100, when trigger platform 932 is properly secured to ski 904, it can be seen that the trip torque threshold of the trigger platform can be increased by turning adjustment screw 1148 so that adjustment nut 1152 further compresses spring 1156, and, conversely, the trigger threshold of the trigger platform can be decreased by turning the adjustment screw so that the adjustment nut moves away from screw-guide bracket 1140 and decompresses the spring. In other embodiments, other trigger trip torque adjusting mechanisms may be provided by those having ordinary skill in the art without undue experimentation using the present disclosure as a guide.

[0033] As mentioned above, secondary toe release 936 is secured to trigger platform 932 so that it is pivotable about pivot point 944 in a constrained manner. In this example, secondary toe release 936 is secured to trigger platform 932 using a locking nut/bolt combination 1160 at pivot point 944 and a sliding hold-down mechanism 1164 spaced from pivot point 940. Sliding hold down mechanism 1164 includes a slidable hold-down 1168 that is fixedly secured to secondary toe release 936 through a slot 1172 in trigger platform 932 using a suitable fastener 1176. Hold-down 1168 is wider than slot 1172, and fastener 1176 is tightened to the point that movement of the secondary toe release away from the trigger platform is substantially constrained, but not to the point that the secondary toe release cannot pivot substantially freely.

[0034] Similar to trigger platform 932 relative to ski 904, secondary toe release 936 is provided with adjustable attenuated release threshold mechanism 1104 that allows a user to set a desired resistance to pivoting of the secondary toe release relative to the trigger platform. In this example, adjustable attenuated release threshold mechanism 1104 includes a screw-guide bracket 1182 fixed to secondary toe release 936 through a slot 1184 in trigger platform 932. Screw-guide bracket 1182 receives an adjustment screw 1186 in a manner that secures the adjustment screw to the bracket, but allows it to rotate freely in a non-threaded way. A rectangular threaded adjustment nut 1188 is

threadedly engaged with adjustment screw 1186 so that the adjustment nut moves longitudinally along the screw (the rotation of the adjustment nut is inhibited by its engagement with the underside of the trigger platform). A spring, here a coil spring 1190, is provided between fixed screw-guide bracket 1182 and threaded adjustment nut 1188 such that the spring can be selectively compressed/decompressed by turning adjustment screw 1186 so that the adjustment nut moves closer to or farther away from the screw-guide bracket. With this adjustable attenuated release threshold mechanism 1104, it can be seen that the pivot-resistance of secondary toe release 936 can be increased by turning adjustment screw 1186 so that adjustment nut 1188 further compresses spring 1190, and, conversely, the pivot-resistance of the secondary toe release can be decreased by turning the adjustment screw so that the adjustment nut moves away from screw-guide bracket 1182 and decompresses the spring. In other embodiments, other attenuated release threshold-adjusting mechanisms may be provided by those having ordinary skill in the art without undue experimentation using the present disclosure as a guide.

[0035] Those skilled in the art will readily appreciate that the embodiment of FIGS. 9A-11 is merely one example of release logic that provides an attenuated release envelope for shear forces applied in the third quadrant. Following are descriptions of three additional examples to illustrate this point. As will be seen in reviewing these additional examples, there are a number of ways to implement the differing aspects of the release logic, such as the implementation of the trigger and the setting of the trigger trip torque, and the implementation of the secondary toe release and the setting of attenuated-release threshold, among other things.

[0036] Turning now to the first of the additional examples, FIGS. 12 and 13 each show an alpine ski system 1200 generally similar to ski system 900 of FIGS. 9A-11 in that it includes a ski 1204, a third-quadrant release-logic mechanism 1208 mounted to the ski and heel and toe pieces 1212, 1216 mounted to the third-quadrant release-logic mechanism. Similar to ski system 900 of FIGS. 9A-11, heel and toe pieces 1212, 1216 of FIGS. 12 and 13 may be any suitable alpine heel and toe pieces, if desired. FIG. 12 shows third-quadrant release-logic mechanism 1208 in an unreleased state, and FIG. 13 shows the third-quadrant release-logic mechanism in a released state. As described below, third-quadrant release-logic mechanism 1208 includes a trigger 1220 that is generally similar to the trigger mechanism of ski system 900, above. Heel piece 1212 is secured to an elongate trigger assembly 1224 near the trailing end of the assembly, and similarly to ski system 900 of FIGS. 9A-11, toe piece 1216 is secured to a pivoting secondary toe release 1228. A conventional standard boot sole 1232 is shown for context. As readily seen in FIG. 13, ski

system 1200 is set up for the right leg of a skier since the pivoting of the toe 1236 of boot sole 1232 is clockwise in response to a shear force being applied to ski 1204 in the third quadrant. FIGS. 14-16 show details of the various components of third-quadrant release-logic mechanism 1208 that provide the attenuated release of toe 1236 of boot sole 1232 in response to only loads in the third quadrant.

[0037] Referring now to FIG. 14, this figure illustrates the various components of third-quadrant release-logic mechanism 1208. Major components of third-quadrant release-logic mechanism 1208 include: rearward and forward lower mounting plates 1400, 1404; rearward and forward upper mounting plates 1408, 1412; a trigger mechanism 1416; a trigger trip torque mechanism 1420; a secondary toe release mechanism 1424, an attenuated release threshold mechanism 1428 and a heel piece mounting plate 1432. As seen in FIGS. 12 and 13, heel piece 1212 is fixedly secured to heel piece mounting plate 1432 and toe piece 1216 is fixedly secured to a toe piece mounting plate 1240 of secondary toe release mechanism 1424. Referring again to FIG. 14, forward upper and lower mounting plates 1412, 1404 are fixedly secured to ski 1204 using suitable fasteners 1436. Trigger 1220 includes a pivotable, flexible (in a direction normal to the upper surface of ski) trigger member 1440, which is captured between forward upper and lower mounting plates 1412, 1404 so as to be slightly pivotable about a pivot axis 1444 normal to upper surface of ski 1204.

[0038] Secondary toe release mechanism 1424 includes in addition to toe piece mounting plate 1240 a pivotable latch 1448 that is captured between trigger member 1440 and forward lower mounting plate 1404. Toe piece mounting plate 1240 is fixedly secured to latch 1448 and, for the purpose discussed below, the composite of these components is pivotably secured to trigger member 1440 about a pivot pin 1452 so that the toe piece mounting plate and latch (and toe piece 1216 (FIG. 12)) pivot in unison under a release condition. The attenuated release threshold for pivoting action of these components is provided by attenuated release threshold mechanism 1428, which includes a housing 1456 fixedly secured to trigger member 1440 with screws 1460 and a movable cam 1464 and spring 1468 located in the housing. Cam 1464 engages a cam follower 1470 on pivotable latch 1448. The attenuated release threshold is set using an adjustment screw 1472, which adjusts the length of spring 1468, and therefore the force applied by cam 1464 to cam follower 1470. In the unreleased state of third-quadrant release-logic mechanism 1208, latch 1448 is securely engaged with a catch 1474, which as described below, is seated in a groove 1500 (FIG. 15) in trigger member 1440 that inhibits its lateral movement relative to the trigger member, but, as

described below in detail, allows it to move longitudinally relative to the trigger member as a result of its interaction with a pin 1476 that is fixed relative to forward upper and lower mounting plates 1412, 1404. When latch 1448 is securely engaged with catch 1474, the attenuated release of secondary toe release 1228 is not active and toe piece 1216 (FIG. 12) functions as it would in a conventional ski system.

[0039] Rearward upper and lower mounting plates 1408, 1400 are secured to ski 1204 using suitable fasteners 1480 and capture the rear end of trigger member 1440 therebetween. Heel piece mounting plate 1432 is fixedly secured to trigger member 1440 so that they pivot in unison with one another about pivot point 1444 of the trigger member when permitted by trigger trip torque mechanism 1420. In general, it is the lateral loads from heel piece 1212 (FIG. 12) that are the input to trigger mechanism 1420. A pair of low friction members 1481 that engage a corresponding respective pair of grooves 1482 in trigger member 1440 are provided to reduce the amount of frictional resistance between rearward upper mounting plate 1408 and the trigger member during pivoting of the trigger member.

[0040] Trigger trip torque mechanism 1420 is fixedly secured to ski 1204 via rearward upper and lower mounting plates 1408, 1400 and includes a housing 1484, a T-shaped resistance toggle 1486, a spring 1488 and an adjustment screw 1490. Spring 1488 biases toggle 1486 into engagement with a pair of fulcrum pins 1492A-B that are fixed relative to housing 1484. Toggle 1486 includes a lever arm 1494 that engages a notch 1496 in trigger member 1440. As will be described below in more detail, as trigger member 1440 pivots it applies a force to lever arm 1494 of toggle 1486 that works against the biasing force applied to the trigger by spring 1488 as the toggle pivots about the appropriate one of fulcrum pins 1492A-B. A locking pin 1498 (FIG. 15) is provided so as to capture toggle 1486 between it and one of fulcrum pins 1492A-B so as to inhibit the toggle from pivoting about the other fulcrum pin. By switching the location of locking pin 1498 (FIG. 15), trigger mechanism 1416 can be set up for either a left-leg ski or a right-leg ski (the right-leg setup being shown). When changing the location of locking pin 1498 (FIG. 15), catch 1474 must also be flipped to change the pivot direction of secondary toe release 1228. This should become apparent from the following description of the working of third-quadrant release-logic mechanism 1208 relative to FIGS. 15 and 16.

[0041] Referring now to FIGS. 15 and 16, which are “upside down” views of third-quadrant release-logic mechanism 1208 relative to FIGS. 12-14, FIG. 15 shows the third-quadrant release-

logic mechanism in its unreleased state, and FIG. 16 shows the mechanism in an attenuated release state caused by a triggering shear force in the third quadrant of ski 1204 (FIGS. 12-14). In FIG. 15, the longitudinal centerline 1504 of trigger member 1440 is aligned with the longitudinal centerline 1508 of the ski, latch 1448 of secondary toe release mechanism 1424 is securely engaged with catch 1474. Consequently, secondary toe release 1228 is securely held by catch 1474 from pivotably releasing. In this state, heel and toe pieces 1212, 1216 (FIGS. 12 and 13) act in the same manner they would if affixed to a ski in a conventional manner. Note the location of locking pin 1498 of trigger trip torque mechanism 1420. In this example, it is located so that trigger member 1440 can pivot only in a counterclockwise direction about pivot axis 1444. Therefore, any shear loads applied in the second and fourth quadrants will not allow trigger mechanism 1416 to trigger. However, when a shear load is applied to ski 1204 (FIGS. 12 and 13) in the third quadrant, and is counteracted in part by a force applied through heel piece mounting plate 1432, this shear force causes trigger member 1440 to apply a toggling force to lever arm 1494 of toggle 1486. Once this toggling force overcomes the resistance and preload of the spring 1488, trigger member 1440 will pivot about pivot axis 1444, as illustrated in FIG. 16, albeit by a relatively small angle α relative to the ski's longitudinal axis 1504.

[0042] Since catch 1474 is laterally captured in groove 1500 in trigger member 1440, this pivoting of the trigger member causes the catch to move and interact with fixed pin 1476 that is fixed relative to ski 1204 (FIGS. 12-14) via forward upper and lower mounting plates 1412, 1404 (FIG. 14). This interaction with fixed pin 1476 moves catch 1474 just enough for latch 1448 to disengage the catch. With latch 1448 disengaged from catch 1474, it can pivot about pivot pin 1452 once the force applied to toe piece mounting plate 1240 from toe 1236 of boot sole 1232 (FIGS. 12 and 13) is large enough to overcome the attenuated release threshold bias of spring 1468 of attenuated release threshold mechanism 1428. After the attenuated secondary release has occurred, trigger mechanism 1416 and secondary toe release mechanism 1424 automatically return to their unreleased states. It is noted that the shape of catch 1474 is such that latch 1448 can pivot only clockwise when secondary toe release mechanism 1424 has been triggered and is in a released state. As mentioned above, a right-leg ski setup can be switched to a left-leg setup by flipping catch 1474 generally about longitudinal axis 1508 of trigger member 1440 and by switching the location of locking pin 1498 of trigger trip torque mechanism 1420.

[0043] While third-quadrant release-logic mechanisms 912, 1208 of FIGS. 9A-11 and FIGS. 12-16, respectively, are similar in the context of the ability to utilize conventional heel and toe

pieces, the second of the additional examples illustrated in FIGS. 17-21 utilizes a unique toe assembly 1700 (FIG. 17) that provides the secondary toe release and the adjustable attenuated release threshold without the need for the pivotable secondary release plate. In addition to toe assembly 1700, FIG. 17 shows a conventional standard boot sole 1704 having its toe 1708 engaged with the toe assembly. Referring to FIGS. 12 and 14, toe assembly 1200 of FIG. 17 replaces both of secondary toe release mechanism 1424 and attenuated release threshold mechanism 1428, but can be used, if desired, with a trigger mechanism and trigger trip torque mechanism substantially similar to, respectively, trigger mechanism 1416 and trigger trip torque mechanism 1420 of FIGS. 12 and 14. Modifications to third-quadrant release-logic mechanism 1208 of FIGS. 12 and 14 to accommodate toe assembly 1700 of FIG. 17 would include removing the pivotable toe piece mounting plate 1240 and latch 1448, removing attenuated release threshold mechanism 1428 and removing catch 1474. Then, toe assembly 1700 of FIG. 17 would be fixedly secured to forward upper mounting plate 1412. As seen in FIGS. 18 and 19, toe assembly 1700 of FIG. 17 includes a movable actuator 1800 that is guidably movable within an L-shaped slot 1804 formed in a base 1808 of the toe assembly. Actuator 1800 is movable both pivotably about the longitudinal centerline 1812 of an adjustment screw 1816 and translationably in a direction parallel with longitudinal centerline 1812. It is this movable actuator 1800 that trigger member 1440 (FIG. 14) would pivot above longitudinal centerline 1812. For reasons that might not be apparent until after reading the following description, trigger member 1440 would need to be slotted substantially along its longitudinal axis (1504, FIG. 15) to allow the actuator to translate along longitudinal centerline 1812 of adjustment screw 1816. Otherwise, the trigger member and trigger trip torque mechanism for toe assembly 1700 may be the same as shown in FIG. 14. Those skilled in the art will readily appreciate that third-quadrant release-logic mechanism 912 of FIGS. 9A-11 may also be modified in a similar manner. In addition, it is noted that the trigger for toe assembly 1700 of FIG. 17 may be of some other type, such as an electronic trigger that is responsive to input from, e.g., one or more force, displacement and/or acceleration transducers.

[0044] Referring to FIGS. 17, 20 and 21, in addition to base 1808, actuator 1800 and adjustment screw 1816, toe assembly 1700 includes a toe retainer 1712 movably secured to the base, for example, by a pair of studs 1716A-B. Toe retainer 1712 includes a pair of L-shaped slots 1720A-B that, under the right loading conditions, allows the toe retainer to pivot either clockwise or counterclockwise so as to release toe 1708 of boot sole 1704. Toe retainer 1712 is biased into engagement with studs 1716A-B by a force-applying member, such as housing 1724, that is movable

relative to base 1808 and that, in turn is biased by either one or both of springs 2000, 2004 (FIGS. 20 and 21) located within the housing, depending on whether or not toe assembly 1700 is in its unreleased or released state.

[0045] Referring to FIGS. 20 and 21, adjustment screw 1816 has a left-hand thread region 2008 and a right-hand thread region 2012, with actuator 1800 located between these two regions. Each of the left- and right-hand thread regions 2008, 2012 is threadedly engaged by a corresponding movable stop 2016, 2020 that moves in an opposite direction from the other when adjustment screw 1816 is turned. In this manner, either both springs 2000, 2004 are being compressed or both springs are being decompressed, depending on which direction adjustment screw 1816 is turned. Actuator 1800 is not threadedly engaged with adjustment screw 1816. Rather, adjustment screw 1816 is free to rotate within an unthreaded opening in actuator 1800. However, actuator 1800 is substantially fixed from moving along longitudinal centerline 1812 of adjustment screw 1816 using, in this example, a C-clip 2024A-B on either side of the actuator that engages a corresponding groove 2028A-B (only groove 2028A can be seen) in the adjustment screw.

[0046] Consequently, and referring to FIGS. 17-21, toe assembly 1700 operates as follows to provide a “normal” release (i.e., a release akin to the release of a conventional binding secured to a ski in a conventional manner) and an attenuated release in response to a suitable shear loading in the third quadrant. With actuator 1800 in its unreleased position, i.e., locked in the transverse portion 1820 of slot 1804 as shown in FIGS. 18 and 20, only spring 2000 is active in biasing housing 1724 against toe retainer 1812. Therefore, the force applied to toe retainer 1812 is equal to the spring constant of spring 2000 multiplied by the compression of this spring. However, when actuator 1800 is triggered and moved into its released position in the longitudinal portion 1900 (FIG. 19) of slot 1804 in base 1808 as shown in FIGS. 19 and 21, housing 1724 is now biased by both springs 2000, 2004 (assuming the longitudinal portion of slot 1804 is long enough to not interfere with activation of the second spring 2004). If springs 2000, 2004 have equal spring rates and are compressed the same amount, the effective force of housing 1724 on toe retainer 1712 remains the same as before but the combined spring rate is halved in this example. Of course, the spring constants, compression distances and other variables will be selected so that both the unreleased and attenuated release forces housing 1724 applies to toe retainer 1712 will be selected to achieve the desired results, which in the context of the present invention includes inhibiting ACL injuries. Referring to FIG. 18, it is noted that the right-leg set up of toe assembly 1700 (FIG. 17) can

be changed to a left-leg setup by locating longitudinal portion 1900 (FIG. 19) of slot 1804 in base 1808 on the other side of transverse portion 1820.

[0047] Whereas the embodiments of FIGS. 9A-21 are generally purely mechanical in nature, the third-quadrant release logic described above in connection with FIGS. 1 and 5-9 can be implemented electronically using either a digital controller or an analog controller, or a combination of both. FIGS. 22-24 illustrate one example of a ski system 2200 that includes an electronic third-quadrant release-logic binding system 2204. Referring first to FIGS. 22 and 23, binding system 2204 includes a base 2208 that supports heel and toe pieces 2212, 2216. For context, a conventional ski boot sole 2218 is shown being clamped between heel and toe pieces 2212, 2216 as it would during an unreleased state of electronic binding system 2204. Base 2208 is secured to a ski 2220 so as to be substantially fixed in the fore and aft direction relative to the ski and also substantially fixed in a direction normal to the upper surface 2224 of the ski. However, base 2208 is secured to ski 2220 so as to be movable laterally relative to ski. In this example, base 2208 is secured using three studs 2300A-C that are fixed to ski 2220 and engage corresponding respective slots 2304A-C in the base. As those skilled in the art will appreciate, in this example studs 2304A, 2304C include a head (not shown) that engages base 2208 in a manner that inhibits movement of the base in a direction normal to upper surface 2224 of ski 2220.

[0048] Electronic binding system 2204 also includes at least two sensors for sensing information regarding the lateral (shear) forces being transmitted between base 2208 and ski 2220 at two distinct locations along the longitudinal axis of the ski. In this example, such sensors are two pairs of load cells 2400A-D (FIG. 24) that are fixed to ski 2200 by corresponding load cell supports 2300A-B (FIG. 23) and extend into corresponding respective cavities 2312A-B in base 2208. As is seen more particularly in FIG. 24 and as described below, with this arrangement, load cells 2400A-D are able to sense the lateral forces between base 2208 and ski 2220 at two distinct locations. In this example, each of heel and toe pieces 2212, 2216 is responsive to a trigger signal to cause a release of boot sole 2218. As those skilled in the art will readily appreciate, heel and toe pieces 2212, 2216 may release in any of a number of manners. In the example shown, heel piece 2212 releases the heel of ski boot 2218 vertically, whereas toe piece 2216 releases the toe of the ski boot by pivoting laterally, in the manner of toe assembly 1700 of FIGS. 17-21. Indeed, toe assembly 1700 of FIGS. 17-21 may readily be adapted for use with electronic binding system 2204 of FIGS. 22-24, by providing a suitable actuator 2316 (FIG. 23) for moving actuator 1800 (FIG. 18) of toe assembly 1700. Actuator 2316 of FIG. 23 may be any suitable electronic or electromechanical actuator. In

this example, electronic binding system 2204 would also be provided with a suitable electronic or electromechanical actuator 2320 (FIG. 23) for activating the release of heel piece 2212. In other embodiments, toe piece 2216 may be replaced by a vertical-release toe piece (not shown) that releases vertically in the manner of heel piece 2212. In yet other embodiments, only toe piece 2216 or heel piece 2212 may provide the desired release.

