SIDE TO SIDE MACHINE

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ABSTRACT

A side to side machine provides training for muscles and body structures using lateral motion. The side to side machine may comprise one or more inclined platforms which each support a step. The steps may be connected to synchronize their movement. The user may lower a first step to raise the other step. The user may then lower the raised step to raise the first step. This may be repeated to complete a user's training. The incline of the platforms may be adjusted as the user is training to strengthen and tone various of the user's leg and other muscles. In addition, the resistance to moving the steps may be adjusted as desired. A control system may be included to control the incline of the platforms and other operations of the side to side machine.
SIDE TO SIDE MACHINE

[0001] This application claims the benefit of U.S. Provisional Application No. 61/374,790 filed on Aug. 18, 2010.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to athletic training equipment and machines, particularly to a side to side machine and method therefor.

[0004] 2. Related Art

[0005] In sports, the ability to move quickly and athletically is highly valued. This ability allows competitors to score and defend their respective goals efficiently and effectively. The ability to move in any direction faster than an opponent provides a great advantage.

[0006] Traditionally, training has focused on increasing the speed and strength available to move an athlete forward. However, as is known, an opponent and the ball may move in any direction and the athlete must be ready to handle such an occurrence the moment it occurs.

[0007] Moving in a direction other than forward utilizes distinct muscle movements and body movements. Traditional training apparatus and methods may be used to increase the speed and agility of these forward movements. Other apparatus typically have a broad training focus which does not provide the desired results for lateral movement even with substantial training. In addition, given the broad focus, the risk of injury may be higher than necessary for particular exercises.

[0008] From the discussion that follows, it will become apparent that the present invention addresses the deficiencies associated with the prior art while providing numerous additional advantages and benefits not contemplated or possible with prior art constructions.

PATENT SUMMARY OF THE INVENTION

[0009] A side to side machine is disclosed herein. The side to side machine provides highly effective training for the muscles and body structures used in making lateral motions. Such motions are highly beneficial in athletic activities. The training provided by the side to side motion increases the speed and strength with which lateral motions may be made. In addition, the side to side machine guides a user's movements during training to increase safety and reduce the risk of injury. The side to side machine may also vary the particular motions made by the user during training by adjusting an incline of the machine's platforms. This helps ensure various muscles and body structures undergo strengthening and toning when training.

[0010] The side to side machine may have a variety of configurations. For example, in one embodiment, the side to side machine may comprise two platforms having a proximal end and a distal end in relation to a pivot at the proximal end of the two platforms. The pivot may be connected to the two platforms to allow the two platforms to rotate relative to one another. An elevator may be attached to the pivot, and be configured to raise and lower the pivot to incline the two platforms varying amounts. A step may be mounted to each of the two platforms and configured to move or slide between the proximal end and the distal end of each of the two platforms. A connecting member may extend between the two steps. The connecting member such as a cable may pull one of the two steps upward when the other of the two steps is lowered.

[0011] Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the figures, like reference numerals designate corresponding parts throughout the different views.

[0013] FIG. 1A is a front view of an exemplary side to side machine;

[0014] FIG. 1B is a perspective view of an exemplary side to side machine;

[0015] FIGS. 2A-2B are front views illustrating an exemplary elevator of a side to side machine in operation;

[0016] FIGS. 3A-3B are front views illustrating an exemplary elevator of a side to side machine in operation;

[0017] FIGS. 4A-4B are front views illustrating an exemplary track of a side to side machine in operation;

[0018] FIGS. 5A-5C are front views illustrating exemplary steps of a side to side machine in operation;

[0019] FIG. 6 is a perspective view illustrating an exemplary pulley of a connecting member of a side to side machine;

[0020] FIG. 7 is a block diagram illustrating an exemplary control system of a side to side machine; and

[0021] FIGS. 8A-8E are front views illustrating a user performing exemplary side to side training on a side to side machine.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] In the following description, numerous specific details are set forth in order to provide a more thorough description of the present invention. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without these specific details. In other instances, well-known features have not been described in detail so as not to obscure the invention.

[0023] In general, the side to side machine provides focused training to increase a user's speed, strength, and agility when making lateral movements. For instance, a user may train his or her leg muscles as well as core muscles to improve his or her lateral movement and control.

[0024] Such improvement is highly advantageous in athletic activities. For example, many sports require speed and agility in a forward direction, but also in a lateral direction such as when going on the offensive or when defending a goal or point. This is generally because a player must match the somewhat unpredictable movement of a hall or other players participating in the activity. For instance, a player may desire to suddenly stop, change direction, or start moving in a particular direction. Tennis is a prime example of a sport requiring such lateral or side to side motion. As will become apparent from the discussion below, the training provided by the
side to side machine builds the muscle and body structures needed to make such movements with increased speed, strength, and agility.

[0025] The side to side machine will now be described with regard to FIGS. 1A-1B. FIG. 1A illustrates a front view of the side to side machine, while FIG. 1B illustrates a perspective view of the side to side machine. In one or more embodiments, the side to side machine may comprise a first platform 104A and a second platform 104B. The platforms 104A, 104B may provide a structure which supports a step 112 that may move along the length of the platforms. FIG. 1B provides a view of the first platform 104A that illustrates this support. As can be seen, the platform 104A may comprise a frame to which various elements of the platform are mounted. To support a step 112A that may move or slide along the length of the platform 104A, the platform may include one or more tracks, rails, guides, or the like. For example, the step 112A may have one or more wheels or bearings that engage the platform 104A and allow the step to move along the length of the platform. It is contemplated that the coupling between the wheels and track (or similar) may prevent the step 112A from moving in other than a linear direction.

