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(54) **SIMULATOR FOR BOARD SPORTS**

SIMULATOR FÜR BOARD-SPORTARTEN

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Description

TECHNICAL FIELD

[0001] The invention relates to a simulator for board sports. In particular the invention relates to a simulator able to be used both for determining a rider's stance and also as a training aid.

BACKGROUND ART

[0002] In recent years, there has been great growth in board sports such as snowboarding, kite surfing, wake boarding, motorised skateboarding etc. As in other sports where an object is manipulated by a person, the person aims to approach an optimal movement of his body and the object. This optimal movement would allow a minimal effort to result in a maximal effect such as, for example, a maximal weight transfer onto an edge when riding a snowboard. In board sports where the rider's feet and lower legs are to a degree fixed relative to a board or platform then it is generally considered that correct stance is necessary to approach this optimal movement.

[0003] Although an incorrect or sub-optimal stance can be employed, such a stance imposes an additional burden upon a beginner during the strenuous and potentially expensive learning phase. This burden could be reduced if a better stance had been adopted initially. At worst, a rider may be so unsuited to a stance that it poses a heightened risk of possible injury.

[0004] As beginners are often fully pre-occupied with mastering numerous skills, the subtle effects of stance changes are often completely overlooked. Consequently, a rider may retain a particular stance setting provided on their first board for a considerable time, without experimentation. This makes beginners reluctant to vary their stance before they have gained a greater degree of ability.

[0005] Riders are further discouraged in experimenting with variations in stance because of the difficulty in making meaningful assessments of the adjustments to the equipment. Attempting to compare the results of different settings between runs is fraught with variables outside the rider's control.

[0006] A board rider's stance can be varied in a number of ways. A typical snowboard, for example, has two longitudinally spaced boot bindings that support both feet, often offset at a substantial angle with respect to the longitudinal centreline of the snowboard. This cross-orientation of the bindings allows the rider to assume a side-forward stance, which is the necessary anatomical positioning for optimal in-use control of the snowboard.

[0007] It is often the case that either a boot worn by the rider or the binding itself will be provided with a support for the lower leg with a variable degree of forward lean. Stance can also be varied by adjusting the angle between the midline of the foot and the centreline of the snowboard and this is often significantly altered for different snowboarding styles, e.g. freestyle or slalom racing. However, when the angle of the midline of the foot with respect to the board is changed, this can also change the angle of forward lean. Other degrees of freedom are also available, however within these restraints the "ideal" stance may be optimally adapted to the anatomical measurements and dynamic qualities of the rider.

[0008] Mechanical surfboards help a surfer learn balance and dynamically determine the effect of adjustments on the width of his stance on his ability to balance, however they do not allow the simulation of board sports, such as snowboarding, where the rider's feet are fixed relative to the board. Snowboard simulating devices which a rider can use on a trampoline allow the simulation of dynamic conditions with feet fixed to a platform, however they provide no means to determine the effect of adjustments of the rider's stance.

[0009] There are also other snowboard simulators described in the prior art, such as Canadian patent CA 2 209 030 and US patent US 4 966 364. None of these simulators allows the rider to dynamically experience the effects of a stance adjustment. In particular they have no provision for fixing the bindings for movement toward and away from one another or for adjusting the spacing between the bindings while the rider is held upon the simulator by the bindings.

[0010] There are also devices allowing people to stand on a pivoting or moveable platform, such as DE10120545 and DE10060116C1, however these devices do not accurately replicate the movements experienced when snowboarding, or allow for the rider to dynamically experience the effects of a stance adjustment.

[0011] It would be desirable to provide a device for determining a rider's stance for board sports and which addresses the above-mentioned disadvantages.

[0012] Typically snowboard training is undertaken on ski fields in formal lessons and/or through self-teaching. The learning phase of snowboarding can be very strenuous and traumatic to many novices due to the inevitable falls incurred and while training devices such as the above-mentioned mechanical surfboards and snowboard simulating devices can assist beginners in learning the movements involved in various board sports, these devices do not provide for increased difficulty of movements as learner's skill level increases. A relatively accessible and safe means of practising movements for board sports which can be made progressively more challenging will enhance the learning phase as well as benefiting experienced riders.

[0013] Therefore, it would also be desirable to make available a training device which addresses the above-mentioned disadvantages and which makes possible an improved and cost-effective progressive training in a course of movement for board sports.

[0014] It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

[0015] Further aspects and advantages of the present

invention will become apparent from the ensuing description which is given by way of example only.

DISCLOSURE OF THE INVENTION

[0016] According to one aspect of the present invention there is provided a simulator for board sports characterised according to claim 1.

[0017] The simulator allows a rider to simulate at least one pivoting movement that is made to manoeuvre a snowboard, or the like. The movement between the bindings toward and away from one another is preferably a linear movement. It will be understood that while a pivoting pavement may move part of a binding toward and away from the other binding, the relative movement must be of the whole binding. Preferably the movement is linear sliding movement e.g. the at least one binding is fixed for sliding on a linear track, in a linear slot, or the like. The rider is thereby able to dynamically determine the effect of adjustments on the width of his stance (determined by the spacing between the foot bindings) on his ability to balance about the first simulator axis.

[0018] In the preferred embodiment the pivoting of the foot bindings about the first simulator axis is adapted to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the at least one of the foot bindings, or both of the foot bindings, being mounted for sliding movement in a direction substantially parallel to the first simulator axis. It will be understood that pivoting about the longitudinal or roll axis of a board is important in steering the board to transfer weight between the opposing longitudinal edges of the board.

[0019] Optionally the simulator may be adapted for simulating pivoting or rotation about a pitch axis and/or about a yaw axis of the board. In addition to pivoting about the first simulator axis therefore, the simulator may include means for pivoting both the foot bindings together about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

[0020] Advantageously the foot bindings are fixed together for pivoting about the first simulator axis. The foot bindings may be fixed to a platform for simulating a snowboard, or the like. Most preferably, for simulating the manner of mounting foot ' bindings on a snowboard, the foot bindings include boot bindings. A support Is fixed to the pivotal attachment for supporting the foot bindings, preferably upon the ground. A handle may be fixed to the support to assist the rider and prevent a fall.

[0021] The pivoting mount assembly preferably includes at least one resilient pivot connecting the ground-supported base and pivoting member to provide the pivoting movement about the simulator axis while also biasing a foot-supporting surface of each foot binding toward the horizontal plane. Alternatively, the pivotal attachment may include a journal and separate resilient means.

[0022] Most preferably the pivoting mount assembly includes two elastomeric pivots, at least one of which is mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of the boot bindings about the first axis, and any one of more closely spaced positions configured for providing an increased degree of pivoting movement, of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

[0023] In a preferred embodiment both foot bindings are adapted to be simultaneously moved for adjusting the spacing between the foot bindings in a direction substantially parallel to the first simulator axis. This may be achieved, for example, by a screw-type adjuster, manually or power-operated linear actuators etc. Optionally one or both foot bindings are fixed in a track extending parallel to the first simulator axis for movement to adjust the spacing between the foot bindings. The means for adjusting the spacing between the foot bindings is preferably a screw-type adjuster, but it will be understood that other manually or power-operated linear actuators may also be used. The screw-type adjustment mechanism is preferably connected to the at least one foot binding for ' sliding the at least one foot binding toward and away from the other of the foot bindings for adjusting the spacing therebetween while the rider's feet are held, by the foot bindings. When both the bindings are mounted for sliding movement the adjustment mechanism includes: a screw threaded adjuster rod having a handle; a screw block received on the adjuster rod; sliding blocks connected to the bindings, and an arm pivotally connected to each sliding block and to the screw block.

[0024] The simulator may further include means for measuring the spacing between the centres of the foot bindings, such as a ruler. An alignment indicating device, such as a plumb line or level, may also be provided to assist in aligning the centre of the rider's knee vertically with his foot. The alignment indicating device may include a knee-receiving cup fixed to each foot binding, the position of the knee-receiving cup being adjustable to align with the knees of different users, the cup being adjustable in a plane extending orthogonally to a foot-supporting surface of the binding and substantially aligned with the centre of the rider's foot. A rod assembly may be fixed to the binding, extending generally perpendicular to a base of the binding or platform and able to telescope to align vertically with the knees of different height users.