[0049] Electronic binding system 2204 includes a controller 2324 for implementing the release logic. Controller 2324 may be either a digital controller that utilizes, for example, a microprocessor such as an application specific integrated circuit (not shown), or an analog computer, or a combination of both. Those skilled in the art understanding the release logic of electronic binding system 2204 will readily be able to implement a suitable controller 2324 without undue experimentation. Similarly, those skilled in the art will readily understand how to implement all communications required between/among actuators 2316, 2320, sensors 2400A-D and controller 2324 using any suitable wired or wireless technology, or a combination of both. Therefore, such details are not presented in FIGS. 22-24.

[0050] Referring now to FIG. 24, this figure is used to explain the release logic used by electronic binding system 2204, and particularly controller 2324, to release heel and toe pieces 2212, 2216 with an attenuated release in response to virtual forces F_y in quadrant 3 that exceed a predetermined trigger trip threshold. Of course, the release logic in the other quadrants 1, 2 and 4 may be programmed so that heel and/or toe pieces 2212, 2216 provide an appropriate non-attenuated release relative to the third-quadrant attenuated release. In FIG. 24, base 2208 is shown in cross-section to expose load cells 2400A-D and corresponding cavities 2304A-B and ski 2208 is shown for context.

[0051] For consistency with the analyses corresponding to FIGS. 1-8 and with the implementations of the embodiments of FIGS. 9A-21, the reference axis used for the release logic of electronic binding 2204 is the tibial axis 2420. With this reference, the torque T (which is equivalent to M_z in the context of FIGS. 1-8, above) about tibial axis 2420 is $T = T_1 + T_2$. Since only one load cell 2400A-D in each of cavities 2304A-B can be loaded (with a compressive load) at a time, the output forces F_A , F_B of load cells 2400A, 2400B can be added, and the output forces F_C , F_D of load cells 2400C, 2400D can be added such that $F_A + F_B = F_2$ and $F_C + F_D = F_1$. Therefore, $T = (L_1 \times F_1) + (L_2 \times F_2)$, where L_1 is the distance between tibial axis 2420 and the transverse (relative to

ski 2220) centerline of load cells 2400C, 2400D and L_2 is the distance between the tibial axis and the transverse centerline of load cells 2400A, 2400B. The virtual force F_y on ski 2220 is the sum of F_1 and F_2 , i.e., $F_y = F_1 + F_2$, and the position, P , of the virtual force F_y relative to tibial axis 2420 is determined by $P = T/F_y$.

[0052] As will be appreciated, the quadrant of virtual force F_y is determined by the signs of position P and torque T . Here, for quadrant 3, position P is negative and torque is positive. For the attenuated quadrant 3 release, the attenuated release logic of controller 2324 is designed to trigger actuators 2316, 2320 when the value of calculated torque T exceeds the value of the predetermined release torque calculated from the appropriate equations for the trigger trip torque and attenuated release torque, which are represented graphically for one example in FIG. 7, above. In other words, if T is greater than both the trigger trip torque and the attenuated release torque, then controller 2324 will send a release signal to actuators 2316, 2320. This same procedure can be used in all other quadrants with as much complexity as is required to satisfy the desired retention threshold in each quadrant. The raw forces F_1 and F_2 can be sampled and filtered to best predict the true loads on the lower extremities of a skier using ski system 2200 (FIG. 22). A mechanical spring (not shown) may, for example, be used in series with each of load cells 2400A-D to filter out very short duration loads that likely do not impact ACL injury.

[0053] Exemplary embodiments have been disclosed above and illustrated in the accompanying drawings. It will be understood by those skilled in the art that various changes, omissions and additions may be made to that which is specifically disclosed herein without departing from the spirit and scope of the present invention.

What is claimed is:

1. A ski binding configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end, the ski binding comprising:
 - a heel piece for releasably engaging the heel of the ski boot;
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - the ski binding is mounted to the snow ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in the ski binding; and
 - release logic providing the ski binding with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.
2. The ski binding of claim 1, wherein, when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said attenuated release torque induces a tibial torque about the tibial axis of the skier, said release logic configured so that the tibial torque is diminished as a function of the location of the lateral shear force in the third-quadrant from the tibial axis toward the trailing end of the snow ski.
3. The ski binding of claim 1, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said trigger being triggerable in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.
4. The ski binding of claim 3, wherein said trigger comprises a trigger mechanism and a trigger trip torque mechanism for providing said trigger mechanism with a trip torque threshold for substantially only lateral shear forces applied at locations in the third-quadrant of the snow ski.

5. The ski binding of claim 4, wherein said trigger mechanism includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and having a pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski.
6. The ski binding of claim 5, wherein said trigger mechanism further includes a pivotable latch releasably securing said secondary toe release, said pivotable latch pivotably secured to said trigger member.
7. The ski binding of claim 6, wherein said pivotable latch is actuated by pivoting of said trigger member relative to said ski about said pivot point.
8. The ski binding of claim 5, wherein said trigger mechanism further includes a movable catch releasably securing said secondary toe release, said movable catch movable in response to said trigger member being pivoted about said pivot point.
9. The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biasing member biased between the snow ski and said trigger member so as to provide the trip torque threshold when the ski binding is affixed to the snow ski.
10. The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biased toggle that includes a lever arm functionally engaging said trigger member.
11. The ski binding of claim 10, wherein, when said trigger member is in an unreleased state, said biased toggle is biased against a pair of fulcrums spaced from one another and, when said trigger member is in a release state, said biased toggle is pivoted about one or the other of said pair of fulcrums.
12. The ski binding of claim 11, wherein said trigger trip torque mechanism includes a locking pin for allowing said biased fulcrum to pivot substantially only about one of said pair of fulcrums.
13. The ski binding of claim 3, wherein said secondary toe release includes a secondary toe release mechanism that, when the ski boot is properly secured in the ski binding, provides the toe of the ski boot with an attenuated release in response to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.
14. The ski binding of claim 13, wherein said trigger includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and has a first pivot point located

forward of the toe of the boot when the boot is properly engaged with the snow ski, said secondary toe release mechanism secured to said trigger member.

15. The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe piece support plate pivotably secured to said trigger member, said toe piece being fixedly secured to said toe piece support plate.
16. The ski binding of claim 15, wherein said toe piece support plate has a second pivot point located between said first pivot point of said trigger member and the toe of the ski boot when the ski boot is properly engaged in the ski binding.
17. The ski binding of claim 15, wherein said secondary toe release mechanism includes a catch fixed relative to said toe piece support plate, said trigger including a movable latch for releasably engaging said catch.
18. The ski binding of claim 15, wherein said secondary toe release mechanism includes a latch fixed relative to said toe piece support plate, said trigger including a movable catch for releasably engaging said latch.
19. The ski binding of claim 15, further comprising an attenuated release threshold mechanism providing said secondary toe release with an attenuated release threshold.
20. The ski binding of claim 19, wherein said attenuated release threshold mechanism includes a biasing member biased between said trigger member and said toe piece support plate so as to provide said attenuated release threshold.
21. The ski binding of claim 19, wherein said secondary toe release includes a latch fixed relative to said toe piece support plate and including a cam follower, said attenuated release threshold mechanism including a biased cam biased into engagement with said cam follower of said latch.
22. The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe assembly configured to selectively provide a non-attenuated toe release and an attenuated toe release in response to a triggering of said trigger.
23. The ski binding of claim 22, wherein said toe assembly includes a base, a toe retainer movable secured to said base, and a movable member biased against said toe retainer.

24. The ski binding of claim 23, wherein said toe assembly further includes a first spring, a second spring in series with said first spring and a movable actuator movable so as to 1) cause only said first spring to be active in biasing said movable member against said toe retainer and 2) cause both said first and second springs to be active in biasing said movable member against said toe retainer depending on the position of said movable actuator, said movable actuator being movable in response to a triggering of said trigger.
25. The ski binding of claim 1, wherein the attenuated release torque is at least 20% less than the non-attenuated release torque.
26. The ski binding of claim 1, wherein said release logic is configured to provide the non-attenuated release torque for lateral shear forces applied in the fourth-quadrant of the snow ski.
27. The ski binding of claim 1, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and a ski when the binding is secured to the ski and the ski binding is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant;
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.
28. The ski binding of claim 27, wherein said electronic controller is configured to generate the third-quadrant attenuated release signal as a function of a tibial torque about a tibial axis of a skier, a net virtual force and a position of the net virtual force relative to the tibial axis.
29. The ski binding of claim 28, further comprising:
- a base supporting said heel and toe pieces and laterally movably securable to a ski;
 - a first pair of load cells spaced from the tibial axis; and
 - a second pair of load cells spaced from the tibial axis so that the tibial axis is located between said first and second pairs of load cells, said first and second pairs of load cells for sensing lateral forces between said base and the ski when the ski binding is secured to a ski and a skier is skiing with the ski binding and providing force data to said controller;

wherein said controller is configured to generate the third-quadrant attenuated release signal as a function of the force data from said first and second plurality of load cells.

30. A ski binding system configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end, the ski binding system comprising:
- an attenuated release logic mechanism for being secured to the snow ski and being configured to fixedly receive a heel piece and a toe piece, said attenuated logic mechanism including:
 - a secondary toe release for providing, when the ski binding system is secured to the snow ski, the heel and toe pieces are fixedly secured to said attenuated release logic mechanism, and the ski boot is properly engaged between the heel and toe pieces:
 - an attenuated release in response to lateral shear loads applied to the snow ski in the third-quadrant of the snow ski; and
 - a non-attenuated release in response to lateral shear forces applied to the snow ski in the fourth-quadrant of the snow ski;
 - a trigger operatively configured, when the ski binding system is secured to the snow ski, to trigger said secondary toe release to switch from said non-attenuated release to said attenuated release in responses to a triggering third-quadrant shear force.
31. The ski binding system of claim 30, wherein said non-attenuated release occurs at a first tibial torque and said attenuated release occurs at a second tibial torque that is at least 20% less than said first tibial torque.
32. The ski binding system of claim 30, wherein said trigger comprises a trigger mechanism and a trigger trip torque mechanism for providing said trigger mechanism with a trip torque threshold for substantially only lateral shear forces applied at locations in the third-quadrant of the snow ski.
33. The ski binding system of claim 32, wherein said trigger mechanism includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and having a pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski.

34. The ski binding system of claim 33, wherein said trigger mechanism further includes a pivotable latch releasably securing said secondary toe release, said pivotable latch pivotably secured to said trigger member.
35. The ski binding system of claim 34, wherein said pivotable latch is actuated by pivoting of said trigger member relative to said ski about said pivot point.
36. The ski binding system of claim 33, wherein said trigger mechanism further includes a movable catch releasably securing said secondary toe release, said movable catch movable in response to said trigger member being pivoted about said pivot point.
37. The ski binding system of claim 33, wherein said trigger trip torque mechanism includes a biasing member biased between the snow ski and said trigger member so as to provide the trip torque threshold when the ski binding is affixed to the snow ski.
38. The ski binding system of claim 33, wherein said trigger trip torque mechanism includes a biased toggle that includes a lever arm functionally engaging said trigger member.
39. The ski binding system of claim 38, wherein, when said trigger member is in an unreleased state, said biased toggle is biased against a pair of fulcrums spaced from one another and, when said trigger member is in a release state, said biased toggle is pivoted about one or the other of said pair of fulcrums.
40. The ski binding system of claim 39, wherein said trigger trip torque mechanism includes a locking pin for allowing said biased fulcrum to pivot substantially only about one of said pair of fulcrums.
41. The ski binding system of claim 30, wherein said secondary toe release includes a secondary toe release mechanism that, when the ski boot is properly secured in the ski binding, provides the toe of the ski boot with an attenuated release in response to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.
42. The ski binding system of claim 41, wherein said trigger includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and has a first pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski, said secondary toe release mechanism secured to said trigger member.

43. The ski binding system of claim 42, wherein said secondary toe release mechanism includes a toe piece support plate pivotably secured to said trigger member, said toe piece being fixedly secured to said toe piece support plate.
44. The ski binding system of claim 43, wherein said toe piece support plate has a second pivot point located between said first pivot point of said trigger member and the toe of the ski boot when the ski boot is properly engaged in the ski binding.
45. The ski binding of claim 43, wherein said secondary toe release mechanism includes a catch fixed relative to said toe piece support plate, said trigger including a movable latch for releasably engaging said catch.
46. The ski binding system of claim 43, wherein said secondary toe release mechanism includes a latch fixed relative to said toe piece support plate, said trigger including a movable catch for releasably engaging said latch.
47. The ski binding system of claim 43, further comprising an attenuated release threshold mechanism providing said secondary toe release with an attenuated release threshold.
48. The ski binding system of claim 47, wherein said attenuated release threshold mechanism includes a biasing member biased between said trigger member and said toe piece support plate so as to provide said attenuated release threshold.
49. The ski binding system of claim 48, wherein said secondary toe release includes a latch fixed relative to said toe piece support plate and including a cam follower, said attenuated release threshold mechanism including a biased cam biased into engagement with said cam follower of said latch.
50. A method of releasing a ski boot from an alpine ski binding system, comprising:
sensing lateral shear forces applied to a snow ski having a first-quadrant, a second-quadrant, a third-quadrant and a fourth-quadrant;
determining when a virtual net shear force present in the third-quadrant exceeds a threshold value;
in response to the net virtual shear force applied to the snow ski in the third-quadrant exceeds the threshold value, triggering a secondary toe release; and
releasing via the secondary toe release the ski boot from the alpine ski binding system.

51. The method of claim 50, wherein said sensing of the lateral shear forces includes sensing the lateral shear forces using an elongate pivotable trigger member having a pivot point located forward of the ski boot when the alpine binding system is secured to a snow ski and the ski boot is properly captured in the alpine ski binding.
52. The method of claim 50, wherein the boot has a toe and said releasing of the ski boot includes allowing a toe piece to pivot so as to release the toe of the boot.
53. The method of claim 50, wherein the alpine ski binding system includes a dual-release-threshold toe assembly having a non-attenuated release threshold and an attenuated release threshold, said triggering of the secondary toe release including switching the dual-release-threshold to assembly from the non-attenuated release threshold to the attenuated release threshold.
54. The method of claim 50, wherein the alpine ski binding system provides a non-attenuated tibial torque threshold prior to said triggering of the secondary toe release and said triggering of the secondary toe release provides an attenuated tibial torque that is at least 20% less than the non-attenuated tibial torque.
55. The method of claim 50, wherein said sensing of the lateral shear forces includes sensing the lateral shear forces using a plurality of load cells.

ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

Abstract of the Disclosure:

An alpine ski binding system for releasably securing a ski boot to a ski. The binding system includes a secondary toe release that provides an attenuated release threshold under lateral shear loading conditions that can cause anterior cruciate ligament injuries. The secondary toe release responds to a trigger that senses the lateral shear loads applied to the inside (medial) afterbody of the ski and triggers the secondary toe release to release the boot at an attenuated release torque. Lateral shear loads applied to the ski along the leading (medial) forebody and along the entire outside (lateral side) of the ski substantially do not cause the trigger to trip.

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Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
First Named Inventor/Applicant Name:		Carl F. Ettlinger		
Filer:		Lawrence H. Meier/Karen Jeffer		
Attorney Docket Number:		12219-00001		
Filed as Small Entity				
Utility Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
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Utility filing Fee (Electronic filing)	4011	1	75	75
Utility Search Fee	2111	1	250	250
Utility Examination Fee	2311	1	100	100
Pages:				
Claims:				
Claims in excess of 20	2202	35	25	875
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1300

Electronic Acknowledgement Receipt

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Application Number:	11834041
International Application Number:	
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Title of Invention:	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury
First Named Inventor/Applicant Name:	Carl F. Ettlinger
Customer Number:	21918
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Payment was successfully received in RAM	\$ 1300
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1085383	no	4
			6c87116dc406707dbc8208970b94c0f59857f3e1		
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration.pdf	116804	no	3
			d980e85d728252989eb99a0424417b01f001e9a4		
Warnings:					
Information:					
3	Power of Attorney	POA.pdf	78756	no	2
			2b40b444cc06e71f7379a246a6a2746f99dd112b9		
Warnings:					
Information:					
4	Drawings	Drawings.pdf	1247864	no	22
			67a3c0f000c10c9fcc972dfeeab4cce21b2709cd		
Warnings:					
Information:					
5		Application.pdf	295630	yes	33
			8cba2673209f189732515e768915f1914d25cc95		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	24	
	Claims		25	32	
	Abstract		33	33	
Warnings:					
Information:					
6	Fee Worksheet (PTO-06)	fee-info.pdf	8529	no	2
			efea3a609c67f3ed02a1165099ece779101b571d		
Warnings:					
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Total Files Size (in bytes):			2832966		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	12219-00001
		Application Number	
Title of Invention	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Carl	F.	Ettlinger		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Underhill Center	State/Province	VT	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	9 Sandhill Road				
Address 2					
City	Underhill Center	State/Province	VT		
Postal Code	05490	Country i	US		
Applicant 2					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	David	J.	Dodge		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Williston	State/Province	VT	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	44 Goldenrod Road				
Address 2					
City	Williston	State/Province	VT		
Postal Code	05495	Country i	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	12219-00001
		Application Number	
Title of Invention	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
Customer Number	21918		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
Attorney Docket Number	12219-00001	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	22	Suggested Figure for Publication (if any)	
Publication Information:			
☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)			
☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.			

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ US Representative (37 CFR 11.9)
Customer Number	21918		

Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60836454	2006-08-08
Additional Domestic Priority Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	12219-00001
		Application Number	
Title of Invention	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove			
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☒ Yes ☐ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1				Remove
If the Assignee is an Organization check here. ☒				
Organization Name	Vermont Safety Developments			
Mailing Address Information:				
Address 1	P.O. Box 85			
Address 2				
City	Underhill Center	State/Province	VT	
Country ⁱ	US	Postal Code	05490	
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Lawrence H. Meier/		Date (YYYY-MM-DD)	2007-08-06
First Name	Lawrence	Last Name	Meier	Registration Number
				31446

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Declaration for Patent Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING
ANTERIOR CRUCIATE LIGAMENT INJURY**

the specification of which (check one)

- ☒ is attached hereto.
☐ was filed on _____ as United States Application Serial No. _____, [which is a §371 application of PCT International Application No. _____, with an international filing date of _____,] and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR §1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d), and/or §§119(a) and 365(b) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Number	Country	Day/Month/Year	Priority Claimed Yes/No
_____	_____	_____	_____

I hereby claim benefit under Title 35, United States Code, §119(e) of any United States provisional applications listed below:

Provisional Application Number	Filing Date
<u>60</u> / <u>836,454</u>	<u>August 8, 2006</u>

I hereby claim the benefit under Title 35, United States Code, §120, and/or §§120 and 365(c), of any United States application(s) and/or any International application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or International application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Applications:

Serial No.	Filing Date	Status (patented, pending, abandoned)
_____	_____	_____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Send all correspondence to:

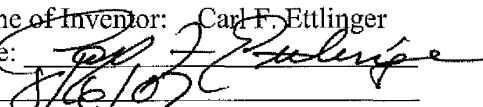
21918

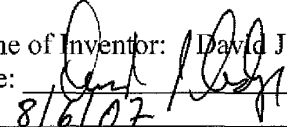
21918

PATENT TRADEMARK OFFICE

Direct Telephone Calls to:

Morgan S. Heller II at (802) 863-2375

(1) Full Name of Inventor: Carl F. Ettlinger
Signature: 
Date: 8/6/07
Residence: 9 Sandhill Road, Underhill Center, VT 05490
Citizenship: US
Post Office
Address: Same as residence address

(2) Full Name of Inventor: David J. Dodge
Signature: 
Date: 8/6/07
Residence: 44 Goldenrod Road, Williston, VT 05495
Citizenship: US
Post Office
Address: Same as residence address

2094203.1

8/6/07

PTO/SB/06 (12-04)

Approved for use through 7/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					11/834,041	
APPLICATION AS FILED – PART I						
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	RATE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))					75	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))					250	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))					100	
TOTAL CLAIMS (37 CFR 1.16(i))	55	minus 20 =		X 25=	875	X 50=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =		X 100=		X 200=
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				N/A		N/A
				TOTAL	1300	TOTAL
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		OTHER THAN SMALL ENTITY
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	X =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X =	
	Application Size Fee (37 CFR 1.16(s))				N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL ADD'T FEE	
(Column 1)		(Column 2)		(Column 3)		OTHER THAN SMALL ENTITY
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	X =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X =	
	Application Size Fee (37 CFR 1.16(s))				N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL ADD'T FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.						