[0026] It is contemplated that various other structures or devices may be used to support the step 112A on the platform 104A in a movable or slidable fashion. For example, step 112A or platform 104A may comprise mating channels and protrusions. The channels or protrusions may run along the length of the platform 104A to cause the step 112A to guide the movement of the step such that it is along the length of the platform. The surfaces of the step 112A and/or platform 104A may be made from or coated with a friction reducing material so as to allow the step to move freely. Examples include nylon, graphite, petroleum, or synthetic lubricants or surfaces.

[0027] As can be seen from the embodiment of FIG. 1B, the platform 104A may comprise one or more rails 148 upon which the step 112A may move. The rails 148 may be aligned along an axis of the platform 104A. In this manner, the step 112A may move along the length of the platform 104A guided by the rails 148.

[0028] The rails 148 may have various configurations. In one or more embodiments, the rails 148 may have an elongated structure so as to span from one side or section of the frame 104A to another. The rails 148 may have various cross-sectional shapes. For instance, in FIG. 1B, the rails have a circular cross-section. It is contemplated that various other shapes may be used. For example, the rails 148 may have a rectangular, square, polygonal, or curved shape, or a combination thereof. It is noted that some shapes, such as rectangular, polygonal, or square shapes, may prevent the step 112A from rotating around a rail 148 because they are non-circular.

[0029] The platforms 104A, 104B of a side to side machine may be similarly or identically configured in one or more embodiments. However, it is contemplated that the platforms 104A, 104B may be distinctly configured in some embodiments. For example, in one embodiment, the platforms 104A, 104B may comprise different frames and/or distinct sliding mounts.

[0030] Though the side to side machine will typically have multiple platforms, it is contemplated that in some embodiments, the side to side machine may have only one platform 104A. Though a user may only train one side of his or her body at a time, the single platform 104A may reduce material utilization, space requirements, and cost. The user may rotate his or her body to train both sides of the body.

[0031] In one or more embodiments, the platforms 104A, 104B may be elevated such as to form an incline. Typically, the platforms 104A, 104B will be inclined such that they form a peak, such as shown in FIGS. 1A-1B. The steps 112A, 112B may move or slide along the incline provided by the platforms 104A, 104B to produce the beneficial side to side training. The platforms 104A, 104B may be inclined by an elevating assembly that may be configured in a variety of ways. For example, in one embodiment the elevating assembly may comprise a support member or other structure that elevates a proximal end of the platforms 104A, 104B to create the incline described herein.

[0032] As will be described further below, the elevator 120 may raise and lower an end of each platform 104A, 104B to produce the desired incline. Typically, the elevator 120 may raise the proximal end of each platform 104A, 104B (though it is contemplated that one or more elevators may be at the distal end of a platform in some embodiments). The elevator 120 may adjust the incline for multiple platforms 104A, 104B simultaneously. For example, the elevator 120 may be connected to the ends of multiple platforms 104A, 104B to raise and lower the platforms simultaneously. It is contemplated that the platforms 104A, 104B may each have their own elevator 120 in some embodiments, and that individual platforms may be raised and lowered independent of other platforms. The platforms 104A, 104B may have rollers 144 in some embodiments, to reduce friction between the other end of the platforms and the floor or a base plate (not shown) when the incline of the platforms is changed.

[0033] It is noted that the side to side machine may have a base 128 that stabilizes or plants the side to side machine to the floor. The base 128 may be secured to the floor by one or more fasteners in some embodiments. Alternatively in addition, the base 128 may have a size and/or weight which holds the side to side machine in position before, during, or after the platforms 104A, 104B have moved. This is beneficial since the distal ends of the platforms 104A, 104B are configured to be movable, and may even include rollers 144 in some embodiments.

[0034] Various elements of the side to side machine may be attached to the base 128, such as to securely fasten or attach these elements to the side to side machine. For example, the elevator 120 may be attached to the base, such as shown. In this manner, the base 128 holds the side to side machine in position at least in part through the connection with the elevator 120. It is noted that the pivot 108 may be attached to the base 128 as well, such as by one or more support members or structures. The support members or structures may articulate, extend, and/or contract to maintain a connection with the pivot 108 as the pivot 108 may be moved to adjust the incline of the platforms 104A, 104B. The hand holds 140, support
riser, or other user stabilizing structure may also or alternatively be attached to the base 128.

[0037] Platforms 104A, 104B may be connected by a pivoting joint in one or more embodiments. For example, as shown, the platforms 104A, 104B are connected by a pivot 108. This allows each platform 104A, 104B to rotate relative to the other platform and permits the incline to be adjusted. It is contemplated that the elevator 120 may be connected to the pivot 108. In this manner, the incline may be adjusted by the elevator 120 raising or lowering the pivot 108. The elevator 120 may support the pivot 108, which in turn supports the platforms 104A, 104B, in such embodiments.

[0038] The platforms 104A, 104B may also be connected with one or more resilient members 124, such as a spring, elastic band, or the like. In general, the resilient members 124 are configured to pull the platforms 104A, 104B together. In this manner, they assist the elevator 120 when the elevator is increasing the incline of the platforms 104A, 104B. The resilient members 124 may extend between the platforms 104A, 104B, or may extend from a platform to another portion of the side to side machine. For instance, as shown, the resilient members 124 extend from the platforms 104A, 104B to the elevator 120. In this manner, the resilient members help stabilize or secure the elevator 120 relative to the platforms 104A, 104B.

[0039] The side to side machine may, but need not, also include user engageable features. For example, the side to side machine may comprise one or more elements that help stabilize a user. FIGS. 1A-13 illustrate an example of such elements. As shown, the side to side machine may include one or more hand holds 140. The user may grasp the hand holds 140 to stabilize him or herself during training. The hand holds 140 may be mounted to a support in one or more embodiments. The support may position the hand holds 140 at a location that is convenient for the user to grasp the hand holds. For instance, as shown, the hand holds 140 are positioned near waist height. The support may have various configurations that position the hand holds 140 where they may be grasped during training. As shown, the support comprises an upward extending member 132 or riser and a horizontal extension 136. The upward extending member 132 raises the position of the hand holds 140 while the horizontal extension positions the hand holds 140 at the sides of the user. It is noted that the hand holds 140 may be adjustable in both a horizontal and vertical direction in some embodiments.

