



Published:

- *without international search report and to be republished
upon receipt of that report (Rule 48.2(g))*

IMPROVED SNOWBOARD BINDINGS

INVENTORS: PAUL J. STOKES AND STEPHEN C. MAYONE

FIELD OF THE INVENTION

[0001] The present invention relates to snowboard bindings, and more particularly to release mechanisms allowing a snowboarder to rotate a snowboard binding without the snowboarder having to release its boot from the binding.

BACKGROUND

[0002] In recent years, the sport of snowboarding has been growing in popularity. If this growth rate continues, snowboarding has the possibility of going past the popularity of downhill skiing. Young children are choosing snowboarding rather than downhill skiing as a beginning point for winter sports. Skateboarders of all ages are transferring their skills to the snowboard when they have the opportunity. Many skiers are even attempting to make the change to the newer, exciting sport of snowboarding. A snowboard is like a wide ski on which both feet are held to the board by two bindings that are set in a side-forward (transverse) stance. This stance is needed for performance in downhill boarding to control the snowboard and maneuver it as gravity pulls the board down the slope.

[0003] There are periods when this side-forward (transverse) position becomes a problem for the snowboarder. When there is none or little pull from gravity, they find it necessary to disengage one boot from its binding, usually the back boot. With this free boot, they can propel their snowboard forward by using "skateboard style". The remaining boot is left on the snowboard in the side-forward transverse position. The snowboarder's body is left in an awkward, uncomfortable and twisted position as he or she attempts to move through flat terrain, and move onto the chairlift. They even keep this position as the snowboard hangs from that boot on the chairlift in the side forward (transverse) position. A rider can be on a chairlift longer than 15 minutes and this position can interfere with others on the chairlift as well as causing much strain and stress on the snowboarder's knee, leg, thigh and hip that are left in that side-forward position.

[0004] A solution to this problem is to allow that forward boot to be easily and quickly swiveled and locked to a predetermined position using a minimum of physical effort. Ideally this should be done without the use of tools and the locked positions should have a minimum of free-play in order

to allow for maximum control of the snowboard under stressful operation conditions. The use of tools for adjusting the position should be avoided to maximize the speed and ease of carrying out the swiveling operation.

[0005] Two types of bindings are commonly used in snowboarding: the high-back strapped binding and a strapless step-in binding. The high-back strapped binding is characterized by a vertical plastic back piece which is used to apply pressure to the heel-side of the board. This binding has two straps which go over the foot, with one strap holding down the heel and the other holding down the toe. Some high-backs also have a third strap on the vertical back piece called a shin strap which gives additional support and aids in toe side turns. The strapless step-in binding is used with a hard shell boot much like a ski binding except it is non-releasable. Similarly, snowboards typically come provided with four screw-receiving holes matching up to these binding screw slots.

[0006] Snowboard boot bindings are normally screwed onto the snowboard in a permanent orientation which is almost perpendicular to the direction of travel of the snowboard. When a snowboarder reaches the bottom of a run, the rear boot is typically released from its binding to allow the snowboarder to propel himself forward across relatively flat snow. Because the front foot in the snowboard binding is at an angle to forward motion, the snowboarder experiences discomfort and tension on his leg, knee, and foot joints. Having the front boot nearly perpendicular to the snowboard with the snowboard and back foot moving straight forward is very uncomfortable and potentially dangerous because a fall in this orientation may injure the ankle or knee joints of the snowboarder. If the snowboarder releases his front boot from the binding, the snowboarder is relegated to walking, carrying his board. Furthermore it is difficult to mount a chair lift with one foot on the board at an angle to the forward direction of the board, and on a chair lift having the foot nearly perpendicular to the snowboard causes the snowboard to be positioned across the front of the chair which is an awkward orientation for mounting and is disturbing or damaging to anyone seated on an adjacent chair.

[0007] The use of rotatable boot binding mechanisms is known in the prior art. More specifically, rotatable boot binding mechanisms heretofore devised and utilized for the purpose of allowing rotation of a boot binding with respect to a snowboard are known to consist basically of familiar, expected and obvious structural configurations, notwithstanding the myriad of designs encompassed by the crowded art which have been developed for the fulfillment of countless objectives and

requirements.

[0008] A number of devices have provided rotatable snowboard bindings, but lack the improved performance and ease of adjustability of the present invention. Presently known art attempts to address this problem, but has not completely solved the problem. The following represents a list of known related art:

Reference: Issued to: Date of Issue: U.S. Pat. No. 6,318,749 Eglitis et al. Nov. 20, 2001 U.S. Pat. No. 6,206,402, Tanaka Mar. 27, 2001 U.S. Pat. No. 6,203,051 Sabol Mar. 20, 2001 U.S. Pat. No. 6,155,578 Patterson Dec. 5, 2000 U.S. Pat. No. 6,102,430 Reynolds Aug. 15, 2000 U.S. Pat. No. 5,984,325 Acuna Nov. 16, 1999 U.S. Pat. No. 5,975,554 Linton Nov. 2, 1999 U.S. Pat. No. 5,868,416 Fardie Feb. 9, 1999 U.S. Pat. No. 5,782,476 Fardie Jul. 21, 1998 U.S. Pat. No. 5,762,358 Hale et al. Jun. 9, 1998 U.S. Pat. No. 5,669,630 Perkins et al. Sep. 23, 1997 U.S. Pat. No. 5,586,779 Dawes et al. Dec. 24, 1996 U.S. Pat. No. 5,584,492 Fardie Dec. 17, 1996 U.S. Pat. No. 5,499,837 Hale et al. Mar. 19, 1996 U.S. Pat. No. 5,354,088 Vetter et al. Oct. 11, 1994 U.S. Pat. No. 5,277,635 Gillis Jan. 11, 1994 U.S. Pat. No. 5,236,216 Ratzek Aug. 11, 1993 U.S. Pat. No. 5,261,689 Carpenter et al. Nov. 16, 1993 U.S. Pat. No. 5,054,807 Fauvet Oct. 8, 1991 U.S. Pat. No. 5,044,654 Meyer Sep. 3, 1991 U.S. Pat. No. 5,028,068 Donovan Jul. 2, 1991 U.S. Pat. No. 5,021,017 Ott Jun. 4, 1991 U.S. Pat. No. 4,728,116 Hill Mar. 1, 1988 U.S. Pat. No. Re. 36,800 Vetter et al. Oct. 11, 1994 U.S. Des. Pat. 357,296 Sims Apr. 11, 1995.

[0009] The teachings of each of the above-listed citations (which does not itself incorporate essential material by reference) are herein incorporated by reference. None of the above inventions and patents, taken either singularly or in combination, is seen to describe the instant invention as claimed.

[0010] U.S. Pat. No. 5,984,325 to Acuna teaches an adjustable snowboard binding. In the reference the foot remains in the binding, and binding can be locked into a selected angular position using one or more hand manipulated levers. The boot binding itself is the rotation device. Boot must be unstrapped and removed to adjust the position. The boot holding device is built into the disclosed binding-the boot is inserted the binding.

[0011] U.S. Pat. No. 6,155,578 to Patterson discloses a snowboard latching mechanism which requires the snowboarder to bend over and with both hands to radially pull outward on handles of boot binding to remove element from notches in binding, and then to rotate the device.

[0012] U.S. Pat. No. 6,102,430, to Reynolds discloses a latching mechanism for a snowboard boot binding, wherein the snowboarder bends down and releases a lever which allows the foot in the boot in the binding to be moved angularly in relation to the snowboard.

[0013] U.S. Pat. No. 6,206,402, to Tanaka discloses a latching mechanism for a snowboard boot binding in which the boot must be removed, and then the twist locking mechanism manually operated to rotate the binding to desired rotation settings, and then the boot is reinserted.

[0014] U.S. Pat. No. 5,586,779, to Dawes et al. teaches a latching mechanism for a snowboard boot binding which includes a screw locking mechanism wherein the screw is screwed into the threaded hole in the binding mount plate, and the mechanism consists of a centrally disposed spring loaded plunger. Dawes claims an adjustable snowboard boot binding apparatus which is rotatably adjustable "on the fly" without removing the boot from the binding and is compatible with existing snowboard boot bindings. A central hub is attached to the board and a top binding mounting plate and bottom circular rotating plate are interconnected and sandwich the hub between them, so that the binding plate and circular plate rotate on a bearing between the binding plate and the central hub. A spring-loaded plunger lock mechanism locks the binding plate to the central hub in a series of holes in the hub. Alternately, gear teeth on the hub may interact with a plunger to lock the device. Several other locking devices are shown.

[0015] U.S. Pat. No. 5,028,068, to Donovan describes a quick-action adjustable snowboard boot binding comprising a support plate to which a conventional boot binding is mounted. The support plate is fixedly attached to a circular swivel plate which rotates, via a center bearing, relative to a base plate attached to the board. Donovan discloses a latching mechanism for a snowboard boot binding in which a handle is pivotally mounted on a bracket which is connected to a yoke, which is attached to a flexible cable which, when tightened, prevents the binding from moving. The handle is mounted on a plate below the boot binding. A person must bend down and loosen, and bend down and tighten. A cable encircles a groove in the swivel plate and a handle pivots up to release the cable for adjusting the angle of the swivel plate and pivots down to tighten the swivel plate at a desired angle.

[0016] U.S. Pat. No. 6,318,749, issued to Eglitis et al. teaches a latching mechanism for a snowboard boot binding to allow the snowboarder to align his boot with the direction of travel. The snowboarder must bend down and manually grasp a pull ring under the binding and pull outwardly,

compressing a spring in the latching mechanism until the locking member disengages from a locking notch.

[0017] U.S. Pat. No. 5,975,554 issued to Linton discloses a latching mechanism for a snowboard boot binding to allow a snowboarder to rotate his boot in relation to the snowboard. The disclosed device utilizes a cable around an outer surface of a floating clamp. A specific boot binding must be used. The cable operates through use of a lever. The snowboarder must bend down to flip the lever to engage or disengage.

[0018] U.S. Pat. No. 5,669,630, issued to Perkins et al. discloses a latching mechanism for a snowboard boot binding to allow a snowboarder to rotate the boot binding relative to the snowboard. The latching mechanism works through a tie down bolt that must be unscrewed to allow rotation of the boot binding relative to the board. Rotation is done without the foot in the binding.

[0019] U.S. Pat. No. Re. 36,800, to Vetter et al. discloses a latching mechanism for releasing a boot binding from a board. The reference discloses bending over and manually lifting up a latch bind held under a spring bias, rotating the foot, and thus disengaging from the board. The reference discloses a quick release for the back foot.

[0020] U.S. Pat. No. 5,354,088 to Vetter et al. discloses a coupling for releasably mounting a boot with boot binding to a turntable ring which is adjustably secured to a snowboard. A spring loaded pin with a long cord is the locking mechanism. Vetter does not disclose a secure screw-type up and down locking device, a retrofit capability, a large diameter roller bearing, an elevated lock ring to prevent icing, a central guide post for ease of alignment during assembly, a positive engagement safety device to limit the degree of rotatability during free rotation, a spring rotation control, or an easy grasp elevated T-shaped lock handle for use with gloves or mittens.

[0021] U.S. Pat. No. 5,762,358 to Hale et al. discloses a latching mechanism for a snowboard boot binding to allow a snowboarder to rotate his boot while bound to the snowboard, in relation to the snowboard. The reference teaches a base plate, a binding plate, and a hold down disk, wherein the binding plate swivels in relation to the snowboard, the base plate and the hold down disk. A dual lever system is provided on the binding plate, on either side of the boot binding, the rotation of the levers engages and disengages a locking element which engages and disengages the binding plate to effectuate the rotatability.