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
11/834,041	08/06/2007		1300	12219-00001	55	3

CONFIRMATION NO. 9042

21918
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

FILING RECEIPT

Date Mailed: 08/16/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Carl F. Ettlinger, Underhill Center, VT;
David J. Dodge, Williston, VT;

Assignment For Published Patent Application

VERMONT SAFETY DEVELOPMENTS, Underhill Center, VT

Power of Attorney:

Lawrence Meier--31446
Morgan Heller II--44756

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/836,454 08/08/2006

Foreign Applications

If Required, Foreign Filing License Granted: 08/15/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is
US11/834,041

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001

CONFIRMATION NO. 9042
FORMALITIES
LETTER

21918
 DOWNS RACHLIN MARTIN PLLC
 199 MAIN STREET
 P O BOX 190
 BURLINGTON, VT 05402-0190

Date Mailed: 08/16/2007

NOTICE TO FILE CORRECTED APPLICATION PAPERS***Filing Date Granted***

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 9b, 10b.
 - The drawings have a line quality that is too light to be reproduced (weight of all lines and letters must be heavy enough to permit adequate reproduction) or text that is illegible (reference characters, sheet numbers, and view numbers must be plain and legible) see 37 CFR 1.84(l) and (p)(1)); See Figure(s) 5, 7, 8, 17.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or

visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
PART 3 - OFFICE COPY

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Carl F. Ettlinger et al.

Serial No.: 11/834,041

Filed: 8/6/2007

Title: Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury

Attorney Docket No.: 12219-00001

Confirmation No.: 9042

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 1, 2007

**Response to Notice to File Corrected Application Papers,
Request for Extension of Time and
Transmittal of Formal Drawings**

In connection with the above-identified patent application, please substitute the attached formal drawings, consisting of 22 sheets, for the corresponding drawings filed with the application on August 6, 2007. We are submitting these drawings in accordance with the Notice to File Corrected Application Papers dated August 16, 2007.

Page 1 of 2

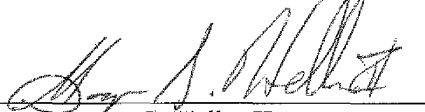
Law Offices of
Downs Rachlin Martin PLLC
199 Main Street, P.O. Box 190
Burlington, VT 05402-0190
(802) 863-2375

Applicants respectfully request that the statutory period for response to the Notice to File Corrected Application Papers dated August 16, 2007 set to expire on October 16, 2007, be extended by one month, to expire on November 16, 2007.

The Commissioner is hereby authorized to charge payment of the one-month extension fee, in the amount of \$60.00, as well as any additional filing fees required under 37 C.F.R. § 1.16, or any patent application processing fees under 37 C.F.R. § 1.17, to Deposit Account No. 04-1588.

Respectfully submitted,

DOWNS RACHLIN MARTIN, PLLC

By: 

Morgan S. Heller II

Registration No.: 44756

2245740.1

Page 2 of 2

Law Offices of
Downs Rachlin Martin PLLC
199 Main Street, P.O. Box 190
Burlington, VT 05402-0190
(802) 863-2375

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Carl F. Ettlinger et al.

Serial No.: 11/834,041

Filed: 8/6/2007

Title: Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury

Attorney Docket No.: 12219-00001

Confirmation No.: 9042

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 1, 2007

**Response to Notice to File Corrected Application Papers,
Request for Extension of Time and
Transmittal of Formal Drawings**

In connection with the above-identified patent application, please substitute the attached formal drawings, consisting of 22 sheets, for the corresponding drawings filed with the application on August 6, 2007. We are submitting these drawings in accordance with the Notice to File Corrected Application Papers dated August 16, 2007.

Page 1 of 2

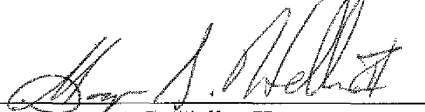
Law Offices of
Downs Rachlin Martin PLLC
199 Main Street, P.O. Box 190
Burlington, VT 05402-0190
(802) 863-2375

Applicants respectfully request that the statutory period for response to the Notice to File Corrected Application Papers dated August 16, 2007 set to expire on October 16, 2007, be extended by one month, to expire on November 16, 2007.

The Commissioner is hereby authorized to charge payment of the one-month extension fee, in the amount of \$60.00, as well as any additional filing fees required under 37 C.F.R. § 1.16, or any patent application processing fees under 37 C.F.R. § 1.17, to Deposit Account No. 04-1588.

Respectfully submitted,

DOWNS RACHLIN MARTIN, PLLC

By: 

Morgan S. Heller II

Registration No.: 44756

2245740.1

Page 2 of 2

Law Offices of
Downs Rachlin Martin PLLC
199 Main Street, P.O. Box 190
Burlington, VT 05402-0190
(802) 863-2375

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Your fee transmittal sheet cannot be generated at this time. Please complete your submission. After completing your submission, please contact the Electronic Business Center (EBC) to request the fee transmittal sheet for this submission. We apologize for the inconvenience. Electronic Business Center (EBC) 1-866-217-9197 (toll-free) or 571-272-4100 6 a.m. to 12 Midnight Eastern Time Monday -Friday		
First Named Inventor/Applicant Name:				
Filer:				
Attorney Docket Number:				
Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				

Electronic Acknowledgement Receipt

EFS ID:	2412737
Application Number:	11834041
International Application Number:	
Confirmation Number:	9042
Title of Invention:	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury
First Named Inventor/Applicant Name:	Carl F. Ettlinger
Customer Number:	21918
Filer:	Morgan Heller/Karen Jeffer
Filer Authorized By:	Morgan Heller
Attorney Docket Number:	12219-00001
Receipt Date:	01-NOV-2007
Filing Date:	06-AUG-2007
Time Stamp:	14:14:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	\$ 60
RAM confirmation Number	10330
Deposit Account	041588
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)				
1		Transmittal.pdf	63733 6b1ef04647db83abbad77ccb53a6c16e07254c	yes	2				
	Multipart Description/PDF files in .zip description								
	Document Description		Start	End					
	Miscellaneous Incoming Letter		1	1					
	Extension of Time		2	2					
Warnings:									
Information:									
2	Drawings-only black and white line drawings	FinalDrawings.pdf	1884109 bb435524fe85385177d113809635c99224c7b7b0	no	22				
Warnings:									
Information:									
3	Fee Worksheet (PTO-06)	fee-info.pdf	30061 769380a49c92bc8e06d1c1dfb5959d2273810ce5	no	2				
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.									

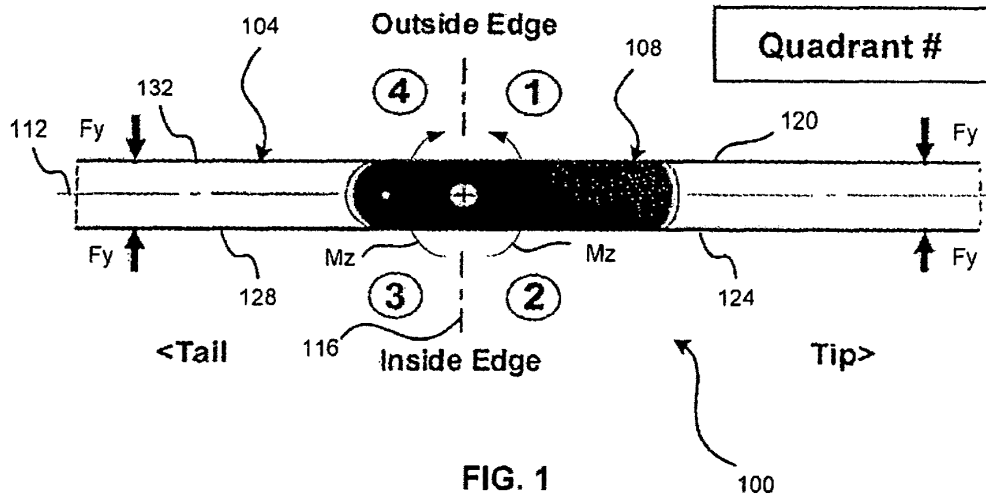


FIG. 1

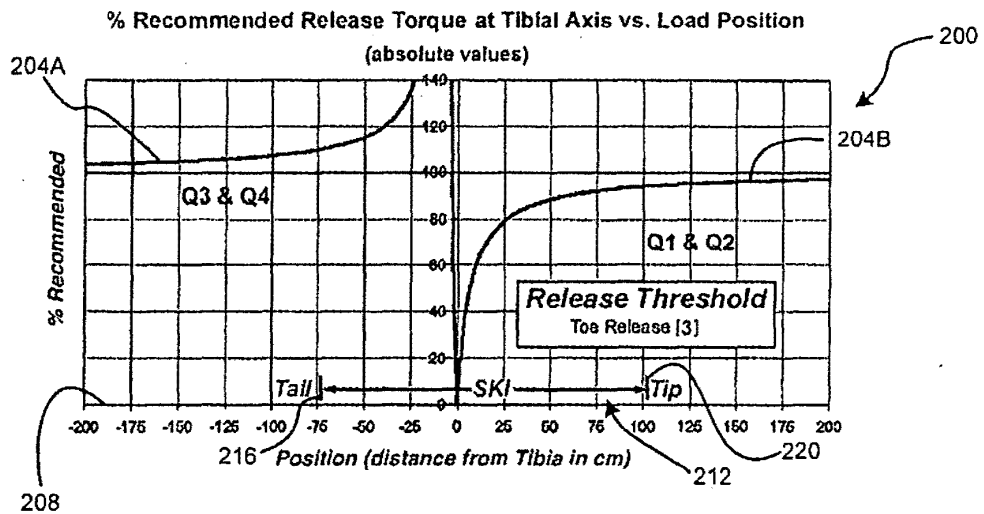


FIG. 2

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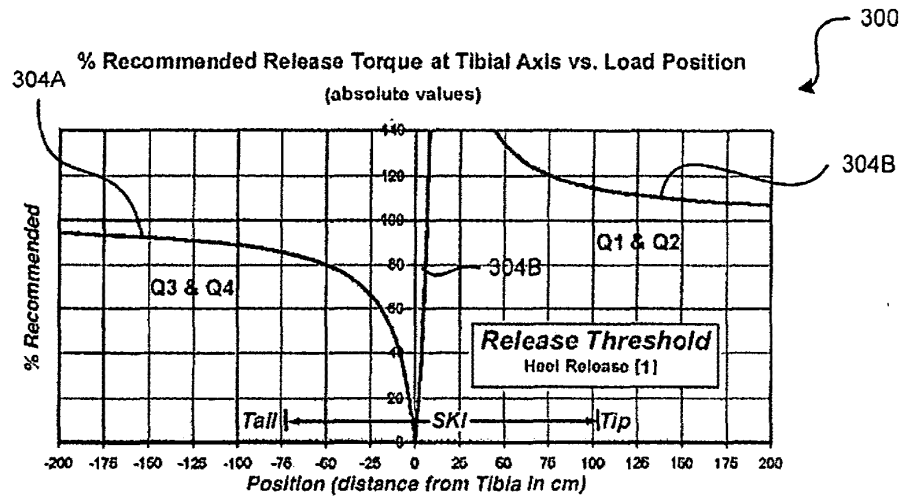


FIG. 3

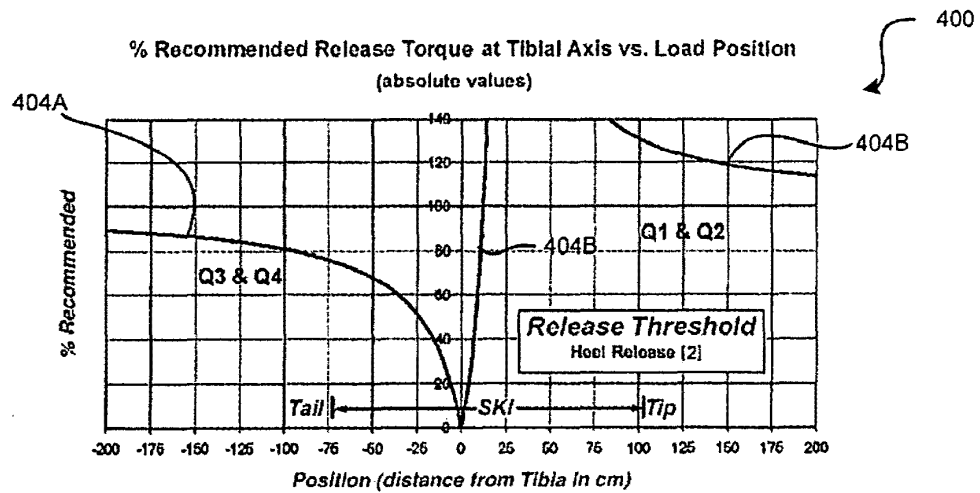


FIG. 4

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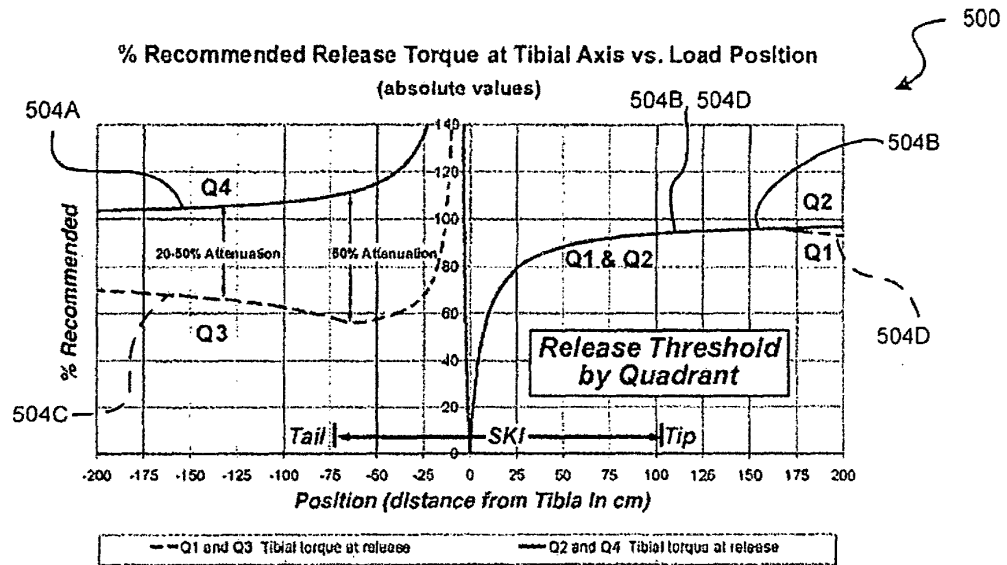


FIG. 5

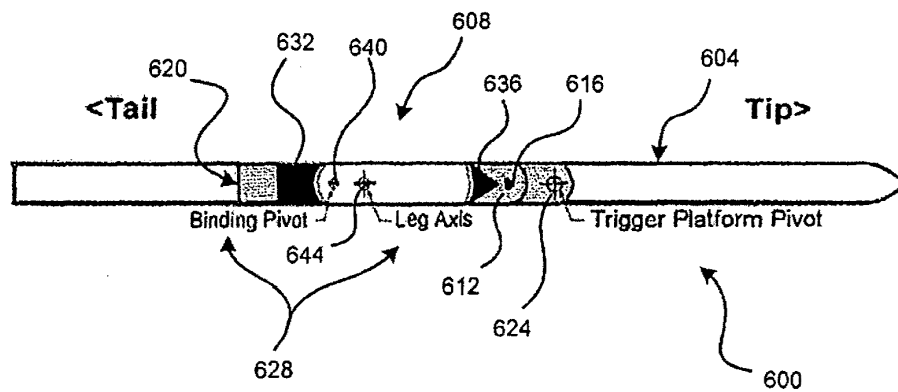


FIG. 6

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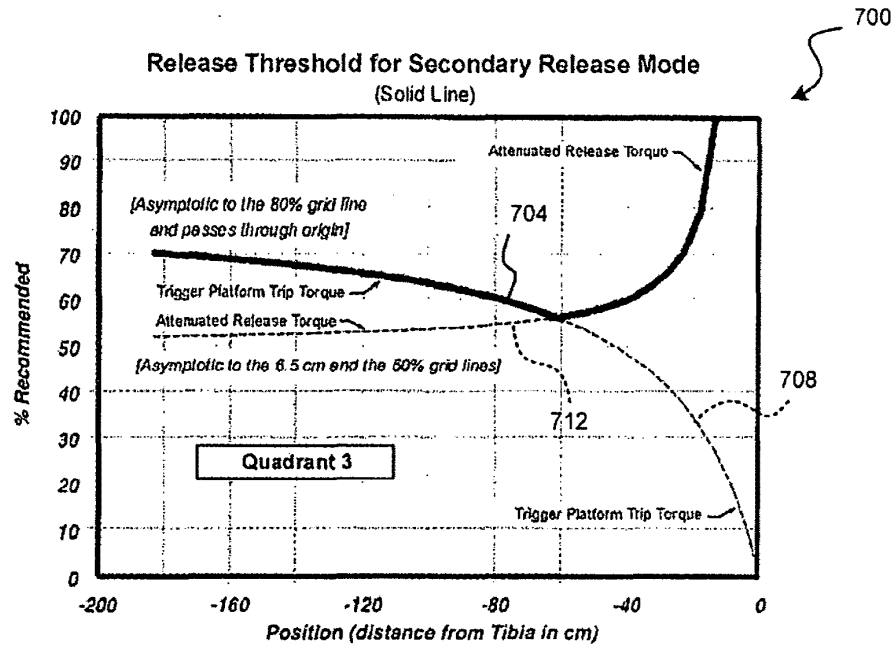