[0025] In addition to this freedom of adjustment of the foot bindings in the longitudinal direction, the simulator preferably includes means for adjustment of the foot bindings by rotation of each foot binding about a central axis substantially intersecting with and extending orthogonally to the first simulator axis for adjusting the angle between the midline of the foot and the first simulator axis.

[0026] Means may also be provided for movement of the foot bindings lateral to the first simulator axis. The means for means for providing each of these adjustments is preferably adapted to allow for adjustment while the rider is held in the foot bindings e.g. by a separate oper-

ator or by remote control means operated by the rider. The simulator preferably further includes a rider's seat, upon which the rider may sit with his feet secured by the bindings. Additionally, an operator's seat may also be provided for seating an operator while he operates the adjustment mechanism. The rider's seat and operator's seats are preferably fixed on opposing sides of the pivoting mount assembly.

[0027] This invention provides a simulator which is effective and efficient in operational use, and which is versatile in operation, allowing it to be used to assist board riders determine their stance and also for training riders in different courses of movement. The simulator may be economically constructed and has an overall simple design which minimizes manufacturing costs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the simulator of the present invention;

Figure 2 is an exploded view of the simulator of Fig. 1;

Figure 3 is a front elevation of the simulator of Fig. 1;

Figure 4 is an exploded pictorial view of the mount of the simulators of Fig. 1; ' '

Figure 5 is an exploded pictorial view of part of the platform assembly of the simulator of Fig. 1;

Figure 6 is an exploded pictorial view of the boot bindings of the simulator of Fig. 1, and

Figure 7 is an exploded pictorial view of the alignment indicating device of the simulator of Fig. 1

BEST MODES FOR CARRYING OUT THE INVENTION

[0029] Referring to Figs 1 - 3, a simulator 100 according to the present invention for board sports, and in particular snowboarding, is shown having a frame 30 with a rider's seat 31 and an operator's seat 32 positioned either side of a platform assembly 33 supported on a pivoting mount 34. The platform assembly 33 includes a platform 5 to which a pair of foot bindings or boot bindings 2a, 2b are mounted for holding the a rider's feet while the mount 34 allows the platform assembly 33 to pivot primarily about a first simulator axis A to simulate edge-to-edge roll of a snowboard about its longitudinal centreline.

[0030] The frame 30 includes a rider's seat framework 35 and an operator's seat framework 36 fixed by a joining member 37. Both frameworks 35, 36 are of like shape and have horizontal portions 35a, 36a for supporting the frame upon the ground and 35b, 36b for supporting the seats 31, 32.

[0031] The mount 34 includes an elongate base 38 rigidly fixed upon the joining member 37 and which supports an elongate pivoting member 39 connected by front and rear resilient pivots 3a, 3b.

[0032] The boot bindings 2a, 2b are fixed for sliding movement in linear slots 41 a, 41 b in the platform 5 and the platform assembly 33 further includes a rotating handle 40 for controlling the sliding movement of the boot bindings 2a, 2b. An alignment indicating device 42 is fixed to each of the boot bindings 2a, 2b.

[0033] As best seen in Fig. 4, the pivots 3a, 3b are moulded from an elastomeric material about a central threaded shank 43 which protrudes from either end for engagement with upper and lower jaws 44a, 44b for clamping engagement with the pivoting member 39 and base 38 respectively. The pivots 3a, 3b are symmetrical about the long axis of the shank 43 and either side of a central waisted section 45 which defines the first simulator axis A. Upper and lower faces of the pivots 3a, 3b are parallel to bias the platform 5 toward the horizontal plane. The base 38 is a rectangular hollow section and the pivoting member a channel, both with cutouts 48a, 48b, 49a, 49b for access to the jaws 44a, 44b. The pivoting member 39 is received between and may be restrained by the end plates 47 fixed to the ends of the base 38. The upper end of the shank 43 of each pivot 3a, 3b is received in a slot 46a, 46b in the pivoting member, with corresponding slots (not shown) in the base 38 in order that the longitudinal position of the pivots 3a, 3b may be varied.

[0034] An adjustment mechanism 50, shown in Fig. 5, forms part of the platform assembly 33 and is provided for adjusting the spacing between the boot bindings 2a, 2b in the longitudinal direction. The mechanism 50 slides blocks 51 a, 51 b in the slots 41 a, 41 b. The blocks 51 a, 51 b are connected to the boot bindings 2a, 2b and with pivots 54, 55 to pivoting arms 52a, 52b, each of which are connected to a screw block 53. A threaded shaft 56 has one end fixed to the handle 40 and the other received in a threaded aperture in the block 53. The shaft 56 is fixed for rotation in saddle blocks 57 to the underside of the platform 5. In this manner, rotation of the handle 40 simultaneously slides the blocks 51 a, 51 b toward or away from a central position on the platform 5. Measurement indicia (e.g. a ruler - not shown) or other means is provided to allow the operator to measure the longitudinal spacing between the centres of the bindings 2a, 2b.

[0035] The simulator 100 can also be readily adapted to support a rider upon a separate snowboard (not shown). After removing the boot bindings 2a, 2b, a separate snowboard may be supported upon the platform 5, the resilient support pads 77 holding the snowboard in place.

[0036] As seen in Fig. 6, mounting and support for the rider's booted feet and the lower legs is provided by each

individual binding 2a, 2b which also forms part of the platform assembly 33. The bindings 2a, 2b are fixed to the sliding blocks 51a, 51b by means of a binding disc 59 and secured by central fasteners 60. Each binding disc 59 defines an axis of rotation B, C which intersects the first simulator axis A (axes B and C extending vertically when axis A extends horizontally). No stops limit the rotational movement of the bindings 2a, 2b, which can rotate through 360 degrees. Rotation of the foot plate 60 connected by the disc 59 about axes C, D varies the angle between the midline of the foot (i.e. a line from the heel to the toe) and the longitudinal centreline of the platform 5. A scale (not shown) is provided on the discs 59 or foot plate 60 to allow angular measurements to be determined.

[0037] Each foot plate 60 has a flat foot-supporting surface, as illustrated in Fig. 7. Mounted to the rear of the foot plate 60 is a high back leg support 12. The high back leg support 12 is preferably rigid, but it may be adjustable for rotation about respective axes normal to the axes B, C to provide a variable degree of forward lean. The high back leg support 12 has openings 62a, 62b for slidably receiving the opposing parallel edges 61 a, 61 b of the foot plate 60. At the front edge of the foot plate 160 a recess 65 is provided for receiving a bracket 66 (Fig. 7) of an alignment indicating device 42. Fixed to the leg support 12 a spring-biased detent 63 is provided for engagement with recesses 64 in the edges 61 a, 61 b. In this manner, adjustment of the position of the rider's foot is provided in the direction of axis D, generally orthogonal to the axes B, C.

[0038] The components of the alignment indicating device 42 are shown in Fig. 7 and include a mounting bracket 66 fixed at one end of an elongate telescoping assembly 67 having a knee cup 68 fixed at one end thereof. The telescoping assembly 67 comprises a bar 69 to which the L-shaped bracket is fixed such the bar 69 extends upwardly from the front and centre of the foot plate 60. The telescoping assembly 67 further comprises an elongate tubular member 70 slidingly received on the bar 69 and having a detent 63 fixed thereto for engagement with recesses 71 in the bar 69 to fix the height of a knee-receiving cup 68 fixed to the end of the member 70. The knee-receiving cup 68 includes a stem 72 received in a aperture 74 in the end of member 70 and may be fixed by pin 74 in any one of openings 75 in the stem 72. In this manner the position of the knee-receiving cup 68 may be adjusted in a plane (not shown) extending orthogonally to the platform 5 and aligned with the centre of the rider's foot.

[0039] The simulator 100 may be used for two main purposes: primarily it allows dynamic adjustments to be made to a rider's stance allowing a suitable stance to be readily determined, and a secondary purpose is to allow users to practice a range of movements applicable to board sports.