[0022] U.S. Pat. No. 5,499,837 to Hale et al. illustrates a swivelable mount for a snowboard having

a rotatable binding plate attached to a circular plate which rotates in a circular groove of a base plate secured to the snowboard. A handle with a cam and spring-loaded pin secures the binding plate at a desired angle. Hale does not disclose a secure screw-type up and down locking device, a retrofit capability, a large diameter roller bearing, an elevated lock ring to prevent icing, a central guide post for ease of alignment during assembly, a positive engagement safety device to limit the degree of rotatability during free rotation, a spring rotation control, or an easy grasp elevated T-shaped lock handle for use with gloves or mittens.

[0023] U.S. Pat. No. 6,203,051 issued to Sabol discloses a latching mechanism for a snowboard boot binding that allows the snowboarder to rotate the binding in relation to the snowboard. The reference teaches a T-handle screw-type lock which can be secured in the up or down position, an elevated lock ring to prevent icing, and a control guide post for ease of alignment. The snowboarder in operation must bend down and grab the "T" shaped lock handle to change the degree of rotation.

[0024] U.S. Pat. Nos. 5,584,492, 5,782,476, and 5,868,416, issued to Fardie disclose a latching mechanism for a snowboard boot binding that allows the snowboarder to rotate the binding in relation to the snowboard. Single or dual levers are actuated to allow rotatability, and to secure the binding from rotation. The levers actuate a band which slides into and out of toothed segments in the binding platform. Fardie provides an adjustable snowboard binding assembly which can be rotatably controlled. The snowboard mounting platforms each have a plurality of inwardly facing radial teeth along the circumference of a centralized circular cutout, the bottom of which rests on four quadrant segments connected to a stainless steel band which moves along a groove in the center of the board activated by a lever. The mounting platform can rotate relative to the four quadrant segments and is locked in place at a desired angle by two spring loaded sliding segments with mating teeth to engage the teeth on the mounting platform to lock it in place at a desired angle.

[0025] U.S. Pat. No. 5,236,216 to Ratzek shows a fastening disk that can be clamped upon a binding-support plate that can be turned about a normal axis to the board. Several bolts must be loosened somewhat to allow the rotational position of the binding plate to be changed, then the bolts must be re-tightened.

[0026] U.S. Pat. No. 5,261,689 to Carpenter et al. shows a number of bolts through a hold-down plate for a rotatable binding-support plate must be loosened and then re-tightened in order to change the binding orientation.

[0027] U.S. Pat. No. 5,044,654 to Meyer shows a system in which a single central bolt must be loosened and re-tightened.

[0028] U.S. Pat. No. 5,277,635 to Gillis shows a water skiboard with rotatably adjustable bindings; however, it appears that such mechanism is not adequate for use in the snowboarding environment. It is also noted that the above-mentioned prior devices in their structure and design, do not lend themselves to relatively inexpensive, lightweight, low-profile, bindings mounts that are desirable by those enthusiasts who desire to enhance their snowboarding performance capabilities.

[0029] U.S. Pat. No. 5,499,837 to Hale et al. shows an improved snowboard binding support with quick and effective swivelable adjustment capability; however, there remains a need for such a product that has unique structural features that will allow for easy and efficient fabrication as well as having superior strength, durability, and reliability in the face of the high stresses encountered during normal rigorous use of a snowboard.

[0030] Still other features would be desirable in an apparatus for allowing rotation of a snowboard boot binding while the boot is in the binding. For example, to be able to adjust rotation angle of the boot binding with the boot in the binding without the need to bend down, it would be desirable if the snowboarder did not have to bend over, and could merely reach his hand to his knee to grab a tether. In addition, to use the greatest selection of snowboards and boot bindings, it would be desirable to have a rotation apparatus which could easily attach to a large selection of snowboards and to which a large selection of boot bindings could easily be attached. Further, to create ease in angular adjustment of the boot binding in relation to the snowboard, it would be desirable to increase the ease by which the boot could be turned on the rotation apparatus in relation to the snowboard. In addition, to increase stability while riding the snowboard, it would be desirable to have the rotation apparatus attach to the snowboard such that the center of the rotation apparatus is attached, rather than attaching the rotation apparatus around its periphery. Further, to allow the greatest flexibility in choice of snowboards and boot bindings, it would be desirable to have a rotation apparatus which could be attached by the untrained individual using only tools generally available in the home.

[0031] Thus, while the foregoing body of art indicates it to be well known to have a boot binding that is rotatable in relation to a snowboard, and which may be angularly adjusted while the boot is in the boot binding, the art described above does not teach or suggest a snowboard binding plate

rotation apparatus which has the following combination of desirable features: (1) allows the snowboarder to rotate the snowboard boot binding in relation to the snowboard without removing his boot from the boot binding; (2) allows the snowboarder to rotate the snowboard boot binding by simply pulling upon a tether attached to his or her leg and turning his or her boot; (3) can be attached to a great variety of boot bindings in the commercial market place, allowing the user a great selection of different boot bindings, such as strapped boot bindings and step-in boot bindings; (4) can easily be attached to snowboards, allowing the snowboarder to choose among commercially available snowboards; (5) can easily attach to boot bindings, allowing the snowboarder to choose among commercially available boot bindings; (6) is easy to manufacture with a relatively limited number of parts; (7) has a base that rotates in relation to the snowboard with the boot binding attached to the base, as opposed to existing techniques wherein the base remains fixed, and the boot binding rotates in relation to the base; and (8) can be attached to a snowboard and a boot binding with tools easily available in the home, and without the need of a trained alpine technician.

SUMMARY AND ADVANTAGES

[0032] The snowboard rotatable binding conversion apparatus attaches to a snowboard and to a boot binding. The snowboarder can choose from a number of commercially available boot bindings and snow boards to be connected to the present invention. This allows the snowboarder to have great flexibility and choice in selecting both his board, as well as his particular boot binding.

[0033] The rotatable binding apparatus of the present invention presents numerous advantages, including: (1) snowboarder may rotate the snowboard boot binding in relation to the snowboard without removing his boot from the boot binding; (2) the rotation can be accomplished without bending down to the ground to operate any levers--the snowboarder can simply pull up on a tether attached to his leg; (3) useable with a number of boot bindings, boot bindings can be attached to the present invention, allowing the snowboarder to choose among the great variety of boot bindings present in the commercial market place; (4) easy to attach to boot bindings, allowing the snowboarder to choose among commercially available boot bindings; (5) easy to attach to a snowboard, allowing the snowboarder to have a great selection of snowboards and boot bindings, as mentioned above, from which to select; (6) easy to manufacture with a relatively limited number of parts; (7) advantageous aspect of having a base that the base rotates in relation to the snowboard and

the boot binding attaches to the base, as opposed to other art wherein the base remains fixed, and the boot binding rotates in relation to the base; (8) the apparatus can be attached to a snowboard and a boot binding with tools easily available in the home, and without the need of a trained alpine technician.

[0034] Additional advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims. Further benefits and advantages of the embodiments of the invention will become apparent from consideration of the following detailed description given with reference to the accompanying drawings, which specify and show preferred embodiments of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] FIG. 1 is a top perspective of a snowboard where the invention is shown mounted to the upper surface of the snowboard.

[0036] FIG. 2 is a side view of a snowboard with the device shown mounted.

[0037] FIG. 3 is a side view of a snowboard with the unit shown mounted.

[0038] FIG. 4 is a detail view of the shoulder screw.

[0039] FIG. 5 is a top plan view of the top plate of the device.

[0040] FIG. 6 is a top plan view of the bottom plate of the device.

[0041] FIG. 7 is a perspective, exploded view showing the first embodiment.

[0042] FIG. 8 is a perspective, exploded view showing the second embodiment.

[0043] FIG. 9 is a perspective, exploded view showing the third embodiment.

[0044] FIG. 10 is a cross sectional side view (A-A) of the device, snowboard and binding, showing the first embodiment.

[0045] FIG. 11 is a cross sectional side view (B-B) of the device, snowboard and binding, showing the first embodiment.

[0046] FIG. 12 is a detail of the pull pin function and installation.

[0047] FIG. 13 is a detail of the hole locator tool, used for customizing the device.

[0048] FIG. 14 is a detail of the edge of the device.

[0049] FIG. 15 is a detail of the screw inserts.

[0050] FIG. 16 is a detail of the channel anchor for mounting the device to a channel mount snowboard.

[0051] FIG. 17 is a detail of the cam lock alternate or supplementary lock to the pull pin.

[0052] FIG. 18 is a cross sectional side view (A-A) of the device, snowboard and binding, showing the second embodiment.

[0053] FIG. 19 is a cross sectional side view (C-C) of the device, snowboard and binding, showing the second embodiment.

[0054] FIG. 20 is a cross sectional side view (A-A) of the device, snowboard and binding, showing the third embodiment.

[0055] FIG. 21 is a cross sectional side view (C-C) of the device, snowboard and binding, showing the third embodiment.

[0056] FIG. 22 is a cross sectional side view (C-C) of the device and snowboard, showing the third embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0057] FIG. 1 shows the rotatable binding device (or "device") **1** mounted to the top surface of a snowboard **3**. The device **1** provides for rotation **7** of the device top plate **11** and an attached snowboard binding **9**, relative to the snowboard **3**, and is preferably located at the forward binding mount of the board. The perimeter edge **2** maintains bearing to the perimeter and resists water intrusion. A rear footpad **6** (preferably made of vinyl) is shown at the snowboard screw binding mount **5** at the other end of the snowboard.

[0058] The rear footpad **6** is located at the binding mount **5** at the end of the snowboard opposite device **1**. The snowboard screw binding mount **5** comprises an array of internally threaded holes within the snowboard **3** to accept screws (preferably metric 6-millimeter machine screws). Alternately, the snowboard channel binding mount **38** comprises a narrow channel to accept channel anchors **39**, which in turn accept screws. Channel anchors **39** are placed into the snowboard channel binding mount **38** through an enlarged opening **105** at one end of the narrow channel. The footpad **6** is adhered to the top surface of the snowboard **3** with a cutout at its center **8** to access a plurality of holes in the binding mount **5**.

[0059] FIG. 2 is a side view, where the bindings are shown mounted and a foot is shown in each binding. The unit, bindings and feet are shown in the operable position for snowboarding, with both feet rotated outward and the left foot in the "forward" position. The device 1, both bindings 9, and both feet 10 rotated so that they are oriented approximately perpendicular to the edges 4 of the board, in an operable position for snowboarding. The rear footpad 6 located opposite device 1 is preferably the same thickness as device 1, which creates for the user an approximately uniform height of the bindings 9 above the top of the snowboard 3. A leash 33 is shown attached just below the knee to a band or loop, is and is tied to the pull pin 26 which is attached to the device.

[0060] FIG. 3 shows the bindings, as well as a foot in the left binding. The device, left binding, and left foot are shown rotated to the operable position for "skateboarding" and ergonomic comfort while not snowboarding. The device 1 and its attached binding 9 rotated into the operable position for "skateboarding" and ergonomic comfort, wherein the binding 9 is oriented so that the foot 10 is approximately parallel to the edges 4 of the snowboard.