FIG. 7

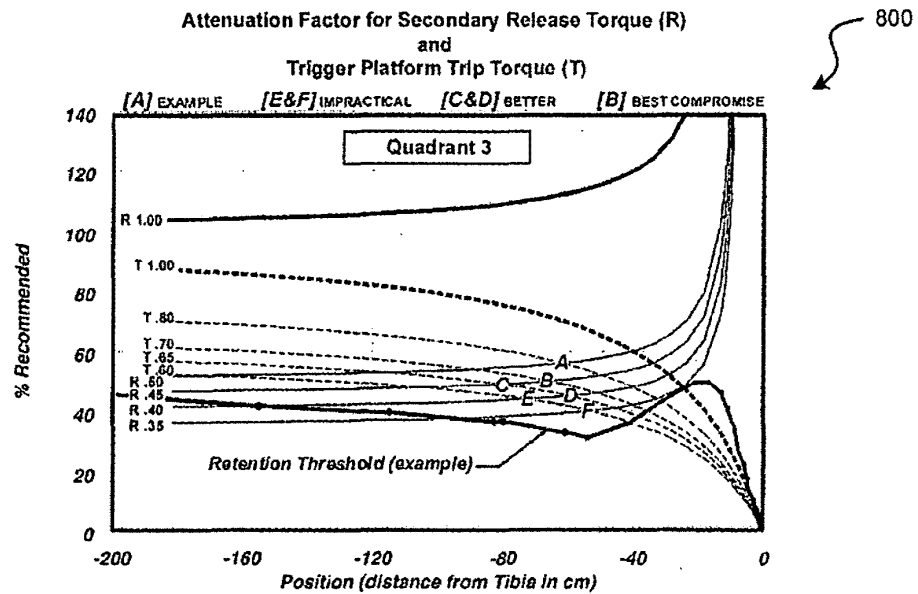


FIG. 8

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FIG. 9A

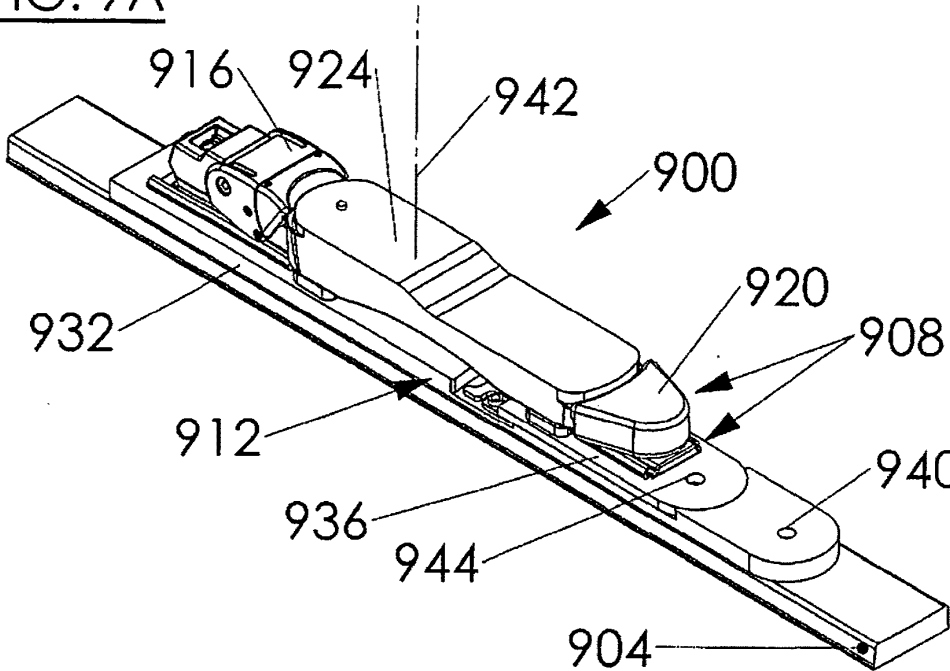
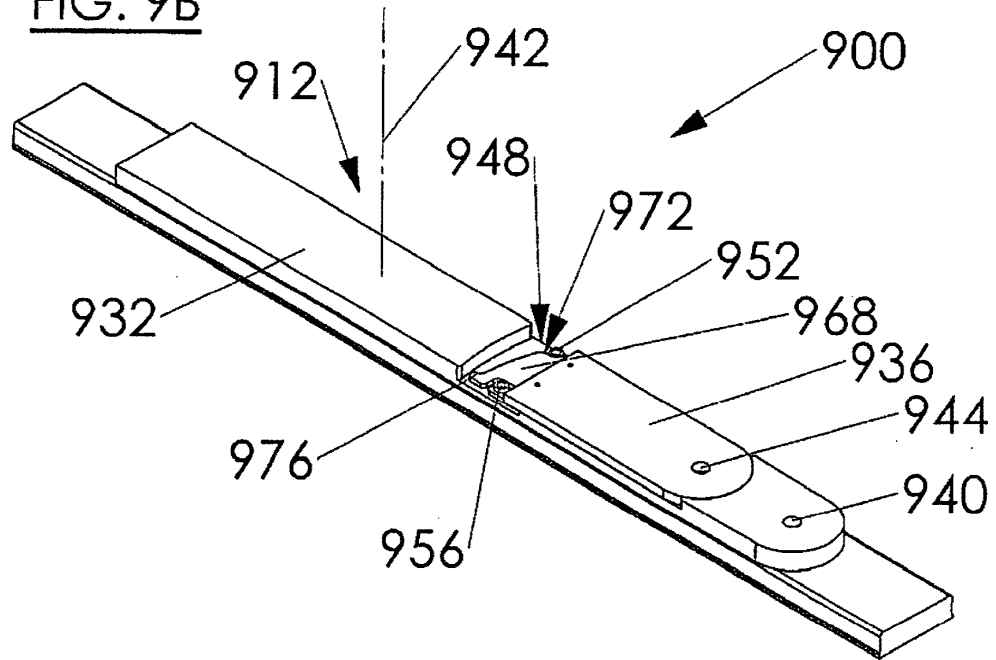
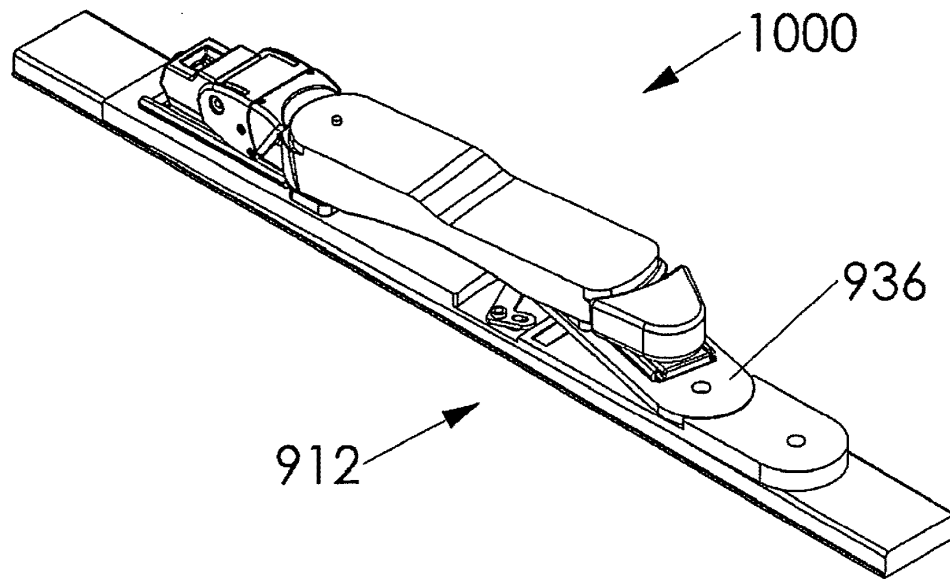


FIG. 9B

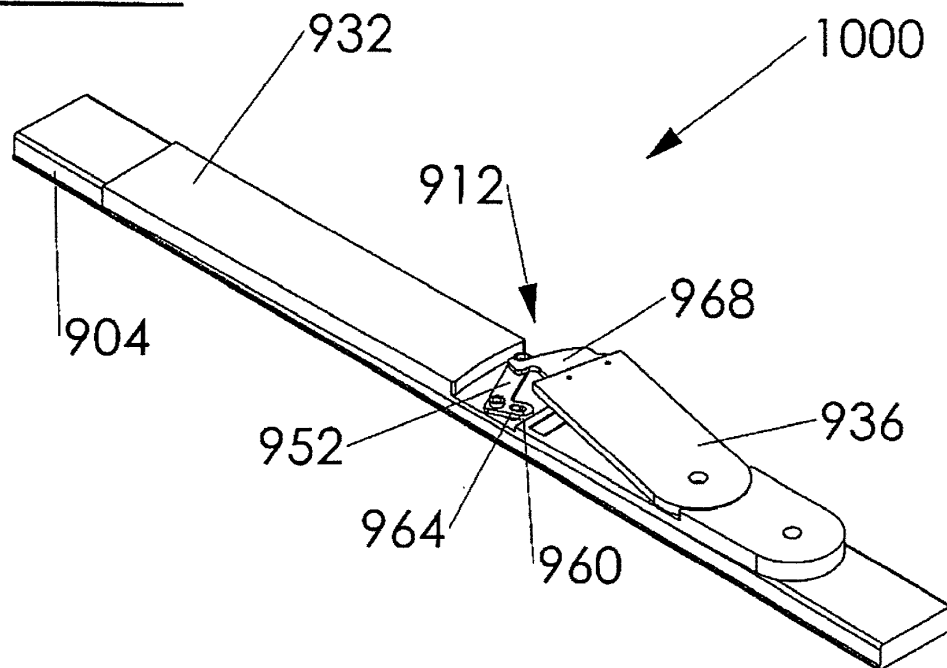
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FIG. 10A



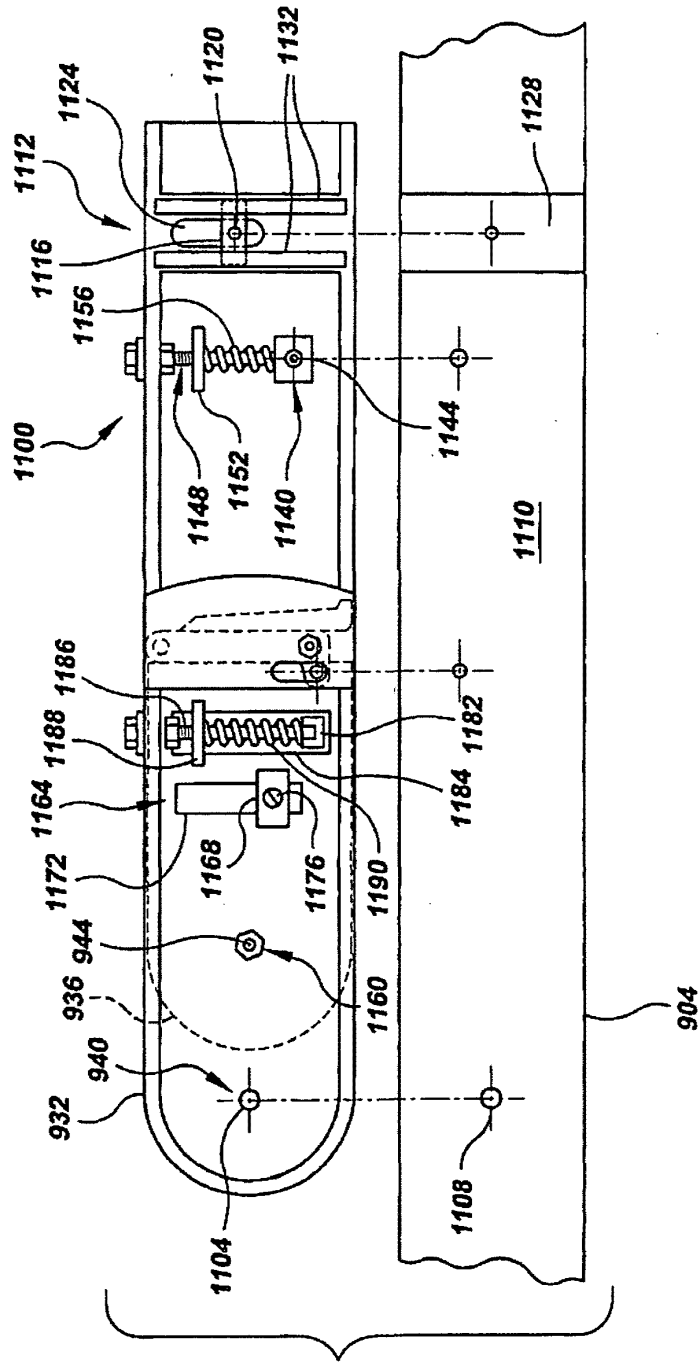
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FIG. 10B



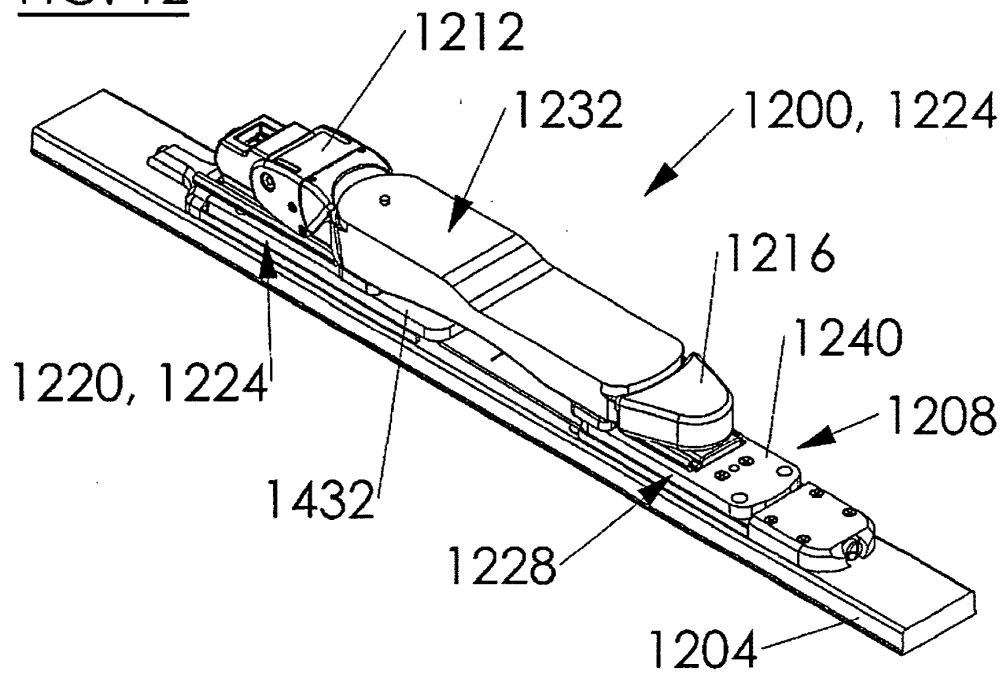
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FIG.11