[0040] It is contemplated that the user may lean against a portion of the support in addition to or instead of grasping the hand holds 140. As such, in some embodiments, hand holds 140 need not be included. It is also contemplated that the support and/or hand holds 140 may be at the front or back of the side to side machine. In this manner, the user may grasp the hand holds 140 or be supported at the front or back of the machine.

[0041] The side to side machine may comprise one or more interactive elements as well. For example, one or more inputs and an associated control system may be provided to allow the user to control features or the operation of the side to side machine. In addition, the side to side machine may have one or more audio or visual outputs to present information to a user. For example, information regarding the operation or configuration of the side to side machine may be presented via an audible or visual output. Though shown at a particular location, it is noted that the control system, inputs, and outputs may be at various locations. Typically, the inputs and outputs will be positioned so as to be conveniently accessed and viewed by the user during training, such as shown in FIGS. 1A-1B.

[0042] The elevating assembly of the side to side machine will now be further described with regard to FIGS. 2A-2B. As stated, the elevating assembly may comprise an elevator 120 used to adjust the incline of the platforms 104A, 104B. It is noted that various devices capable of raising and lowering an end of the platforms 104A, 104B may be used as an elevator 120. It is contemplated that the elevator 120 may have sufficient capacity to raise and lower the end of the platforms 104A, 104B and the user’s weight. In this manner, the incline may be adjusted while the user is on or using the side to side machine.

[0043] An exemplary elevator 120 is shown in operation in FIGS. 2A-2B. In FIG. 2A, the elevator 120 is at a lowered position while in FIG. 2B, the elevator 120 is in a raised position. As can be seen, the raised position creates a steeper incline at the platforms 104A, 104B. The elevator 120 may comprise one or more arms 204 that may bend when adjusting the incline. For instance, it can be seen from the figures that the arms 204 extend to raise the platforms 104A, 104B and flex or bend to lower the platforms. The arms 204 may comprise a hinge or pivoting joint 208 to permit such extension and flexing.

[0044] As can be seen from FIGS. 2A-2B, the pivoting joints 208, if moved closer together, cause the arms 204 to extend thus raising the platforms 104A, 104B. When the pivoting joints 208 are moved apart, the arms 204 flex thus lowering the platforms 104A, 104B. It is contemplated that a variety of devices may be used to move the joints 208 towards or away from one another. In addition or alternatively, the force of gravity may be harnessed to move the joints 208 apart. For instance, it can be seen that a downward force (such as the weight of the platforms 104A, 104B and/or a user) may press down on the arms 204 causing them to flex thus lowering the platforms.

[0045] In one embodiment, a clamp may move the joints 208 of the arms 204. For example, closing the articulating “jaws” or articulating portions of a clamp around the joints 208 may move the joints closer together. The clamp may be closed until the desired incline is achieved. The clamp may then be left in this position to secure the platforms 104A, 104B in position thus keeping the platforms 104A, 104B in position as well. Opening the clamp allows the joints 208 to move away from one another thus allowing the arms to flex and the incline to be decreased (i.e., the platforms 104A, 104B to be lowered).

[0046] The clamp may have various configurations. For example, rather than pressing in on the joints 208 to move the joints closer together, the clamp may pull in the joints closer together, such as by connecting the articulating jaws or portions of the clamp to an inside portion of the joints 208 (i.e., the side of the joints that face each other).

[0047] In one embodiment, the articulating portions may be at the joints 208. To illustrate, in FIGS. 2A-2B, a threaded member or rod 212 spans the distance between the joints 208. The arms 204 may each have a threaded opening so that the arms may accept the threaded rod 212. In this manner, turning the threaded rod 212 causes the arms to extend as the threaded openings of the arms 204 move along the length of the threaded rod as the rod is rotated. Turning in a first direction may cause the arms 204 to retract while turning in a second
direction may cause the arms to extend. Each of the arms 204 may have threaded openings that comprise threads going in opposite directions to accomplish this. Alternatively, one side of the threaded rod 212 may have threads in a first direction, while the other side has threads in an opposite direction.

[0048] It is contemplated that the threaded opening of each arm 204 may be at the joints 208 so as to secure the threaded rod 212 between the joints such as shown in FIGS. 2A-2B. Alternatively, the threaded opening may be at another location of each arm 204. In addition, in some embodiments, each arm 204 may have multiple threaded openings so that multiple threaded rods 212 (or clamps) may be secured to the arms. This spreads the amount of force that each threaded rod 212 must provide to extend, hold, and flex the arms 204.

[0049] An elevator 120 may be powered by hand or manually in some embodiments. For example, a clamp or portion thereof may be turned by a crank or the like to move its articulating portions to flex or extend the arms 204. It is contemplated that the movement of the steps 112A, 112B may power the elevator 120 of some configurations. For example, moving a step 112A, 112B may rotate a gear or the like which in turn raises or lowers the elevator 120 and/or platforms 104A, 104B. Alternatively, moving a step 112A, 112B may turn an electrical generator that powers the elevator 120.

[0050] Typically however, the elevator 120 will be motorized. In such embodiments, an electrical or other motor 116 may be used to raise or lower the platforms 104A, 104B. For example, a motor 116 may be coupled to a clamp to power the clamp’s articulating portions to extend the arms 204. The motor 116 may be stopped when the desired extension is achieved. When stopped, the motor 116 may hold the arms 204 in their current position, thus securing the platforms 104A, 104B at their current incline. The motor may also power the articulating portions in an opposite direction to flex the arms 204 or to allow gravity to flex the arms.