[0040] To determine a suitable stance for a novice rider the pivots 3a, 3b are clamped at their maximum longitudinal spacing (at opposing ends of the slots 46a, 46b). In this position, movement of the platform 5 is largely restricted to pivoting about the first simulator axis A to simulate edge-to-edge roll of a snowboard. The rider (not shown) is secured to the simulator 100 by the bindings 2a, 2b in an initial narrow stance, where the bindings 2a, 2b are relatively close together in the longitudinal direction (parallel to axis A). The high back leg support 12 is adjusted for the size of the rider's boots to position his feet centrally on the foot plates 60. The angle of the bindings 2a, 2b are adjusted by rotation about the respective axes B, C normal to the platform 5 to a suitable initial stance.

[0041] With support initially from the seat 31 the rider 1 attempts to stand and balance the platform 5, maintaining it horizontal, while the operator slowly winds the handle 40 to move the bindings 2a, 2b and widen the rider's stance. As the stance is widened, the rider is able to feel a point at which he can balance the platform. This "correct" stance can be verified by use of the vertical indicating device 42. The operator adjusts the vertical and horizontal position of the knee cups 68 so that the rider's knees are received therein. This verifies that the centre of the rider's knee is properly aligned with his foot.

[0042] This same dynamic process can be repeated with variations in the angle of each binding 2a, 2b about axes B, C described above to determine a comfortable stance, approaching an optimal, which is suited to the anatomical measures and dynamic qualities of the rider.

[0043] It will also be understood that the simulator allows for improved training, allowing a rider to practice courses of movement, and, for example, to allow a trainer to make ready observations to assist the learning process. By adjusting the position of the pivots 3a, 3b the characteristics of the simulator can be varied. As the pivots 3a, 3b are positioned closed together the rotary freedom of movement of the platform 5 is increased, and whereas at maximum spacing the movement is largely roll movement about longitudinal axis A, at minimum spacing a degree of pitch and yaw rotation are provided (about respective axes perpendicular to axis A). The amount of freedom of movement may thus be adjusted to suit the user's progress through the learning process, making use of the simulator progressively more challenging even as the user increases in skill.

[0044] Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof as defined in the appended claims.

Claims

1. A simulator (100) for board sports including:

a pair of foot bindings (2a,2b) for holding a rider's feet;

characterised in that the simulator (100) also includes a pivoting mount assembly (34) for pivoting both the foot bindings (2a, 2b) together about a first primary simulator axis (A), to simulate edge-to-edge roll movement of a board (5) about the longitudinal or roll axis of the board (A), the pivoting mount assembly (34) including a ground-supported base (38) pivotally connected, along said longitudinal axis (A), to a pivoting member (39), to which at least one of the foot bindings (2a, 2b) is attached for movement toward and away from the other of the foot bindings(2a, 2b), and

adjustment means (50) operatively connected to said at least one of the foot bindings (2a, 2b) for moving said at least one of the foot bindings (2a, 2b) toward and away from the other of the foot bindings (2a, 2b) to fixedly adjust the spacing between the pair of foot bindings (2a, 2b) while the rider's feet are held thereby.

2. The simulator (100) of claim 1 wherein said at least one of the foot bindings (2a, 2b), or both of the foot bindings (2a, 2b), are mounted for sliding movement in a direction substantially parallel to the first simulator axis (A).

3. The simulator (100) of claim 1 or claim 2 wherein the pivoting mount assembly (34) includes a platform (5) to which the foot bindings (2a, 2b) are fixed, the platform (5) pivoting about the first simulator axis (A) and simulating a snowboard.

4. The simulator (100) of any preceding claim wherein the first simulator axis (A) is below the foot bindings (2a, 2b).

5. The simulator (100) of any preceding claim wherein the pivoting mount assembly (34) includes at least one resilient pivot (3a, 3b) connecting the ground-supported base (38) and pivoting member (39) to provide the pivoting movement about the simulator axis (A) while also biasing a foot-supporting surface (60) of each foot binding (2a, 2b) toward the horizontal plane.

6. The simulator (100) of claim 5 wherein the pivoting mount assembly (34) includes two elastomeric, pivots (3a, 3b), at least one of which is mounted for sliding movement parallel to the first simulator axis (A) for movement between a widely spaced position to provide substantially roll movement of the boot bindings (2a, 2b) about the first axis (A), and any of one or more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings (2a, 2b) about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis (A).

7. The simulator (100) of any preceding claim wherein a binding (2a, 2b) adjustment means comprises a screw-type adjustment mechanism (50) connected to at least one foot binding (2a, 2b)) for sliding at least one foot binding (2a, 2b) toward and away from the other of the foot bindings (2a, 2b) for adjusting the spacing therebetween while the rider's feet are held by the foot bindings (2a, 2b).

8. The simulator (100) of claim 7 wherein both the bindings (2a, 2b) are mounted for linear sliding movement and the adjustment mechanism (50) includes: a screw threaded adjuster rod (56) having a handle (40); a screw block (53) received on the adjuster rod (56); sliding blocks (51a, 51b) connected to the bindings (2a, 2b), and an arm (52a, 52b) pivotally connected to each sliding block (51a, 51b) and to the screw block (53).

9. The simulator (100) of any preceding claim further including means for measuring the spacing between the foot bindings (2a, 2b).

10. The simulator (100) of any preceding claim further including an alignment indicating device (42) to assist in aligning the rider's knees vertically with his respective foot.

11. The simulator (100) of claim 10 wherein the alignment indicating device (42) includes a knee-receiving cup (68) fixed to each foot binding (2a, 2b), the position of the knee-receiving cup (68) being adjustable to align with the knees of different users, the cup (68), being adjustable in a plane extending orthogonally to a foot-supporting surface of the binding (60) and aligned with the centre of the rider's foot.

12. The simulator (100) of claim 10 or claim 11 wherein the alignment indicating device (42) includes a rod assembly (67) fixed to the binding (2a, 2b), extending generally perpendicular to a base of the binding (2a, 2b) or platform (5) and able to telescope to align vertically with the knees of different height users.

13. The simulator (100) of any preceding claim wherein each foot binding (2a, 2b) is mounted to the pivoting mount assembly (34) for relative rotation about respective central axes (B, C) substantially intersecting with and extending orthogonally to the first simulator axis (A) for adjusting the angle between the midline of the foot and the first simulator axis (A).

14. The simulator (100) of any preceding claim further including a rider's seat (31).

15. The simulator (100) of claim 14 further including an operators seat (32), the rider's seat (31) and operator's seat (32) being fixed on opposing sides of the

pivoting mount assembly (34).

16. A method of determining a rider's stance for board sports, including: providing a simulator (100) as claimed in any one of claims 1 to 15; fixing both the rider's feet in the foot bindings (2a, 2b) in an initial narrow stance; adjusting the spacing between the foot bindings (2a, 2b) to broaden the rider's stance while the rider attempts to balance about the first simulator axis (A), and measuring the spacing between the foot bindings (2a, 2b).

17. The method of claim 16 wherein the simulator (100) further includes an alignment indicating device (42) to assist in aligning the rider's knees vertically with his respective foot, the method including, prior to step d), the further step of: using the alignment indicating device (42) to align the rider's knees vertically with his feet.

18. The method of claim 16 wherein each foot binding (2a, 2b) is mounted to the pivoting mount assembly (34) for relative rotation about respective central axes (B,C) substantially intersecting with and extending orthogonally to the first simulator axis (A), the method including: rotating each binding (2a, 2b) about its respective central axis (B, C) to adjust the angle between the midline of the foot (D) and the first simulator axis (A), and measuring the angle between the midline of the foot (D) and the first simulator axis (A).