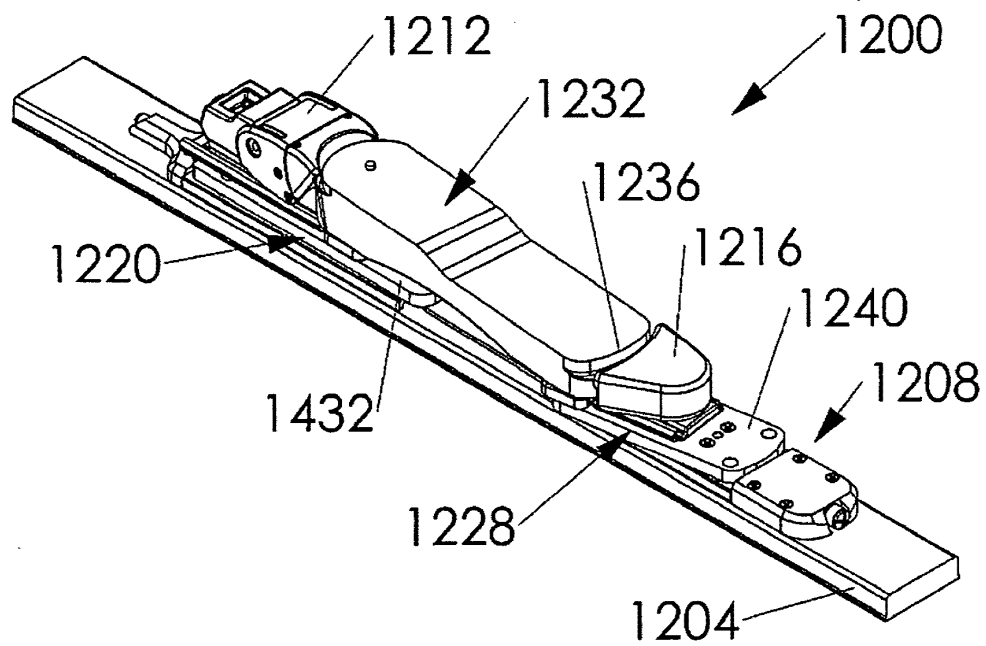
10/22

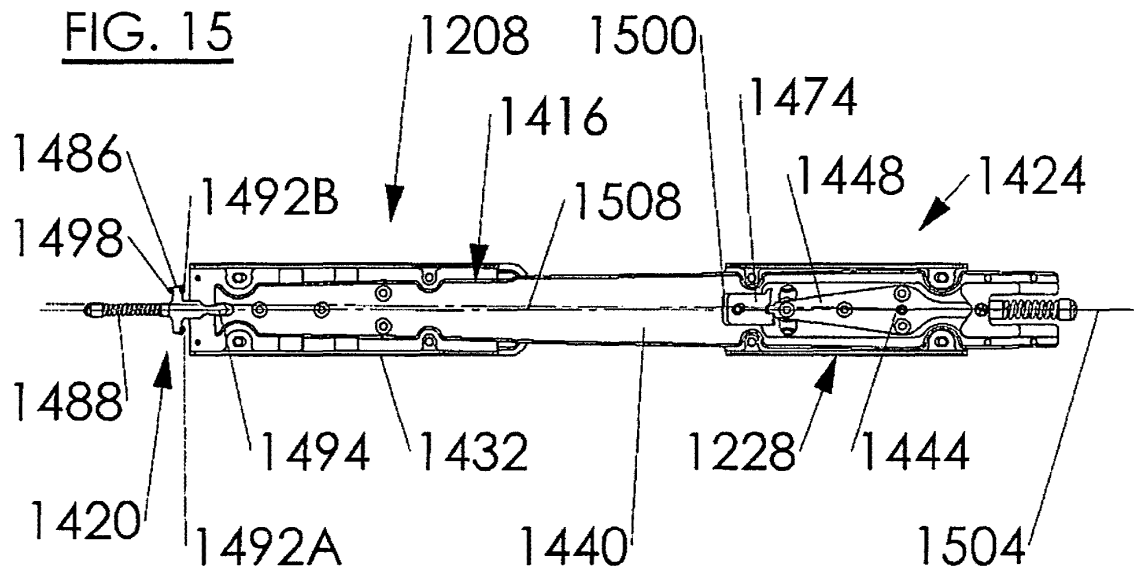
FIG. 12



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FIG. 13





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FIG. 17

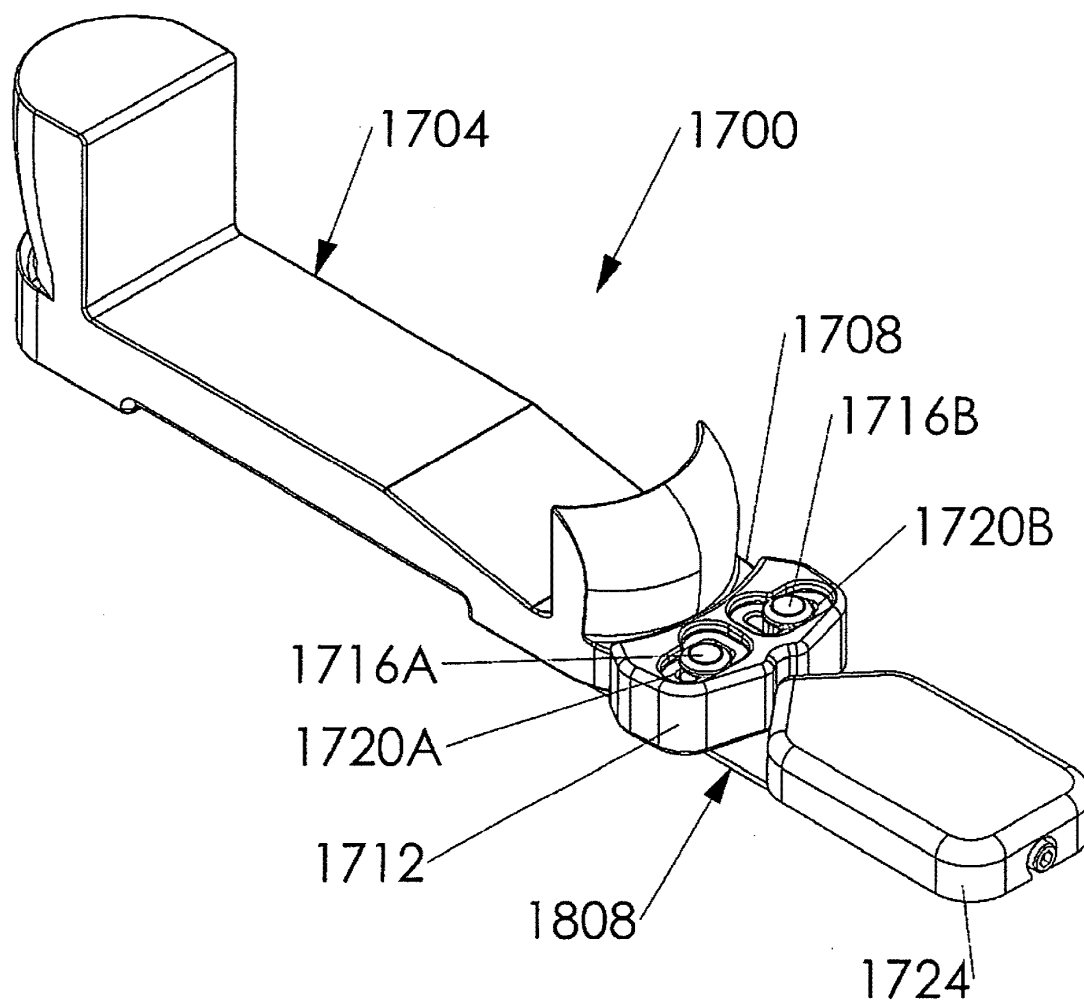


FIG. 18

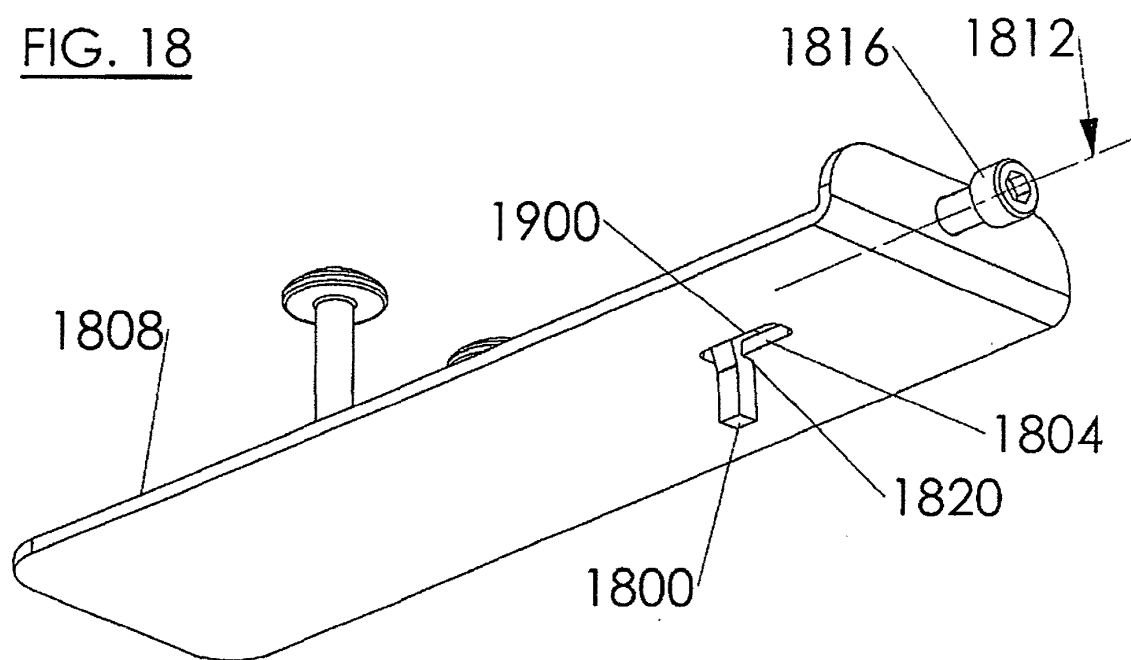


FIG. 20

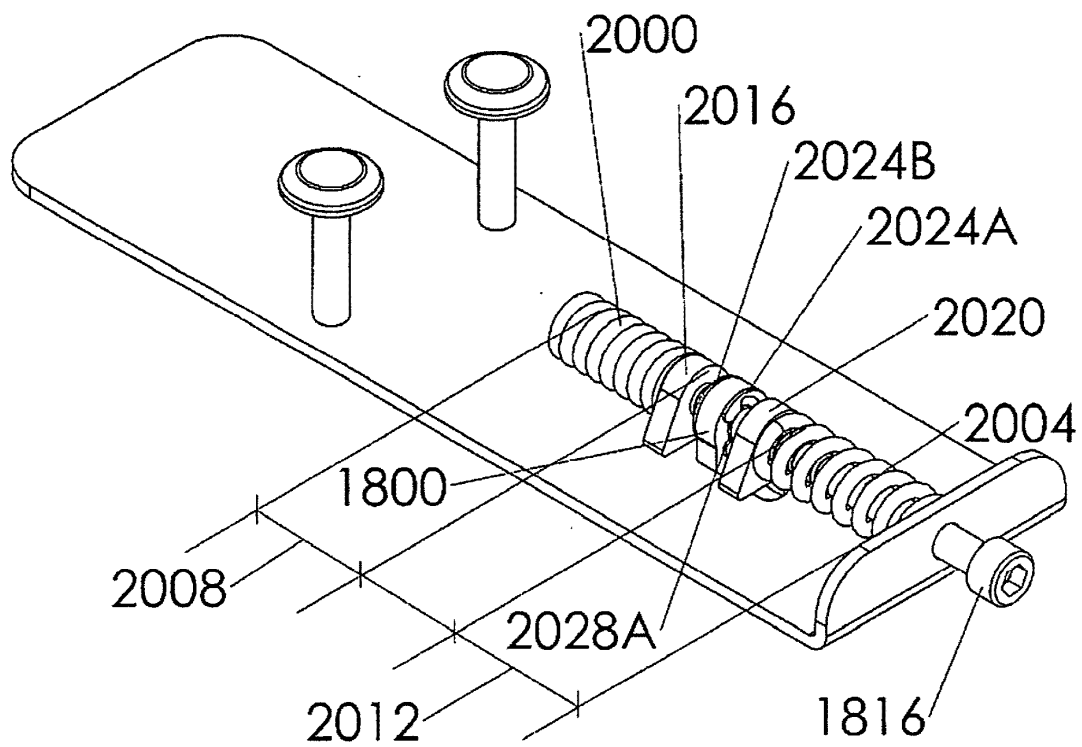
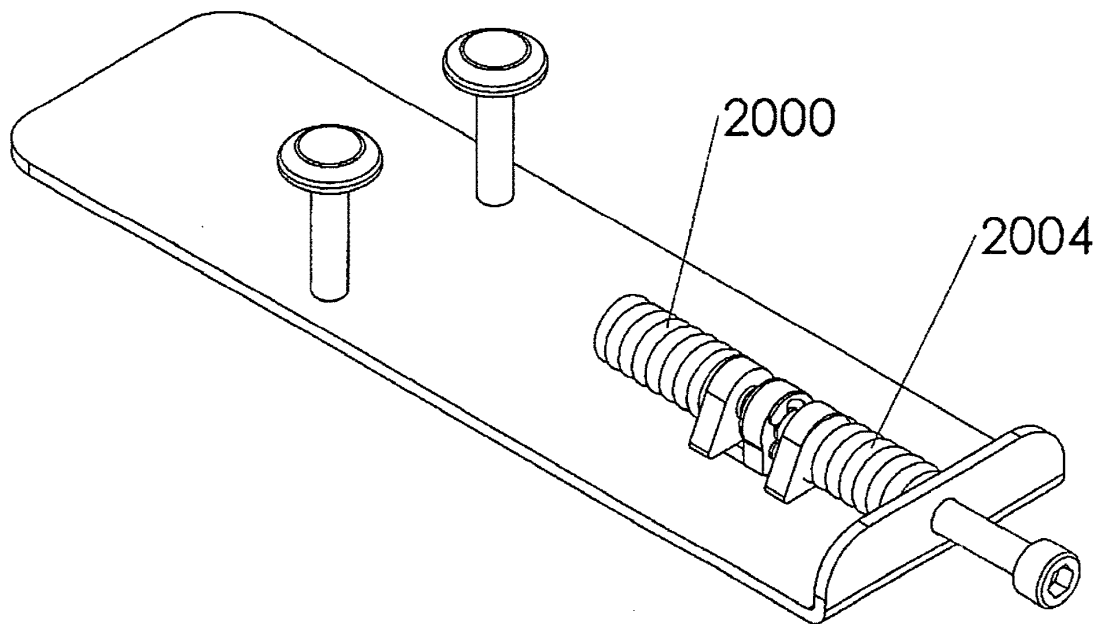


FIG. 21



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FIG. 22

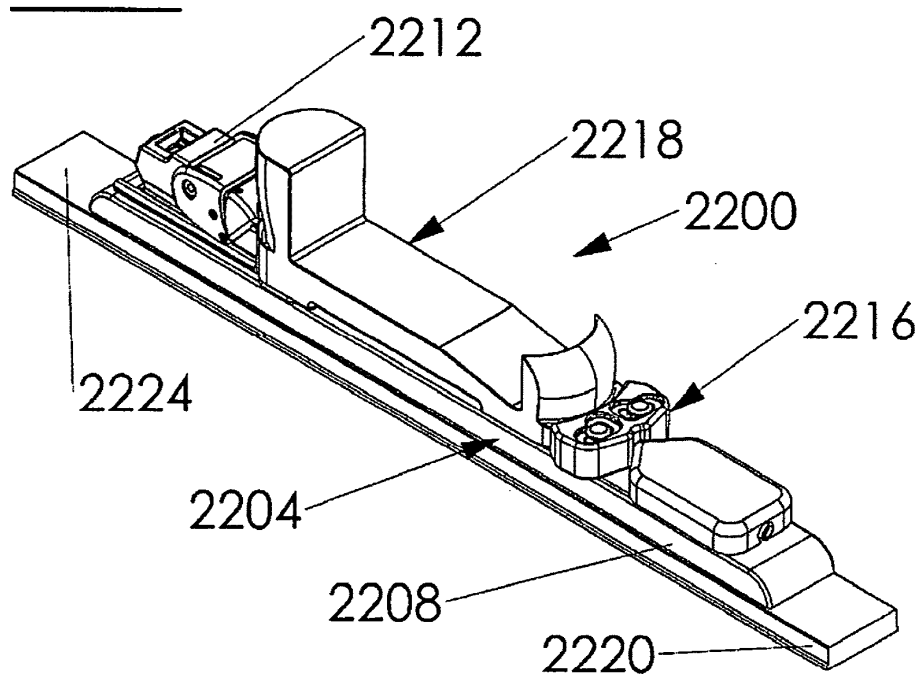
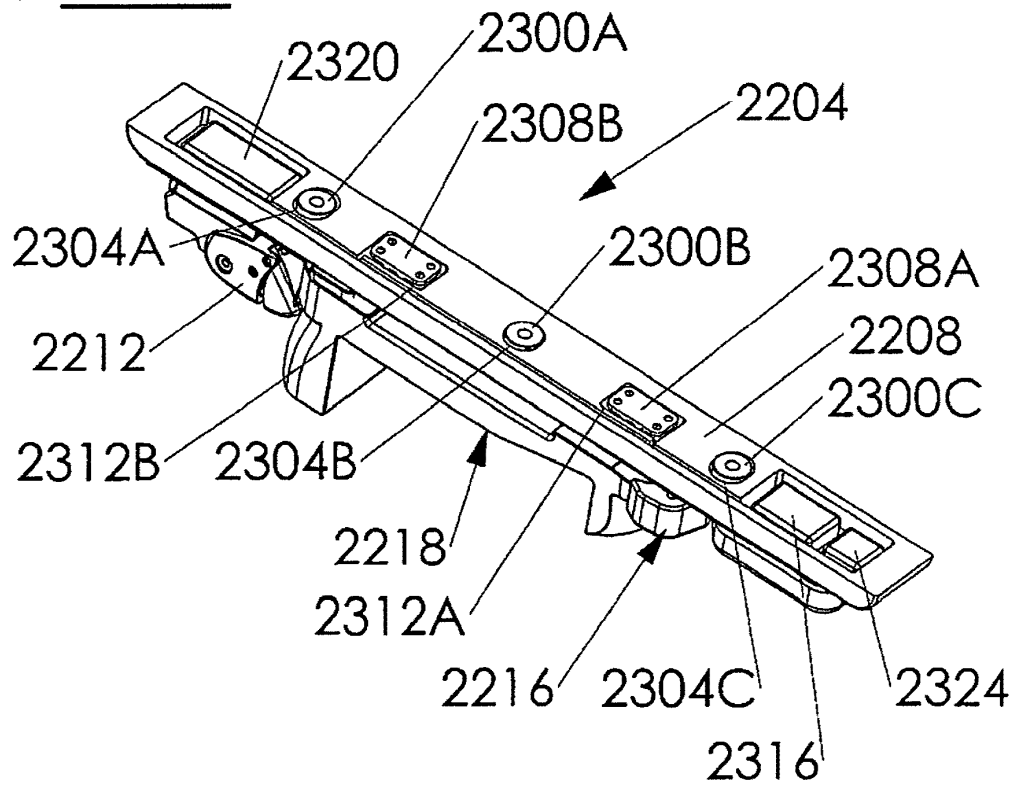
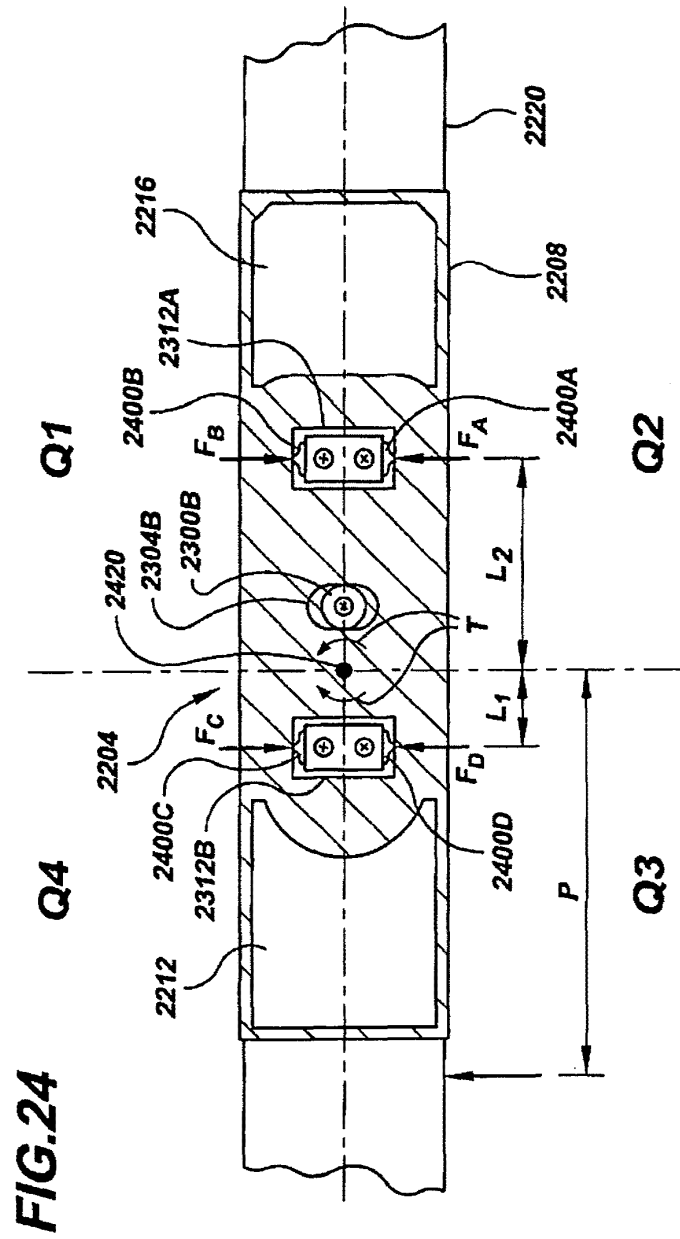


FIG. 23







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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
11/834,041	08/06/2007	3618	1300	12219-00001	55	3

CONFIRMATION NO. 9042

UPDATED FILING RECEIPT



OC000000026611241

21918
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

Date Mailed: 11/06/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Carl F. Ettlinger, Underhill Center, VT;
David J. Dodge, Williston, VT;

Assignment For Published Patent Application

VERMONT SAFETY DEVELOPMENTS, Underhill Center, VT

Power of Attorney:

Lawrence Meier--31446
Morgan Heller II--44756

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/836,454 08/08/2006

Foreign Applications

If Required, Foreign Filing License Granted: 08/15/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 11/834,041**

Projected Publication Date: 02/14/2008

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury

Preliminary Class

280

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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Electronic Patent Application Fee Transmittal				
Application Number:		11834041		
Filing Date:		06-Aug-2007		
Title of Invention:		Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
First Named Inventor/Applicant Name:		Carl F. Ettlinger		
Filer:		Morgan Heller/Karen Jeffer		
Attorney Docket Number:		12219-00001		
Filed as Small Entity				
Utility Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	2251	1	60	60

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				60



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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001

CONFIRMATION NO. 9042

21918
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT05402-0190

Title: Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury

Publication No. US-2008-0036180-A1

Publication Date: 02/14/2008

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Pre-Grant Publication Division, 703-605-4283



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001	9042
21918 7590 08/01/2008 DOWNS RACHLIN MARTIN PLLC 199 MAIN STREET P O BOX 190 BURLINGTON, VT 05402-0190			EXAMINER OLSZEWSKI, JOHN	
			ART UNIT 3618	PAPER NUMBER
			MAIL DATE 08/01/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Election/Restrictions

1. **The inventions found in claims 50-55 and claims (1-29 and 30-49) are related as process and apparatus for its practice.** The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case apparatus as claimed can be used to practice another and materially different process with regards to claims 1-29 and 50-55, specifically, the apparatus does not require the use of a secondary toe release. With regards to claims 30-49 and 50-55 the apparatus as claimed can be used to practice another and materially different process, specifically a process that requires a non-attenuated release in response to lateral shear forces in the fourth quadrant.

NOTE: *Applicant must either elect method (claims 50-55) or apparatus (claims 1-49) after making this election applicant must proceed to the below election of species and make an additional election.*

2. **This application contains claims directed to the following patentably distinct species:**

Species I: (Figures 9A-11) disclose one embodiment of the present invention

Species II: (Figures 12-16) disclose another embodiment of the invention

designed for skier's right leg since dynamics of this system vary

substantially, structurally from one leg to the other due to the
complementary nature of the human body

Species III: (Figures 17-21) disclose an alternate toe assembly

Species IV: (Figures 22-24) disclose an electronic release-logic system

Sub-species I: (Figure 1) discloses one embodiment of the applicant's
apparatus

Sub-species II: (Figures 5-8) disclose another embodiment of applicant's
apparatus

NOTE: Figures 2-4 are generic to prior art binding systems.

NOTE: If applicant elects species IV above applicant must also elect either sub-species
I OR sub-species II.

The species are independent or distinct because claims to the different species
recite the mutually exclusive characteristics of such species. In addition, these species
are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for
prosecution on the merits to which the claims shall be restricted if no generic claim is
finally held to be allowable. There is an examination and search burden for these
patentably distinct species due to their mutually exclusive characteristics. The species
require a different field of search (e.g., searching different classes/subclasses or
electronic resources, or employing different search queries); and/or the prior art
applicable to one species would not likely be applicable to another species; and/or the

species are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election of the species may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species.

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

Conclusion

3. **Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN R. OLSZEWSKI whose telephone number is (571)272-2706.** The examiner can normally be reached on M-Th 5:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Ellis can be reached on 571-272-6914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. R. O./
Examiner, Art Unit 3618

/Christopher P Ellis/
Supervisory Patent Examiner, Art
Unit 3618

Application/Control Number: 11/834,041
Art Unit: 3618

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<i>Index of Claims</i> 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant			☐ CPA			☐ T.D.			☐ R.1.47		
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CLAIM		DATE								
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Carl F. Ettlinger et al.