[0051] In one embodiment, the motor 116 may be coupled to and turn a threaded rod 212 to extend and contract the arms. For example, the motor 116 may turn the threaded rod 212 in one direction to extend the arms and turn the thread rod 212 in the opposite direction to flex the arms. This in turn adjusts the incline of the platforms 104A, 104B. Once the desired incline is reached, the motor 116 may be stopped. As stated above, once stopped, the arms 204 may be held in position thus securing the platforms 104A, 104B at the desired incline. It is noted that the motor 116 may be directly coupled to a clamp or threaded rod 212, or may be coupled via a transmission mechanism, such as one comprising one or more gears, transfer rods, or the like.

[0052] As can be seen, the side to side machine may provide a variety of inclines via its elevator 120. A user may secure the platforms 104A, 104B at a particular incline and utilize the side to side machine in this configuration. The user may also utilize the side to side machine at automatically variable inclines as well. For example, it is contemplated that the elevator 120 may continuously or periodically alter the inclines as the user is training. To illustrate, the elevator 120 may continuously move between a raised and lowered position, such as shown in FIGS. 2B and 2A, respectively. Alternatively, the elevator 120 may move to various positions randomly at periodic or random time intervals. For instance, the elevator may 120 move to a first position and hold the platforms 104A, 104B at that position for a period of time. The elevator 120 may then move to a second position (higher or lower than the first position) and hold that position for a period of time. In the meantime, the user is experiencing varying amounts of incline to vary his or her side to side training.

[0053] It is noted that the user may set the desired minimum and maximum incline if desired, such as by providing input to the control system. Alternatively, the incline may repeatedly change between the minimum and maximum inclines that the side to side machine is capable of. In some embodiments, the control system may provide one or more sets of default minimum and maximum inclines.

[0054] As stated an elevating assembly may comprise various elevators 120. FIGS. 3A-3B illustrate another exemplary elevator 120 comprising an actuator. As can be seen, in an actuator configuration, the elevator 120 may comprise a body 304 and a piston 308 that may extend from and retract into the body. As can also be seen, the elevator 120 may be oriented such that extending the piston 308 raises the platforms 104A, 104B, and retracting the piston lowers the platforms. It is contemplated that a transfer mechanism, such as one or more levers, connecting rods, or the like may connect the piston 308 to the platforms 104A, 104B. In such embodiments, the elevator 120 need not be positioned vertically may be positioned at various angles or other orientations.

[0055] An actuator-type elevator 120 may be powered in various ways. For example, the elevator 120 may be pneumatic, hydraulic, or electrically powered. The elevator 120 may be activated to move its piston 208 to a lowered position such as shown in FIG. 3A, and/or to a raised position such as shown in FIG. 3B. As discussed above, the elevator 120 (in this case the piston 308) may be held or stopped at various positions to provide the desired incline for the platforms 104A, 104B.

[0056] As can be seen from FIGS. 2A-2B and FIGS. 3A-3B, the platforms 104A, 104B comprise rollers 144 that allow the distal ends of the platforms to more easily move along the floor. This reduces the friction between the distal ends of the platforms 104A, 104B and the floor and allows the incline to be adjusted much more easily. The rollers 144 may be wheels or various other spherical or cylindrical structures configured to allow the distal ends of the platforms 104A, 104B to roll along the floor.

[0057] It is contemplated that the side to side machine may have various elements that allow the distal ends of the platforms 104A, 104B to move easily. For example, in addition to or instead of rollers or wheels, the platforms 104A, 104B may have a low friction material at their distal ends so as to allow the distal ends to slide easily along the floor. In addition, in one embodiment, the side to side machine may comprise one or more tracks upon which the platforms 104A, 104B may move.

[0058] FIGS. 4A-4B illustrate an exemplary embodiment utilizing a track 404. As can be seen, the track 404 may span a particular length. The length of the track 404 may define to what extent the incline of the platforms 104A, 104B may be lowered. This is because the distal ends of the platforms 104A, 104B may be configured not to extend beyond the end of the track 404. It is contemplated that track 404 may have one or more stops or blockages which prevent the distal ends from moving too close to one another in some embodiments.

[0059] In general, the track 404 may be configured to engage the distal ends of the platforms 104A, 104B and to provide a structure at which the distal ends may easily move when the incline of the platforms is adjusted. For example, the
track 404 may be a channel, rail or the like which engages one or more roller 144 or the like of the platforms 104A, 104B. The rollers 144 may roll along the track as the incline of the platforms 104A, 104B is adjusted. The distal ends of the platforms 104A, 104B may roll or more along the track towards one another to increase the incline of the platforms, such as shown in FIG. 3B. The distal ends may move away from one another to reduce the incline of the platforms 104A, 104B such as shown in FIG. 3A.

The track 404 may guide the movement of the distal ends, such as by providing a channel or rail for the rollers 144 at the distal ends. In addition, the track 404 protects the floor from wear caused by moving the distal ends of the platforms 104A, 104B. It is contemplated that multiple tracks 404 may be used in some embodiments. For example, a track may be used for each platform 104A, 104B individually such as by extending at one side of the side to side machine. In addition or alternatively, a track may be used for pairs of rollers 144 between platforms 104A, 104B, such as shown in FIGS. 4A-4B.

The elevators 120 described above may be used in embodiments having a track 404. Alternatively or in addition, the track 404 may incorporate an elevating assembly and/or elevator 120. For example, rather than raising and lowering the platforms 104A, 104B at a pivot 108, force may be applied at the distal ends of the platforms to raise and lower the platforms. To illustrate, a roller 144 may be motorized to move the distal end of a platform, or the track 404 itself may be motorized such as with blocks (or other structures) that may engage and move the distal ends of the platforms along the track. It is contemplated that one or more threaded rods may extend between the platforms 104A, 104B and pull or push the platforms closer together or further apart (respectively) via threaded openings in the platforms. The threaded rods may be rotated by a motor to motorize the adjustment of the platforms’ incline. The threaded rods may be within the track 404 in some embodiments. In other embodiments, the threaded rods may be above or outside of the track 404.