[0061] The second binding, located on the large pad 6, remains in position for snowboarding. In this operable position for "skateboarding" and ergonomic comfort, one foot 10 is left in the binding that is attached to device 1, rotated into the forward position (foot 10 approximately parallel to the edges 4 of the board), allowing the snowboarder's other (rear) foot out of its binding, and free to step, stand, assist in balance, or push off the grade, as is done in riding a skateboard on level or uphill grades. This operable position is useful for maneuvering the snowboard on level or uphill grades, and improves ergonomic comfort while riding on a chair lift.

[0062] FIG. 4 shows a shoulder screw 24 used to mount the top plate to the bottom plate, or to mount the unit directly to a channel snowboard mount, or to mount the top plate directly to inserts installed in a snowboard. The shoulder screw 24 may comprise an oversized head 41 and shoulder 42, sized to move freely through arch channels 16 and the axle hole 17. The screw 24 may also include a threaded portion to screw directly into bottom plate inserts 22 (or a threaded hole) in the bottom plate 11 for a snowboard screw binding mount 5 (see figure 7), or into channel anchors 39 for mounting the device to a snowboard channel binding mount 38 (see figure 8), or into inserts 53 installed into a snowboard 3 for direct attachment of the device top plate 11 to a snowboard 3 (see figure 9). The screw has a Phillips drive and is rounded at the top 44 to reduce friction with the

rotating snowboard binding above. The screw is preferably made of stainless steel, or other non-corrosive material of similar mechanical properties.

[0063] FIG. 5 is a top down view of the top plate **11** of the device **1**. The device preferably has a top plate **11**, located on top of a bottom plate **12**, or (foregoing the bottom plate) directly to the snowboard **3** (through a slide sheet **52** - see also figure 9), and is preferably fabricated using lightweight, corrosion-resistant metal or injection-molded plastic. The top plate extreme perimeter **14** aligns with the bottom plate extreme perimeter **86** at the bottom plate flange **32**. Shown in figure 5 are design elements **40** that correspond to optional regions of reduced thickness of the top plate, to reduce weight and material. Two shouldered, curved, slotted channels **16** (or 'arc channels') provide for rotation of the top plate between operable positions for snowboarding and "skateboarding" modes.

[0064] The arc channels **16** (see also figure 7) accept flat-head rivets, bolts or shoulder screws **24** ('arc pins'), with clearance all around to allow for rotation of the top plate **11**. The arc pins **24** are secured, through the arc channels **16** in the top plate **11**, into the arc pin receptacles **22** located in the bottom plate **12**. This arrangement allows the top plate **11** to rotate about the axis pin **25** (see fig. 7) that is preferably a flat-head rivet, bolt or shoulder screw, with similar clearance, functioning as an axle, through the center hole **17**, located in the center of top plate **11**.

Four threaded holes or inserts **18**, located in the top plate **11** accept screws **28** (see fig. 7), preferably 6-millimeter machine screws, from a standard attachment plate **29** (see fig. 7) for a snowboard binding **9**. Arc pin receptacles **22** in bottom plate **12** can be threaded holes or inserts press-fit, epoxy-in or mold-in.

[0065] Four oversize access holes **19**, located in the top plate **11**, provide access through the top plate to accommodate placement of screws **30** (see fig. 7) into the slotted channels **23** (see fig. 7) of the bottom plate **12**, and screwing into the binding mount **5** on the snowboard **3**.

[0066] Also shown in figure 5 are ring pull holes **15**. These ring pull holes are preferably located near the periphery of the top plate **11** and are sized to accommodate a retractable plunger, or ring pull pin **26**, **27**. The ring pull holes **15** are annotated **37** with "left" or "goofy" (slang for "right") imprinted into the top surface of the top plate **11**, to indicate left- and right- foot forward pin locations, and an arrow head is also imprinted adjacent to each, indicating for that pull pin location a reading on the protractor calibrations **49** imprinted in the bottom plate **12** (see below) and visible

through the arc channel openings **16**. Optional and supplementary to the ring pull pin, a cam locking mechanism **46** (see figure 17) can be installed to cam mounting holes **45** in top plate **11**.

[0067] FIG. 6 is a top down view of the bottom plate **12** of the device **1**, and is preferably fabricated of lightweight, corrosion-resistant metal or injection-molded plastic. The bottom plate has four symmetric regions of optionally reduced thickness **20**, to reduce weight and material in the bottom plate. The bottom plate perimeter flange **32** extends to the bottom plate extreme perimeter **86** and extends below the top plate lip **13** (see figure 14), providing resistance to water intrusion and direct bearing to the snowboard to the bottom plate extreme perimeter **86**. Three holes **21** located at the perimeter are receptacles for the pull pin rotation-locking mechanism described below, and hole **47** (shown light) receives the axle pin **78** of the optional cam locking mechanism **46** (see fig. 17). The center axis pin receiver hole **36** and the arc pin receiver holes **22** are all located on a line that is a diameter of the bottom plate **12**.

[0068] Square and triangular arrays of countersunk holes **23** provide for attachment of the bottom plate **12** to a snowboard screw binding mount **5**, as noted below. The countersunk screw hole arrays can be annotated **48** as follows: a numeral "4" can be imprinted at each hole in the square array, and for triangular arrays, lines forming triangles connecting the countersunk screw holes can be imprinted into the top surface of the bottom plate **12**. Protractor calibrations **49** can be imprinted into the top surface of the bottom plate **12** for setting rotation angles for pull pin plunger stops **31**. Instructional annotations for setup and installation **51** also can be imprinted on the top surface of the bottom plate **12**.

[0069] Two arrays of pre-set locations for alternate ring pull plunger receptacles **31** can be located with a shallow 'divot' **34** with sides countersunk at an angle corresponding to the tip angle of a standard drill bit; or molded to partial-depth (or engraved, stamped, etc.) into the backside (underside) of the bottom plate **12**. These locations are set at regular angle increments corresponding to customary angles used in the snowboarding industry, and to account for strength of material between holes. A proprietary 'hole locator tool' **60** (see figure 13), to allow accurate holes to be drilled by the installer or end-user, can be provided for drilling out a divot **34** to create a ring pull pin plunger receptacle **31**.

[0070] Alternatively, the array of pull pin plunger receptacles **31** can be molded-in plugs **50** that can be popped out at chosen plunger stop locations. By creating additional ring pull plunger receptacles

31, the user can adjust the degree of rotation between the operable positions for snowboarding and "skateboarding," and can create other stops in between, to customize the device 1 to suit their use.

[0071] FIG. 7 shows a perspective, exploded view of the first embodiment (Snowboard Screw Binding Mount). This figure shows the assembly of the device 1 and the attachment of the binding 9 to the device, and the device 1 to a four-hole snowboard screw binding mount 5. The arc channels 16 accept flat-head rivets, bolts or shoulder screws 24 ('arc pins'), with clearance all around to allow for rotation of the top plate 11. The arc pins 24 are secured by welding or screwing directly into the arc pin receiver holes 22, or into arc pin receptacles 93 inserted into the arc pin receiver holes 22, or other method of fastening. This arrangement allows the top plate 11 to rotate (relative to the bottom plate 12) about the axis pin 25, which is preferably a flat-head rivet, bolt or shoulder screw, with similar clearance to allow for sliding and rotation. The axis pin 25 functions as an axle through the center hole 17 located in the center of top plate 11. The axis pin 25 is anchored into a smooth or threaded receiver hole 36, in the bottom plate 12, by welding or screwing directly into the center axis pin receiver hole 36, or into the axis pin receptacle 94 inserted into the axis pin receiver hole 36, or other method of fastening. These arc and axis pins 24, 25 (which can be rivets, bolts or shoulder screws) are fabricated of lightweight, corrosion-resistant metal or high-strength plastic.

[0072] Threaded holes or inserts (sonic welded, press-in or epoxy-in inserts shown) 18 on the top plate 11, preferably four, accept and secure boot plate screws 28. The boot plate screws 28 are preferably 6 millimeter machine screws, and are used to secure the boot plate 29 to the top plate 11. The boot plate 29 is a fairly standardized piece of equipment in the industry.

[0073] Two threaded or smooth ring pull pin holes 15 with a recess for a non-rotating flange 57 at the bottom (see figure 12), are provided to receive the threaded or smooth barrel of the ring pull pin 26. The two holes 15 are located at the perimeter of the top plate 11 to provide alternate attachment points for the ring pull pin 26, which functions to lock rotation. Alternate installations of the ring pull pin 26, located 90-degrees apart, accommodate right- (slang: "goofy-") and left-footed use of the snowboard.

[0074] The ring pull pin plunger receptacles 21 and arrays of potential receptacles 31, located at the perimeter of bottom plate 12, receive the smooth, retractable plunger 27 of the ring pull pin 26. The multiple ring pull pin receptacles 21, 31 allow the user to vary or customize the angle of the bindings relative to the snowboard. The smooth, retractable pin 27 extends into a ring pull pin

receptacle **21** or **31** to block the relative rotation of the top and bottom plates, thereby locking the device **1** into operable positions for snowboarding or "skateboarding" mode; or another selected stop in between. With the pin **27** retracted, the top and bottom plates are free to rotate within the 90-degree range of the arc channels **16**. The optional cam locking mechanism **46** is shown with anchoring pin **73** and axle pin **78** mounted to the top plate **11** cam mounting holes **45**. Hole **47** is shown in the bottom plate **12**, to receive the axle pin **78** of the camlock **46**.

[0075] In the top plate **11**, four holes **18** (preferably an insert or threads cut into the plate material) accept screws **28** (preferably metric 6-millimeter machine screws) from a standard attachment plate **29** for a snowboard binding **9**.

[0076] In the bottom plate **12**, square and triangular arrays of countersunk holes **23** preferably accept up to four screws **30** (preferably flat-head metric 6-millimeter machine screws), to attach the bottom plate **12** to a snowboard screw binding mount **5**, thereby anchoring the device **1** to the snowboard **3**. Hole **47** in the bottom plate **12** receives the axle pin **78** of the optional cam locking mechanism **46**. Attachment of the device **1** to a snowboard channel binding mount is discussed below.

[0077] A pull tag **35**, preferably cloth, is shown attached to the pull pin ring **26**. This configuration allows the user to more easily grasp the ring pull pin **26** with a gloved hand in order to retract the pull pin plunger **27**. Alternately, a leash **33** tied to the lower leg (see figure 3) can be connected to the ring pull pin **26** to facilitate retracting the pull pin plunger **27**. The leash **33** can function as an extension cord, allowing the user to retract the pull pin plunger **27** without having to reach all the way down to the pull pin **26**.

[0078] FIG. 8 is a perspective, exploded view showing the second embodiment (Snowboard Channel Binding Mount), including the assembly of the device **1** and the attachment of the binding **9** to the device, and the device to a snowboard channel binding mount **38**. Figure 8 is similar to figure 7, with the following exceptions. The arc pin and axis pin screws **24**, **25** are anchored directly into the snowboard channel binding mount **38**. The square and triangular arrays of countersunk holes **23** are not utilized to attach the bottom plate **12** to the snowboard **3**. The arc pins **24** are secured by screwing into arc pin channel anchors **39**, which are inserted into the arc pin receiver holes **22**. The axis pin **25** is secured by screwing into axis pin channel anchor **95**, which is inserted into the axis pin receiver hole **36**. Flat washers **109** of stainless steel or similar material are

set into depressions 108 in the top surface of the bottom plate 12, at the arc pin receiver holes 22 and axis pin receiver hole 36. Arc and axis pins 24, 25, installed through washers 109 into channel anchors 39, 95, effectively clamp bottom plate 12 to the snowboard 3.