Serial No.: 11/834,041

Filed: August 6, 2007

Title: Alpine Ski Binding System Having Release Logic For Inhibiting
Anterior Cruciate Ligament Injury

Attorney Docket No.: 12219-00001

Group Art Unit: 3618

Confirmation No.: 9042

Examiner: John Olszewski

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

September 2, 2008

RESPONSE TO RESTRICTION/ELECTION REQUIREMENT
AND AMENDMENT

This is in response to the Office Action (paper no. 20080731) mailed from the United States Patent and Trademark Office on August 1, 2008, with respect to the above-identified application.

A **STATUS OF THE CLAIMS** starts on the following page 2.

REMARKS concerning the Office Action start on the following page 12.

STATUS OF THE CLAIMS

The status of the claims of the current application stands as follows:

1. **(Original)** A ski binding configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end, the ski binding comprising:
 - a heel piece for releasably engaging the heel of the ski boot;
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - the ski binding is mounted to the snow ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in the ski binding; and
 - release logic providing the ski binding with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.
2. **(Original)** The ski binding of claim 1, wherein, when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said attenuated release torque induces a tibial torque about the tibial axis of the skier, said release logic configured so that the tibial torque is diminished as a function of the location of the lateral shear force in the third-quadrant from the tibial axis toward the trailing end of the snow ski.
3. **(Original)** The ski binding of claim 1, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said trigger being triggerable in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.

4. **(Original)** The ski binding of claim 3, wherein said trigger comprises a trigger mechanism and a trigger trip torque mechanism for providing said trigger mechanism with a trip torque threshold for substantially only lateral shear forces applied at locations in the third-quadrant of the snow ski.
5. **(Original)** The ski binding of claim 4, wherein said trigger mechanism includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and having a pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski.
6. **(Original)** The ski binding of claim 5, wherein said trigger mechanism further includes a pivotable latch releasably securing said secondary toe release, said pivotable latch pivotably secured to said trigger member.
7. **(Original)** The ski binding of claim 6, wherein said pivotable latch is actuated by pivoting of said trigger member relative to said ski about said pivot point.
8. **(Original)** The ski binding of claim 5, wherein said trigger mechanism further includes a movable catch releasably securing said secondary toe release, said movable catch movable in response to said trigger member being pivoted about said pivot point.
9. **(Original)** The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biasing member biased between the snow ski and said trigger member so as to provide the trip torque threshold when the ski binding is affixed to the snow ski.
10. **(Withdrawn)** The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biased toggle that includes a lever arm functionally engaging said trigger member.
11. **(Withdrawn)** The ski binding of claim 10, wherein, when said trigger member is in an unreleased state, said biased toggle is biased against a pair of fulcrums spaced from one another and, when said trigger member is in a release state, said biased toggle is pivoted about one or the other of said pair of fulcrums.

12. **(Withdrawn)** The ski binding of claim 11, wherein said trigger trip torque mechanism includes a locking pin for allowing said biased fulcrum to pivot substantially only about one of said pair of fulcrums.
13. **(Original)** The ski binding of claim 3, wherein said secondary toe release includes a secondary toe release mechanism that, when the ski boot is properly secured in the ski binding, provides the toe of the ski boot with an attenuated release in response to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.
14. **(Original)** The ski binding of claim 13, wherein said trigger includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and has a first pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski, said secondary toe release mechanism secured to said trigger member.
15. **(Original)** The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe piece support plate pivotably secured to said trigger member, said toe piece being fixedly secured to said toe piece support plate.
16. **(Original)** The ski binding of claim 15, wherein said toe piece support plate has a second pivot point located between said first pivot point of said trigger member and the toe of the ski boot when the ski boot is properly engaged in the ski binding.
17. **(Original)** The ski binding of claim 15, wherein said secondary toe release mechanism includes a catch fixed relative to said toe piece support plate, said trigger including a movable latch for releasably engaging said catch.
18. **(Withdrawn)** The ski binding of claim 15, wherein said secondary toe release mechanism includes a latch fixed relative to said toe piece support plate, said trigger including a movable catch for releasably engaging said latch.
19. **(Original)** The ski binding of claim 15, further comprising an attenuated release threshold mechanism providing said secondary toe release with an attenuated release threshold.

20. **(Original)** The ski binding of claim 19, wherein said attenuated release threshold mechanism includes a biasing member biased between said trigger member and said toe piece support plate so as to provide said attenuated release threshold.
21. **(Withdrawn)** The ski binding of claim 19, wherein said secondary toe release includes a latch fixed relative to said toe piece support plate and including a cam follower, said attenuated release threshold mechanism including a biased cam biased into engagement with said cam follower of said latch.
22. **(Withdrawn)** The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe assembly configured to selectively provide a non-attenuated toe release and an attenuated toe release in response to a triggering of said trigger.
23. **(Withdrawn)** The ski binding of claim 22, wherein said toe assembly includes a base, a toe retainer movable secured to said base, and a movable member biased against said toe retainer.
24. **(Withdrawn)** The ski binding of claim 23, wherein said toe assembly further includes a first spring, a second spring in series with said first spring and a movable actuator movable so as to 1) cause only said first spring to be active in biasing said movable member against said toe retainer and 2) cause both said first and second springs to be active in biasing said movable member against said toe retainer depending on the position of said movable actuator, said movable actuator being movable in response to a triggering of said trigger.
25. **(Original)** The ski binding of claim 1, wherein the attenuated release torque is at least 20% less than the non-attenuated release torque.
26. **(Original)** The ski binding of claim 1, wherein said release logic is configured to provide the non-attenuated release torque for lateral shear forces applied in the fourth-quadrant of the snow ski.

27. **(Withdrawn)** The ski binding of claim 1, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and a ski when the binding is secured to the ski and the ski binding is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant;
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.
28. **(Withdrawn)** The ski binding of claim 27, wherein said electronic controller is configured to generate the third-quadrant attenuated release signal as a function of a tibial torque about a tibial axis of a skier, a net virtual force and a position of the net virtual force relative to the tibial axis.
29. **(Withdrawn)** The ski binding of claim 28, further comprising:
- a base supporting said heel and toe pieces and laterally movably securable to a ski;
 - a first pair of load cells spaced from the tibial axis; and
 - a second pair of load cells spaced from the tibial axis so that the tibial axis is located between said first and second pairs of load cells, said first and second pairs of load cells for sensing lateral forces between said base and the ski when the ski binding is secured to a ski and a skier is skiing with the ski binding and providing force data to said controller;
- wherein said controller is configured to generate the third-quadrant attenuated release signal as a function of the force data from said first and second plurality of load cells.

Claims 30-55: **(Canceled)**.

56. **(New)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:
- a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release

the ski boot at said first release in response to a release condition, said ski binding assembly configured to:

assess, relative to a first axis, a first loading internal to the ski system caused by an external loading applied to the ski system; and
assess, relative to a second axis spaced from said first axis and substantially parallel to said first axis, a second loading internal to the ski system caused by the external loading;

wherein said release logic is configured to:

determine whether or not the release condition is occurring as a function of both of the first loading and the second loading; and
cause said ski binding assembly to provide said first release if the release logic determines that the release condition is occurring.

57. **(New)** An apparatus according to claim 56, wherein said ski binding assembly is configured to determine a force-couple at a third axis from said first loading and said second loading, and said release logic is configured to determine whether or not the release condition is occurring as a function of the force-couple.
58. **(New)** An apparatus according to claim 57, wherein said third axis is substantially coincident with a tibial axis of a user when the user is wearing the ski boot and the ski boot is releasably engaged in the binding assembly.
59. **(New)** An apparatus according to claim 57, wherein said first loading is a first shear force on said first axis and said second loading is a second shear force on said second axis, and said ski binding assembly is configured to determine the force-couple from the first shear force and the second shear force.
60. **(New)** An apparatus according to claim 57, wherein said first loading is a shear force on said first axis and said second loading is a moment on said second axis, and said ski binding assembly is configured to determine the force-couple from the shear force and the moment.
61. **(New)** An apparatus according to claim 57, wherein said first loading is a first moment on said first axis and said second loading is a second moment on said second axis, and said ski

binding assembly is configured to determine the force-couple from the first moment and the second moment.

62. **(New)** An apparatus according to claim 56, wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.
63. **(New)** An apparatus according to claim 62, wherein said first release is at least 20% less than said second release.
64. **(New)** An apparatus according to claim 62, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.
65. **(New)** An apparatus according to claim 64, wherein said first release torque is at least 20% less than said second release torque.
66. **(New)** An apparatus according to claim 62, wherein:
- the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and
 - the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;
- said ski binding assembly including:
- a heel piece for releasably engaging the heel of the ski boot; and
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - said ski binding assembly is mounted to the ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in said ski binding assembly;
- wherein said release logic provides said ski binding assembly with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.

67. **(New)** An apparatus according to claim 66, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when said ski binding assembly is mounted to the ski, the skier is wearing the ski boot and the ski boot is properly captured in said ski binding assembly, said trigger being triggerable in response substantially only to a lateral shear force being applied to the ski at a location in the third-quadrant of the snow ski.
68. **(New and Withdrawn)** An apparatus according to claim 66, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and the ski when said ski binding assembly is secured to the ski and said ski binding assembly is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant; and
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.
69. **(New)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:
- a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release, said release logic set to activate said first release substantially only when:
 - a first loading, internal to the ski system along or about a first axis and caused by an external loading applied to the ski system, exceeds a first defined level and has a first defined sense; and
 - a second loading, internal to the ski system along or about a second axis and caused by the external loading, exceeds a second defined level and has a second defined sense.

70. **(New)** An apparatus according to claim 69, wherein said first and second axes are spaced from, and substantially parallel to, one another.
71. **(New)** An apparatus according to claim 69, wherein the ski system has a first-quadrant, a second-quadrant, a third-quadrant and a fourth-quadrant and the external loading resolves into a single virtual lateral shear force on the ski, said release logic set to activate said first release substantially only when the single virtual lateral shear force is located within the third-quadrant.
72. **(New)** An apparatus according to claim 69, wherein said first loading is a first force and said second loading is a second force parallel to, and spaced from, said first force.
73. **(New)** An apparatus according to claim 69, wherein said first loading is a force and said second loading is a moment.
74. **(New)** An apparatus according to claim 69, wherein said first loading is a first moment and said second loading is a second moment and said first and second axes are spaced from, and substantially parallel to, one another.
75. **(New)** An apparatus according to claim 69, wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.
76. **(New)** An apparatus according to claim 69, wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.
77. **(New)** An apparatus according to claim 76, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.
78. **(New)** An apparatus according to claim 77, wherein said first release torque is at least 20% less than said second release torque.

79. **(New)** An apparatus according to claim 76, wherein:
- the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and
 - the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;
 - said ski binding assembly including:
 - a heel piece for releasably engaging the heel of the ski boot; and
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - said ski binding assembly is mounted to the ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in said ski binding assembly;
- wherein said release logic provides said ski binding assembly with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.
80. **(New)** An apparatus according to claim 79, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when said ski binding assembly is mounted to the ski, the skier is wearing the ski boot and the ski boot is properly captured in said ski binding assembly, said trigger being triggerable in response substantially only to a lateral shear force being applied to the ski at a location in the third-quadrant of the snow ski.
81. **(New and Withdrawn)** An apparatus according to claim 80, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and the ski when said ski binding assembly is secured to the ski and said ski binding assembly is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant; and
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.

REMARKS

Claims 1-29 and 56-81 are pending in the current application. Claims 30-55 have been canceled, without prejudice. Claims 56-81 have been added. Claims 10-12, 18, 21-24, 27-29, 68 and 81 have been withdrawn as being directed to non-elected species.

Applicants respectfully request that the Examiner enter the foregoing amendments prior to examining the application on the merits.

New Claims 56-81

Applicants respectfully submit that new independent claim 56, and its dependent claims 57-61, and new independent claim 69, and its dependent claims 70-74, are directed to alternative ways of claiming various inventive concepts of the current application. Support for these claims is found, for example, in paragraphs [0010]-[0025] and [0047]-[0052] and FIGS. 1-8 and 22-24 that accompany the descriptions in these paragraphs. New dependent claims 62-68 that depend from new independent claim 56, and new dependent claims 75-81 that depend from new independent claim 69, are largely restatements of various ones of original claims 1-29. Applicants respectfully submit that no new matter is being added by the new claims.

Restriction/Election Requirement

Applicants hereby elect to prosecute the claims directed to Species I identified in the present Office Action. The claims corresponding to Species I are claims 1-9, 13-17, 19, 20, 25 and 26, as well as new claims 56-67 and 69-80.

Regarding new claims 56-67 and 69-80, Applicants respectfully submit that the nature of these claims is such that it would appear that the U.S. Patent and Trademark Office (USPTO) would need to search the same prior art that it would need to search for claims 1-9, 13-17, 19, 20, 25 and 26. Consequently, it is Applicants position that there is no additional burden on the USPTO to search new claims 56-67 and 69-80 along with remaining original claims 1-9, 13-17, 19, 20, 25 and 26. Therefore, Applicants' respectfully submit that original claims 1-9, 13-17, 19, 20, 25 and 26 and new claims 56-67 and 69-80 should rightfully be examined in the present application.

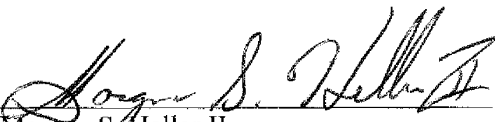
If, however, the USPTO disagrees, Applicants desire to elect, with traverse, new claims 56-67 and 69-80 for immediate prosecution. Applicants respectfully submit that all of these claims cover Species I identified in the present Office Action.

Information Disclosure Statement

Applicants are filing herewith the attached Information Disclosure Statement (IDS) and accompanying non-patent literature references. The Examiner is respectfully requested to review the information cited in the IDS when examining the claims elected above. Applicants respectfully submit that no fee is due relative to the filing of the IDS because it has been filed prior to the mailing of a first office action on the merits.

Respectfully submitted,

VERMONT SAFETY DEVELOPMENTS

By: 
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Tel: (802) 863-2375
Attorneys for Assignee

Attachments:

Information Disclosure Statement and non-patent literature references cited therein

2795561.1

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Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (08-08)

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11834041
	Filing Date		2007-08-06
	First Named Inventor	Carl F. Ettlinger	
	Art Unit	3618	
	Examiner Name	John Olszewski	
	Attorney Docket Number	12219-00001	

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	1	6450526	B1	2002-09-17	Bressand	
	2	5722681		1998-03-03	Merino	
	3	5551720		1996-09-03	Ruffinengo	
	4	7086662		2006-08-08	Dodge	
	5	7063345		2006-06-20	Holzer	
	6	3091475		1963-05-28	Wunder	
	7	5071155		1991-12-10	Stepanek et al.	
	8	5064215		1991-11-12	Ferdinand et al.	
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	1	International Search Report of related International Application No. PCT/US07/75334 dated August 22, 2008.		☐
	2	GORDON LIPE, The ALLSOP-Pegged for Safety, KNOW YOUR BINDINGS: 18, Ziff-Davis Publishing Company, October 1973.		☐
	3	GORDON LIPE, The Allmat 8000, Jet, and PSC, KNOW YOUR BINDINGS: 19, November 1973, pp. 155, 158 and 163.		☐

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	Examiner Name	John Olszewski	
	Attorney Docket Number	12219-00001	

4	GORDON LIPE, The Americana: Heel Release on a Plate, KNOW YOUR BINDINGS: 21, pp.12-14, published prior to August 7, 2005.	☐
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11834041
	Filing Date		2007-08-06
	First Named Inventor	Carl F. Ettlinger	
	Art Unit	3618	
	Examiner Name	John Olszewski	
	Attorney Docket Number	12219-00001	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Morgan S. Heller II/	Date (YYYY-MM-DD)	2008-09-02
Name/Print	Morgan S. Heller II	Registration Number	44756

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	3875465
Application Number:	11834041
International Application Number:	
Confirmation Number:	9042
Title of Invention:	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury
First Named Inventor/Applicant Name:	Carl F. Ettlinger
Customer Number:	21918
Filer:	Morgan Heller/Karen Jeffer
Filer Authorized By:	Morgan Heller
Attorney Docket Number:	12219-00001
Receipt Date:	02-SEP-2008
Filing Date:	06-AUG-2007
Time Stamp:	17:22:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response2Restriction.pdf	654151 ecc45c4cd50b3df780641a7823fec5076ffcae14	yes	13

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Response to Election / Restriction Filed		1	1	
	Claims		2	11	
	Applicant Arguments/Remarks Made in an Amendment		12	13	
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	1165195 9b8d13d9cb4fae7df48c2944e3bdd439b42b7b26	no	6
Warnings:					
Information:					
3	NPL Documents	NPL1.pdf	452543 745098d22f39318d603096de8aff57906e9c748	no	8
Warnings:					
Information:					
4	NPL Documents	NPL2.pdf	318913 2124541ca0fa3789e78218439aa51381be4f0341	no	3
Warnings:					
Information:					
5	NPL Documents	NPL3.pdf	464249 23ed11c3a6c0334fb2c26f4cfb117fa16f25635	no	3
Warnings:					
Information:					
6	NPL Documents	NPL4.pdf	279923 7eda1ac203bdf0134a3d805036fb1f569303b80e	no	3
Warnings:					
Information:					
7	NPL Documents	NPL5.pdf	428722 7cc1820b2a5a2e5eaa721dcc24043bef0428d077	no	3
Warnings:					
Information:					
8	NPL Documents	NPL6.pdf	400468 fca048e48ac34e57e0304dd754666e5ea41c51aa	no	3
Warnings:					

Information:					
9	NPL Documents	NPL7.pdf	405123	no	3
			3fd14c65968bb1957fa05586235b424ea5ce201		
Warnings:					
Information:					
10	NPL Documents	NPL8.pdf	501345	no	4
			06da37d830ba911c4d42e007624c22d795d38e96		
Warnings:					
Information:					
11	NPL Documents	NPL9.pdf	536764	no	4
			1956c211aa7c782c4b5f643ae9b7ebb285aba7c1		
Warnings:					
Information:					
12	NPL Documents	NPL10.pdf	466409	no	3
			2628ff1e9b82b265a028c3b9dae813b06ec17e9a		
Warnings:					
Information:					
13	NPL Documents	NPL11.pdf	393045	no	3
			375768add85f06ef259a6f16b2618141aa90c539		
Warnings:					
Information:					
14	NPL Documents	NPL12.pdf	207469	no	2
			4470ef765378e9f9cd795f61bf58287f270edaec		
Warnings:					
Information:					
15	NPL Documents	NPL13.pdf	470066	no	3
			5cd764d93e5cca22a72f9febb4c00c7202c5135c		
Warnings:					
Information:					
16	NPL Documents	NPL14.pdf	498188	no	4
			3a623039c506004070e576107142e08491885430		
Warnings:					
Information:					
Total Files Size (in bytes):			7642573		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/834,041		Filing Date 08/06/2007		☐ To be Mailed	
---	--	--	--	--	---	--	----------------------------------	--	---------------------------------------	--

APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)		SMALL ENTITY ☒		OR		SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=		X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=		X \$	=
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))			If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL		TOTAL		

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	09/02/2008	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	55	Minus	**	55	=	0		X \$	=	
Independent (37 CFR 1.16(h))	*	3	Minus	***	3	=	0		X \$	=	
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=		X \$	=		
Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		X \$	=		
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CHARMISE D. CARTER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001	9042

21918 7590 10/14/2008
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

EXAMINER

OLSZEWSKI, JOHN

ART UNIT	PAPER NUMBER
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3618

MAIL DATE	DELIVERY MODE
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10/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 11/834,041		Applicant(s) ETTLINGER ET AL.	
	Examiner JOHN R. OLSZEWSKI		Art Unit 3618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 02 September 2008.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-29 and 56-81 is/are pending in the application.
 4a) Of the above claim(s) 10-12, 18, 21-24, 27-29, 68 and 81 is/are withdrawn from consideration.