Where the track 404 moves the platforms 104A, 104B, it is contemplated that an extending/retracting support may be used to guide the pivot 108 as the incline is adjusted. This helps ensure that the platforms 104A, 104B move upward in a substantially vertical direction without moving laterally. For example, a vertical extending/retracting support may extend from the base 128 to the pivot 108 to help keep the platforms 104A, 104B in alignment as their incline is adjusted.

As stated above, the side to side machine may include steps 112A, 112B which the user may move along the incline of the platforms 104A, 104B to train his or her body. FIGS. 5A-5C illustrate an exemplary configuration of such steps 112A, 112B and their operation. As can be seen, the steps 112A, 112B may extend outward from each platform 104A, 104B to engage a user’s feet. It is contemplated that the steps 112A, 112B may have a textured surface or coating to increase friction/traction between the user’s feet and the steps. This helps ensure the steps 112A, 112B move with the user’s feet and that the user does not slide off a step.

Referring back to FIG. 1B, it can be seen that the steps 112A, 112B may move or slide along one or more rails 148. In addition, the steps 112A, 112B may be connected by a connecting member 152 so as to synchronize the movement of the steps. In FIG. 1B for example, the connecting member 152 may be a flexible member such as a cable, which connects the steps 112A, 112B. In this manner, the movement of a first step 112A outward (towards the distal end of a platform 104A) may pull the second step 112B inward, and vice versa. Because the user need only stand on the steps 112A, 112B, this connection permits the user to raise a step by pressing down or lowering the other step. This allows training to continue in a repeating raise/lower cycle for each of the steps 112A, 112B.

It is contemplated that the steps 112A, 112B may have retention mechanisms to hold a user’s foot, such as one or more foot straps, foot bindings, or the like. In such embodiments, the steps 112A, 112B may raise as the user’s foot moves upward. It is also contemplated that a resilient member, such as a spring or an elastic band, may be attached to the steps 112A, 112B. The resilient member may be configured to provide a force which raises the steps 112A, 112B. For example, the resilient member may be attached between a step 112A and the pivot 108 or a portion of the side to side machine adjacent the pivot. Alternatively or in addition, a spring or other biasing device may push a step 112A upward. For example, one or more springs may be wrapped around one or more rails 148 in some embodiments. To this manner, the springs may push the step 112A upward. In such an embodiment, the steps 112A, 112B raise themselves (via the resilient members/springs) to permit the repeating raising/lowering cycle for training on the side to side machine. The connecting member 152 may not be required in such embodiments and as such may not be provided with the side to side machine.

Referring to FIGS. 5A-5C, it can be seen how the steps 112A, 112B may move in a synchronized fashion when in use. In FIG. 5A, the first step 112A is at a raised position, while the second step 112B is at a lowered position. In FIG. 5B, it can be seen that as the first step 112A is moved or pushed downward, the second step 112B moves upward. This may be caused at least in part by the connecting member 152 pulling the second step 112B upward as the first step 112A is moved. In embodiments without connecting members 152, the second step 112B may move upward as the user shifts his or her weight to the first step 112A to push the first step downward. As the first step 112A reaches the lowered position, the second step 112B moves to the raised position, such as shown in FIG. 5C.

Once in a raised position, the second step 112B may be moved downward. The first step 112B may move upward as the second step 112B moves downward, continuing the raising/lowering cycle of side to side training on the side to side machine. It is contemplated that the user may move the steps 112A, 112B to various extents along the length of the platforms 104A, 104B before the direction of movement of the steps must be reversed. Alternatively, the user may move the steps 112A, 112B to a maximum or minimum extent (i.e., until the steps can no longer move any further) before their direction of movement must be reversed. It is contemplated that the side to side machine may comprise one or more adjustable blocks or pins which allow a user to adjustably set these maximums and minimums. For example, a user may insert a pin, rod, or the like to set a maximum or minimum extent of each step 112A, 112B.

Further details regarding the steps 112A, 112B will now be described with regard to FIG. 5A. As can be seen, a step 112A may be supported in a substantially horizontal orientation by a sliding mount 512. It is contemplated that the orientation of the step 112A need not be horizontal and may
be angled upward or downward such as to provide a different angle for the user’s foot to engage the step. The angle or orientation of the step 112A may be adjustable according to a user’s preferences. For example, angling the distal end of the step 112A upward may increase comfort for some users during training. It is noted that each step 112A, 112B may be angled independently. The sliding mount 512 may include one or more pivots, joints, or the like to allow the step 112A to be angled as desired. Alternatively, the structure of the sliding mount 512 may be configured to provide such angle.

The sliding mount 512 may comprise a sleeve 520 in one or more embodiments. The sleeve 520 may engage a rail 148 of a platform 104A. For instance, the sleeve 520 may surround all or a portion of the rail 148. In this manner, the sleeve 520 and thus the sliding mount 512 may move along the rail 148. Accordingly, the step 112A also moves along the rail 148. The resistance between the sleeve 520 and the rail 148 may be adjusted to make it easier or more difficult to move the step 112A in one or more embodiments. For example, a sleeve 520 having a narrower opening may provide increased resistance.

It is contemplated that various tracks, rails 148, channels, or guides may be used to allow the sliding mount 512 to move along the length of a platform 104A. For instance, rather than a sleeve 520, the sliding mount may comprise one or more rollers or wheels which rollably engage with a track, rail 148, channel, or guide of a platform 104A. The rolling resistance of the rollers or wheels may be adjusted to provide resistance to the movement of a step 112A. It is also contemplated that the tracks, rails, channels, or guides may be connected to the step 112A and that the sleeve 520, roller, or wheel may be provided by the platform 104A in some embodiments.