Patentansprüche

1. Simulator (100) für Boardsportarten, der Folgendes umfasst:

ein Paar Fußbindungen (2a, 2b) zum Halten der Füße eines Läufers/Fahrers;
dadurch gekennzeichnet, dass der Simulator (100) ferner eine schwenkbare Lagerbaugruppe (34) zum Schwenken der beiden Fußbindungen (2a, 2b) zusammen um eine erste primäre Simulatorachse (A) umfasst, um Rollbewegung eines Bords (5) von Kante zu Kante um die Längs- oder Rollachse des Boards (A) zu simulieren;
wobei die schwenkbare Lagerbaugruppe (34) einen auf dem Boden abgestützten Sockel (38) umfasst, der schwenkbar entlang der Längsachse (A) mit einem Schwenkelement (39) verbunden ist, an dem mindestens eine der Fußbindungen (2a, 2b) zur Bewegung in Richtung der anderen der Fußbindungen (2a, 2b) und von dieser weg befestigt ist, und
Einstellmittel (50), die Operativ mit mindestens einer der Fußbindungen (2a, 2b) zum Bewegen der mindestens einen der Fußbindungen (2a, 2b) in Richtung der anderen der Fußbindungen (2a, 2b) und von dieser weg verbunden sind, um den Abstand zwischen dem Paar von Fußbindungen (2a, 2b) fest einzustellen, während die Füße des Läufers/Fahrers von diesen gehalten werden.

2. Simulator (100) nach Anspruch 1, bei dem die mindestens eine der Fußbindungen (2a, 2b) oder beide der Fußbindungen (2a, 2b) für gleitende Bewegung in eine Richtung im Wesentlichen parallel zu der ersten Simulatorachse (A) angebracht ist/sind.

3. Simulator (100) nach Anspruch 1 oder Anspruch 2, bei dem die schwenkbare Lagerbaugruppe (34) eine Plattform (5) umfasst, an der die Fußbindungen (2a, 2b) befestigt sind, wobei die Plattform (5) um die erste Simulatorachse (A) schwenkt und ein Snowboard simuliert.

4. Simulator (100) nach einem vorhergehenden Anspruch, bei dem sich die erste Simulatorachse (A) unter den Fußbindungen (2a, 2b) befindet.

5. Simulator (100) nach einem vorhergehenden Anspruch, bei dem die schwenkbare Lagerbaugruppe (34) mindestens eine elastische Schwenkachse (3a, 3b) umfasst, die den am Boden abgestützten Sockel (38) und ein Schwenkelement (39) verbindet, um eine Schwenkbewegung um die Simulatorachse (A) herum zu ermöglichen, während sie ferner eine Fußabstützfläche (60) jeder Fußbindung (2a, 2b) in Richtung der horizontalen Ebene vorspannt.

6. Simulator (100) nach Anspruch 5, bei dem die schwenkbare Lagerbaugruppe (34) zwei elastomere Schwenkachsen (3a, 3b) umfasst, von denen mindestens eine zur Gleitbewegung parallel zu der ersten Simulatorachse (A) zur Bewegung zwischen einer weit beabstandeten Position, um im Wesentlichen eine Rollbewegung der Schuhbindungen (2a, 2b) um die erste Achse (A) zu ermöglichen, und einer jeglichen von einer oder mehreren dicht beabstandeten Positionen angebracht ist, die ausgelegt sind, um einen vergrößerten Grad von Schwenkbewegung der Bindungen (2a, 2b) um zueinander orthogonalen Nick- und Gierachsen zu ermöglichen, die beide senkrecht zu der ersten Simulatorachse (A) sind.

7. Simulator (100) nach einem vorhergehenden Anspruch, bei dem ein Bindungs- (2a, 2b) Einstellmittel einen schraubenartigen Einstellmechanismus (50) aufweist, der mit mindestens einer Fußbindung (2a, 2b) zum Verschieben mindestens einer Fußbindung (2a, 2b) in Richtung der anderen der Fußbindungen (2a, 2b) und von dieser weg verbunden ist, um den Abstand zwischen denselben einzustellen, während

die Füße des Läufers/Fahrers durch die Fußbindungen (2a, 2b) gehalten werden.

8. Simulator (100) nach Anspruch 7, bei dem beide der Bindungen (2a, 2b) für lineare Gleitbewegung angebracht sind und der Einstellmechanismus (50) Folgendes umfasst: eine Einstellstange (56) mit Schraubengewinde und einem Griff (40); einen Schraubenblock (53), der in der Einstellstange (56) aufgenommen wird; Gleitstücke (51a, 51b), die mit den Bindungen (2a, 2b) verbunden sind, und einen Arm (52a, 52b), der schwenkbar mit jedem Gleitstück (51a, 51b) und mit dem Schraubenblock (53) verbunden ist.

9. Simulator (100) nach einem vorhergehenden Anspruch, der weiter Mittel zum Messen des Abstands zwischen den Fußbindungen (2a, 2b) umfasst.

10. Simulator (100) nach einem vorhergehenden Anspruch, der weiter eine Ausrichtung anzeigende Einrichtung (42) zur Unterstützung beim Ausrichten der Knie des Läufers/Fahrers vertikal zu seinem jeweiligen Fuß umfasst.

11. Simulator (100) nach Anspruch 10, bei dem die Ausrichtung anzeigende Einrichtung (42) eine an jeder Fußbindung (2a, 2b) befestigte Knieaufnahmeschale (68) umfasst, wobei die Position der Knieaufnahmeschale (68) zum Ausrichten auf die Knie verschiedener Benutzer einstellbar ist, und die Schale (68) in einer Ebene einstellbar ist, die orthogonal zu einer Fußabstützfläche der Bindung (60) verläuft und auf die Mitte des Fußes des Läufers/Fahrers ausgerichtet ist.

12. Simulator (100) nach Anspruch 10 oder Anspruch 11, bei der die Ausrichtung anzeigende Einrichtung (42) eine Stangenbaugruppe (67) befestigt an der Bindung (2a, 2b) umfasst, die sich allgemein senkrecht zu einer Bodentläche der Bindungen (2a, 2b) oder Plattform (5) erstreckt und teleskopieren kann, um vertikal auf die Knie von Benutzers unterschiedlicher Größe ausgerichtet zu werden.

13. Simulator (100) nach einem vorhergehenden Anspruch, bei dem jede Fußbindung (2a, 2b) an der schwenkbaren Lagerbaugruppe (34) für relative Rotation um jeweilige Mittelachsen (B, C) angebracht ist, die sich im Wesentlichen mit der ersten Simulatorachse (A) kreuzen und orthogonal zu dieser erstrecken, um den Winkel zwischen der Mittellinie des Fußes und der ersten Simulatorachse (A) einzustellen.

14. Simulator (100) nach einem vorhergehenden Anspruch, der weiter einen Fahrersitz (31) umfasst.

15. Simulator (100) nach Anspruch 14, der weiter einen Sitz (32) einer Bedienungsperson umfasst, wobei der Fahrersitz (31) und der Sitz (32) der Bedienungsperson auf gegenüberliegenden Seiten der schwenkbaren Lagerbaugruppe (34) angebracht sind.

16. Verfahren zum Bestimmen der Fußstellung eines Läufers/Fahrers für Boardsportarten, das Folgendes umfasst: Bereitstellen eines Simulators (100) nach einem der Ansprüche 1 bis 15; Befestigen beider Füße des Läufers/Fahrers in den Fußbindungen (2a, 2b) in einer Anfangsstellung dicht beieinander; Anpassen des Abstands zwischen den Fußbindungen (2a, 2b), um die Fußstellung des Läufers/Fahrers zu erweitern, während der Läufer/Fahrer versucht, um die erste Simulatorachse (A) zu balancieren, und Messen des Abstands zwischen den Fußbindungen (2a, 2b).

17. Verfahren nach Anspruch 16, bei dem der Simulator (100) weiter eine Ausrichtung anzeigende Einrichtung (42) zur Unterstützung beim Ausrichten der Knie des Läufers/Fahrers vertikal zu seinem jeweiligen Fuß umfasst, wobei das Verfahren vor Schritt d) den folgenden weiteren Schritt umfasst: Verwenden der Ausrichtung anzeigenden Einrichtung (42) zum Ausrichten der Knie des Läufers/Fahrers vertikal zu seinen Füßen,

18. Verfahren nach Anspruch 16, bei dem jede Fußbindung (2a, 2b) an der schwenkbaren Lagerbaugruppe (34) zur relativen Rotation um jeweiligen Mittelachsen (B, C) angebracht ist, die sich im Wesentlichen mit der ersten Simulatorachse (A) kreuzen und orthogonal zu derselben erstrecken, wobei das Verfahren Folgendes umfasst: Rotieren jeder Bindung (2a, 2b) um ihre jeweilige Mittelachse (B, C), um den Winkel zwischen der Mittellinie des Fußes (D) und der ersten Simulatorachse (A) einzustellen, und Messen des Winkels zwischen der Mittellinie des Fußes (D) und der ersten Simulatorachse (A).