[0079] FIG. 9 is a perspective, exploded view showing the third embodiment (Snowboard-Direct Mount). The figure shows the top plate 11 and the attachment of the binding to the top plate 11, and the attachment of the top plate 11, through a slip sheet 52 to a snowboard. The slip sheet 52 allows the top plate 11 to rotate smoothly on the top surface of the snowboard 3. The slip sheet 52 has holes at the perimeter to allow the pull pin to pass through 96, holes for the arc pins to pass through 97 and a hole at the center for the axis pin to pass through 98. For this embodiment, the arc and axis pins 24, 25 screw into receptacles 53 that may be threaded inserts installed or manufactured directly into mounting points 99 along the center of the snowboard 3. The circular slip sheet 52 has a smaller diameter than the top plate 11, as it nests inside the top plate lip 13: the lip confines the perimeter of slip sheet 52: see figure 20. Alternate to using slip sheet 52, the underside of top plate 11 can be formed with a plurality of thickened concentric rings, similar to the lip 13, to function as a reduced friction bearing surface between top plate 11 and the top surface of the snowboard 3: see figure 22. Figure 9 is similar to figure 7, with the following exceptions. The bottom plate 12 is not used, and the usual snowboard screw binding mount 5 at the location of the device is not used (and might not be needed in the production of this snowboard). The arc and axis pins 24, 25 screw into threaded inserts 53 which are directly installed into the snowboard 3. The pull pin plunger 27 insets into smooth (not threaded) receptacles 54 which are also directly installed into the snowboard 3. This configuration is not intended for use with a snowboard channel binding mount 38.

[0080] FIG. 10 is a cross sectional side view (section A-A) through the device 1, snowboard 3 and binding 9, for the first embodiment, a Snowboard Screw Binding Mount 5. The section shows machine screws 28, from a standard attachment plate 29 for a binding 9, screwed into threaded holes or inserts 18 in top plate 11; and flat-head machine screws 30, are installed into an array of countersunk holes 23, to attach the bottom plate 12 of the device 1 to the snowboard screw binding mount 5. This section demonstrates that the device 1 has the same flexibility in selection of screw binding mount holes 5 as does the binding 9 mounted alone to the snowboard. This section shows the arc pins 24, in arc channels 16, engaged into arc pin receiver holes 22; and the axis pin 25, in the

center hole 17, engaged into the axis pin receiver hole 36. This figure also shows the ring pull pin 26 with lock nut 88, with the retractable pull pin plunger 27 extended into a ring pull pin receptacle 21 to block rotation (see figure 12). A pull tag 35, preferably cloth, is shown attached to the ring pull pin 26. This configuration allows the user to more easily grasp the pull tag 35 with a gloved hand in order to retract the pull pin plunger 27.

[0081] FIG. 11 is a cross sectional side view (section B-B) through the device 1, snowboard 3, and binding 9, for the first embodiment, a Snowboard Screw Binding Mount 5. The section shows the arc channels 16 in the top plate 11; and the axis pin 25, in the center hole 17, engaged into the axis pin receiver hole 36. The section shows the machine screws 28, from a standard attachment plate 29 for a binding 9, attach to top plate 11; and flat-head machine screws 30, are installed into an array of countersunk holes 23, to attach the bottom plate 12 of the device 1 to the snowboard screw binding mount 5. The section shows the top plate perimeter lip 13 and the bottom plate flange 32.

[0082] FIG. 12 is a detail of the ring pull pin 26. When the pull pin plunger is retracted 55, the top stem of the ring pull pin 26 is exposed, and a textured, red-painted portion 56 is exposed, warning the user that the plunger is retracted. The non-rotating pull pin bottom flange 57 of the pull pin 26 is a turned circular flange with two flattened sides 90, let into a recess 58 in the underside of the top plate 11. The body of the pull pin 26 is preferably turned from the same piece of material as the bottom flange 57, and can have threads 106 above the plate, and can be clamped or locked to the plate with a low-profile, conical shaped, flanged nut 88 with two parallel, flat surfaces 89 for wrenching as shown shaded. The flat surfaces 89 extend from tangent at the top diameter to the nut flange 100 at the bottom. The flanged nut 88 has internal threads 107 with plastic insert or thread-locking chemical ("Loctite") applied. Alternately, the body of the pull pin can be threaded and screwed into an insert, molded, press-fit, epoxy-fit or sonic-welded into the top plate 11. One flat side of the pull pin bottom flange 57 is aligned parallel to the extreme perimeter of the device 14 to maximize the plate material surrounding the pull pin receptacle 15. Two ring pull pin receptacles 15 are located at the perimeter of the top plate 11 to provide right- and left-foot-forward attachment points for the ring pull pin 26. Within the barrel of the ring pull pin 26 is a spring 59 with a preferably increased spring force, relative to usual pull pin spring force specification. The ring pull pin 26 is preferably made of stainless steel or other material of similar properties.

[0083] FIG. 13 is a detail of the hole locator tool 60, used to accurately locate the drill bit 61 to drill into a divot 34 to create pull pin plunger receptacles 31 as needed. The hole locator tool 60 is to be pressed or screwed into the ring pull pin receptacles 15 and rotated with the top plate 1 into position above a divot 34. The hole locator tool 60 is preferably included with the device 1. A knurled and threaded tool 62 can be used to screw into a ring pull pin receptacle 15 that is a threaded insert, or a smooth tool 63 can be used to press into ring pull pin receptacle 15 that is a smooth hole. The hole locator tool 60 can be made of mild steel to reduce cost, as stainless steel is not necessary since the tool 60 will most likely be utilized in a shop, and need not taken out in the snow.

[0084] FIG. 14 is a detail of the perimeter edge of the device 1. For the first and second embodiments, the top plate 11 has a perimeter lip 13 that overlaps a portion of the bottom plate 12 and bears on the bottom plate flange 32. The lip 13 extends below the underside of the center portion of the top plate to resist water intrusion. The bearing surface of the lip 13 on the bottom plate flange 32 is gently canted inward 87, to impede any tendency of the top plate lip 13 to splay outward under bearing pressure. The top plate extreme perimeter 14 at the perimeter lip 13 matches the bottom plate extreme perimeter 86 at the bottom plate flange 32. This ensures direct bearing of the device 1 to the snowboard 3 at the extreme perimeter 14, 86. The overlapping lip 13 also functions as a “ring beam” to stiffen the perimeter edge of the top plate.

[0085] FIG. 15 is a detail of alternate screw inserts 64, 65, 66, 102 that can be used for the binding mounts 18 in the top plate 11, or to fasten the shoulder screws 24, 25 into receptacles 22 the bottom plate 12. The inserts can be mold-in 64, epoxy-in 65, press-fit 66, or sonic-welded 102. Mold-in 64, epoxy-in 65, press-fit 66 have a rotation-resisting bottom flange 68 pressed into a matching recess in the underside of the top plate 11 or the bottom plate 12. Sonic-welded 102 will have rotation-resisting deformations 104 and a circular bottom flange 118 pressed into a matching recess in the underside of either plate 11, 12. Due to the flattened geometry of the device 1, all inserts are generally shorter than those typically manufactured for screws of this size, preferably 6-millimeter machine screws, which is the standard of the snowboarding industry. Over-wide flanges 87 account for the short height. Additionally, the hex base 68 on all inserts provides anti-rotation function for all inserts, which similarly is in response to the short insert height, wherein other anti-rotation geometry was not suitable within the height limit of the device 1. The screw inserts 64, 65, 66, 102 are preferably made of stainless steel or other material of similar properties. Mold-in insert 64 has

two flanges 87; epoxy-in 65 has notches 103 to accept epoxy filler/bonding agent; press-fit 66 is smooth to be pressed into a smooth hole; and sonic-welded 102 has deformations 104, likely low-pitch knurling.

[0086] FIG. 16 is four views of the channel anchor 39 for mounting the device to a snowboard channel binding mount 38, and two sections showing the channel anchor 39 installed into a snowboard channel binding mount 38. The channel anchor 39 is preferably made of stainless steel or other material of similar properties. The channel anchor 39 functions with both 5-millimeter snowboard channel binding mounts 67 and 6-millimeter snowboard channel binding mounts 68, by way of the narrowed plate 69 that supports the threaded cylinder 70 that sits up above the top of the snowboard 3. The narrowed plate is designed to fit into the narrow channel slot 93 of the 5-millimeter 67 channel binding mount and the wider channel slot 94 of the 6-millimeter 68 channel binding mount. The threaded hole 91 passes through the full height of the channel anchor 39. Where the threaded hole 91 passes through the narrowed plate 69, it cuts an opening 92 (shown shaded) through the sides of narrowed plate 69. The annulus of the threaded cylinder 70 is thick enough to provide adequate continuous material 71 (shown shaded) between the cylinder 70 and the narrowed plate 69. The base flange 72 is ribbed or knurled at top to increase friction at the channel contact. A notch 84 indicated in the plan view of the base flange 72 may be required to engage a 6-millimeter snowboard channel binding mount 68.

[0087] FIG. 17 is a detail of the optional cam lock supplementary rotation-locking mechanism 46. The cam lock 46 attaches to the top plate with a round anchoring pin 73. The cam lock 46 and anchoring pin 73 are preferably made of high-strength plastic or cast out material with similar strength and non-corrosive properties. Anchoring pin 73 is molded with a bottom flange 83, which presses into a recess 74 in the underside of the top plate 11. Recess 74 (in top plate 11) and the bottom flange 83 (of the anchoring pin 73) are circular with flat sides to be set parallel to the extreme edge of the plates 14. Two tapered, circular pins 110, molded on opposite the sides of the anchoring pin 73, press-lock into circular depressions 76 at both sides of the cam lock 46, after being pressed through tapered slots 111 leading to the circular depressions 76 from the bottom of the cam lock 46. Cam pin 78 and the small horizontal pin 113 are preferably made of stainless steel. The small horizontal pin 113 is pressed into the cam pin 78, and the assembly is pressed down into the body of the cam lock 46, with the ends of the small horizontal pin 113 pressed

through tapered slots **114** leading to a slotted hole **115**. The walls **112** of the cam lock **46** wrap both sides of the anchoring pin **73** and the cam pin **78** and flex enough to install the two pins and then elastically recover, to adequately secure the pins when the mechanism is used for the intended purpose of locking and unlocking rotation of device **1**. The lever end **77** of the cam lock **46** has deformations on top and bottom **116** to aid in gripping the lever **77**.

[0088] The anchoring pin **73** is installed with a compressible o-ring **75** on top of bottom flange **83** to provide tension/compression for the cam mechanism. Pulling on the cam lock lever **77** disengages the axle pin **78** from the bottom plate **12**. The o-ring **75** is compressed **80** between engaged **85** and disengaged **81** stops for the axle pin, and the cam action locks the axle pin **78** in both the engaged **85** and the disengaged **81** positions. With the lever **77** in the full up position **82**, the axle pin **78** is fully disengaged **81**.