A step 112A may be attached to the sleeve 520 or the like of the sliding mount 512. Alternatively or in addition, the sliding mount may comprise one or more supports which extend from the sleeve 520 to provide support to the step 112A. These supports may help hold the step 112A in a substantially horizontal orientation or at various angles. As can be seen in FIG. 5A for example, the sleeve 520 has a support extend upward therefrom to support the step 112A in a substantially horizontal orientation. This support may be configured to bend, extend, and/or retract so as to allow the orientation of the step 112A to be changed in some embodiments.

A step 112A may also be configured to extend and retract in one or more embodiments. For example, the step 112A may be mounted to the sliding mount 512 via one or more internal supports 504. The step 112A may be configured to move along the length of the internal supports 504. In this manner, the step 112A may be extended outward or retracted inward about an internal support 504. It is contemplated that the step 112A may be locked in a desired (extended or retracted) position by a pin 508, rod, clip, clamp, screw, or other fastener in one or more embodiments. For example, the internal supports 504 may have one or more openings. The user may lock the step 112A in position by inserting a pin 508 through an opening in the step and into one of the openings of its internal support 504. The pin 508 may be removed to allow the step to be moved again. A handle 516 may be provided to allow a user to easily grasp and extend/retract the step 112A.

The step 112A may have various configurations which allow it to extend and retract about an internal support 504. For instance, the step 112A may comprise one or more cavities which accept an internal support 504. In this manner, the step 112A may “slide” or move along the internal supports 504. It is contemplated that a stop or blockage may be provided to prevent the step 112A from sliding off its internal support(s) 504.

The ability to extend or retract the steps 112A, 112B is beneficial in that it permits user’s to set the distance between the steps as desired. For example, one user may have different distance preferences than another user. In addition, the extension/retraction capability of the steps 112A, 112B allow the side to side machine to accommodate users of various sizes. For example, a larger user may have a wider stance than a smaller user. This is highly beneficial in that it prevents some users from over extending while allowing an increased width to maximize training benefits for other users.

The steps 112A, 112B may move freely in one or more embodiments. In such embodiments, training may be achieved by the user overcoming the force of gravity in moving his or her legs/body to move the steps in a repeating raising/lowering cycle. In other embodiments, such as described above, the movement of the steps 112A, 112B may be resisted. For example, the sliding mount 512 may provide resistance to the movement of the steps 112A, 112B.

In addition or alternatively, it is contemplated that resistance may be provided in other ways. For example, the steps 112A, 112B may be weighted. Typically such weighting will be equal or substantially equal between the steps 112A, 112B. A resistance to the movement of the steps 112A, 112B is provided because some amount of force is required to cause the weights to move when the weights are in a stationary position, such as the moment when the steps 112A, 112B transitions from being raised to being lowered (or vice versa).

Resistance may also be provided by resilient members, such as springs or elastic bands. For instance, as described above, a resilient member may be attached between a step 112A and its associated platform 104A. In this manner, the resilient member may resist movement of the step 112A at least in one direction. For example, a resilient member may be used to resist downward motion of the step 112A.

FIG. 6 illustrates another example for providing resistance to the movement of the steps 112A, 112B. As can be seen, a resistance may be applied to the steps 112A, 112B via a connecting member 152. For instance, the connecting member 152 may be supported by a pulley 604 that rotates on an axle 616. The pulley 604 may be configured to rotate freely, or may be configured to resist rotation. When resisting rotation the pulley 604 provides a resistance to the steps 112A, 112B via the connecting member 152.

For instance, in FIG. 6, the pulley 604 comprises an extension 612 that rotates with the pulley. Friction between the extension 612 and another structure of the side to side machine resists rotation of the pulley 604. For example, as shown, a strap 608 bears against the extension 612 to resist rotation of the pulley 604. It is noted that the amount of force applied by the strap 608 onto the extension 612 may be adjusted to alter the amount of resistance. For example, tightening the strap 608 may increase resistance while loosening the strap decreases resistance. The tension on the strap 608 may be controlled by a user input electronically or mechanically coupled to the strap. For instance, the strap 608 may be connected to a wire, which when pulled, increases tension on the strap. The wire may in turn be connected to a tension adjuster, such as a rotary knob or a ratcheting mechanism which allows a user to easily increase or decrease tension. In
an electronic embodiment, an electronic user input may cause an electrical actuator, motor, or the like to adjust the tension or force.

[0080] Other structures may be on the extension 612 or other portion of the pulley 604 to provide resistance to the rotation of the pulley 604. For instance, one or more brake pads or the like may be in contact with the extension 612 or other portion of the pulley 604. The force applied upon the extension 612 or other portion of the pulley 604 via a brake pad may be increased to increase resistance and decreased to decrease resistance. As with the above, the brake pad may be electronically or mechanically coupled to a user input to adjust the force applied by the brake pad. A magnetic resistance may also be used such as by positioning one or more strong magnets adjacent the pulley 604 or its extension 612. The magnets may be moved towards the pulley 604 to increase resistance and moved away to decrease resistance such as via a user input. It is contemplated that resistance to the pulley's rotation may also or alternatively be achieved by increasing or decreasing friction between the axle 616 and the pulley 604, such as by adjusting the size of the axle relative to the pulley's opening.

[0081] FIG. 7 is a block diagram illustrating an exemplary control system. The control system may be used to adjust resistance of the steps 112A, 112B, the incline of the platforms 104A, 104B, among other things. In addition, the control system may be used to control operation of various aspects of the side to side machine, such as the rate or time at which the incline of the platforms 104A, 104B is adjusted. The control system may also track or record a user's training, achievements, characteristics (e.g., age, sex, fitness level, strength, endurance, etc . . . ), personal settings, goals, or the like.

[0082] The control system may have a variety of configurations. In one embodiment, the control system may comprise a controller 704 that may perform one or more operations to provide the functionality of the control system as described herein. The controller 704 may be a microprocessor, electrical circuit, or the like. In some embodiments, the controller 704 may execute machine readable code fixed on a tangible medium, such as a memory 708. The machine readable code may contain one or more instructions that allow the control system to function as described herein. It is noted that the memory 708 may be read only or read/write memory. In addition, the memory 708 may provide temporary or permanent data storage. Though shown as part of the controller 704, it is contemplated that the memory 708 may be a separate component in some embodiments.

[0083] One or more user inputs 712 may be in communication with the controller 704. For example, the side to side machine may comprise one or more control panels or the like having user inputs 712 such as buttons, touch screens, switches, dials, microphones, and/or cameras. As can be seen, the user inputs 712 allow a user to provide information or input to the control system to operate the side to side machine. For instance one or more user inputs 712 may be used to increase or decrease the incline of the platforms, to program the rate at which the increase or decrease occurs, to set a time between reversing the increase or decrease of the incline, to increase or decrease the resistance in moving the steps, to set the minimum and maximum incline for the platforms, or the like.

[0084] Feedback may be provided to the user via one or more display(s) 716 and/or one or more speaker(s) 720. For instance, an audible or visible indicator may notify the user that his or her input as been received. In addition, such indicators may inform the user of the current state of the side to side machine. For instance, the level of resistance, amount of incline, or the like may be presented via the displays 716 or speakers 720. It is noted that the speakers 720 and displays 716 may be optional in some embodiments. It is contemplated that videos or music may be presented on the speakers 720 and or displays 716 in some embodiments such as to invigorate a user during training.

[0085] The controller 702 may control various motors, actuators, or other motorized elements of the side to side machine via one or more switches 736 or the like. For instance the controller 702 may utilize a power regulator 736 to turn an actuator 728 on or off that controls the resistance to movement of the steps. In addition, the power regulator 736 may be used to turn an elevator 120 on or off to adjust the incline of the platforms. The power regulator 726 may be used to send varying amounts of energy to control the speed at which motorized elements of the side to side machine operate, or to control the force provided by the motorized elements.

[0086] The controller 704 may be configured to send or to cause to be sent different signals to the actuator 728 and/or elevator 120 to control the direction in which these elements operate. This may be accomplished by sending signals to the power regulator 736, or by the controller 704 itself. In this manner, the elevator 120 may be raised and lowered by different signals and the actuator 728 may increase or decrease resistance according to the signals provided by the controller 704. In one embodiment, the controller 704 and/or power regulator 736 may control the polarity of the power being sent to the actuator 728 and/or elevator 720 to control the direction in which these elements operate.

[0087] It is contemplated that the control system may comprise one or more sensors 740 in some embodiments. The sensors may receive or detect various events or conditions related to training on the side to side machine. For example, a heart rate monitor may sense the user's heart rate and report it to the controller 704. The information from the sensors 740 may be interpreted or processed by the controller 704 and presented on one or more displays 716 or speakers 720. The sensors 740 may also detect the rate at which the user is moving the steps, the number of times the steps have been moved, the distance the steps have been moved, or the like. In addition, the sensors 740 may detect the weight or other characteristic of the user.

[0088] It is also contemplated that the control system may communicate with other devices. For example, the control system may include a transceiver 724 such as a wired or wireless network interface. The controller 704 may utilize the transceiver 724 to communicate information with an external device. For example, a record of the user's training time, the rate at which the user moves the steps, the number of times the user moved the steps, the date/time when the user trains, the change in weight of the user, the change in speed or strength of the user, and the like may be communicated to an external device.

[0089] In this way, the user may remotely access his or her training history or records for comparison. For example, the user may access training records remotely via a computing device. Alternatively, the user may access training records via another side to side machine. It is contemplated that the user's preferences, such as the resistance of the steps, rate at which the incline changes, period of time between changes in
incline, minimum and maximum incline, or the like, may be shared between side to side machines. In this manner, the user's preferences may be available at any side to side machine without the user having to manually enter them.

[0090] It is contemplated that the transceiver may also be used to communicate with the user's personal devices. For example, the user may utilize a user input 712 of the control system to control volume, track changes, or the like on his or her personal media player, such as through a wired or wireless connection. It is also contemplated that the control system may stream or transmit audio to the user through the user's personal media player, such as through a wired or wireless transmission.

[0091] FIGS. 8A-8E illustrate the side to side machine in use. As can be seen from FIG. 8A, a user 804 may step onto the steps 112A, 112B of the side to side machine. The steps 112A, 112B of the side to side machine may have a default configuration when not in use. For instance, the steps 112A, 112B may be locked in position when the side to side machine is not in use. For example, a brace, clamp, or the like may hold the connecting member 152 between the steps 112A, 112B in position. In this manner, the steps 112A, 112B may not move when the user first steps onto the side to side machine. This increases safety when the user is first stepping onto the machine.

[0092] Alternatively, the steps 112A, 112B may default to a particular position when not in use. For example, as shown in FIG. 8A, one step 112D may be at a lowest possible position. The user may then step first on the lower step 112D and the step on the raised step 112A. The user may keep most of his or her weight on the lower step 112B. This prevents the steps 112A, 112B from moving as the user is first stepping on the machine. This also increases safety. It is noted that the user may move one of the steps 112A, 112B to its lowest possible position prior to stepping onto the step (if the step is not already at its lowest possible position).

[0093] Once the user is on the steps 112A, 112B, the user may begin training by moving the first step 112A downward. This strengthens and tones the inner and outer muscles of the user’s legs which is highly beneficial to improving the user’s lateral strength and movement. As can be seen in FIG. 8B, moving the first step 112A downward shifts the user’s legs to a more equal position as the second step 112B moves upward. Where the steps 112A, 112B are connected by a connecting member, lowering the first step 112A pulls the second step 112B upward, such as shown in FIG. 8B.

[0094] The user may continue the downward motion of the first step 112A as far as the user desires before reversing, or the user may continue the downward motion until the first step has reached its lowest point. Once the downward motion of the first step 112A is complete, such as shown in FIG. 8C, the user may stop or may continue by lowering the second step 112B. As can be seen, as the user’s body moves to lower the first step 112A further, the second step 112B continues moving upward. This may occur because the second step 112B is pulled upward by the connecting member between the second step and the first step. It is noted that other mechanisms may cause the steps to move upward, such as the resilient members described above.

[0095] FIG. 8D illustrates the subsequent lowering of the second step 112B. As can be seen, the first step 112A may move upward as the second step 112B is moved downward. The second step 112B may continue downward until the user decides to stop or until the second step reaches its lowest point, such as shown in FIG. 8E. The activities shown and described with regard to FIGS. 8A-8E may be repeated as desired to provide the side to side training.

[0096] The steps 112A, 112B and platforms 104A, 104B guide the motion of the user’s legs and feet along an incline that is safe for the user’s body. Without such guidance there is a greatly increased risk of pulling a muscle or tendon or other bodily injury. Even as the incline is changed the user’s range of motion is controlled by the steps 112A, 112B thus reducing the likelihood of undesirable body motions and injuries. For example, the likelihood that the user may overextend is reduced. In addition, the minimum and maximum incline may be set for particular users to prevent overextending or other injuries. Moreover, the length of travel along each platform 104A, 104B may be set, also to prevent overextension and other injuries.

[0097] FIGS. 8A-8E also illustrate the operation of the platforms 104A, 104B during training. As can be seen, the user may move the steps 112A, 112B while the platforms 104A, 104B are at various inclines. For instance, FIGS. 8A-8C illustrate training while the platforms 104A, 104B are at a steep incline, while FIGS. 8D-8E illustrate training while the platforms 104A, 104B are at a smaller incline. Though shown at particular inclines, it is noted that the platforms 104A, 104B may provide a variety of inclines, as described above.

[0098] The different inclines change the amount particular muscles are used to move the steps 112A, 112B. Thus, varying the inclines helps ensure that the different leg muscles in the user’s legs are toned and strengthened. As discussed above, the incline of the platforms 104A, 104B may be continuously changing as the user is training. Alternatively, the incline may periodically change as the user is training. For example, the incline may increase and decrease in a repeating cycle as the user is training. The user may specify how the incline of the side to side machine will change the incline via the control system. This includes the speed at which the incline changes. It is contemplated that the control system may provide one or more preset programs for changing the incline, or that the user may set his or her own program for changing the incline.

[0099] It is contemplated that the resistance provided by the steps 112A, 112B may also change as the user trains. For example, the user may manually set the resistance before or during training. Alternatively, the control system may change the resistance randomly or according to a preset program or the user’s own program.

[0100] Though not shown, it is noted that the side to side machine may support the user’s upper body while training. For example, as discussed above, the user may grasp one or more hand holds or lean against one or more supports that extend upward towards the user’s upper body. This support may allow the user to apply some force to the steps through his or her upper body muscles. For example, the user’s arm or torso muscles may stiffen to allow his or her leg muscles to move the steps 112A, 112B. In this manner, the user may also experience at least some taming and strengthening of his or her arm or torso muscles or body structures.

[0101] While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of this invention. In addi-
tion, the various features, elements, and embodiments described herein may be claimed or combined in any combination or arrangement.

What is claimed is:

1. A side to side machine comprising:
   two platforms having a proximal end and a distal end;
   a pivot at the proximal end of the two platforms, the pivot
   connected to the two platforms to allow the two platforms to rotate relative to one another;
   an elevator attached to the pivot, the elevator configured to
   raise and lower the pivot to incline the two platforms
   varying amounts;
   two steps, each step mounted to each of the two platforms
   and configured to move between the proximal end and
   the distal end of each of the two platforms; and
   a connecting member extending between the two steps,
   wherein the connecting member pulls one of the two
   steps upward when the other of the two steps is lowered.
2. The apparatus of claim 1, further comprising a base.
3. The apparatus of claim 2, wherein the base is secured to
   the floor.
4. The apparatus of claim 2, wherein the elevator is
   attached to the base.
5. The apparatus of claim 2, wherein a support riser is
   attached to the base.
6. The apparatus of claim 5, wherein the support riser
   comprises handles that are horizontally or vertically adjustable.
7. The apparatus of claim 1, wherein the elevator is manually powered.
8. The apparatus of claim 7, wherein the movement of the
   steps powers the elevator.
9. The apparatus of claim 1, wherein the elevator is motorized.
10. The apparatus of claim 1, wherein the elevator comprises an actuator.
11. The apparatus of claim 1, wherein the platforms further
    comprise spherical or cylindrical structures at the distal ends
    of said platforms.
12. The apparatus of claim 1, further comprising a control system.
13. The apparatus of claim 11, wherein the control system
    is used to adjust the resistance of the steps.
14. The apparatus of claim 11, wherein the control system
    is used to adjust the incline of the platforms.
15. The apparatus of claim 11, wherein the control system
    is used to track the user's timing, achievement or characteristics.
16. A method for training at a side to side apparatus comprising:
    standing on the two platforms of the side to side apparatus;
    engaging at least one platform of the side to side apparatus
    with at least one foot;
    pushing the at least one platform downward along the angle
    of the inclination against a resistance provided by the
    side to side apparatus; and
    raising the opposite platform upward along the angle of the
    inclination.

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