5) ☒ Claim(s) 1-9, 13-17, 19, 20, 25 and 26 is/are allowed.

6) ☒ Claim(s) 56, 69, 70 and 72-74 is/are rejected.

7) ☒ Claim(s) 57-67, 71 and 75-80 is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 01 November 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 02 September 2008.

4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. **Applicant's election without traverse of Species I in the reply filed on the 2nd of September 2008 is acknowledged.**

Claim Objections

2. **Claims 75 and 76 are objected to because of the following informalities: these claims are identical, they carry the same structural language and both depend from the same claim. Appropriate correction is required.**

Claim Rejections - 35 USC § 103

3. **Claims 56, 69-70, and 72-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopkins (US 6,007,086).**

[claim 56] a ski binding assembly configured to be attached to the ski (Figure 1, Items 14 and 16) and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release (Column 10, Lines 9-27), said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release in response to a release condition, said ski binding assembly configured to: assess, relative to a first axis (axis through the toe portion of the binding), a first loading internal to the ski system caused by an external loading applied to the ski system; and assess, relative to a second axis (axis through the heel portion of the binding) spaced from said first axis and substantially parallel to said first axis, a second loading internal to the ski system caused by the external loading; wherein said release

logic is configured to: determine whether or not the release condition is occurring as a function of both of the first loading and the second loading; and cause said ski binding assembly to provide said first release if the release logic determines that the release condition is occurring (Column 10, Lines 9-27; the microprocessor intakes data from both sensors in its control system before making a determination so it is well aware of and capable of determining what the release condition is a function of)

[claim 69] a ski binding assembly configured to be attached to the ski (Figure 1, Items 14 and 16) and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release (Column 10, Lines 9-27), said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release, said release logic set to activate said first release substantially only when: a first loading, internal to the ski system along or about a first axis (axis through the toe portion of the binding) and caused by an external loading applied to the ski system, exceeds a first defined level and has a first defined sense; and a second loading, internal to the ski system along or about a second axis (axis through the heel portion of the binding) and caused by the external loading, exceeds a second defined level and has a second defined sense (Column 10, Lines 9-27; the microprocessor intakes data from both sensors in its control system before making a determination so it is well aware of and capable of determining what the release condition is a function of, also since there are at least two separate sensor inputs [heel and toe portions] there are two separate levels and senses which allow for the determination of release or not.);

[claim 70] wherein said first and second axes are spaced from, and substantially

parallel to, one another (Figure 1); **[claim 72]** wherein said first loading is a first force and said second loading is a second force parallel to, and spaced from, said first force (Column 10, Lines 9-27; this system is responsive to this form of situation since the microprocessor intakes the different measurements and makes a determination to release or not to release based off of at least two separate sensors); **[claim 73]** wherein said first loading is a force and said second loading is a moment (Column 10, Lines 9-27; this system is responsive to this form of situation since the microprocessor intakes the different measurements and makes a determination to release or not to release based off of at least two separate sensors, of which a moment is a force by definition); **[claim 74]** wherein said first loading is a first moment and said second loading is a second moment (Column 10, Lines 9-27; this system is responsive to this form of situation since the microprocessor intakes the different measurements and makes a determination to release or not to release based off of at least two separate sensors, of which a moment is a force) and said first and second axes are spaced from, and substantially parallel to, one another (the axes have already been defined previously as separate and parallel).

Allowable Subject Matter

4. Claims 1-9, 13-17, 19-20, and 25-26 are allowed.

With regards to claims 1-9, 13-17, 19-20, and 25-26:

- The allowable subject matter present in claim 1 that has not been found to have been taught or disclosed in the prior art found at this time is that the release logic providing a release torque about the tibial axis in response to substantially only to

a lateral shear force being applied to the ski at a location in the third quadrant.

Therefore claim 1 and any claim(s) that depend therefrom are found to contain allowable subject matter.

5. Claims 57-61, 62-67, 71, 75, and 76-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With regards to claims 57-61:

- The allowable subject matter present in claim 57 that has not been found to have been taught or disclosed in the prior art found at this time is that the ski binding assembly is configured to determine a force-couple at a third axis from said first loading and said second loading, and said release logic is configured to determine whether or not the release condition is occurring as a function of the force-couple. Therefore claim 57 and any claim(s) that depend therefrom are found to contain allowable subject matter.

With regards to claims 62-67, 75, and 76:

- The allowable subject matter present in claims 62, 75, and 76 that has not been found to have been taught or disclosed in the prior art found at this time is that the ski binding assembly has a second release, said first release being an attenuated release relative to said second release. Therefore claims 62, 75, and 76 and any claim(s) that depend therefrom are found to contain allowable subject matter.

With regards to claim 71:

- The allowable subject matter present in claim 71 that has not been found to have been taught or disclosed in the prior art found at this time is that the ski system has a first-quadrant, a second-quadrant, a third-quadrant and a fourth-quadrant and the external loading resolves into a single virtual lateral shear force on the ski, said release logic set to activate said first release substantially only when the single virtual lateral shear force is located within the third-quadrant. Therefore claim 71 and any claim(s) that depend therefrom are found to contain allowable subject matter.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Von Besser (US 3,876,218) and Holzer (US 2004/0145154)
 - Disclose structure similar to that claimed and disclosed by applicant

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN R. OLSZEWSKI whose telephone number is (571)272-2706. The examiner can normally be reached on M-Th 5:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Ellis can be reached on 571-272-6914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3618

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. R. O./
Examiner, Art Unit 3618

/Christopher P Ellis/
Supervisory Patent Examiner, Art
Unit 3618

Notice of References Cited	Application/Control No. 11/834,041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.	
	Examiner JOHN R. OLSZEWSKI	Art Unit 3618	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,007,086	12-1999	Hopkins, Mark D.	280/612
*	B	US-3,876,218	04-1975	Von Besser, Kurt	280/618
*	C	US-2004/0145154	07-2004	Holzer, Helmut	280/611
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

SEARCHED			
Class	Subclass	Date	Examiner
280	611,613,614,615,616,617,618,623,626,627,628,629,14.2 3,14.24,dig.13	10/08/2008	JRO

SEARCH NOTES		
Search Notes	Date	Examiner
Searched the applicable classes and subclasses and performed text searches in order to find the most applicable art. See EAST Search History.	10/08/2008	JRO

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE							
Final	Original	07/31/2008	10/09/2008						
	1	÷	=						
	2	÷	=						
	3	÷	=						
	4	÷	=						
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<i>Index of Claims</i> 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47	
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	67		O						
	68		N						
	69		✓						
	70		✓						
	71		O						
	72		✓						

<i>Index of Claims</i> 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47									
CLAIM		DATE							
Final	Original	07/31/2008	10/09/2008						
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	74		✓						
	75		O						
	76		O						
	77		O						
	78		O						
	79		O						
	80		O						
	81		N						

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2797	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/24 09:19
S2	2812	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:36
S3	24	S2 AND (("primary release" AND "secondary release") OR ("first release" AND "second release"))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:36
S4	23	S2 AND (("primary release" AND "secondary release") OR ("first release" AND "second release")) AND (load OR loading OR force OR pressure)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:37
S5	22	("20040145154" "20040173994" "3091475" "5064215" "5071155" "5551720" "5722681" "6450526" "7063345" "7086662").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 14:14

10/9/2008 9:34:28 AM

C:\Documents and Settings\jolszewski\My Documents\EAST\Workspaces\Ski Binding with release logic for ACL injury (11834041 PCTUS0775334).wsp

Receipt date: 09/02/2008

Doc code :IDS

Doc description: Information Disclosure Statement (IDS) Filed

11834041 - GAU: 3618

PTO/SB/08a (08-08)

Approved for use through 08/31/2008. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11834041
	Filing Date		2007-08-06
	First Named Inventor	Carl F. Ettlinger	
	Art Unit	3618	
	Examiner Name	John Olszewski	
	Attorney Docket Number	12219-00001	

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
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/JO/	2	5722681		1998-03-03	Merino	
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/JO/	6	3091475		1963-05-28	Wunder	
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/JO/	8	5064215		1991-11-12	Ferdinand et al.	
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Application Number	11834041	11834041 - GAU: 3618
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First Named Inventor	Carl F. Ettlinger	
Art Unit	3618	
Examiner Name	John Olszewski	
Attorney Docket Number	12219-00001	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
/JO/	1	20040173994	A1	2004-09-09	Howell		
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/JO/	1	International Search Report of related International Application No. PCT/US07/75334 dated August 22, 2008.	☐	
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Receipt date: 09/02/2008

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11834041	11834041 - GAU: 3618
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	First Named Inventor	Carl F. Ettlinger		
	Art Unit	3618		
	Examiner Name	John Olszewski		
	Attorney Docket Number	12219-00001		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11834041	11834041 - GAU: 3618
	Filing Date		2007-08-06	
	First Named Inventor	Carl F. Ettlinger		
	Art Unit	3618		
	Examiner Name	John Olszewski		
	Attorney Docket Number	12219-00001		

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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Carl F. Ettlinger et al.

Serial No.: 11/834,041

Filed: August 6, 2007

Title: Alpine Ski Binding System Having Release Logic For Inhibiting
Anterior Cruciate Ligament Injury

Attorney Docket No.: 12219-00001

Group Art Unit: 3618

Confirmation No.: 9042

Examiner: John Olszewski

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

January 13, 2009

RESPONSE TO FIRST OFFICE ACTION ON THE MERITS

This is in response to the Office Action (paper no. 20081009) mailed from the United States Patent and Trademark Office on October 14, 2008, with respect to the above-identified application.

A **STATUS OF THE CLAIMS** starts on the following page 2.

REMARKS concerning the Office Action start on the following page 15.

STATUS OF THE CLAIMS

The status of the claims of the current application stands as follows:

1. **(Original)** A ski binding configured to be secured to a snow ski and selectively retain a ski boot having a heel and a toe and worn by a skier having a tibial axis, the snow ski having a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end, the ski binding comprising:
 - a heel piece for releasably engaging the heel of the ski boot;
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - the ski binding is mounted to the snow ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in the ski binding; and
 - release logic providing the ski binding with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.
2. **(Original)** The ski binding of claim 1, wherein, when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said attenuated release torque induces a tibial torque about the tibial axis of the skier, said release logic configured so that the tibial torque is diminished as a function of the location of the lateral shear force in the third-quadrant from the tibial axis toward the trailing end of the snow ski.
3. **(Original)** The ski binding of claim 1, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when the ski binding is mounted to the snow ski, the skier is wearing the ski boot and the ski boot is properly captured in the ski binding, said trigger being triggerable in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.

4. **(Original)** The ski binding of claim 3, wherein said trigger comprises a trigger mechanism and a trigger trip torque mechanism for providing said trigger mechanism with a trip torque threshold for substantially only lateral shear forces applied at locations in the third-quadrant of the snow ski.
5. **(Original)** The ski binding of claim 4, wherein said trigger mechanism includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and having a pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski.
6. **(Original)** The ski binding of claim 5, wherein said trigger mechanism further includes a pivotable latch releasably securing said secondary toe release, said pivotable latch pivotably secured to said trigger member.
7. **(Original)** The ski binding of claim 6, wherein said pivotable latch is actuated by pivoting of said trigger member relative to said ski about said pivot point.
8. **(Original)** The ski binding of claim 5, wherein said trigger mechanism further includes a movable catch releasably securing said secondary toe release, said movable catch movable in response to said trigger member being pivoted about said pivot point.
9. **(Original)** The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biasing member biased between the snow ski and said trigger member so as to provide the trip torque threshold when the ski binding is affixed to the snow ski.
10. **(Original)** The ski binding of claim 5, wherein said trigger trip torque mechanism includes a biased toggle that includes a lever arm functionally engaging said trigger member.
11. **(Original)** The ski binding of claim 10, wherein, when said trigger member is in an unreleased state, said biased toggle is biased against a pair of fulcrums spaced from one another and, when said trigger member is in a release state, said biased toggle is pivoted about one or the other of said pair of fulcrums.

12. **(Original)** The ski binding of claim 11, wherein said trigger trip torque mechanism includes a locking pin for allowing said biased fulcrum to pivot substantially only about one of said pair of fulcrums.
13. **(Original)** The ski binding of claim 3, wherein said secondary toe release includes a secondary toe release mechanism that, when the ski boot is properly secured in the ski binding, provides the toe of the ski boot with an attenuated release in response to a lateral shear force being applied to the snow ski at a location in the third-quadrant of the snow ski.
14. **(Original)** The ski binding of claim 13, wherein said trigger includes, when the ski binding is secured to the snow ski, a trigger member pivotably secured to the snow ski and has a first pivot point located forward of the toe of the boot when the boot is properly engaged with the snow ski, said secondary toe release mechanism secured to said trigger member.
15. **(Original)** The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe piece support plate pivotably secured to said trigger member, said toe piece being fixedly secured to said toe piece support plate.
16. **(Original)** The ski binding of claim 15, wherein said toe piece support plate has a second pivot point located between said first pivot point of said trigger member and the toe of the ski boot when the ski boot is properly engaged in the ski binding.
17. **(Original)** The ski binding of claim 15, wherein said secondary toe release mechanism includes a catch fixed relative to said toe piece support plate, said trigger including a movable latch for releasably engaging said catch.
18. **(Original)** The ski binding of claim 15, wherein said secondary toe release mechanism includes a latch fixed relative to said toe piece support plate, said trigger including a movable catch for releasably engaging said latch.
19. **(Original)** The ski binding of claim 15, further comprising an attenuated release threshold mechanism providing said secondary toe release with an attenuated release threshold.

20. **(Original)** The ski binding of claim 19, wherein said attenuated release threshold mechanism includes a biasing member biased between said trigger member and said toe piece support plate so as to provide said attenuated release threshold.
21. **(Original)** The ski binding of claim 19, wherein said secondary toe release includes a latch fixed relative to said toe piece support plate and including a cam follower, said attenuated release threshold mechanism including a biased cam biased into engagement with said cam follower of said latch.
22. **(Original)** The ski binding of claim 14, wherein said secondary toe release mechanism includes a toe assembly configured to selectively provide a non-attenuated toe release and an attenuated toe release in response to a triggering of said trigger.
23. **(Original)** The ski binding of claim 22, wherein said toe assembly includes a base, a toe retainer movable secured to said base, and a movable member biased against said toe retainer.
24. **(Original)** The ski binding of claim 23, wherein said toe assembly further includes a first spring, a second spring in series with said first spring and a movable actuator movable so as to 1) cause only said first spring to be active in biasing said movable member against said toe retainer and 2) cause both said first and second springs to be active in biasing said movable member against said toe retainer depending on the position of said movable actuator, said movable actuator being movable in response to a triggering of said trigger.
25. **(Original)** The ski binding of claim 1, wherein the attenuated release torque is at least 20% less than the non-attenuated release torque.
26. **(Original)** The ski binding of claim 1, wherein said release logic is configured to provide the non-attenuated release torque for lateral shear forces applied in the fourth-quadrant of the snow ski.

27. **(Original)** The ski binding of claim 1, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and a ski when the binding is secured to the ski and the ski binding is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant;
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.
28. **(Original)** The ski binding of claim 27, wherein said electronic controller is configured to generate the third-quadrant attenuated release signal as a function of a tibial torque about a tibial axis of a skier, a net virtual force and a position of the net virtual force relative to the tibial axis.
29. **(Original)** The ski binding of claim 28, further comprising:
- a base supporting said heel and toe pieces and laterally movably securable to a ski;
 - a first pair of load cells spaced from the tibial axis; and
 - a second pair of load cells spaced from the tibial axis so that the tibial axis is located between said first and second pairs of load cells, said first and second pairs of load cells for sensing lateral forces between said base and the ski when the ski binding is secured to a ski and a skier is skiing with the ski binding and providing force data to said controller;
- wherein said controller is configured to generate the third-quadrant attenuated release signal as a function of the force data from said first and second plurality of load cells.

Claims 30-55: **(Canceled)**.

56. **(Currently Amended)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:
- a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release

the ski boot at said first release in response to a release condition, said ski binding assembly configured to:

assess, relative to a first axis, a first loading internal to the ski system caused by an external loading applied to the ski system; and
assess, relative to a second axis spaced from said first axis and substantially parallel to said first axis, a second loading internal to the ski system caused by the external loading;

wherein said release logic is configured to:

determine whether or not the release condition is occurring as a function of both of the first loading and the second loading; and

cause said ski binding assembly to provide said first release if the release logic

determines that the release condition is occurring;

wherein said ski binding assembly is configured to determine a force-couple at a third axis from said first loading and said second loading, and said release logic is configured to determine whether or not the release condition is occurring as a function of the force-couple.

57. (Canceled).

58. (Currently Amended) An apparatus according to claim 5756, wherein said third axis is substantially coincident with a tibial axis of a user when the user is wearing the ski boot and the ski boot is releasably engaged in the binding assembly.

59. (Currently Amended) An apparatus according to claim 5756, wherein said first loading is a first shear force on said first axis and said second loading is a second shear force on said second axis, and said ski binding assembly is configured to determine the force-couple from the first shear force and the second shear force.

60. (Currently Amended) An apparatus according to claim 5756, wherein said first loading is a shear force on said first axis and said second loading is a moment on said second axis, and said ski binding assembly is configured to determine the force-couple from the shear force and the moment.

61. **(Currently Amended)** An apparatus according to claim ~~57~~56, wherein said first loading is a first moment on said first axis and said second loading is a second moment on said second axis, and said ski binding assembly is configured to determine the force-couple from the first moment and the second moment.
62. **(Previously Presented)** An apparatus according to claim 56, wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.
63. **(Previously Presented)** An apparatus according to claim 62, wherein said first release is at least 20% less than said second release.
64. **(Previously Presented)** An apparatus according to claim 62, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.
65. **(Previously Presented)** An apparatus according to claim 64, wherein said first release torque is at least 20% less than said second release torque.
66. **(Previously Presented)** An apparatus according to claim 62, wherein:
the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and
the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;
said ski binding assembly including:
a heel piece for releasably engaging the heel of the ski boot; and
a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
said ski binding assembly is mounted to the ski;
the skier is wearing the ski boot; and
the ski boot is properly captured in said ski binding assembly;

wherein said release logic provides said ski binding assembly with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.

67. **(Previously Presented)** An apparatus according to claim 66, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when said ski binding assembly is mounted to the ski, the skier is wearing the ski boot and the ski boot is properly captured in said ski binding assembly, said trigger being triggerable in response substantially only to a lateral shear force being applied to the ski at a location in the third-quadrant of the snow ski.
68. **(Previously Presented)** An apparatus according to claim 66, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and the ski when said ski binding assembly is secured to the ski and said ski binding assembly is secured to the skier;
 - an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant; and
 - at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.
69. **(Currently Amended)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:
- a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release, said release logic set to activate said first release substantially only when:
 - a first loading, internal to the ski system along or about a first axis and caused by an external loading applied to the ski system, exceeds a first defined level and has a first defined sense; and

a second loading, internal to the ski system along or about a second axis and caused by the external loading, exceeds a second defined level and has a second defined sense;

wherein the ski system has a first-quadrant, a second-quadrant, a third-quadrant and a fourth-quadrant and the external loading resolves into a single virtual lateral shear force on the ski, said release logic set to activate said first release substantially only when the single virtual lateral shear force is located within the third-quadrant.

70. **(Previously Presented)** An apparatus according to claim 69, wherein said first and second axes are spaced from, and substantially parallel to, one another.
71. **(Canceled).**
72. **(Previously Presented)** An apparatus according to claim 69, wherein said first loading is a first force and said second loading is a second force parallel to, and spaced from, said first force.
73. **(Previously Presented)** An apparatus according to claim 69, wherein said first loading is a force and said second loading is a moment.
74. **(Previously Presented)** An apparatus according to claim 69, wherein said first loading is a first moment and said second loading is a second moment and said first and second axes are spaced from, and substantially parallel to, one another.
75. **(Canceled).**
76. **(Previously Presented)** An apparatus according to claim 69, wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.
77. **(Previously Presented)** An apparatus according to claim 76, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.