[0089] FIG. 18 is a cross sectional side view (section A-A) through the device **1**, snowboard **3** and binding **9**, for the second embodiment, a Snowboard Channel Binding Mount **38**. The section shows the machine screws **28**, from a standard attachment plate **29** for a binding **9**, screwed into threaded holes or inserts **18** in top plate **11**. This section shows arc pins **24**, in arc channels **16**, and axis pin **25**, in the center hole **17**, screwed into channel anchors **39** and **95**, respectively, which are inserted into the snowboard channel binding mount **38**. Also shown is the enlarged opening **105** at one end of the narrow channel, for placing channel anchors **39**, **95** into the snowboard channel binding mount **38**. With channel anchors **39**, **95** placed into the channel binding mount **38**, the bottom plate **12** can be placed on top of the channel binding mount **38**, and channel anchors **39** and **95** can be pressed into, respectively, the arc pin receiver holes **22** and axis pin receiver hole **36** in bottom plate **12**. Flat washers **109** are set into depressions **108** in the top surface of the bottom plate **12**, at the arc pin receiver holes **22** and axis pin receiver hole **36**. The arc & axis pins **24**, **25** can then be used to attach the top plate **11** by installing through the flat washers **109** and screwing into the channel anchors **39**, **95**. This section also shows that no screws are installed into the array of countersunk holes **23**, to attach to the bottom plate **12**.

[0090] FIG. 19 is a cross sectional side view (section C-C) through the device **1**, snowboard **3**, and binding **9**, for the second embodiment, a Snowboard Channel Binding Mount **38**. The section shows machine screws **28**, from a standard attachment plate **29** for a binding **9**, screw into threaded holes or inserts **18** in top plate **11**. The section shows the arc channels **16** in top plate **11**; and shows

the axis pin 25, in the center hole 17, through flat washers 109 and screwed into channel anchor 95, which is inserted into the snowboard channel binding mount 38. Channel anchor 95 is inserted through the axis pin receiver hole 36 in the bottom plate 12. This section also shows that no screws are installed in the array of countersunk holes 23, to attach to the bottom plate 12.

[0091] FIG. 20 is a cross sectional side view (section A-A) through the device 1, snowboard 3 and binding 9, for the third embodiment, a Snowboard Direct Mount. The section shows the machine screws 28, from a standard attachment plate 29 for a binding 9, screwed into threaded holes or inserts 18 in top plate 11. The section shows the top plate 11 with the perimeter lip 13 (refer to figure 14) bearing directly on the top surface of the snowboard 3 and confining the perimeter 101 of the slip sheet 52. The slip sheet 52 has a plurality of holes for the pull pin 26, and holes for the arc pins 24 and the axis pin 25. Holes in slip sheet 52 allow all pins to pass through, into receptacles installed or manufactured directly into the snowboard 3. The arc and axis pins 24, 25 screw into receptacles 53 that may be threaded inserts, located at mounting points 99 along the center of the snowboard 3. The pull pin plunger 27 insets into a plurality of smooth (not threaded) receptacles 54.

[0092] FIG. 21 is a cross sectional side view (section C-C) through the device 1, snowboard 3, and binding 9, for the third embodiment, a Snowboard Direct Mount. The section shows machine screws 28, from a standard attachment plate 29 for a binding 9, screw into threaded holes or inserts 18 in top plate 11. The section shows the arc channels 16 in the top plate 11. The section shows the top plate 11 with the perimeter lip 13 (refer to figure 14) bearing directly on the top surface of the snowboard 3 and confining the perimeter 101 of the slip sheet 52. The slip sheet 52 has holes for all pins to pass through, into receptacles installed or manufactured directly into the snowboard 3. The axis pin 25, in the center hole 17, is screwed into receptacle 53 that may be a threaded insert, located at a mounting point 99, located along the center of the snowboard 3.

[0093] FIG. 22 is a cross sectional side view (section C-C) through the device 1 and snowboard 3, for the third embodiment, a Snowboard Direct Mount. The section shows the arc channels 16 and threaded holes or inserts 18 in top plate 11. The section shows the top plate 11 with the perimeter lip 13 (refer to figure 14) bearing directly on the top surface of the snowboard 3. The section shows at the underside of top plate 11 a plurality of thickened concentric rings 117, similar to the lip 13, formed integrally with top plate 11. The lip 13 and the thickened concentric rings 117 function

together as a reduced friction bearing surface between top plate 11 and the top surface of the snowboard 3.

[0094] It should be noted that the present invention may be used with existing mounting holes 5 in the snowboard 3 and may be used with commercially available bindings 9. It may also be integrated with a binding, and/or board and manufactured and sold as a unit, as demonstrated in figure 9.

[0095] The description, above, describes in detail three embodiments of the invention (and several variations of those embodiments). This discussion should not be construed, however, as limiting the invention to those particular embodiments since practitioners skilled in the art will recognize numerous other embodiments as well. Therefore it is intended that the appended claims will cover all such obvious modifications of the invention.

CLAIMS

1. A rotatable binding apparatus for a snowboard, comprising:
 - a. A bottom plate comprising:
 - i. Means to mount the bottom plate to the snowboard;
 - ii. A plurality of pull pin receptacles;
 - iii. A center axis pin receptacle;
 - iv. A plurality of arc pin receptacles;
 - b. A rotatable top plate, comprising
 - i. A plurality of arc channels;
 - ii. At least one pull pin hole;
 - iii. An axis pin hole;
 - c. A pull pin located within the pull pin hole of the top plate for insertion into a pull pin receptacle, for locking the top plate to the bottom plate;
 - d. An axis pin located within the axis pin hole and the center axis pin receptacle; and
 - e. A plurality of arc pins located within the arc channels and secured in the arc pin receptacles.
2. The device of claim 1, wherein the means to mount the bottom plate to the snowboard comprises screw binding mounts that protrude from fixed locations on the snowboard.
3. The device of claim 1, wherein the means to mount the bottom plate to the snowboard comprises channel anchors inserted into, and protruding from, one or more channels in the snowboard.
4. A rotatable binding apparatus for a snowboard, wherein the snowboard comprises a plurality of pull pin receptacles and a center axis pin receptacle, comprising:
 - a. A rotatable top plate, comprising
 - i. A plurality of arc channels;
 - ii. At least one pull pin hole;
 - iii. An axis pin hole;
 - b. A plurality of arc pin receptacles inserted into the snowboard and protruding therefrom;

- c. A pull pin located within the pull pin hole of the top plate for insertion into a pull pin receptacle on the snowboard, for locking the top plate to the snowboard;
- d. An axis pin located within the axis pin hole of the top plate and the center axis pin receptacle on the snowboard; and
- e. A plurality of arc pins, wherein each arc pin is located within an arc channel and secured in an arc pin receptacle.

1/15

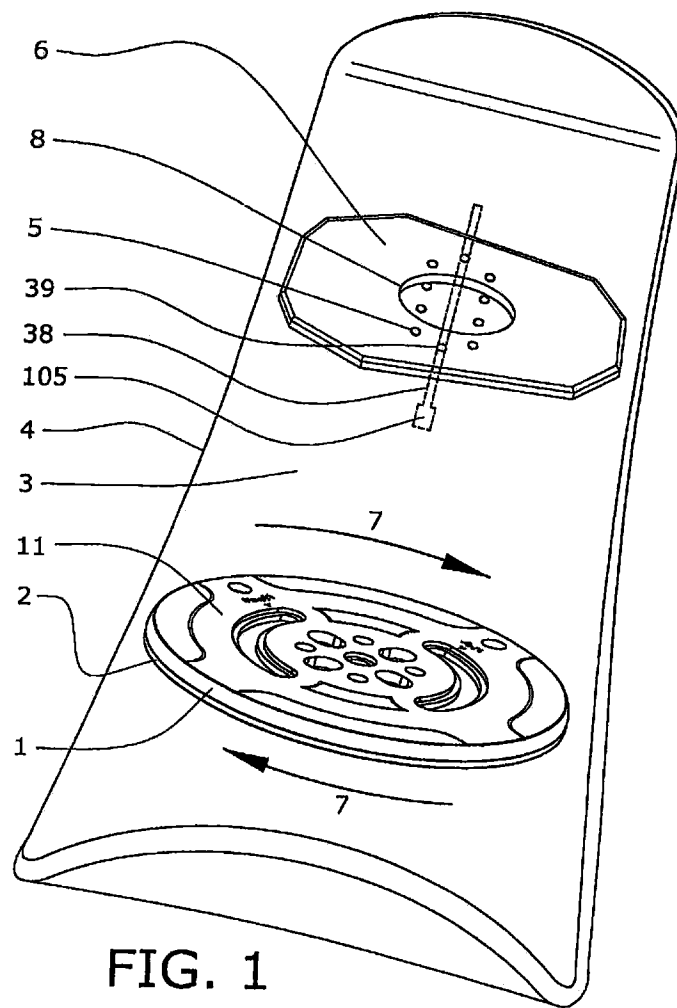
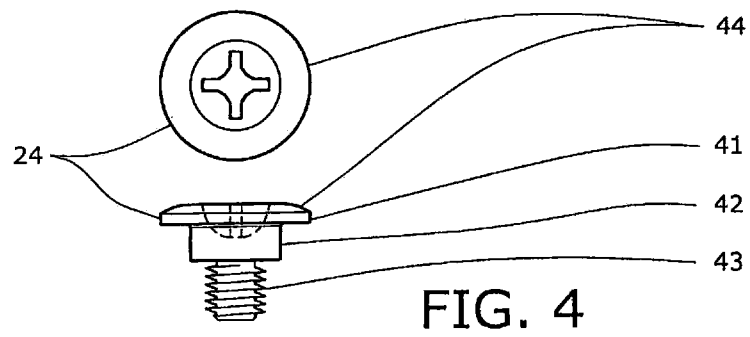
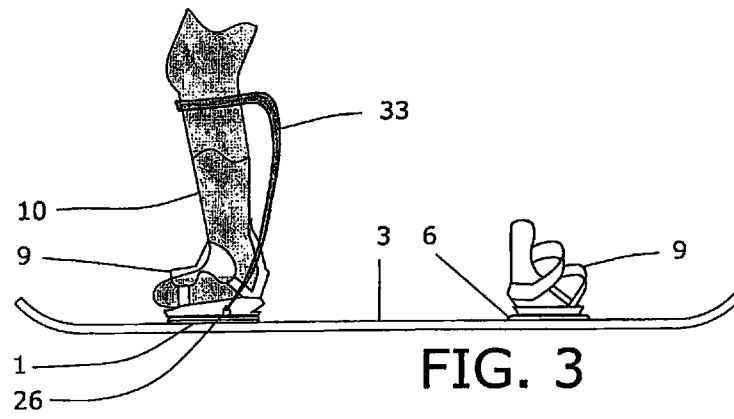
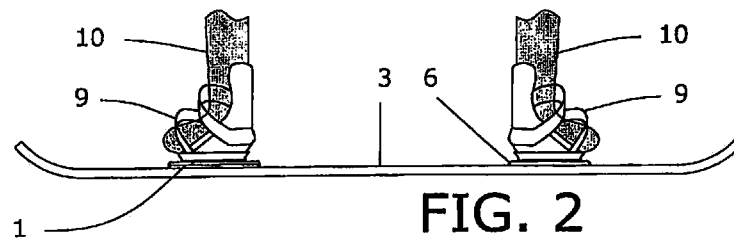


FIG. 1

2/15



3/15

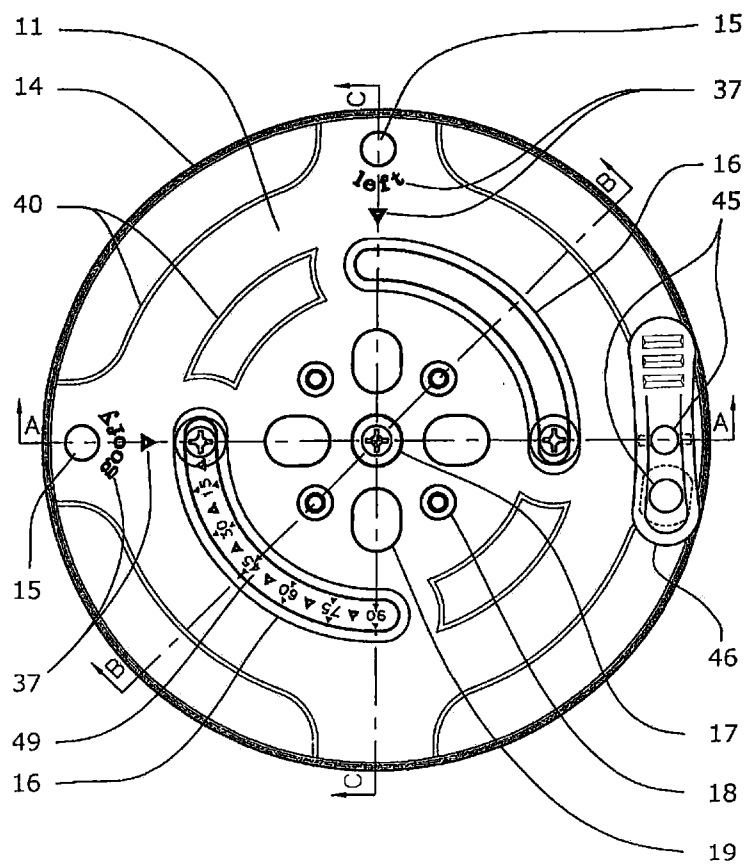


FIG. 5

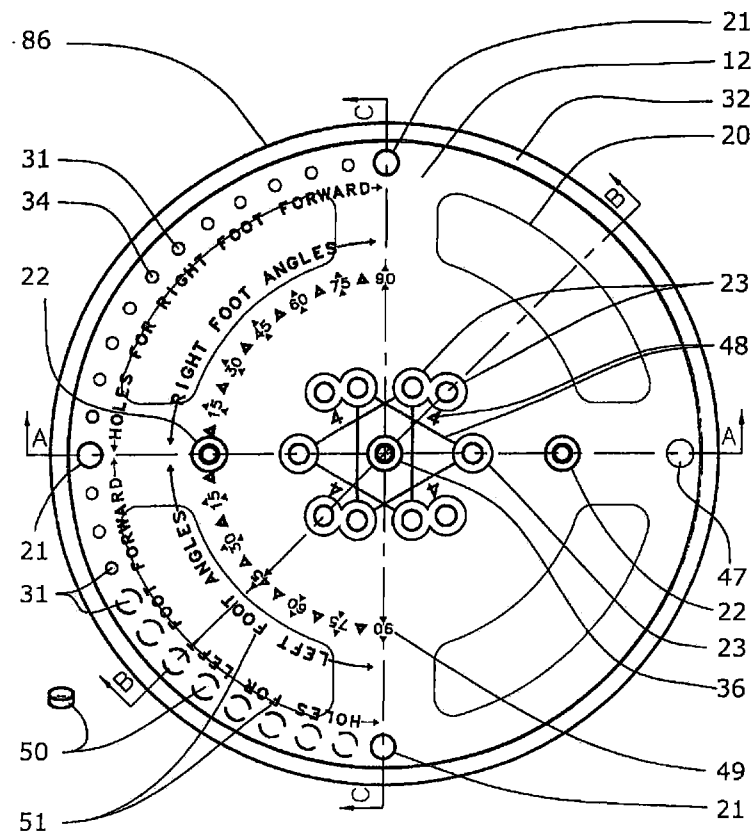


FIG. 6

5/15

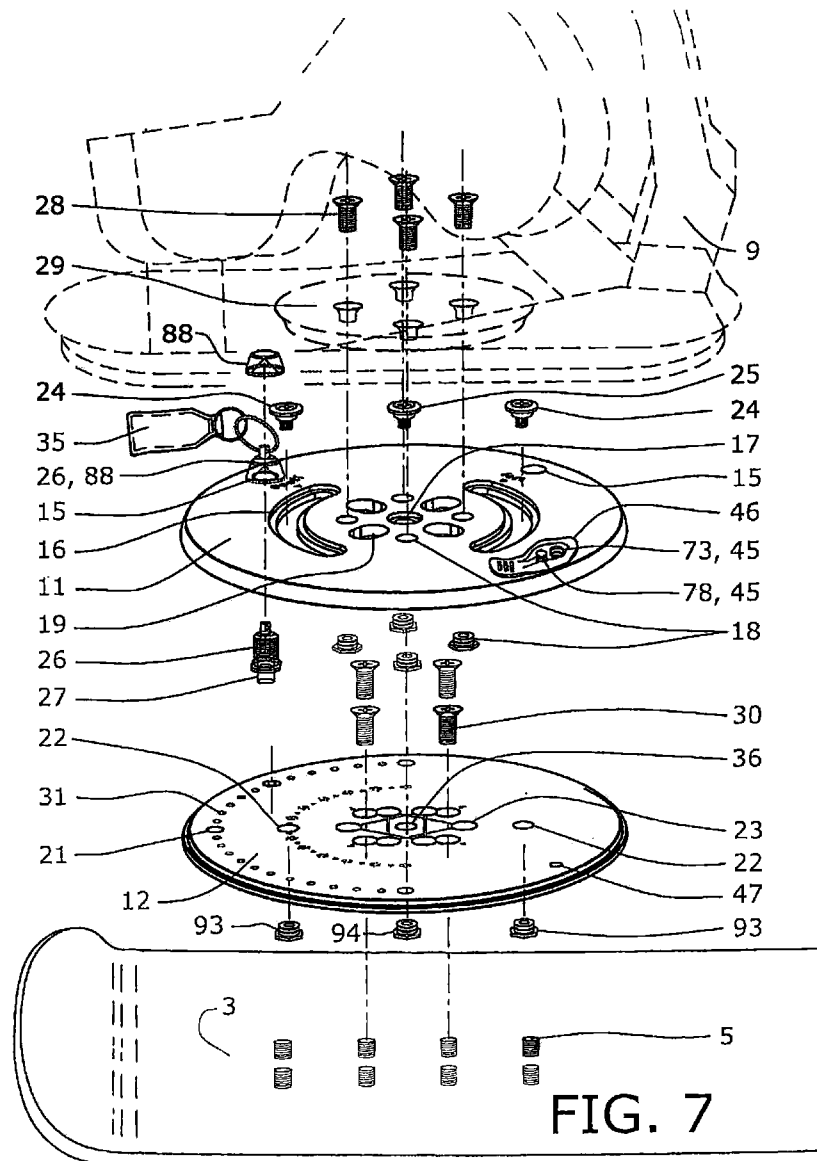
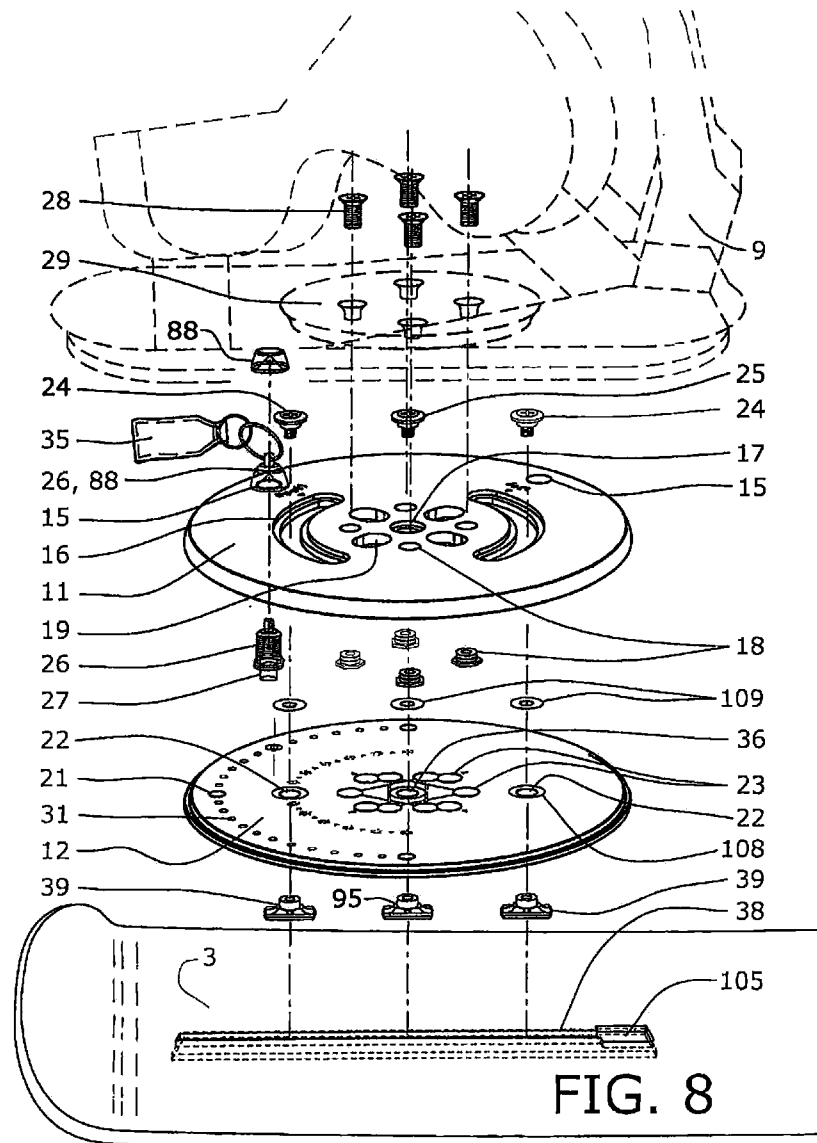
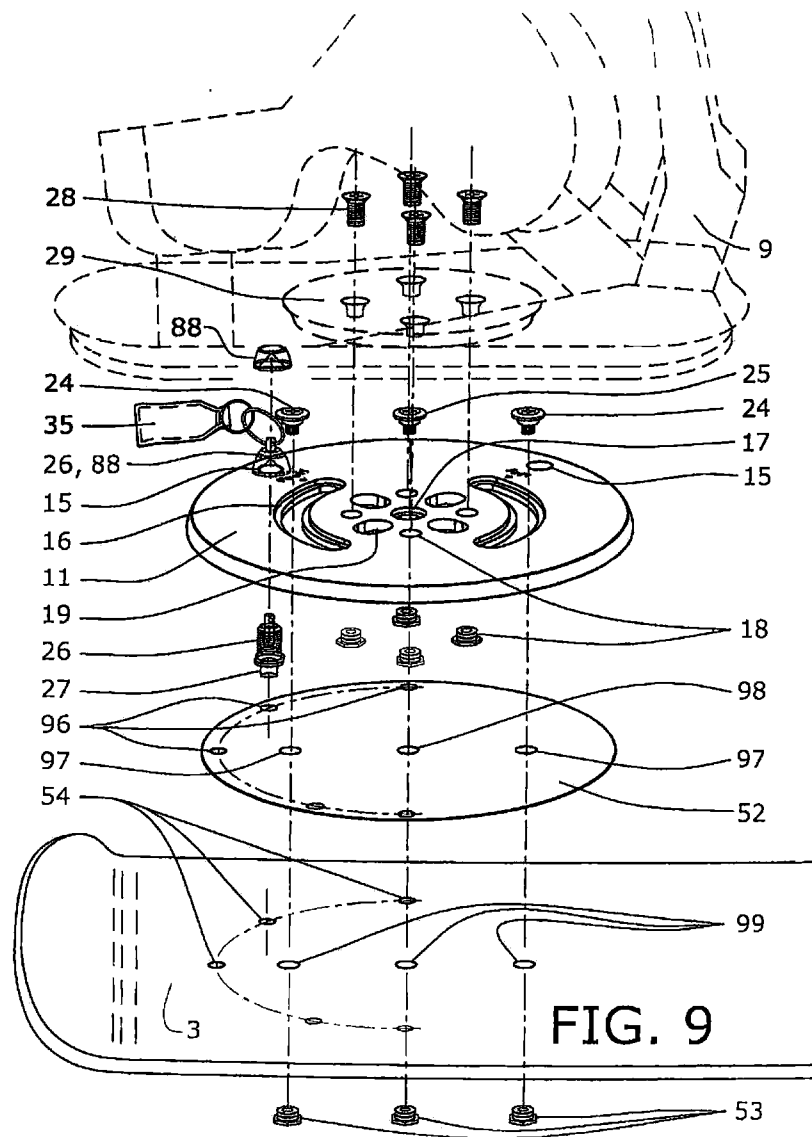


FIG. 7

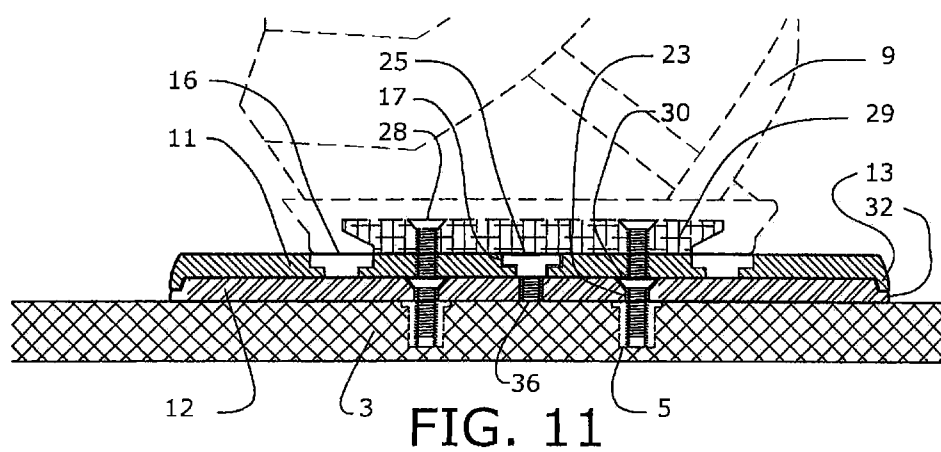
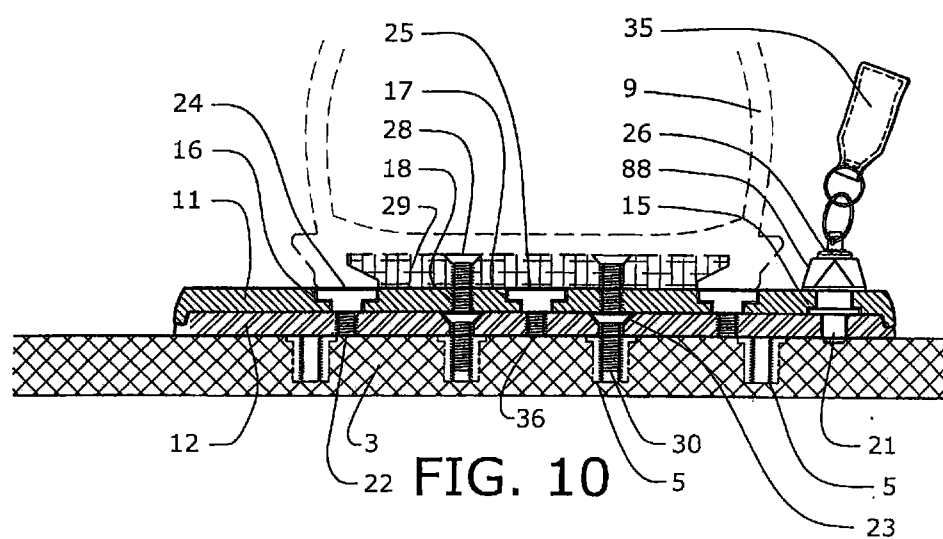
6/15



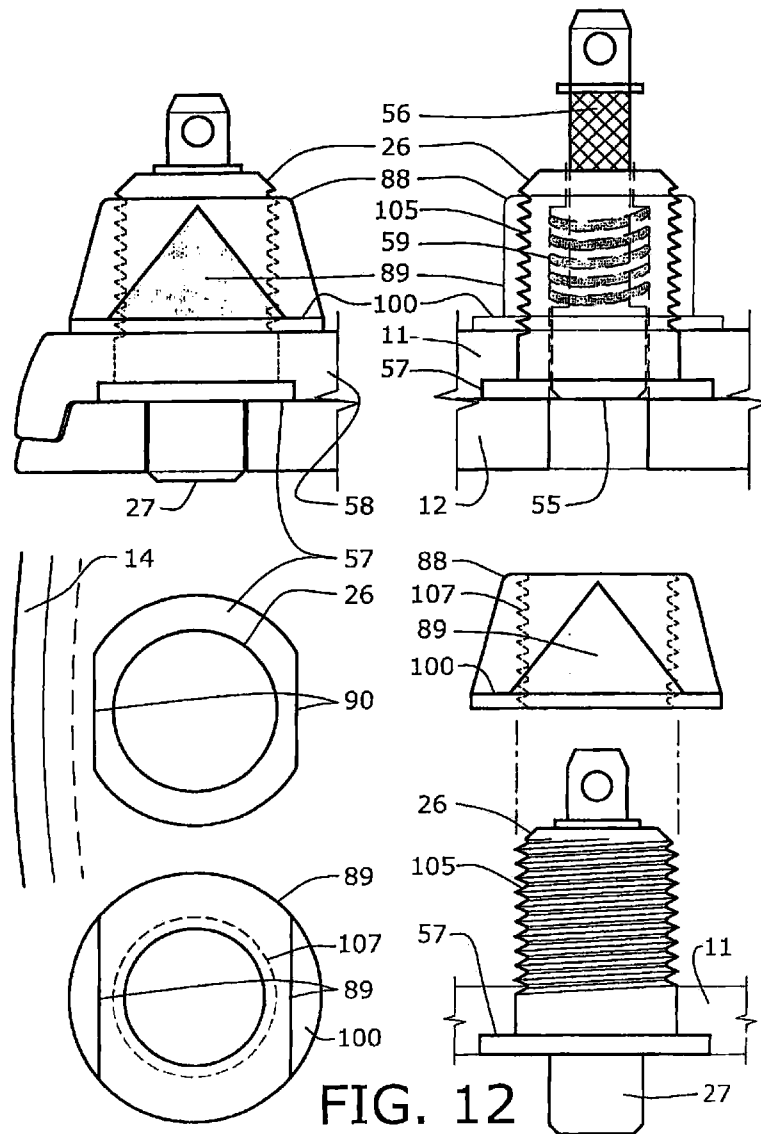
7/15



8/15



9/15



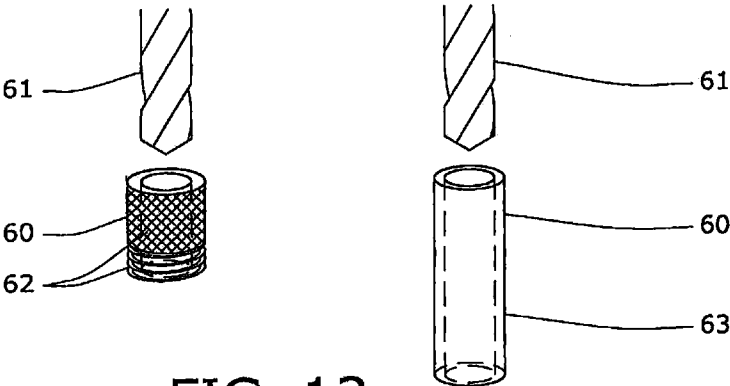


FIG. 13

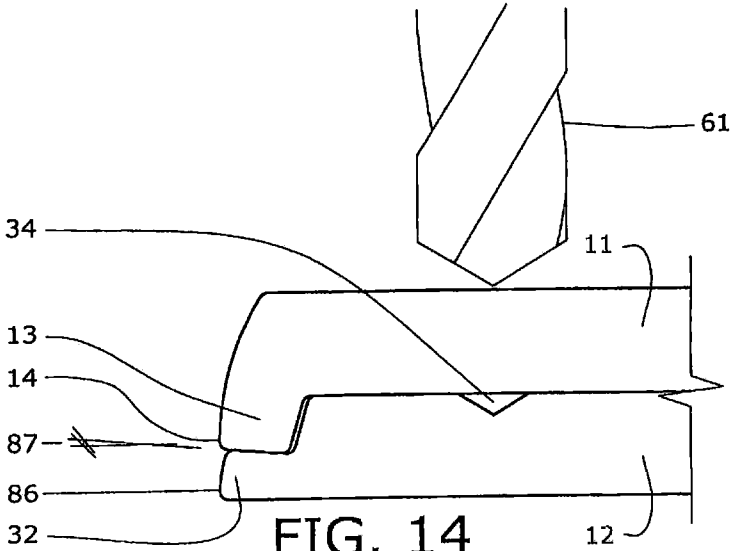


FIG. 14

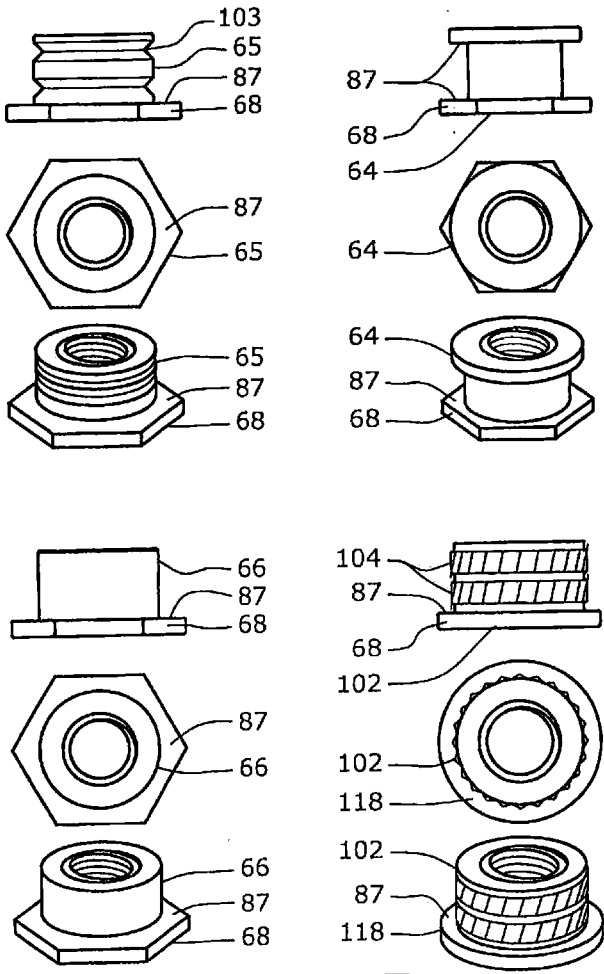


FIG. 15

12/15

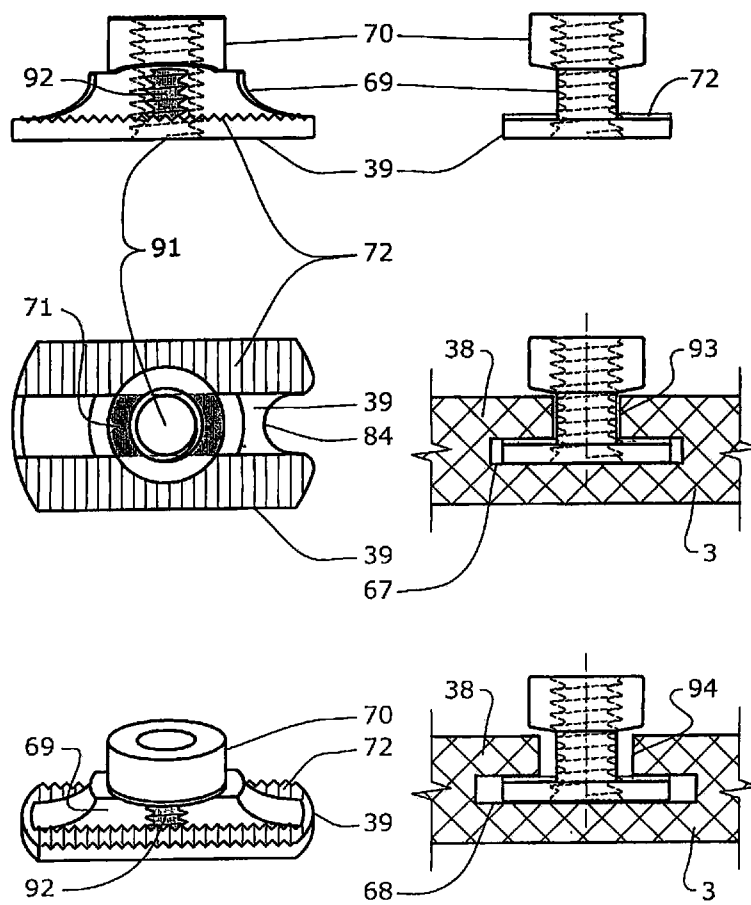
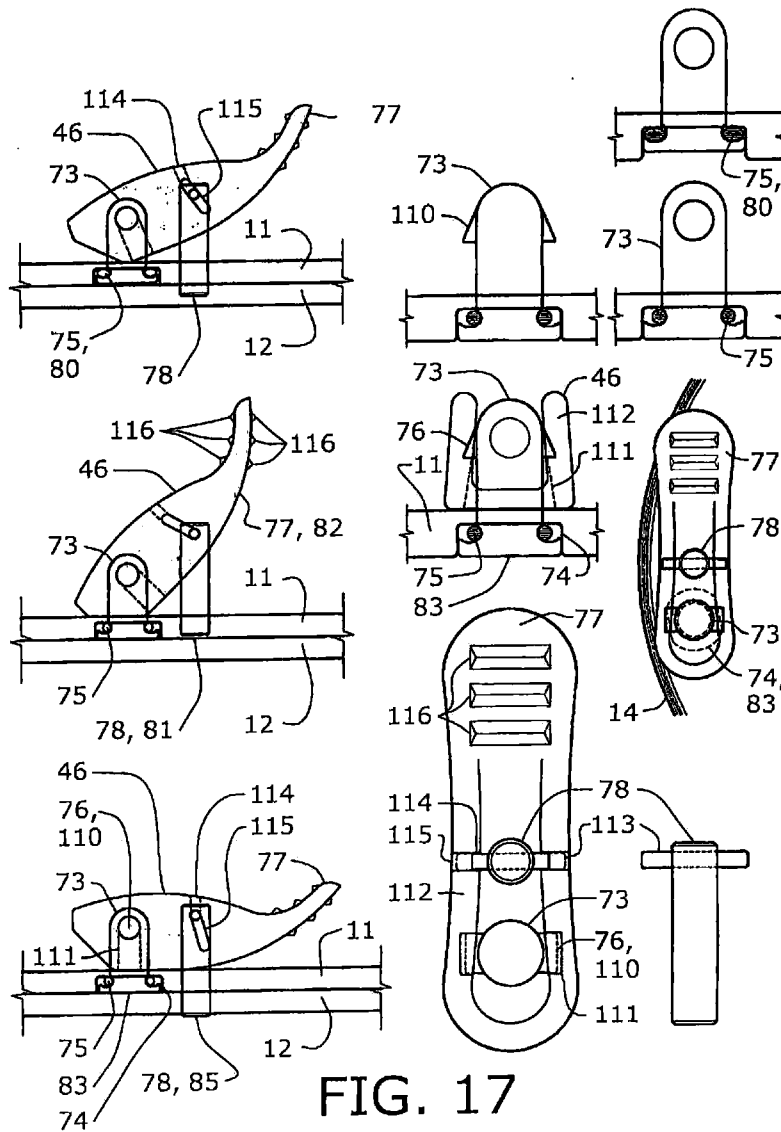
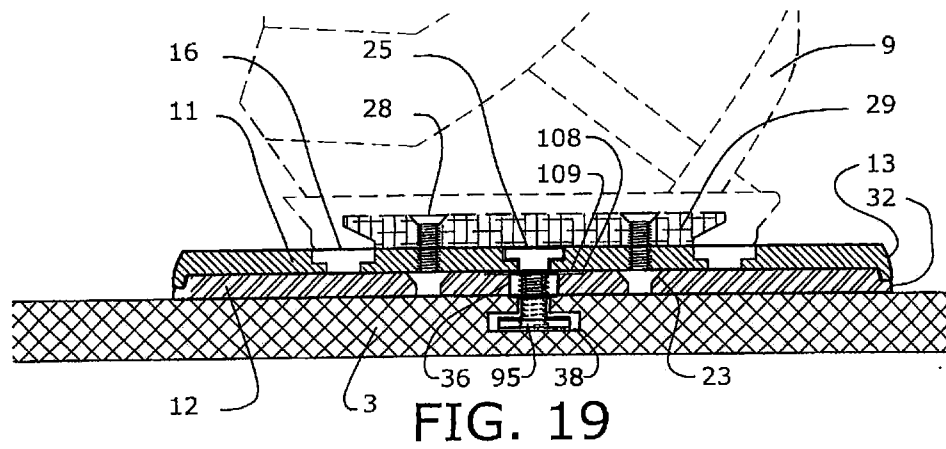
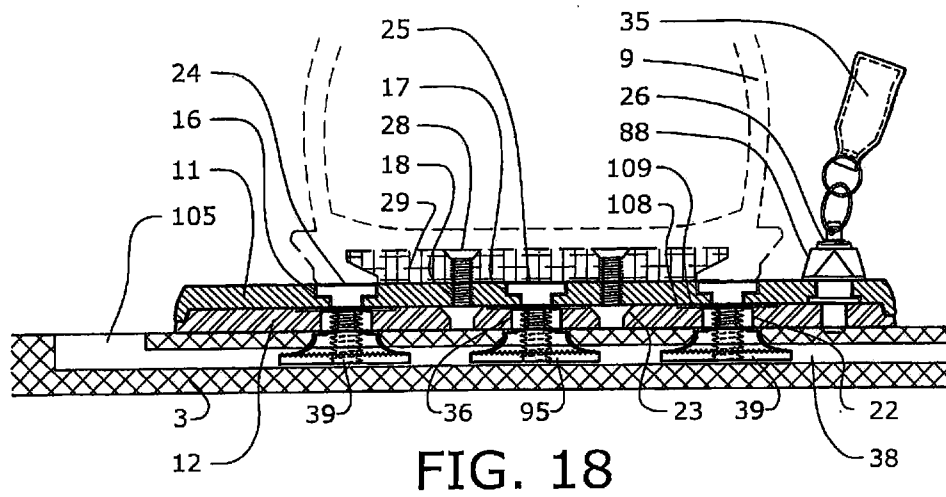


FIG. 16

13/15



14/15



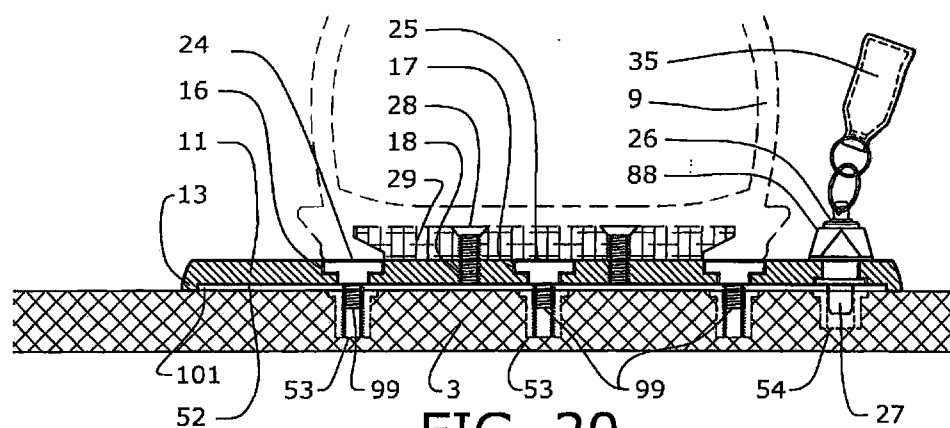


FIG. 20

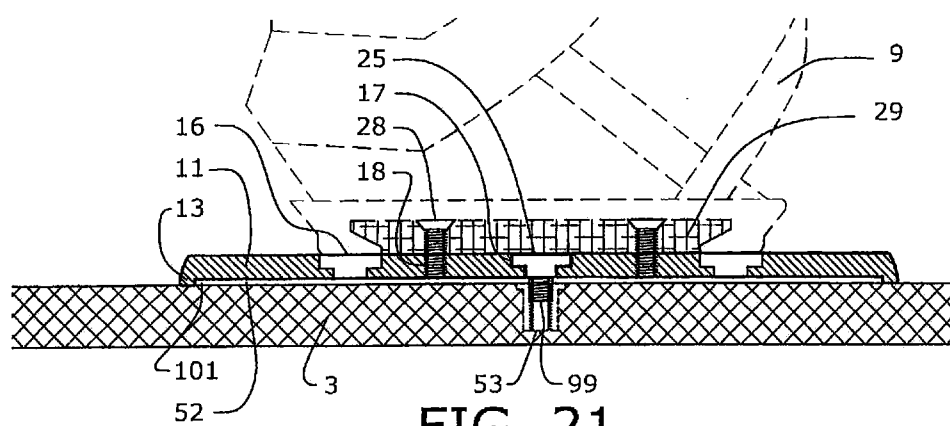


FIG. 21

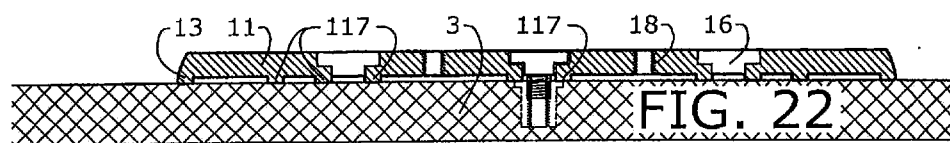


FIG. 22