Revendications

1. Simulateur (100) pour sports de planche, comprenant :

une paire de fixations à pieds (2a, 2b) pour maintenir les pieds du planchiste ;
caractérisé en ce que le simulateur (100) comprend également un ensemble support pivotant (34) pour faire pivoter les deux fixations à pieds (2a, 2b) ensemble autour d'un premier axe simulateur primaire (A), pour simuler le mouvement de roulis de bord à bord d'une planche (5) autour de l'axe longitudinal ou de roulis de la

planche (A),
l'ensemble support pivotant (34) comportant une base montée sur le sol (38) connectée de manière pivotante, le long dudit axe longitudinal (A), à un organe pivotant (39), auquel au moins une des fixations à pieds (2a, 2b) est attachée pour lui faire faire des mouvements la rapprochant et l'éloignant de l'autre fixation à pieds (2a, 2b), et
un moyen de réglage (50) connecté fonctionnellement à ladite au moins une des fixations à pieds (2a, 2b) pour éloigner et rapprocher ladite au moins une des fixations à pieds (2a, 2b) de l'autre des fixations à pieds (2a, 2b) pour régler de manière fixe l'écartement entre la paire de fixations à pieds (2a, 2b) pendant que les pieds du planchiste y sont maintenus.

2. Simulateur (100) conforme à la revendication 1, où ladite au moins une des fixations à pieds (2a, 2b) ou les deux fixations à pieds (2a, 2b) sont montées pour faire un mouvement de glissement dans une directement sensiblement parallèle au premier axe du simulateur (A).

3. Simulateur (100) conforme à la revendication 1 ou la revendication 2, où l'ensemble support pivotant (34) comprend une plateforme (5) sur laquelle sont fixées les fixations à pieds (2a, 2b), la plateforme (5) pivotant autour du premier axe du simulateur (A) et simulant une planche à neige.

4. Simulateur (100) conforme à une quelconque des revendications précédentes, où le premier axe simulateur (A) est en dessous des fixations à pieds (2a, 2b).

5. Simulateur (100) conforme à une quelconque des revendications précédentes, où l'ensemble support pivotant (34) comprend au moins un pivot élastique (3a, 3b) connectant la base montée sur le sol (38) et l'organe pivotant (39) pour assurer le mouvement pivotant autour de l'axe simulateur (A) tout en orientant une surface de support de pied (60) de chaque fixation à pieds (2a, 2b) vers le plan horizontal.

6. Simulateur (100) conforme à la revendication 5, où l'ensemble support pivotant (34) comprend deux pivots en élastomère (3a, 3b), dont au moins un est monté pour faire un mouvement de glissement parallèle au premier axe simulateur (A) pour assurer un mouvement entre une position largement écartée donnant un mouvement de roulis substantiel aux fixations à chaussures (2a, 2b) autour du premier axe (A), et une quelconque de positions plus rapprochées configurées pour fournir un degré supérieur de pivotement des fixations (2a, 2b) autour des axes de tangage et lacet mutuellement orthogonaux, dont tous deux sont perpendiculaires au premier axe simulateur (A).

7. Simulateur (100) conforme à une quelconque des revendications précédentes, où un moyen de réglage des fixations (2a, 2b) comprend un mécanisme de réglage de type à vis (50) connecté à au moins une fixation à pieds (2a, 2b) pour faire glisser au moins une fixation à pieds (2a, 2b) en la rapprochant ou l'éloignant de l'autre des fixations à pieds (2a, 2b) afin de régler l'écartement entre celles-ci pendant que les pieds du planchiste sont maintenus par les fixations à pieds (2a, 2b).

8. Simulateur (100) conforme à la revendication 7, oit les deux fixations (2a, 2b) sont montées de manière à pouvoir faire un mouvement de glissement linéaire et où le mécanisme de réglage (50) comprend : une barre de réglage filetée (56) munie d'une poignée (40) ; un bloc fileté (53) reçu sur la barre de réglage (56) ; des blocs coulissants (51a, 51b) connectés aux fixations (2a, 2b), et un bras (52a, 52b) connecté pivotant à chaque bloc coulissant (51a, 51b) et au bloc fileté (53).

9. Simulateur (100) conforme à une quelconque des revendications précédentes, comprenant de plus un moyen de mesurer l'écartement entre les fixations à pieds (2a, 2b).

10. Simulateur (100) conforme à une quelconque des revendications précédentes, comprenant de plus un dispositif indicateur d'alignement (42) pour aider à aligner les genoux du planchiste à la verticale du pied correspondant.

11. Simulateur (100) conforme à la revendication 10, où le dispositif indicateur d'alignement (42) comprend une coupelle pour recevoir le genou (68) fixée à chaque fixation à pieds (2a, 2b), la position de la coupelle à genou (68) étant réglable pour s'aligner avec les genoux de différents utilisateurs, la coupelle (68) étant réglable dans un plan formant un angle droit avec une surface de soutien du pied de la fixation (60) et alignée avec le centre du pied du planchiste.

12. Simulateur (100) conforme à la revendication 10 ou la revendication 11, où le dispositif indicateur d'alignement (42) comprend un ensemble à barre (67) fixé à la fixation (2a, 2b), s'étendant globalement perpendiculairement à une base de la fixation (2a, 2b) ou à la plateforme (5) et apte à se télescoper pour s'aligner verticalement avec les genoux d'utilisateurs de tailles différentes.

13. Simulateur (100) conforme à une quelconque des revendications précédentes, où chaque fixation à pieds (2a, 2b) est montée sur l'ensemble support

pivotant (34) pour faire une rotation relative autour d'axes centraux respectifs (B, C) sensiblement en intersection avec et en prolongement orthogonal du premier axe simulateur (A) pour régler l'angle entre la ligne médiane du pied et le premier axe simulateur (A).

14. Simulateur (100) conforme à une quelconque des revendications précédentes, comportant de plus un siège (31) pour le planchiste.

15. Simulateur (100) conforme à la revendication 14, comportant de plus un siège (32) pour l'opérateur, le siège (31) du planchiste et le siège (32) de l'opérateur étant fixés sur des côtés opposés de l'ensemble support pivotant (34).

16. Procédé pour déterminer la position des pieds d'un pratiquant de sports de planche, comprenant : fournir un simulateur (100) conforme à une quelconque des revendications 1 à 15 ; fixer les deux pieds du planchiste dans les fixations à pieds (2a, 2b) selon un écartement étroit pour commencer ; régler l'écartement entre les fixations à pieds (2a, 2b) pour augmenter l'écartement des pieds pendant que le planchiste tente de garder l'équilibre autour du premier axe simulateur (A), et mesurer l'écartement entre les fixations à pieds (2a, 2b).

17. Procédé conforme à la revendication 16, où le simulateur (100) comporte en outre un dispositif indicateur d'alignement (42) pour aider à aligner les genoux du planchiste verticalement par rapport au pied correspondant, le procédé comprenant, avant l'étape d), l'étape supplémentaire consistant à utiliser le dispositif indicateur d'alignement (42) pour aligner les genoux du planchiste verticalement par rapport à ses pieds.

18. Procédé conforme à la revendication 16, où chaque fixation à pieds (2a, 2b) est montée sur l'ensemble support pivotant (34) de manière à pivoter relativement autour des axes centraux correspondants (B, C) sensiblement en intersection avec et en prolongement orthogonal du premier axe simulateur (A), le procédé comprenant : faire pivoter chaque fixation (2a, 2b) autour de son axe central respectif (B, C) pour régler l'angle entre la ligne médiane du pied (D) et le premier axe simulateur (A), et mesurer l'angle entre la ligne médiane du pied (D) et le premier axe simulateur (A).

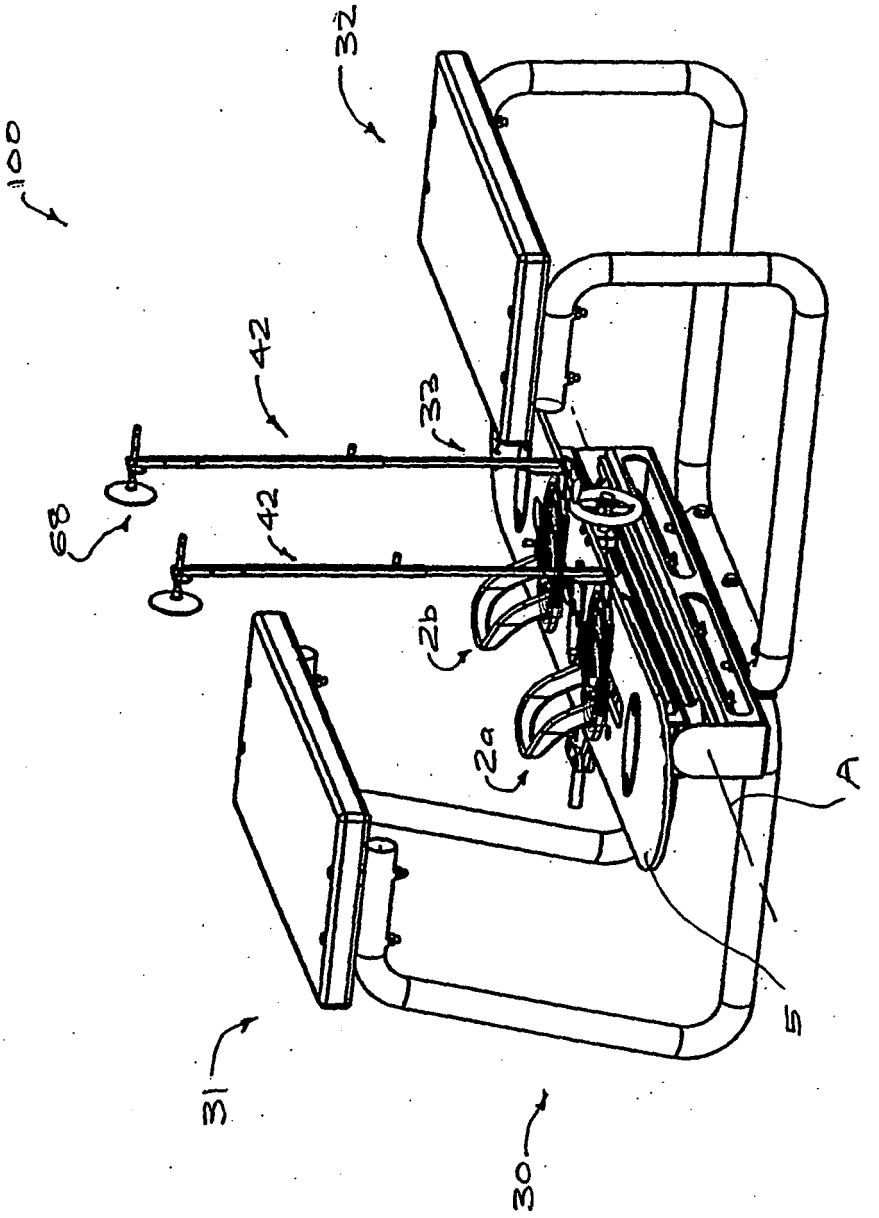

FIG. 1

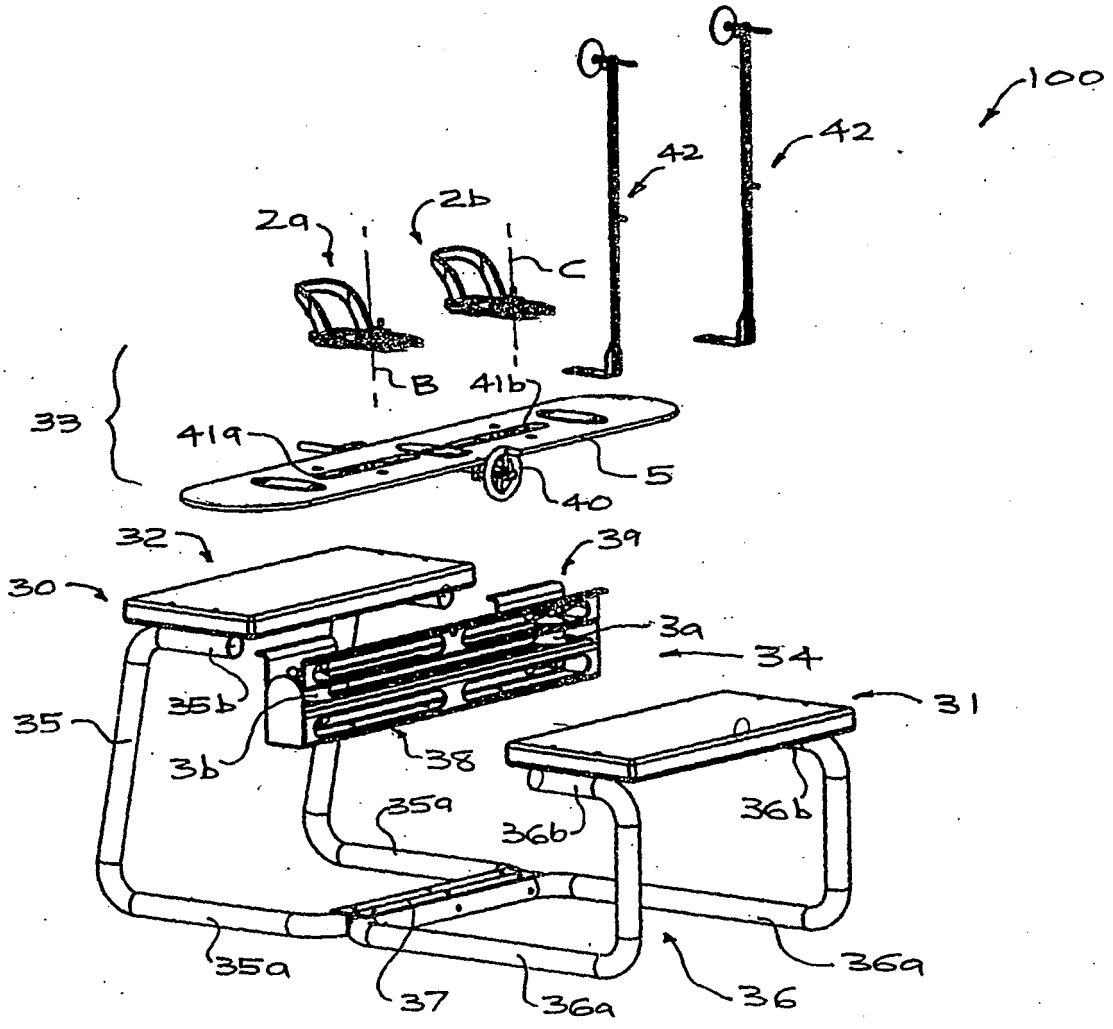
100
42
42
2a
2b
C
B
41b
33
41a
5
40
32
39
30
3a
34
35b
31
35
3b
38
35a
36b
36b
37
36a
36
36a

FIG.2

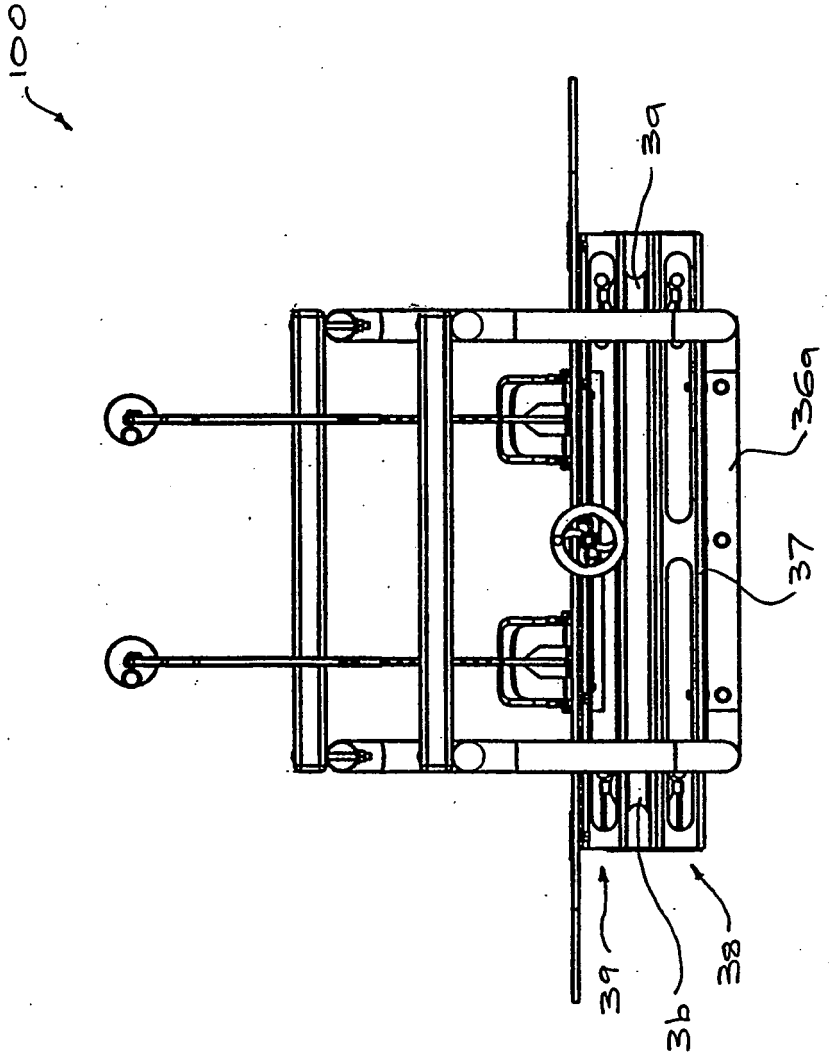

FIG. 3

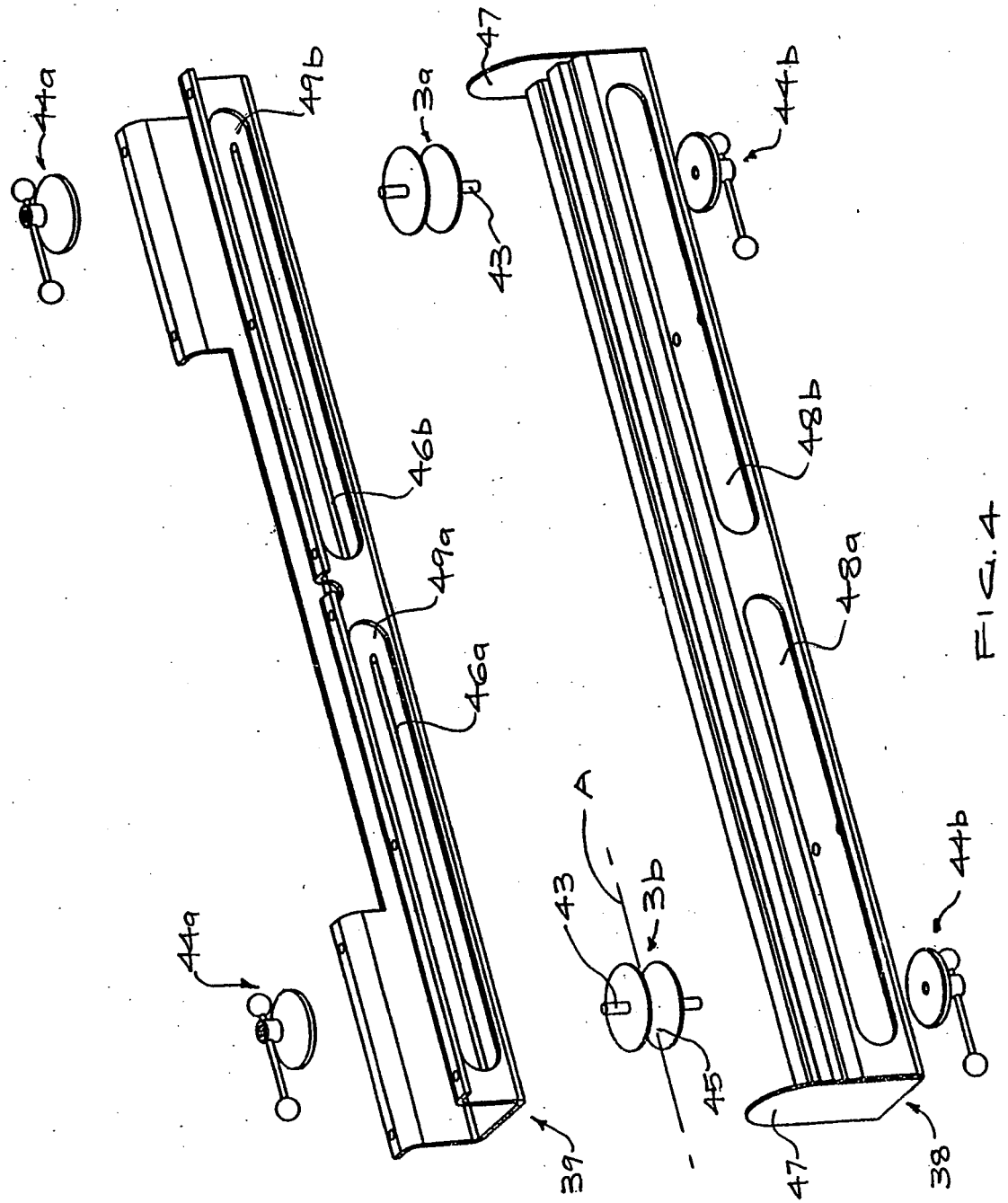

FIG. 4

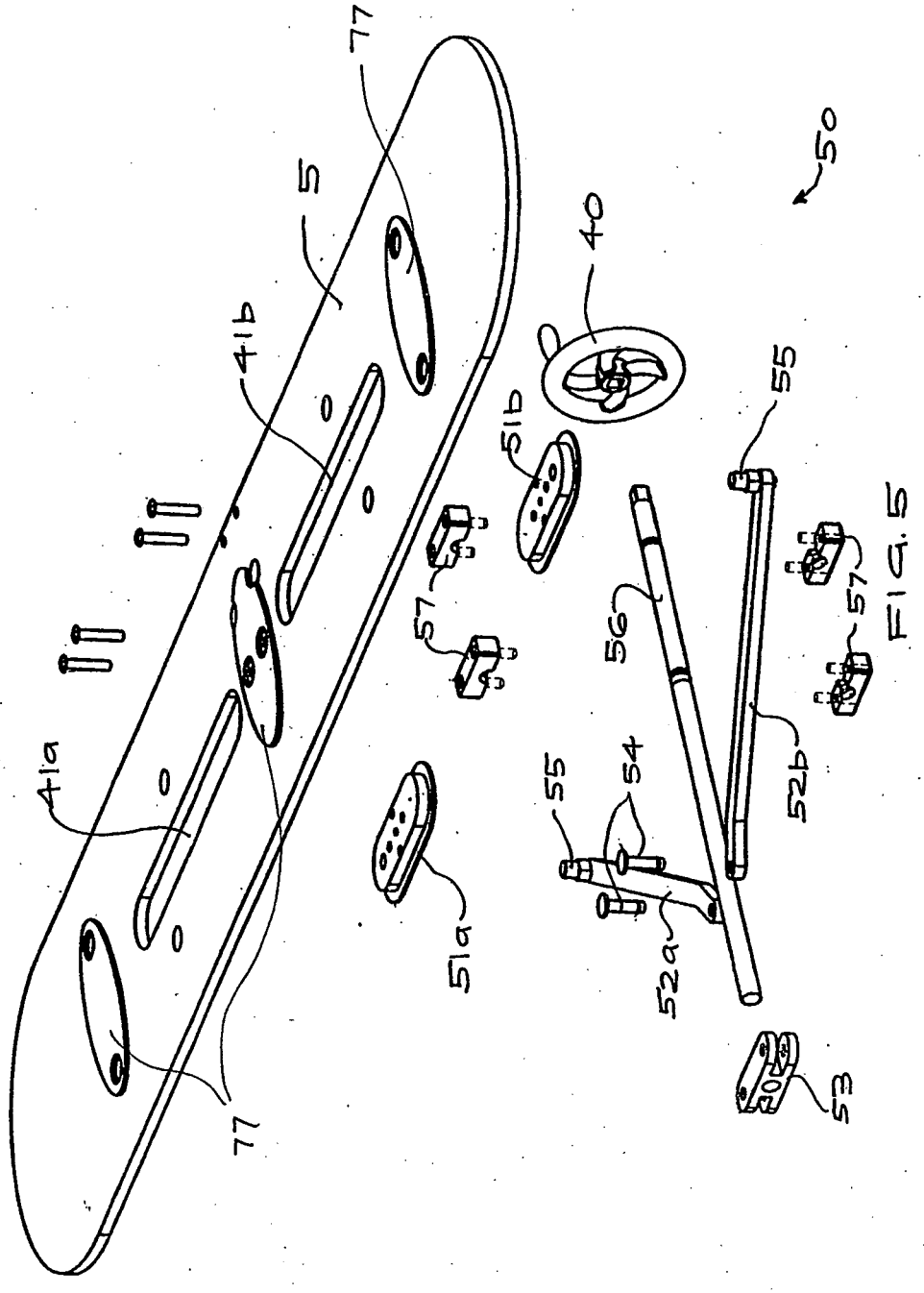

FIG.5

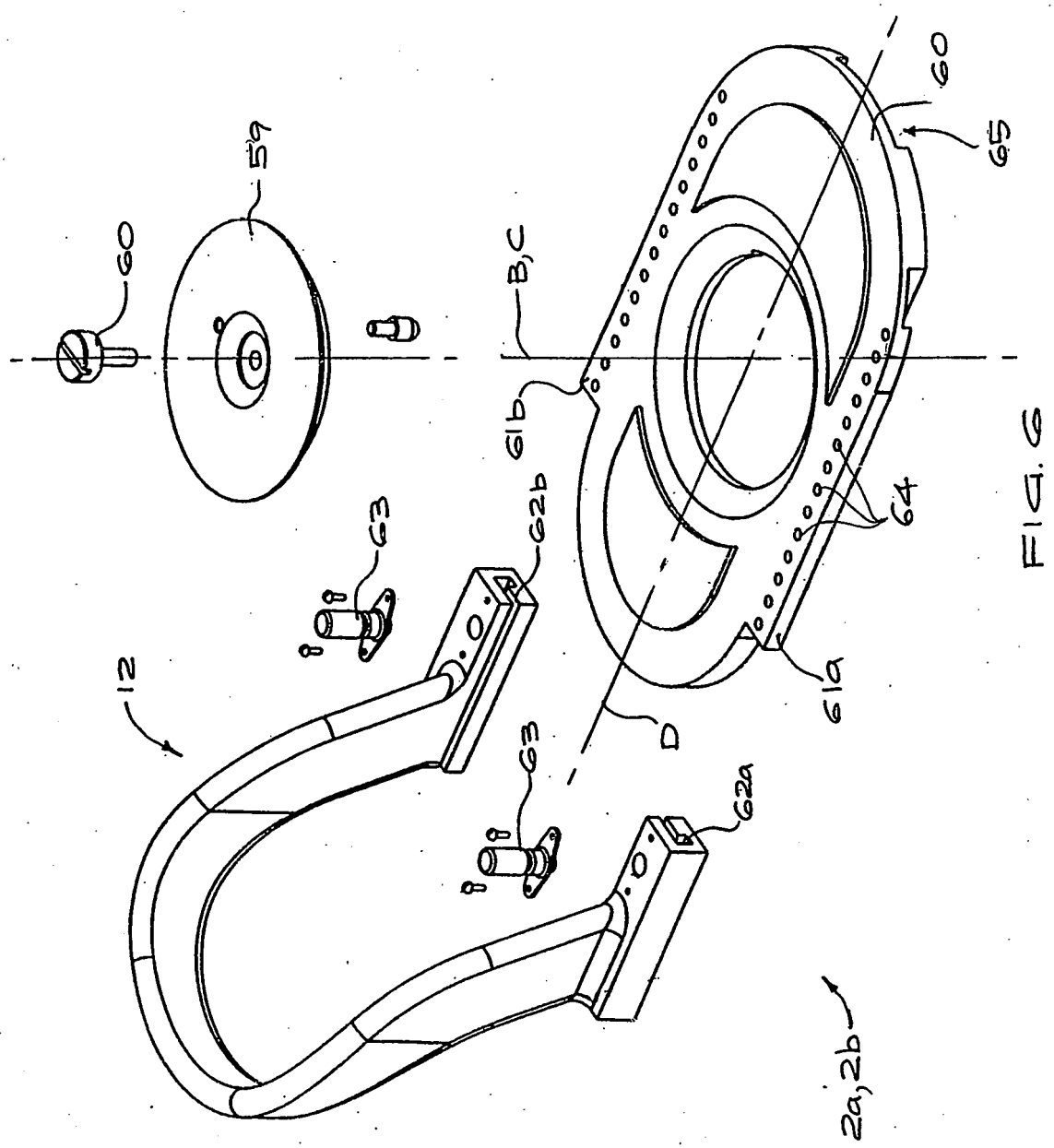

FIG 6

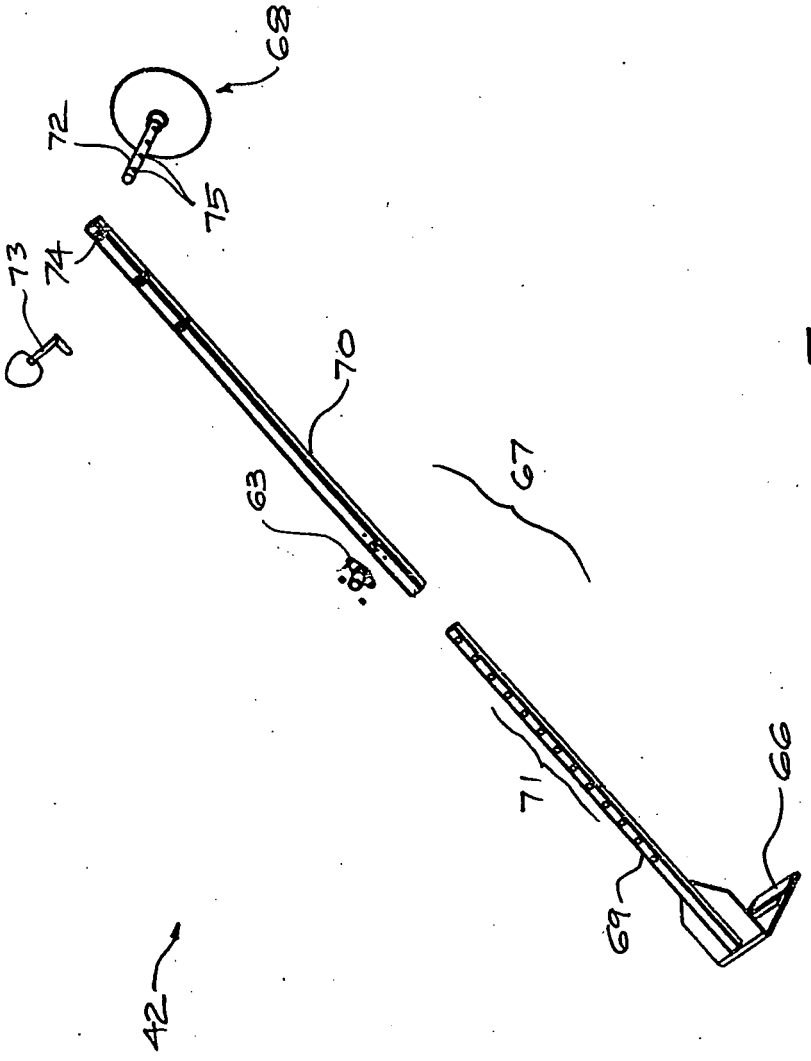

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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