78. **(Previously Presented)** An apparatus according to claim 77, wherein said first release torque is at least 20% less than said second release torque.
79. **(Previously Presented)** An apparatus according to claim 76, wherein:
- the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and
 - the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;
 - said ski binding assembly including:
 - a heel piece for releasably engaging the heel of the ski boot; and
 - a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:
 - said ski binding assembly is mounted to the ski;
 - the skier is wearing the ski boot; and
 - the ski boot is properly captured in said ski binding assembly;
 - wherein said release logic provides said ski binding assembly with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.
80. **(Previously Presented)** An apparatus according to claim 79, wherein said release logic comprises a trigger and a secondary toe release responsive to said trigger so as to release the toe of the ski when said ski binding assembly is mounted to the ski, the skier is wearing the ski boot and the ski boot is properly captured in said ski binding assembly, said trigger being triggerable in response substantially only to a lateral shear force being applied to the ski at a location in the third-quadrant of the snow ski.
81. **(Previously Presented)** An apparatus according to claim 80, further comprising:
- one or more sensors for obtaining information for determining forces being transmitted between a skier and the ski when said ski binding assembly is secured to the ski and said ski binding assembly is secured to the skier;

an electronic controller in communication with said one or more sensors, said electronic controller configured to generate a third-quadrant attenuated release signal in response to a virtual loading applied in the third-quadrant; and
at least one actuator operatively connected to said toe piece or said heel piece, or both, said at least one actuator being responsive to the third-quadrant attenuated release signal.

82. **(New)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:

a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release in response to a release condition, said ski binding assembly configured to:

assess, relative to a first axis, a first loading internal to the ski system caused by an external loading applied to the ski system; and
assess, relative to a second axis spaced from said first axis and substantially parallel to said first axis, a second loading internal to the ski system caused by the external loading;

wherein said release logic is configured to:

determine whether or not the release condition is occurring as a function of both of the first loading and the second loading; and
cause said ski binding assembly to provide said first release if the release logic determines that the release condition is occurring;

wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.

83. **(New)** An apparatus according to claim 82, wherein said first release is at least 20% less than said second release.

84. **(New)** An apparatus according to claim 82, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque

about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.

85. **(New)** An apparatus according to claim 84, wherein said first release torque is at least 20% less than said second release torque.

86. **(New)** An apparatus according to claim 82, wherein:

the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and

the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;

said ski binding assembly including:

a heel piece for releasably engaging the heel of the ski boot; and

a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:

said ski binding assembly is mounted to the ski;

the skier is wearing the ski boot; and

the ski boot is properly captured in said ski binding assembly;

wherein said release logic provides said ski binding assembly with an attenuated release

torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.

87. **(New)** An apparatus for securing a ski boot to a ski so as to form a ski system, the apparatus comprising:

a ski binding assembly configured to be attached to the ski and to releasably secure the ski boot to the ski during use, said ski binding assembly having a first release, said ski binding assembly including release logic that causes the ski binding assembly to release the ski boot at said first release, said release logic set to activate said first release substantially only when:

a first loading, internal to the ski system along or about a first axis and caused by an external loading applied to the ski system, exceeds a first defined level and has a first defined sense; and

a second loading, internal to the ski system along or about a second axis and caused by the external loading, exceeds a second defined level and has a second defined sense;

wherein said ski binding assembly has a second release, said first release being an attenuated release relative to said second release.

88. **(New)** An apparatus according to claim 87, wherein said first release is a first release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly and said second release is a second release torque about a tibial axis of a skier when the skier is wearing the ski boot and the ski boot is secured to the ski by said ski binding assembly.

89. **(New)** An apparatus according to claim 88, wherein said first release torque is at least 20% less than said second release torque.

90. **(New)** An apparatus according to claim 87, wherein:

the ski boot has a toe and a heel and is worn by a skier having a tibial axis; and
the ski has a first-quadrant, a second-quadrant, a third-quadrant, a fourth-quadrant and a trailing end;

said ski binding assembly including:

a heel piece for releasably engaging the heel of the ski boot; and
a toe piece for releasably engaging the toe of the ski boot, wherein said toe piece and said heel piece provide the ski binding with a non-attenuated release torque about the tibial axis of the skier when:

said ski binding assembly is mounted to the ski;

the skier is wearing the ski boot; and

the ski boot is properly captured in said ski binding assembly;

wherein said release logic provides said ski binding assembly with an attenuated release torque about the tibial axis in response substantially only to a lateral shear force being applied to the snow ski at a location in the third-quadrant.

REMARKS

Claims 1-29, 56, 58-70, 72-74 and 76-90 are pending in the current application. Claims 57, 71 and 75 are canceled herein. Claims 30-55 were previously canceled. Claims 56, 58-61 and 69 are amended herein. Claims 56-81 were previously added. Claims 82-90 are added herein.

The Examiner has indicated that claims 1-9, 13-17, 19, 20, 25 and 26 are allowed and that claims 57-67, 71 and 75-80 would be allowable if rewritten into independent form. In this connection, dependent claims 10-12, 18, 21-24, 27-29, 68 and 81 were previously withdrawn as being directed to non-elected species, but are reinstated herein as being subject to rejoinder under MPEP § 821.04(a) in view of the fact that each of these claims depends from an allowed or allowable claim and includes all of the limitations of such claim.

In an effort to expedite issuance of the allowed claims 1-9, 13-17, 19, 20, 25 and 26 and claims containing the allowable subject matter of objected-to claims 57-67, 71 and 75-80, Applicants have: 1) amended the subject matter of allowable claim 57 into claim 56 and canceled claim 57; 2) amended the subject matter of allowable claim 71 into claim 69 and canceled claim 71; 3) added new independent claim 82, which is essentially a verbatim combination of previously presented independent claim 56 and allowable claim 62; 4) added new dependent claims 83-86, which are essentially verbatim copies of previously presented dependent claims 63-66 that depend from allowable claim 62; 5) added new independent claim 87, which is essentially a verbatim combination of previously presented independent claim 69 and allowable claim 76; and 6) added new dependent claims 88-90, which are essentially verbatim copies of previously presented dependent claims 77-79.

In taking the foregoing actions, Applicants are not necessarily conceding in this application that the amended claims, as originally and previously presented, are not patentable over the references cited by the Examiner, as pertinent ones of the present claim amendments are only for facilitating expeditious prosecution of the allowed and allowable subject matter of the claims indicated by the Examiner. Applicants respectfully reserve the right to prosecute any of the original claims, previously presented claims and/or other claims in one or more continuing applications.

In view of the motivation to expedite issuance of the amended claims, if there are any outstanding unresolved issues that would delay the Examiner passing this application to

allowance after considering this Response, Applicants respectfully request that the Examiner call the undersigned attorney to work to resolve these issues as expeditiously as possible.

Objection to Claims

Claims 75 and 76 stand objected to as containing identical language and being dependent from the same claim.

Applicants have canceled claim 75 to remove the redundancy. Therefore, Applicants respectfully request withdrawal of this objection.

Rejection Under 35 U.S.C. § 103(a)

Claims 56, 69, 70 and 72-74 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of U.S. Patent No. 6,007,086 to Hopkins.

Without necessarily conceding the propriety of this rejection and for the sake of expediting the patenting of the allowed and allowable subject matter as described above, Applicants have amended independent claim 56 with the allowable subject matter of claim 57 so that claim 56 now includes the allowable subject matter of claim 57. Similarly, Applicants have amended independent claim 69 to include the allowable subject matter of claim 71 so that claim 69 and claims 70 and 72-74 that depend from amended claim 69 now include the allowable subject matter of claim 71. Therefore, Applicants respectfully request withdrawal of this rejection.

Patentability of Previously Withdrawn Claims

As noted above, in view of the fact that each of the previously withdrawn, and currently reinstated, dependent claims 10-12, 18, 21-24, 27-29, 68 and 81 depends from a claim that contains allowed or allowable subject matter and further contains all of the limitations of such claim, Applicants respectfully submit that claims 10-12, 18, 21-24, 27-29, 68 and 81 are subject to rejoinder under MPEP § 821.04(a) and respectfully request that these claims be rejoined with the remaining claims.

Patentability of New Claims 82-90

As mentioned above, new independent claims 82 and 87 are simply allowable dependent claims 62 and 76 rewritten into independent form. New dependent claims 83-86 correspond to previously presented dependent claims 63-66, which depend from allowable claim 62, but are rewritten to depend from new claim 82. Similarly, new dependent claims 88-90 correspond to

previously presented dependent claims 77-79, which depend from allowable claim 76, but are rewritten to depend from new claim 87. Because each of new claims 82-90 contains subject matter from either allowable claim 62 or claim 76, Applicants respectfully submit that claims 82-90 are patentable.

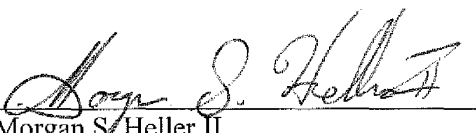
CONCLUSION

In view of the foregoing, Applicants submit that claims 1-29, 56, 58-70, 72-74 and 76-90, as amended, are in condition for allowance. If any issues remain, the Examiner is encouraged to call the undersigned attorney at the number listed below.

Respectfully submitted,

VERMONT SAFETY DEVELOPMENTS

By:



Morgan S. Heller II
Registration No. 44,756

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Tel: (802) 863-2375
Attorneys for Assignee

2921716.2

Electronic Patent Application Fee Transmittal				
Application Number:		11834041		
Filing Date:		06-Aug-2007		
Title of Invention:		Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury		
First Named Inventor/Applicant Name:		Carl F. Ettlinger		
Filer:		Morgan Heller/Karen Jeffer		
Attorney Docket Number:		12219-00001		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	6	26	156
Independent claims in excess of 3	2201	2	110	220
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				376

Electronic Acknowledgement Receipt	
EFS ID:	4604890
Application Number:	11834041
International Application Number:	
Confirmation Number:	9042
Title of Invention:	Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury
First Named Inventor/Applicant Name:	Carl F. Ettlinger
Customer Number:	21918
Filer:	Morgan Heller/Karen Jeffer
Filer Authorized By:	Morgan Heller
Attorney Docket Number:	12219-00001
Receipt Date:	13-JAN-2009
Filing Date:	06-AUG-2007
Time Stamp:	16:06:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 376
RAM confirmation Number	1587
Deposit Account	041588
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ResponseOfficeAction.pdf	872557 fbd4ddbb85d1d110ce25d4b1944368bc07100f57	yes	17
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1		
	Claims	2	14		
	Applicant Arguments/Remarks Made in an Amendment	15	17		
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	fee-info.pdf	31776 f9c596966f87ab430c6ed884025fc4d14a0f5424	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			904333		
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/834,041		Filing Date 08/06/2007		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	01/13/2009	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(o))	* 61	Minus	** 55	= 6	X \$26 =	156	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 5	Minus	*** 3	= 2	X \$110 =	220	OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	376	OR	TOTAL ADD'L FEE	
AMENDMENT	Total (37 CFR 1.16(o))	*	Minus	**	=	X \$ =		OR	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
	* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

Legal Instrument Examiner:
/Trina Steptoe/

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NOTICE OF ALLOWANCE AND FEE(S) DUE

21918 7590 03/10/2009

DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

EXAMINER

OLSZEWSKI, JOHN

ART UNIT

PAPER NUMBER

3618

DATE MAILED: 03/10/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001	9042

TITLE OF INVENTION: ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	06/10/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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A. Pay TOTAL FEE(S) DUE shown above, or

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21918 7590 03/10/2009

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/834,041 08/06/2007 Carl F. Ettlinger 12219-00001 9042

TITLE OF INVENTION: ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	06/10/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
OLSZEWSKI, JOHN	3618	280-617000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001	9042
21918	7590	03/10/2009	EXAMINER	
DOWNS RACHLIN MARTIN PLLC 199 MAIN STREET P O BOX 190 BURLINGTON, VT 05402-0190			OLSZEWSKI, JOHN	
			ART UNIT	PAPER NUMBER
			3618	
DATE MAILED: 03/10/2009				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

DETAILED ACTION

Election/Restrictions

1. **The restriction requirement, as set forth in the Office action mailed on the 1st of August, 2008, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim.** Claims 10-12, 18, 21-24, 27-29, 68, and 81, directed to alternate species are no longer withdrawn from consideration because the claim(s) requires all the limitations of an allowable claim.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

2. **Claims 1-29, 56, 58-70, 72-74, and 76-90 are allowed.**

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN R. OLSZEWSKI whose telephone number is (571)272-2706. The examiner can normally be reached on M-Th 5:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Ellis can be reached on 571-272-6914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. R. O./
Examiner, Art Unit 3618

/Christopher P Ellis/
Supervisory Patent Examiner, Art
Unit 3618

Search Notes 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

SEARCHED			
Class	Subclass	Date	Examiner
280	611,613,614,615,616,617,618,623,626,627,628,629,14.2 3,14.24,dig.13	10/08/2008	JRO

SEARCH NOTES		
Search Notes	Date	Examiner
Searched the applicable classes and subclasses and performed text searches in order to find the most applicable art. See EAST Search History.	10/08/2008	JRO
Updated EAST Search and performed interference search. See EAST Search History.	02/24/2009	JRO

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
280	611,613,614,615,616,617,618,623,626,627,628,629,14.2 3,14.24,dig.13	02/24/2009	JRO

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BIB DATA SHEET

CONFIRMATION NO. 9042

SERIAL NUMBER 11/834,041	FILING or 371(c) DATE 08/06/2007 RULE	CLASS 280	GROUP ART UNIT 3618	ATTORNEY DOCKET NO. 12219-00001		
APPLICANTS Carl F. Ettlinger, Underhill Center, VT; David J. Dodge, Williston, VT; ** CONTINUING DATA ***** This appln claims benefit of 60/836,454 08/08/2006 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY ** 08/15/2007						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /JOHN OLSZEWSKI/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY VT	SHEETS DRAWINGS 22	TOTAL CLAIMS 55	INDEPENDENT CLAIMS 3
ADDRESS DOWNS RACHLIN MARTIN PLLC 199 MAIN STREET P O BOX 190 BURLINGTON, VT 05402-0190 UNITED STATES						
TITLE Alpine Ski Binding System Having Release Logic for Inhibiting Anterior Cruciate Ligament Injury						
FILING FEE RECEIVED 1676	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit			

Issue Classification 	Application/Control No. 11834041	Applicant(s)/Patent Under Reexamination ETTLINGER ET AL.
	Examiner JOHN R OLSZEWSKI	Art Unit 3618

ORIGINAL						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
280		617				A	6	3	C	9 / 00 (2006.01.01)									
CROSS REFERENCE(S)						A	6	3	C	9 / 08 (2006.01.01)									
						A	6	3	C	9 / 081 (2006.01.01)									
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					A	6	3	C	9 / 082 (2006.01.01)									
280	611	613	614	615	DIG 13														
280	618	623	626	627	628														
280	629	14.23	14.24																

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17		33		49	38	65	52	81				
2	2	18	18		34		50	39	66	53	82				
3	3	19	19		35		51	40	67	54	83				
4	4	20	20		36		52	41	68	55	84				
5	5	21	21		37		53	42	69	56	85				
6	6	22	22		38		54	43	70	57	86				
7	7	23	23		39		55		71	58	87				
8	8	24	24		40	30	56	44	72	59	88				
9	9	25	25		41		57	45	73	60	89				
10	10	26	26		42	31	58	46	74	61	90				
11	11	27	27		43	32	59		75						
12	12	28	28		44	33	60	47	76						
13	13	29	29		45	34	61	48	77						
14	14		30		46	35	62	49	78						
15	15		31		47	36	63	50	79						
16	16		32		48	37	64	51	80						

/JOHN R OLSZEWSKI/ Examiner.Art Unit 3618 (Assistant Examiner)	02/24/2009 (Date)	Total Claims Allowed: 61	
/CHRISTOPHER P ELLIS/ Supervisory Patent Examiner.Art Unit 3618 (Primary Examiner)	02/24/2009 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 9A

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2831	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/02/24 07:58
L2	1666	ski AND knee	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/02/24 07:59
L3	2831	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/02/24 07:59
L4	151	L2 AND L3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/02/24 07:59
S1	2797	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/24 09:19
S2	2812	(280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CQLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:36

S3	24	S2 AND (("primary release" AND "secondary release") OR ("first release" AND "second release"))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:36
S4	23	S2 AND (("primary release" AND "secondary release") OR ("first release" AND "second release")) AND (load OR loading OR force OR pressure)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 09:37
S5	22	("20040145154" "20040173994" "3091475" "5064215" "5071155" "5551720" "5722681" "6450526" "7063345" "7086662").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/08 14:14
S6	1631	ski AND knee	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/16 09:39
S7	2812	280/611,613,614,615,616,617,618,623,626,627,628,629,14.23,14.24,dig.13).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/16 09:39
S8	150	S6 AND S7	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/10/16 09:39

2/24/2009 8:01:31 AM

C:\Documents and Settings\jolszewski\My Documents\EAST\Workspaces\Ski Binding with release logic for ACL injury (11834041 PCTUS0775334).wsp

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
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or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

21918 7590 03/10/2009
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	08/06/2007	Carl F. Ettlinger	12219-00001	9042

TITLE OF INVENTION: ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$300	\$0	\$1055	06/10/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
OLSZEWSKI, JOHN	3618	280-617000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Downs Rachlin Martin PLLC

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Vermont Safety Developments

P.O. Box 85, Underhill Center, VT 05490

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the ~~XXXXXX~~ any deficiency, or credit any overpayment, to Deposit Account Number 041588 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature

Morgan S. Heller II

Date

18 MARCH 2009

Typed or printed name

Morgan S. Heller II

Registration No.

44756

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:	11834041			
Filing Date:	06-Aug-2007			
Title of Invention:	ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY			
First Named Inventor/Applicant Name:	Carl F. Ettlinger			
Filer:	Morgan Heller/Karen Jeffer			
Attorney Docket Number:	12219-00001			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	2501	1	755	755
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1055

Electronic Acknowledgement Receipt	
EFS ID:	4989696
Application Number:	11834041
International Application Number:	
Confirmation Number:	9042
Title of Invention:	ALPINE SKI BINDING SYSTEM HAVING RELEASE LOGIC FOR INHIBITING ANTERIOR CRUCIATE LIGAMENT INJURY
First Named Inventor/Applicant Name:	Carl F. Ettlinger
Customer Number:	21918
Filer:	Morgan Heller/Karen Jeffer
Filer Authorized By:	Morgan Heller
Attorney Docket Number:	12219-00001
Receipt Date:	18-MAR-2009
Filing Date:	06-AUG-2007
Time Stamp:	14:43:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1055
RAM confirmation Number	66
Deposit Account	041588
Authorized User	HELLER,MORGAN
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees) Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFeeTransmittal.pdf	105748	no	1
			a07868684c5deed7cca27d724678e48e040f5968		
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	fee-info.pdf	32018	no	2
			3396cf35db8561fcee05a3d34abdb5aac284ea6		
Warnings:					
Information:					
Total Files Size (in bytes):			137766		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/834,041	04/28/2009	7523953	12219-00001	9042

21918 7590 04/08/2009
DOWNS RACHLIN MARTIN PLLC
199 MAIN STREET
P O BOX 190
BURLINGTON, VT 05402-0190

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Carl F. Ettlinger, Underhill Center, VT;
David J. Dodge, Williston, VT;

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
filed in the U.S. District Court District of Vermont on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:23-cv-00089	DATE FILED 5/11/2023	U.S. DISTRICT COURT District of Vermont
PLAINTIFF Vermont Safety Developments LLC		DEFENDANT Head Sport GmbH
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,523,953	4/28/2009	Vermont Safety Developments LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK Jeffrey S. Eaton	(BY) DEPUTY CLERK /s/ Sharrah LeClair	DATE 5/12/2023
---------------------------	--	-------------------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy