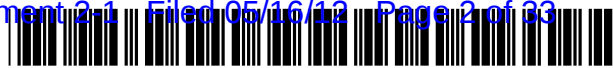


# **EXHIBIT A**



US005772560A

**United States Patent** [19][11] **Patent Number:** **5,772,560****Watterson et al.**[45] **Date of Patent:** **Jun. 30, 1998**[54] **REORIENTING TREADMILL WITH LIFT ASSISTANCE**

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[75] Inventors: **Scott R. Watterson; William T. Dalebout**, both of Logan; **Timothy O. Armstrong**, Providence, all of Utah

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[73] Assignee: **ICON Health & Fitness, Inc.**, Logan, Utah[21] Appl. No.: **593,802**[22] Filed: **Jan. 30, 1996**[51] **Int. Cl.**<sup>6</sup> ..... **A63B 22/02**[52] **U.S. Cl.** ..... **482/54; 482/51**[58] **Field of Search** ..... **482/54, 51**[56] **References Cited****U.S. PATENT DOCUMENTS**

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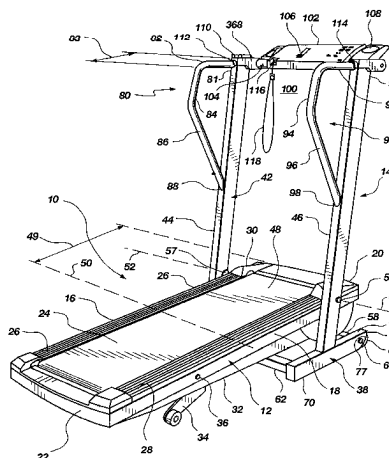
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*Primary Examiner*—Lynne A. Reichard*Attorney, Agent, or Firm*—Trask, Britt & Rossa[57] **ABSTRACT**

The treadmill has a tread base that is rotatably attached to and between a left upright and a right upright. The tread base is rotatable between a first position for performing exercises and an upright or storage position. A latching structure is provided to latch the tread base to the support structure. The treadmill also includes inclination structure for inclining the tread relative to the support surface when in the first position. The treadmill also includes rigid handles and in one configuration movable handles. The tread base also has a rigid undersurface or pan to fully enclose the underside of the tread base. A lift assist gas cylinder is also interconnected between the tread base and the feet attached to the uprights.

**13 Claims, 15 Drawing Sheets**

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Page 2

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U.S. Patent

Jun. 30, 1998

Sheet 1 of 15

5,772,560

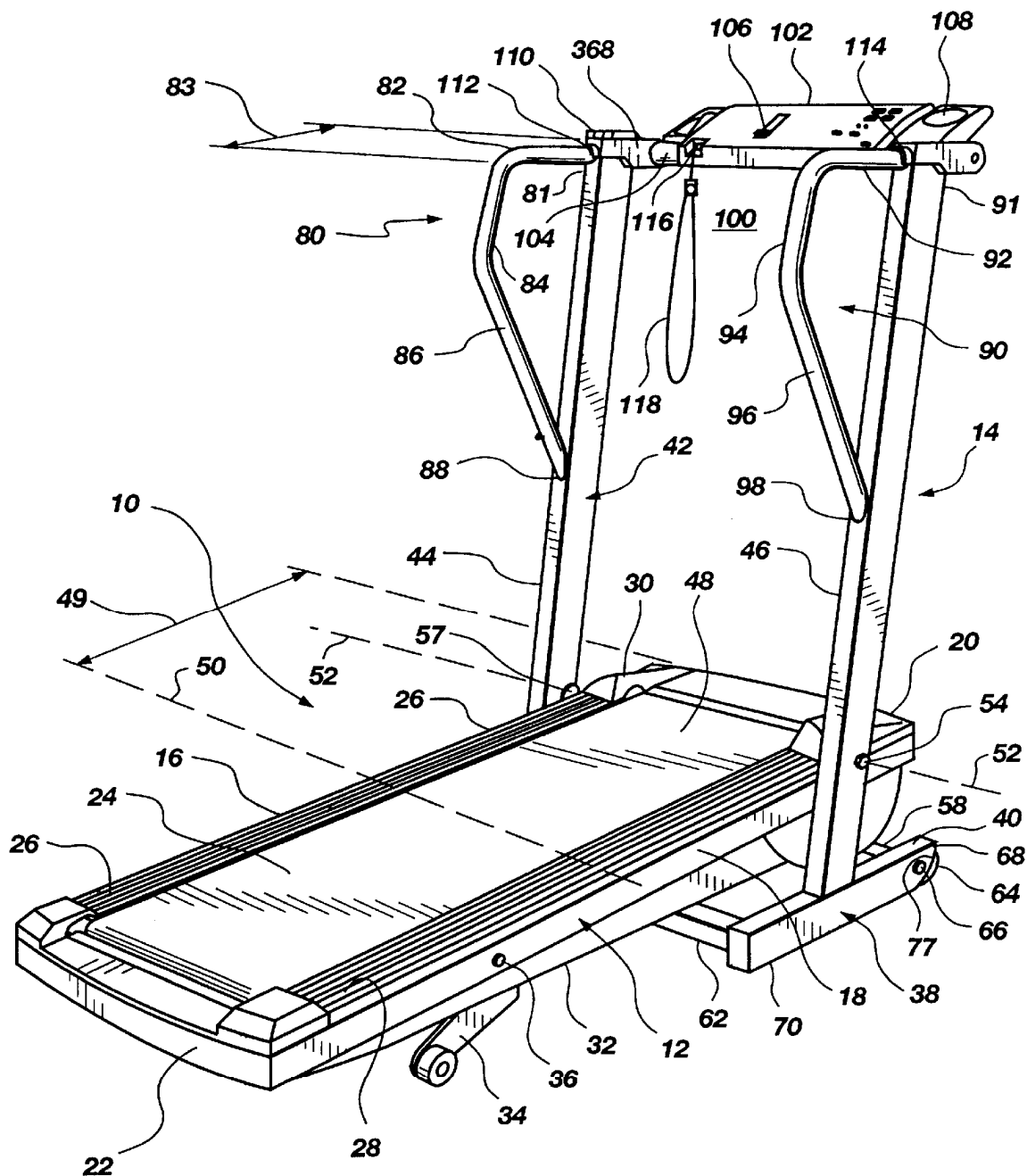


Fig. 1

U.S. Patent

Jun. 30, 1998

Sheet 2 of 15

5,772,560

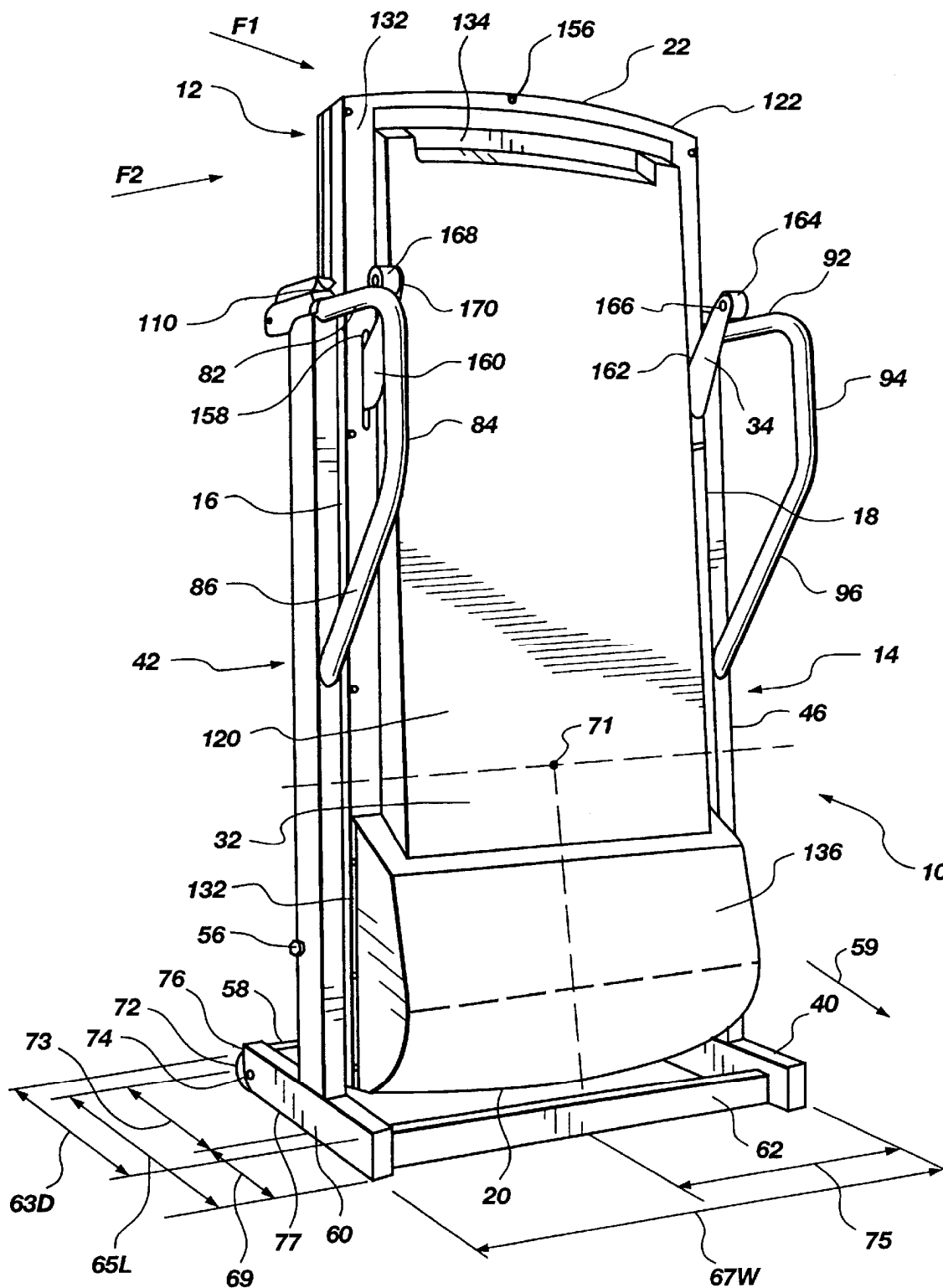


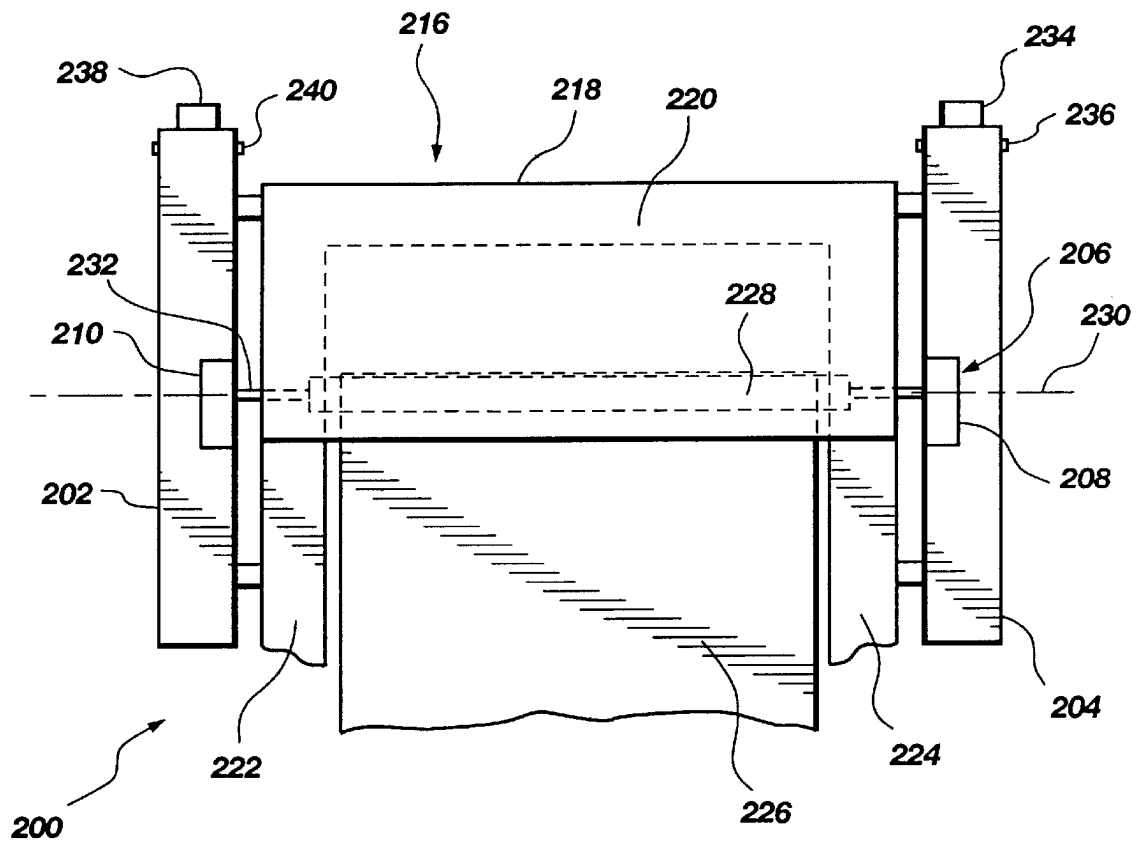
Fig. 2

U.S. Patent

Jun. 30, 1998

Sheet 3 of 15

5,772,560



**Fig. 3**

U.S. Patent

Jun. 30, 1998

Sheet 4 of 15

5,772,560

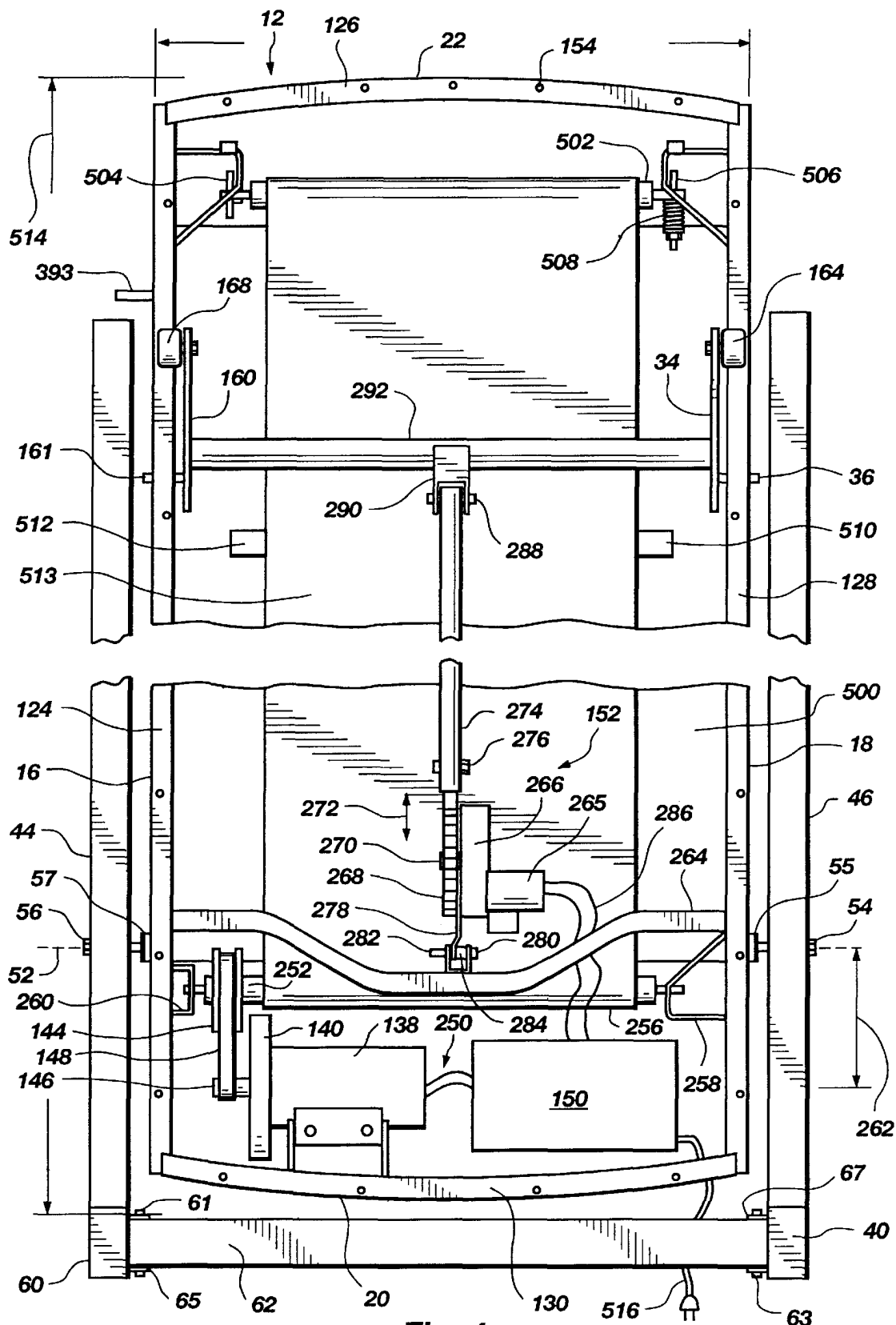


Fig. 4

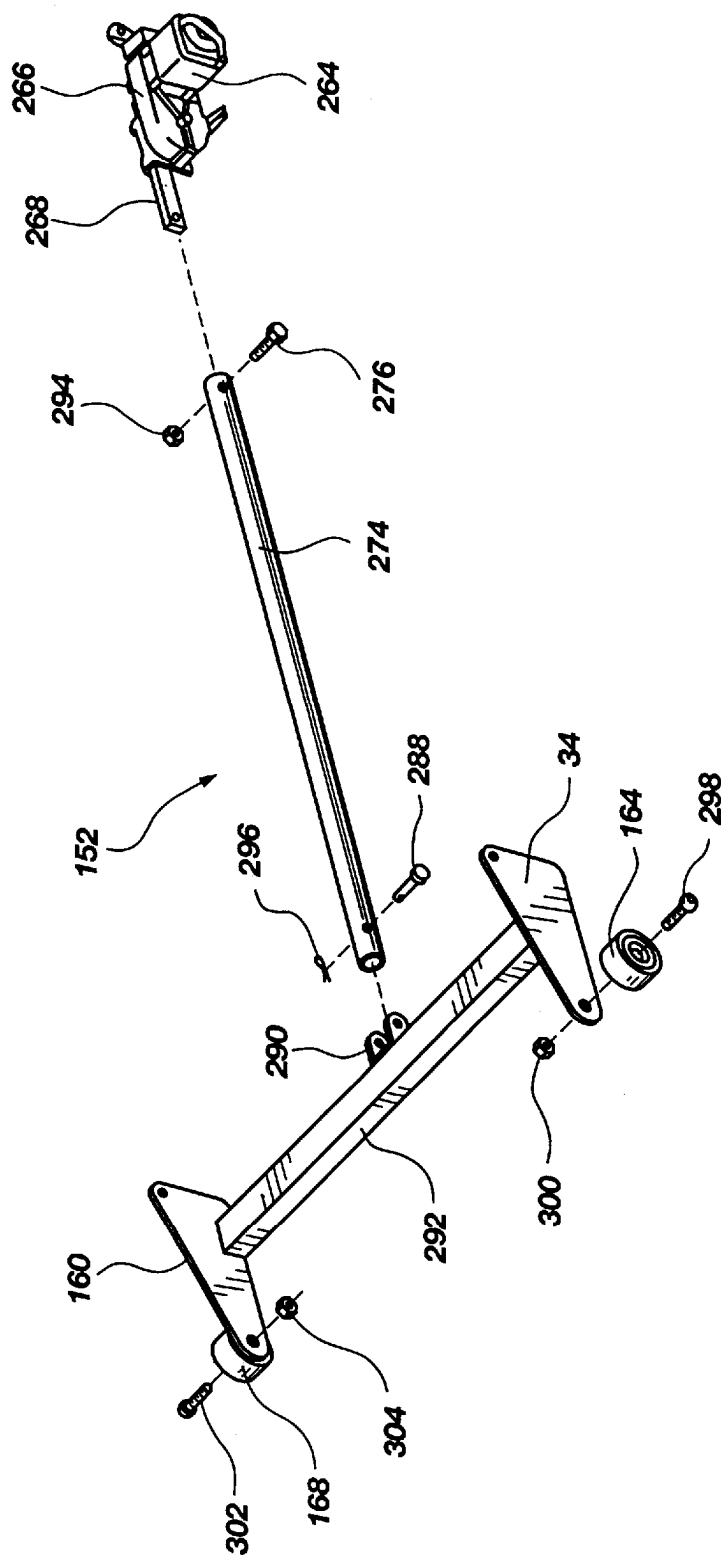
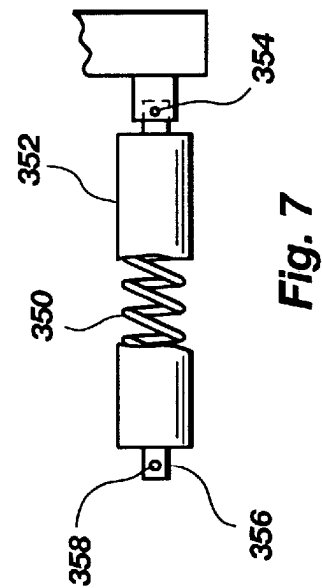
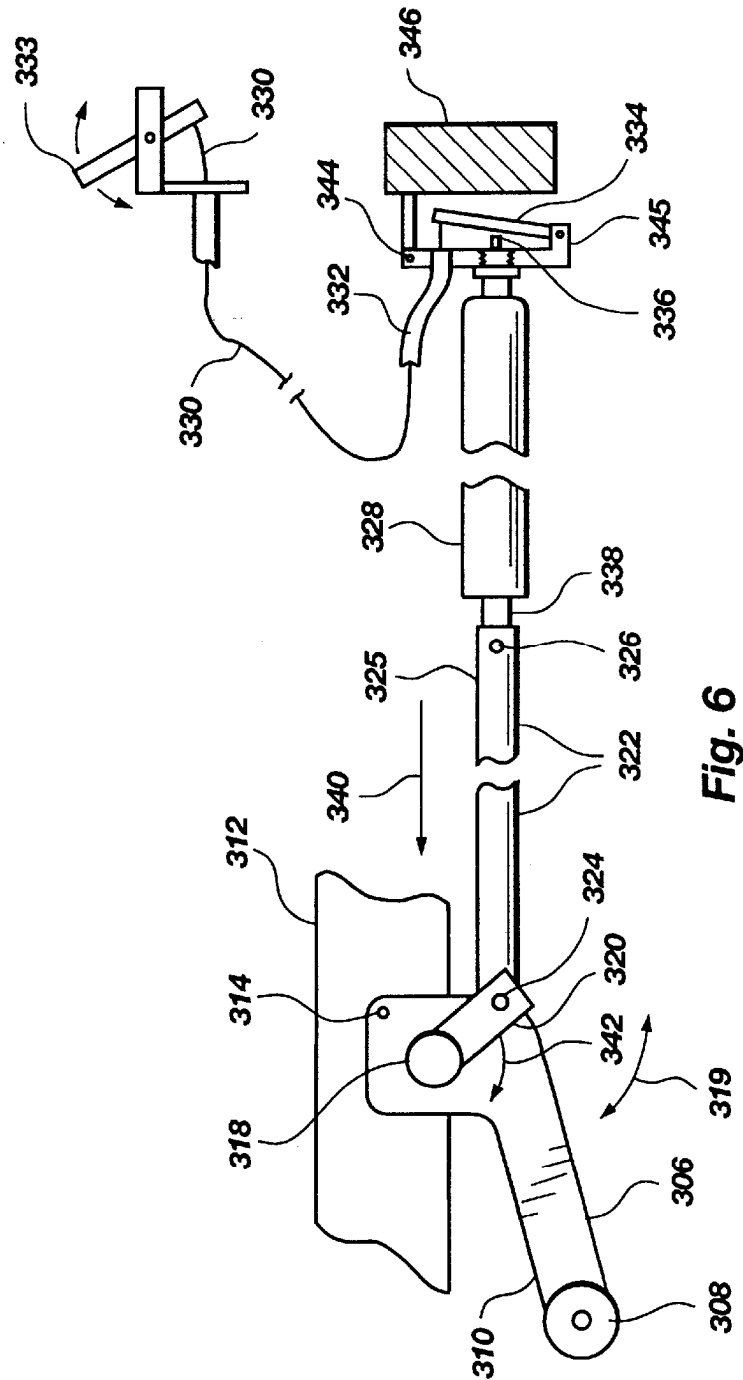


Fig. 5





U.S. Patent

Jun. 30, 1998

Sheet 7 of 15

5,772,560

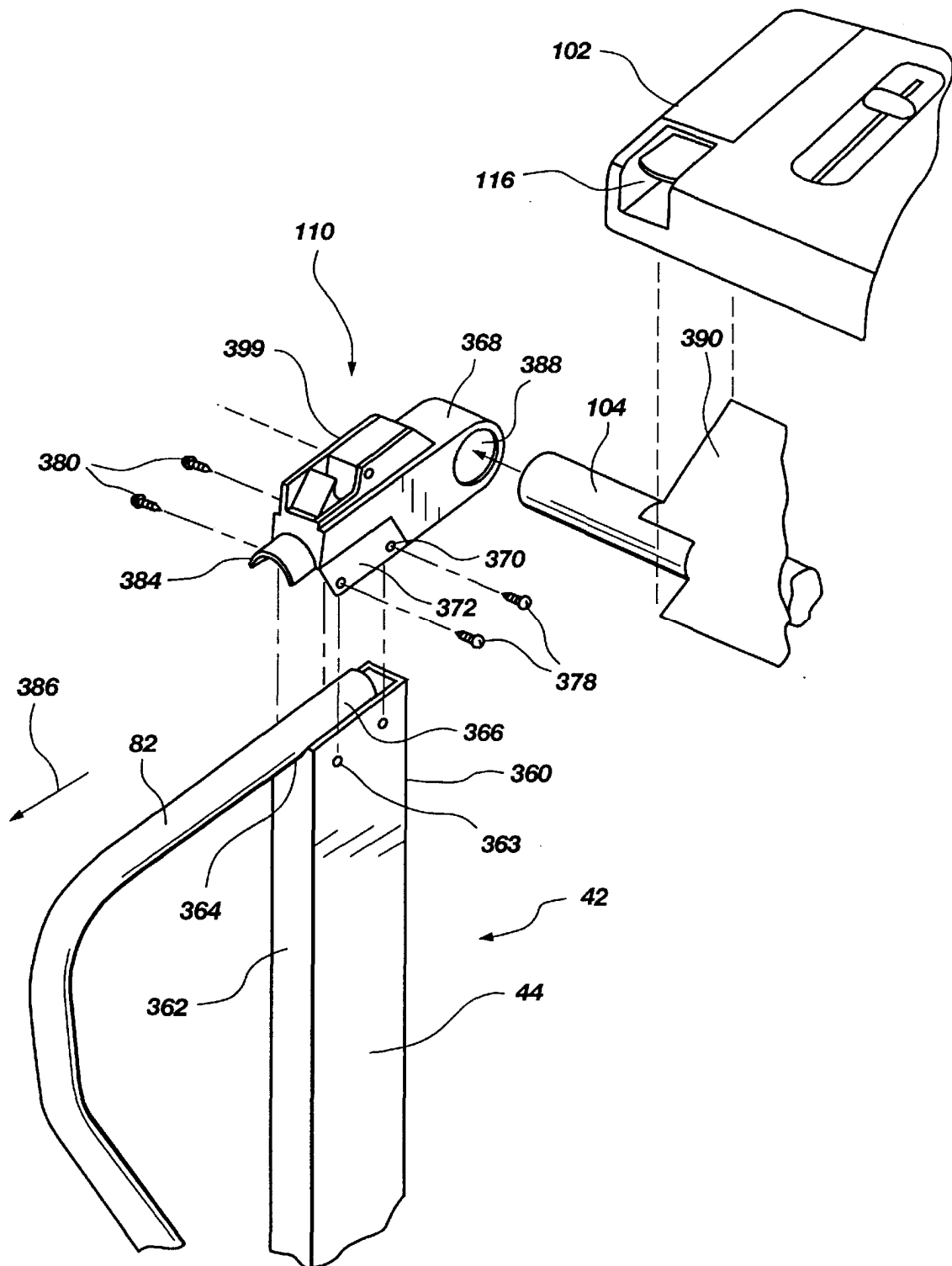


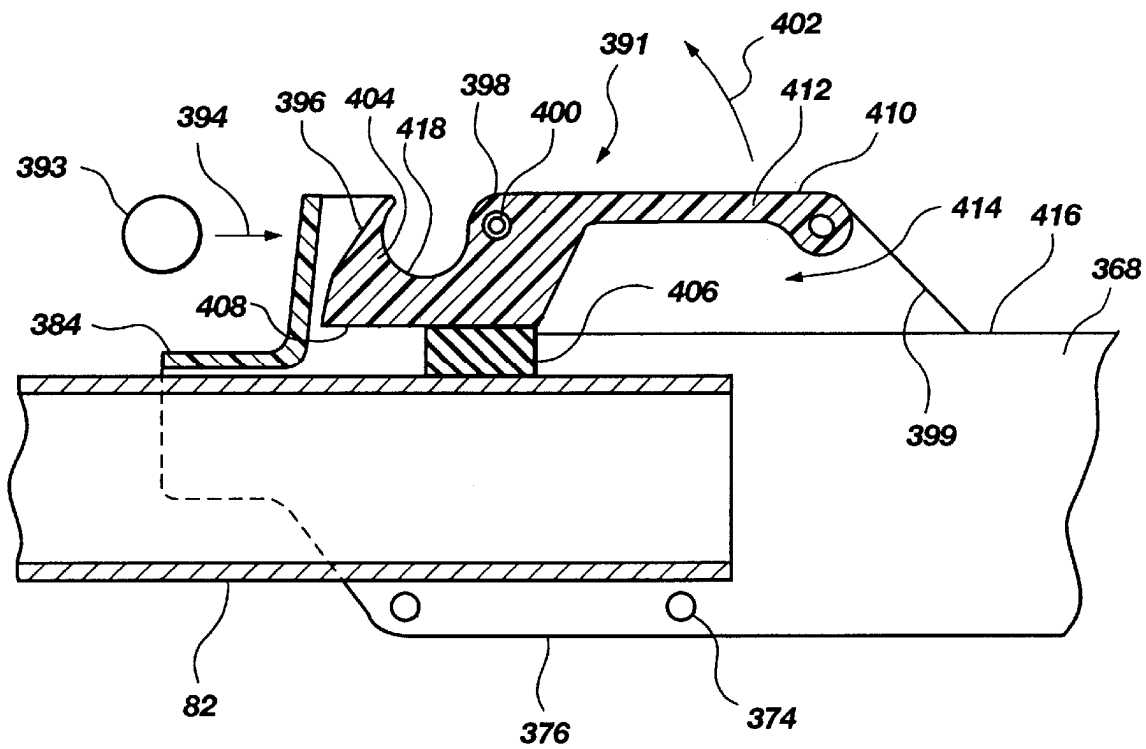
Fig. 8

U.S. Patent

Jun. 30, 1998

Sheet 8 of 15

5,772,560



**Fig. 9**

U.S. Patent

Jun. 30, 1998

Sheet 9 of 15

5,772,560

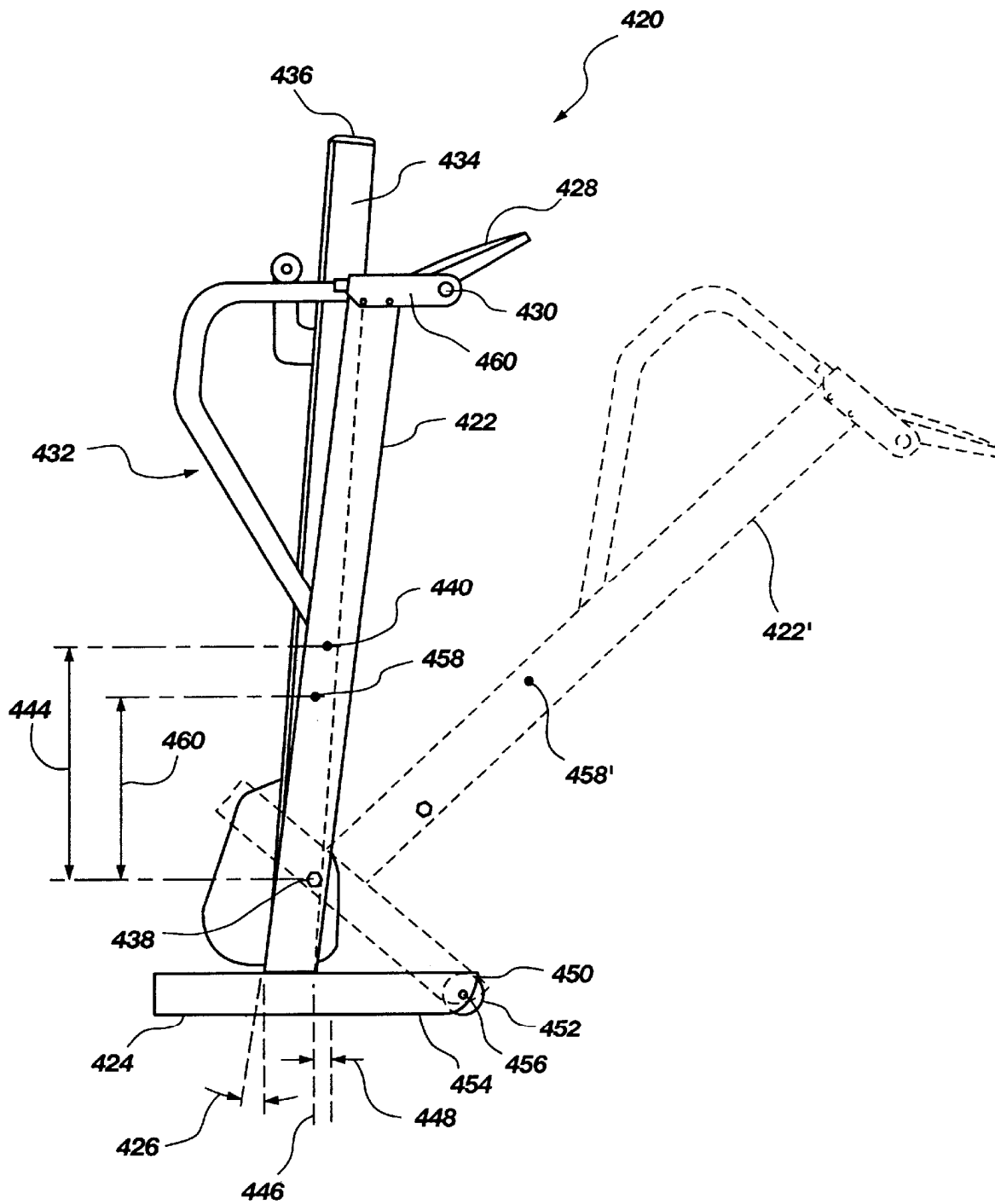


Fig. 10

U.S. Patent

Jun. 30, 1998

Sheet 10 of 15

5,772,560

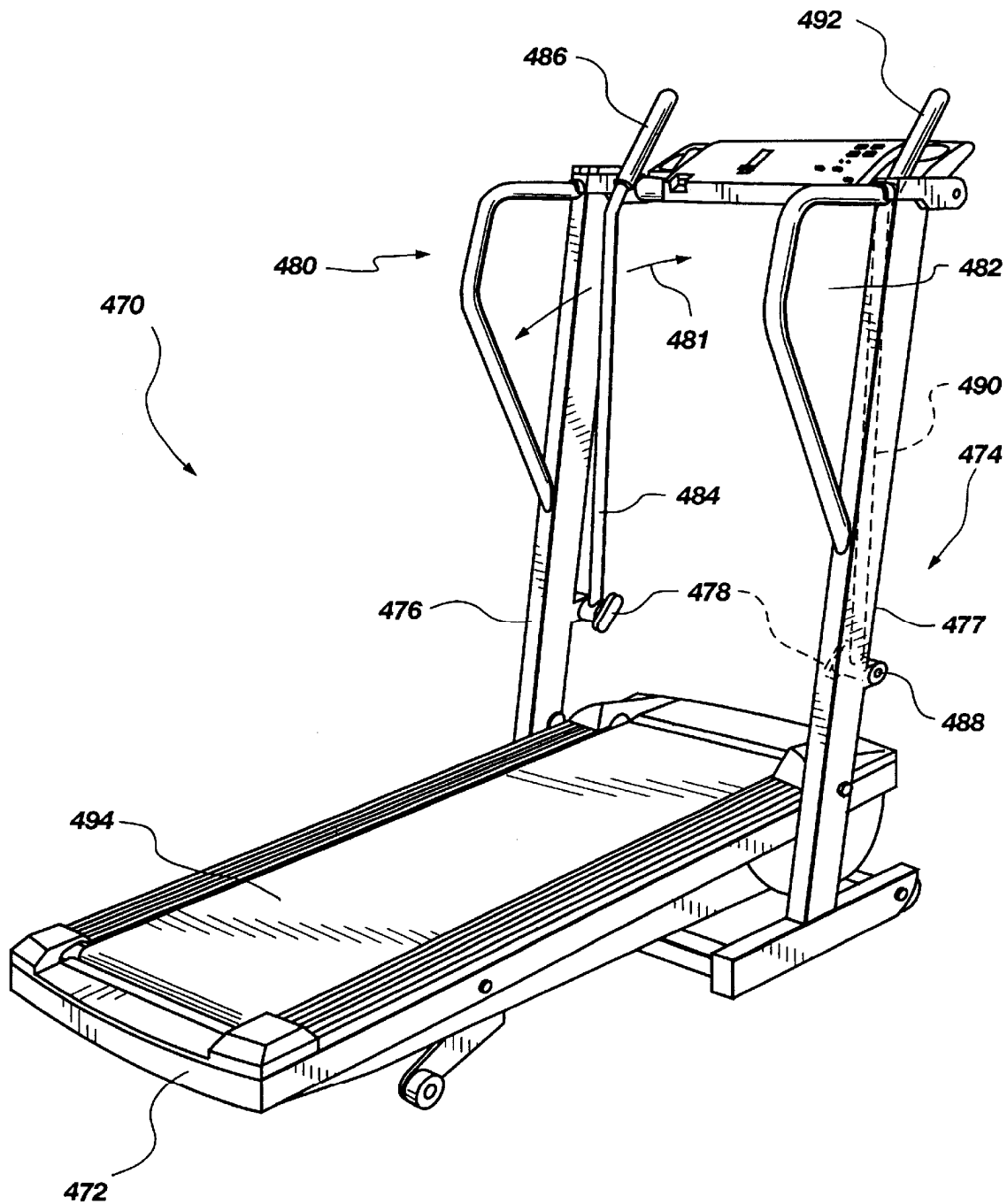
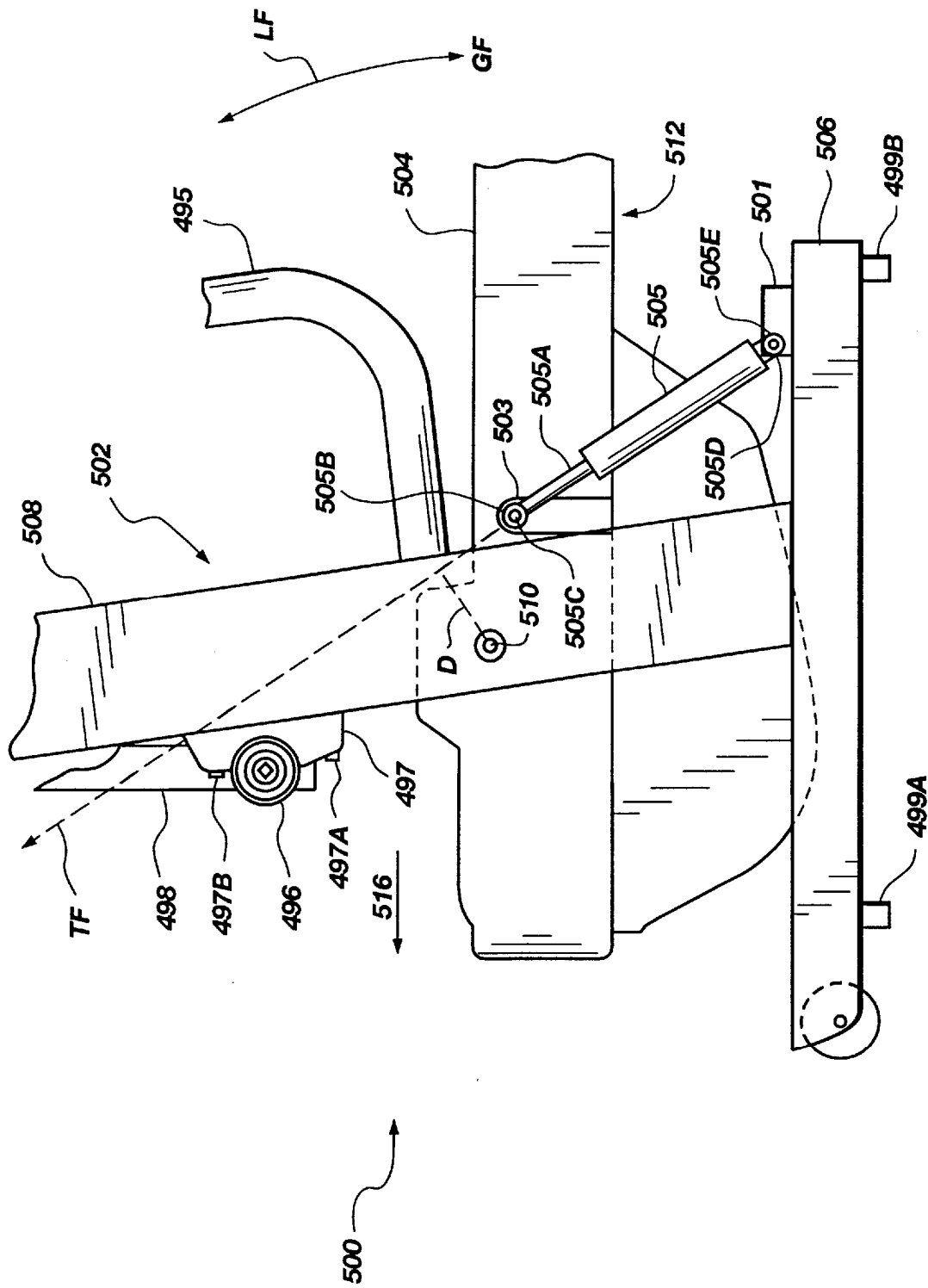


Fig. 11



U.S. Patent

Jun. 30, 1998

Sheet 12 of 15

5,772,560

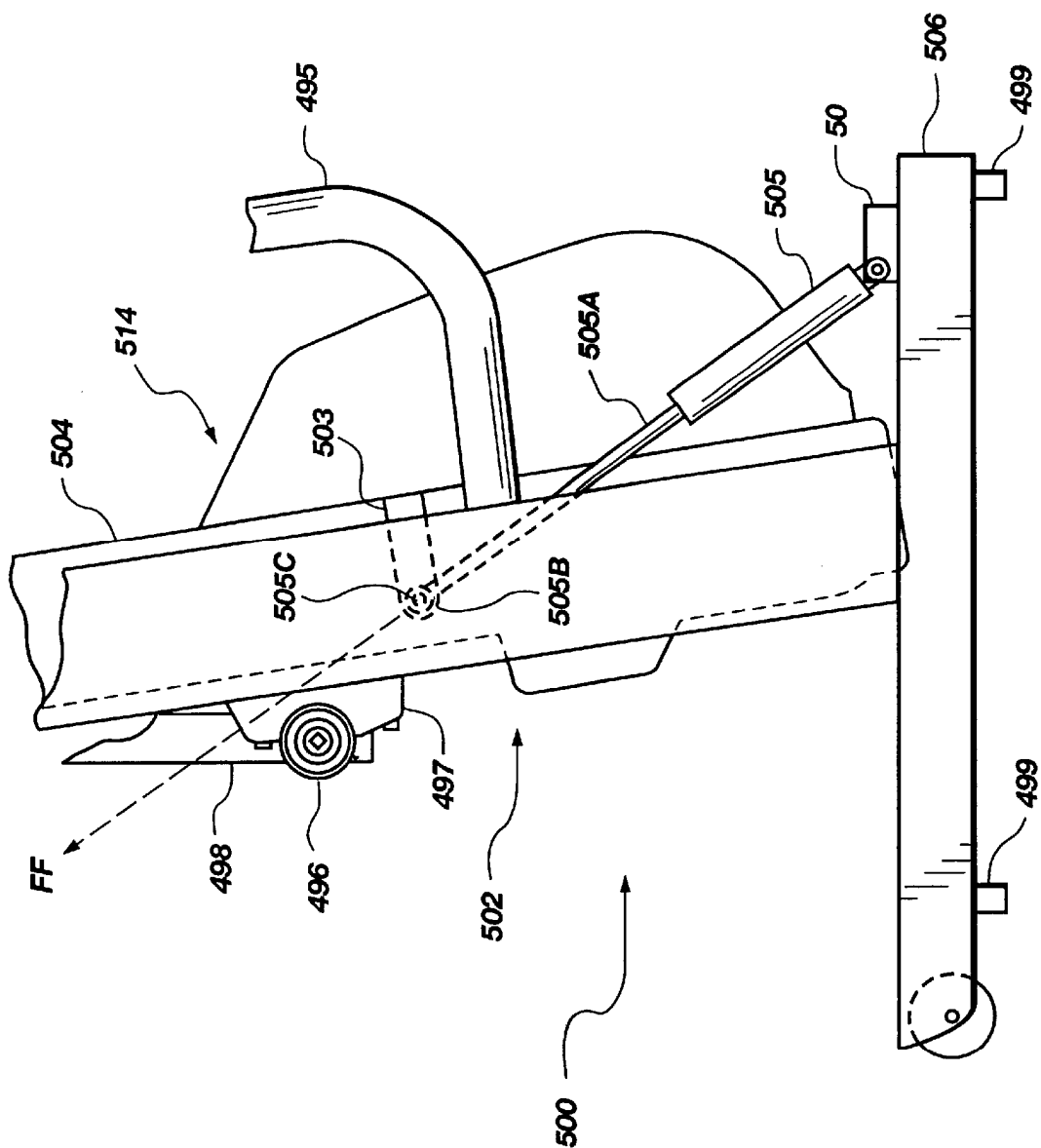


Fig. 13

U.S. Patent

Jun. 30, 1998

Sheet 13 of 15

5,772,560

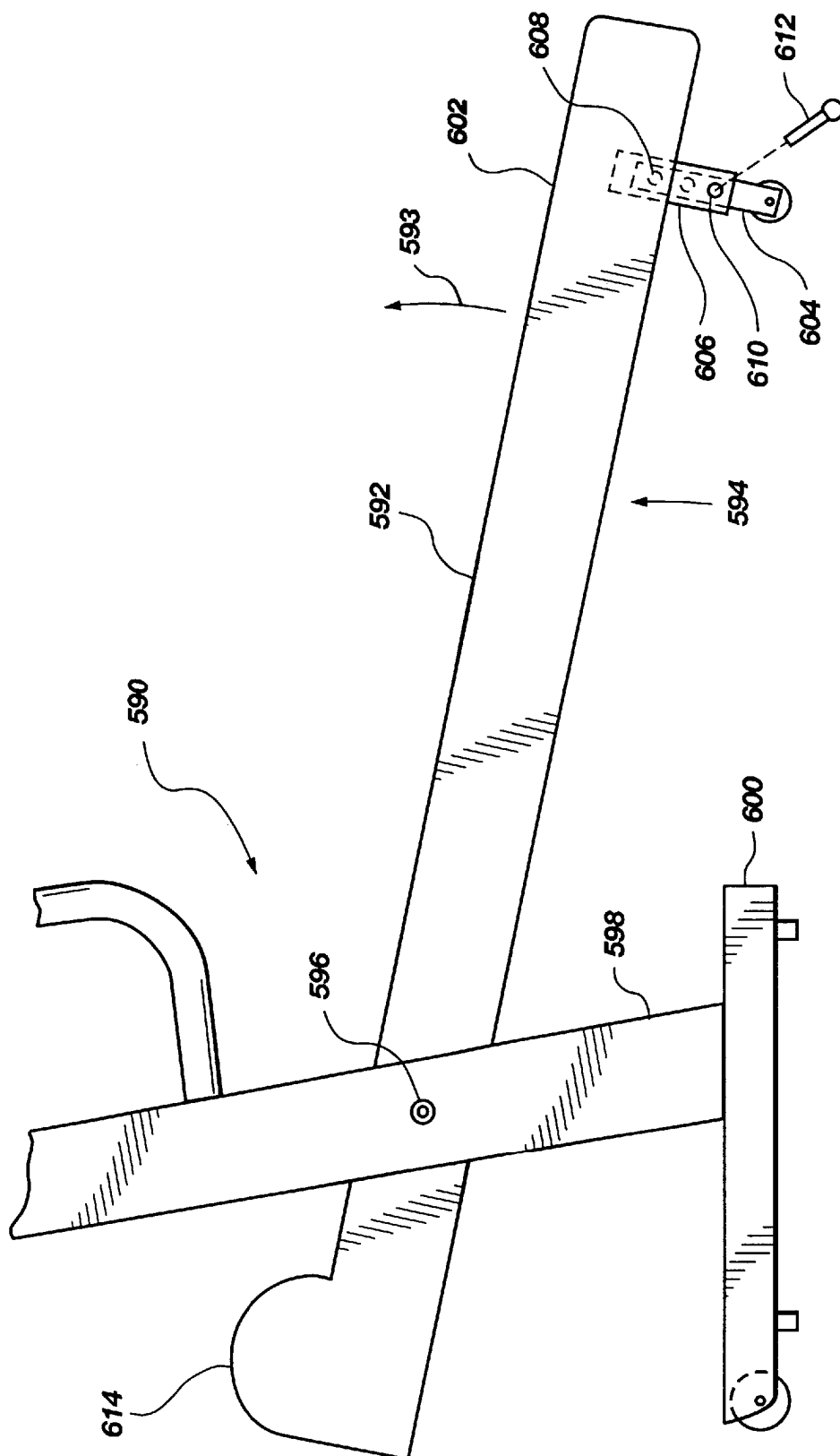
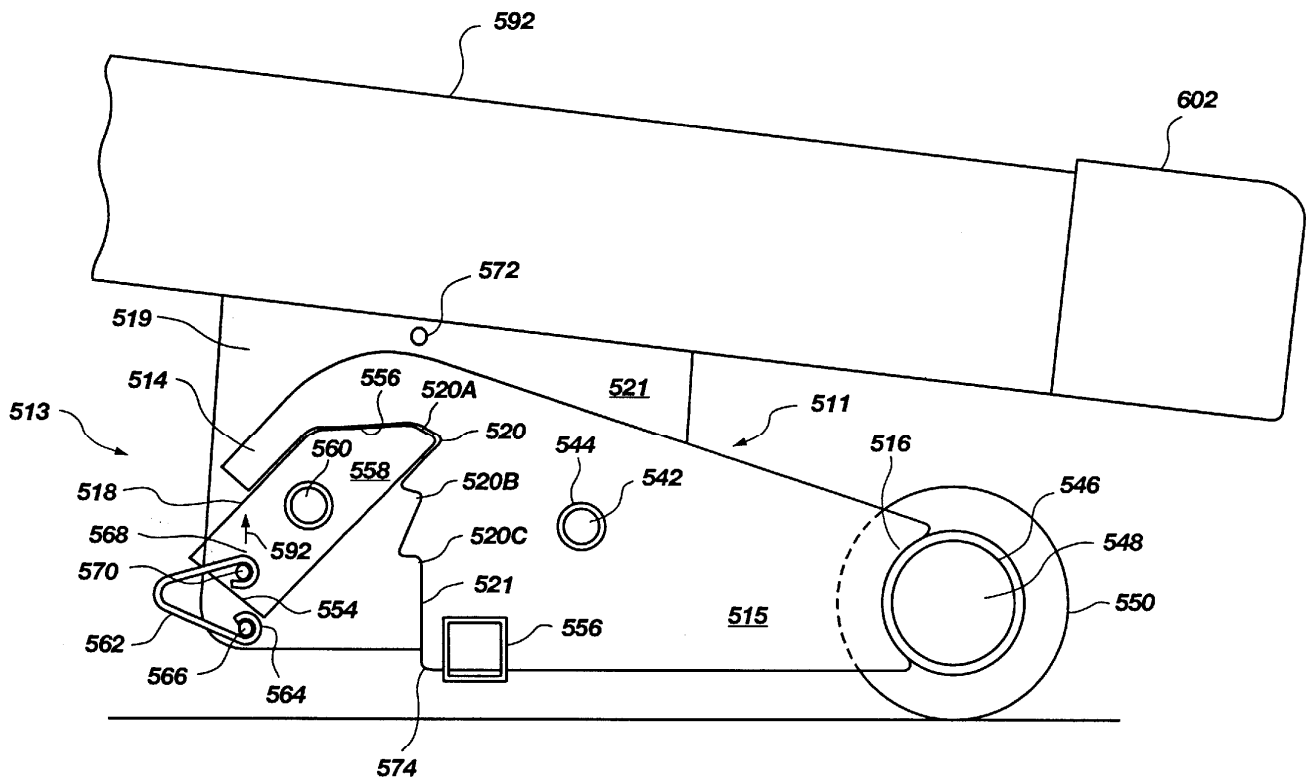


Fig. 14





**Fig. 15**

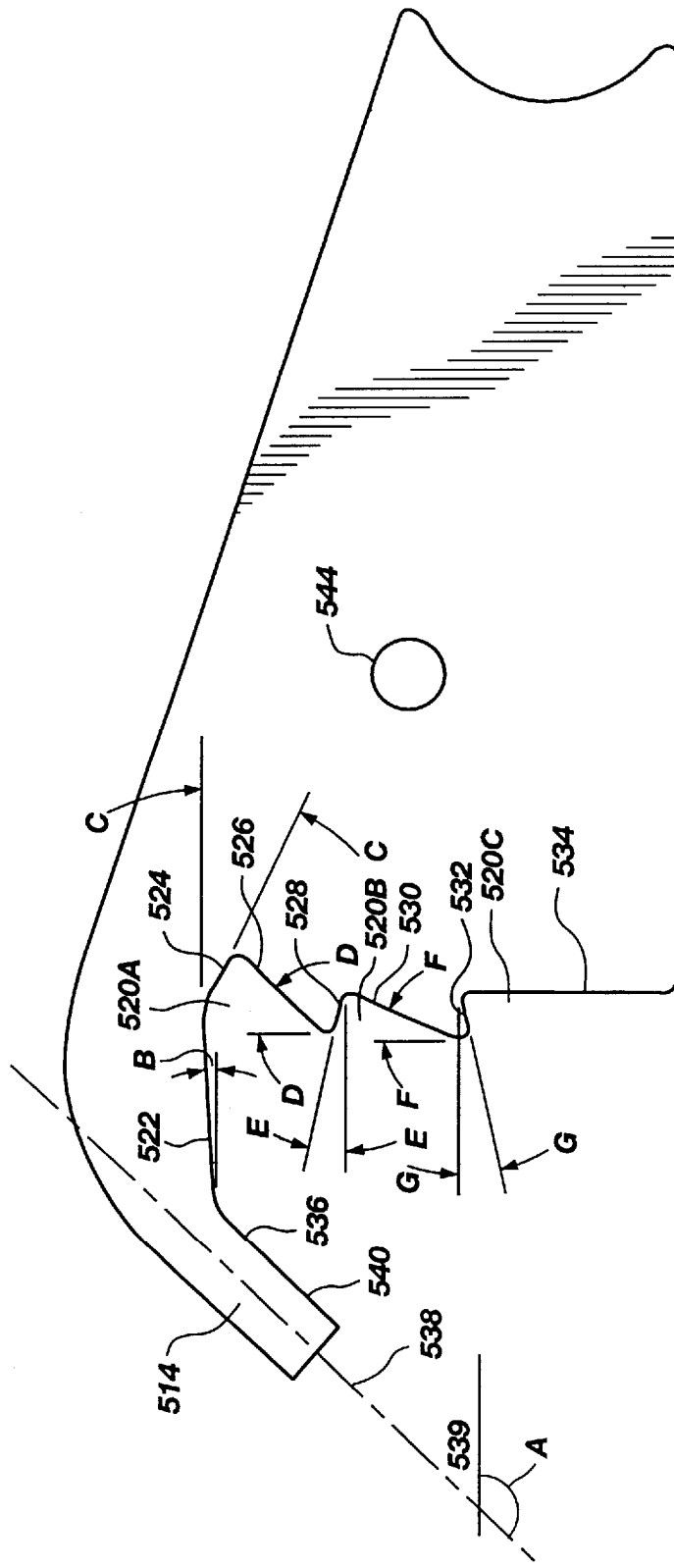


Fig. 16

5,772,560

1

## REORIENTING TREADMILL WITH LIFT ASSISTANCE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to treadmills and, more particularly, the treadmills of the type that have a tread base that is rotatably attached to a structure and orientable from a first position for performing exercises and a second stored position.

#### 2. State of the Art

Typical treadmills include a continuous or endless belt trained about a pair of laterally extending rollers mounted to and between spaced apart longitudinally extending rigid treadmill frame members. A deck is secured to and between the frame members or rails; and the endless belt moves over and under the deck upon rotation about the laterally extending rollers positioned at opposite ends of the deck.

Non-motorized treadmills typically have a flywheel to store energy from the user moving the tread. The flywheel delivers the energy to the front roller to maintain even rotation or operation of the tread particularly when the user is moving on the treadmill in such a fashion that the user's feet simultaneously leave the treadmill or substantially leave the treadmill, such as when jogging or running.

In a typical motorized treadmill, an electric motor is provided to supply rotational torque to the front roller to, in turn, drive the endless belt. The motor is typically operated through controls positioned on a control console operable by a user positioned on the endless belt.

Many treadmills have an upright post or column with a control console positioned at the front end of the treadmill to contain controls or present information desirable or useful to the user. For example, time, speed, pulse, calorie-burn and other similar information may be presented in one or more different combinations. Controls for speed, inclination, exercise program or the like, may also be part of the control console. In other circumstances, a tape player, disc player or similar device may be mounted or attached to the upright post for operation by the user during the exercise period.

The deck with the endless belt trained thereabout is typically oriented generally in alignment with a support surface such as the floor or ground in an area where exercise is being performed. In turn, a treadmill may be said to occupy or use floor space that may be at a premium in given locations. For example, in an apartment or in a small room used for exercise, the available floor space may be needed for multiple uses. In such circumstances, treadmills may be reoriented or repositioned for storage. U.S. Pat. No. 4,066,257 (Moller) shows a treadmill that is secured to a wall. It may be reoriented to an upright position against the wall for storage. U.S. Pat. No. 4,757,987 (Allemand) shows a treadmill that may be folded into a portable compact structure.

U.S. Pat. No. 4,679,787 (Guilbault) shows a structure that may be used as a rowing machine or a treadmill in combination with a bed. That is, the exercise structure is combined with the bed and stored underneath the bed.

U.S. Pat. No. 3,642,279 (Cutter) shows a treadmill that may be reoriented to an upright position for storage and moved about upon wheels positioned at one end of the treadmill. Similarly, the HEALTH WALKER treadmill made by Battle Creek Equipment Company, Battle Creek, Mich., shows a manual treadmill which may be repositioned to an upright orientation for storage. Similarly, U.S. Pat. Des. No. 207,541 (Hesen) shows an exercise treadmill

2

configured for reorientation from an operational configuration to an upright orientation or storage configuration.

U.S. Pat. Des. No. 316,124 (Dalebout, et al.) and U.S. Pat. No. 4,913,396 (Dalebout, et al.) show treadmill structures that are not specifically intended for reorientation of the treadmill deck or endless belt when not in use. However, some treadmills have upright structures that may be reconfigured by placing the forward upright structure or post in an orientation generally in alignment with the treadmill deck as seen in U.S. Pat. No. 5,102,380 (Jacobson, et al.).

### SUMMARY OF THE INVENTION

The treadmill has support structure which includes feet for positioning on its support surface. Upright structure extends upwardly from the feet. A tread base has a frame that includes a front, a rear, a left side and a right side. An endless belt is positioned between the left side and the right side. The frame is connected to the support structure to be movable between a first position in which the endless belt is positioned for operation by a user positioned thereon and a second position in which the rear of the frame is positioned toward the support structure. The treadmill also includes lift means interconnected between the support structure and the tread base to urge the tread base from the first position to the second position.

The lift means is preferably a gas cylinder which continuously urges the tread base from the first position toward the second position. The gas cylinder is desirably attached at one end to the left side or the right side. The upright structure includes a left upright and a right upright with the tread base positioned thereinbetween. The other end of the gas cylinder is attached to either the left upright or the right upright. That is, the gas cylinder may be attached to the left side and the left upright or the right side and the right upright. More preferably, the gas cylinder is attached to the left side or the right side between the axis and the rear of the tread base.

The gas cylinder exerts a torque selected to be less than the torque of the gravitational force exerted on the tread base when it is moved out of the second or stored position and is moved toward the first position. Similarly, the torque of the gas cylinder is less than the torque of the gravitational force of the tread base when it is being moved from the first position toward the second position. In other words, the force of the gas cylinder may be selected so that it may deliver sufficient torque in foot pounds of rotational force (based on its displacement from the axis of rotation) to overcome or exceed the torque attributable to gravitational forces so that the tread base will always automatically return to the upright position. However, it is preferred that the torque delivered by the gas cylinder be less than the torque from the gravitational force so that the tread base will not automatically return from the first position to the second position.

In the second position, the tread base is positioned proximate the left upright and the right upright. The tread base also desirably includes rear feet means positioned proximate the rear thereof to support the tread base on the support surface.

### BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings which illustrate what is presently regarded to be the best mode for carrying out the invention:

FIG. 1 is a perspective illustration of a reorienting treadmill of the present invention with the tread base positioned in a first position for a user to perform exercises;

5,772,560

3

FIG. 2 is a perspective illustration of a reorienting treadmill of FIG. 1 with the tread base reoriented to a second or storage position;

FIG. 3 is a partial, simplified plan view of a portion of an alternate configuration of a reorienting treadmill of the present invention;

FIG. 4 is a partial view of portions of the reorienting treadmill of FIG. 1 and FIG. 2;

FIG. 5 is a partial perspective exploded view of an inclination assembly for use with the treadmill of the present invention to vary the inclination of the treadmill base relative to the support surface;

FIG. 6 is a partial schematic side view of an inclination assembly for use with a reorienting treadmill of the present invention;

FIG. 7 shows a portion of an inclination structure for use with a reorienting treadmill of the present invention;

FIG. 8 is a partial perspective of a portion of a reorienting treadmill including a latching structure associated therewith;

FIG. 9 is a partial cross sectional view of a latching structure of the type shown in FIG. 8;

FIG. 10 is a partial side view of a reorienting treadmill of the present invention with the tread base oriented in a second or stored position and with the treadmill shown in phantom oriented for movement;

FIG. 11 is a perspective view of an alternate embodiment of a reorienting treadmill of the present invention with movable handles and with the tread base oriented in a first position to receive a user for performing exercises;

FIG. 12 is a simplified partial side view of an alternate reorienting treadmill of the present invention having lift assist means and with a tread base in a first position;

FIG. 13 is a simplified partial side view of the reorienting treadmill of FIG. 12 with a tread base in a second or stored position;

FIG. 14 is a simplified partial side view of an alternate reorienting treadmill of the present invention having elevation structure associated with the tread base in its first position;

FIG. 15 is a simplified side view of the alternate reorienting treadmill of FIG. 14 with alternate elevation structure; and

FIG. 16 is a simplified side view of portions of the alternate elevation structure of FIG. 15.

#### DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

A reorienting treadmill 10 is shown in FIG. 1 to have a tread base 12 which is movably connected to support structure 14. The tread base 12 has a left side 16 and a right side 18. As can be seen, the left side 16 and the right side 18 are spaced apart and in general alignment. The tread base also has a front end member 20 and a rear end member 22. As here shown, the front end member 20 and the rear end member 22 are each cross members that form part of the overall frame of the tread base 12. That is, the frame may be said to include the front end member 20, the rear end member 22, the left side 16 and the right side 18. The frame may also include other structural members.

It should be noted that the front end member 20 and the rear end member 22 denote specific structural members. However, in some contexts the front end and rear end may refer to the region or area proximate the front or the rear of the tread base 12.

4

The tread base 12 has an endless belt 24 positioned between the left side 16 and the right side 18. The endless belt 24 or tread is configured to receive a user thereon to perform exercises such as running, walking, jogging or the like. The user also may perform stationary exercises such as bending, stretching or the like while positioned on the endless belt 24. However, the machine principally is intended for use in performing walking, running or jogging exercise.

The tread base 12, as here shown in FIG. 1, has a left side rail 26 positioned over the top of the left side and a right side rail 28 positioned over the top of the right side 18. The left side rail 26 and the right side rail 28 are configured and positioned to support a user. That is, a user seeking to dismount from the moving endless belt 24 or tread may simply place the user's left foot on the left rail 26 and the user's right foot on the right rail 28 to dismount or leave the moving surface to terminate the exercise before terminating movement of the endless belt 24.

It can also be seen that the tread base 12 has a front cover 30 positioned over structure such as pulley 144 associated with the drive mechanism for driving the front roller 252 not illustrated in FIG. 1, but illustrated and discussed more fully hereinafter with respect to FIG. 4. The front cover 30 is also provided for aesthetics and for safety to minimize the risk of materials entering into the area thereunder and interfering with operation of the drive mechanism or otherwise becoming entangled therewith.

The tread base 12 of FIG. 1 also includes an underside rigid surface 32 or pan secured to the left side 16, the right side 18, the front end member 20 and the rear end member 22 as more fully discussed hereinafter.

The tread base 12 also has rear feet means for positioning and supporting the tread base on the support surface. The rear feet means include specifically a left foot 160 (FIG. 4) and a right foot 34 which is rotatably secured to the right side to rotate about a pin 36. That is, the right foot 34 and the left foot 160 rotate about pin 36 and pin 161 (FIG. 4) to move toward and away from the endless belt 24 to, in turn, vary the inclination of the tread base 12 relative to the support surface.

The support structure 14 of the reorienting treadmill 10 of FIG. 1 has feet means 38. The support structure 14 as shown is configured to be free-standing and to stably support the treadmill and more specifically the tread base 12 in the first orientation of the tread base 12 as shown in FIG. 1 and in the second or storage orientation of the tread base as shown in FIG. 2.

The feet means 38 includes a left foot 60 (FIG. 2) and a right foot 40. The support structure 14 also includes an upright structure 42 to extend upwardly from the feet means 38. More specifically, the upright structure includes a left upright member 44 and a right upright member 46 spaced from the left upright member and in general alignment therewith.

The tread base 12 has a front portion 48 that extends 49 from the front end member 20 to a position or point 50 about midway between the front end member 20 and the rear end member 22. It may be noted that the midway point 50 is here shown to be at a distance halfway between the front end member 20 and the rear end member 22. However, those skilled in the art will recognize that the actual midpoint or midway position 50 need only be approximate and is here defined to indicate that the front portion 48 is essentially that half of the tread base 12 which may be said to be frontward or forward of a similar half portion which may be said to be rearward.

5,772,560

5

The front portion 48 of the tread base 12 is rotatably attached to the support structure 14 to rotate around a base axis 52. As shown in FIGS. 1 and 4, the tread base 12 rotates with or around bolts or pins 54 and 56 which function as an axle and are connected to the right upright 46 and the left upright 44. The pins 54 and 56 connect to pivoting straps 55 and 57 which are attached to their respective right and left sides 18 and 16 to extend upwardly therefrom. With the straps 55 and 57 extending upwardly, the base axis 52 may be located above the tread base 12 when the tread base is in the first position as shown in FIG. 1. The length or height of the straps 55 and 57 and the orientation to extend upwardly from the sides 16 and 18 or downwardly from the sides 16 and 18 may be selected to position the center of gravity of the tread base 12 relative to the base axis 52. That is, the necessary force or leverage to lift and move the tread base 12 from the first position to the second position may be varied by varying the distance between the center of gravity and the base axis 52 as discussed more fully hereinafter.

In FIG. 1 the support structure 14 and more particularly the feet means 38 is shown to include a forward cross member 58 which is connected to the right foot 40 to extend to the left foot 60. Similarly, the feet means 38 includes a rear cross support 62 that extends between and is connected by nuts and bolts 61 and 63 to brackets 65 and 67 to the right foot 40 and the left foot 60 spaced rearward 59 from the front cross member 58 a distance 63D selected to rigidly support the right foot 40 and left foot 60. The cross members 58 and 62 also may be connected by welding, brazing or the like as desired.

The right foot 40 and left foot 60 are each sized in length and spaced apart a distance 67W to provide the support structure 14 with a footprint so that the support structure is freestanding and also stably supports the tread base 12 in the first position, in the second position and in movement thereinbetween. The footprint may be regarded as the perimeter of the geometric figure projected on the support surface that is defined by left foot 60 and right foot 40. The footprint could be in any desired geometric shape to have a length 65L and width 67L. The length 65L and width 67L are selected so that the distance 69 between the vertical location of the center of gravity 71 (projected onto the support surface) of entire treadmill 10 is selected so that the force necessary to tip the treadmill 10 is necessarily more or higher than that applied by a nudge or accidental bump. That is, a rearward 59 force  $F_1$  applied at the rear end member 22 of the tread base 12 in the second position would tend to tip the treadmill 10 rearwardly. A force exerted forwardly would, of course, tend to tip the treadmill 10 forwardly. Thus, the feet 40 and 60 extend a similar distance 73 selected so that the tipping force  $F_1$  necessary to cause rotation or tip of the treadmill exceeds a nominal sum (e.g., 1 pound) and indeed is at least a somewhat larger sum (e.g., 10 to 20 lbs.) and even more preferably a significantly larger sum. The distance 73 preferably is selected so that tipping can be effected only by a user deliberately seeking to rotate or tip the treadmill 10 in normal use.

Similarly, the distance 67W of the treadmill 10 is selected so that the distance 75 between the center of gravity 71 and the feet 40 and 60 will resist accidental tipping by a bump or nudge. That is, the treadmill 10 cannot be tipped over sideways except upon application of a force  $F_2$  that exceeds a nominal sum (e.g., 1 pound) and is about the same as force  $F_1$ .

It may also be seen that the right foot 40 has a right wheel 64 rotatably positioned at its forward end 68 to rotate about an axle 66. At the forward end 68, the right foot 40 angles

6

rearwardly 77 toward a lower edge 70 thereby exposing the wheel 64 to facilitate rotation of the support structure 14 onto the wheel 64 for movement of the treadmill 10 on the support surface.

Similarly, the left foot 60 (FIG. 2) has a left wheel 72 positioned to rotate about an axle 74. The left wheel 72 is exposed to facilitate rotation and movement inasmuch as the left foot 60 is formed to have a front portion 76 that angulates rearward and downward towards the lower edge 77 of the left foot 60. The left foot 60 and the right foot 40 are both made of a rectangular (in cross section) hollow tube to contain the wheels 72 and 64. Therefore the support structure 14 can be tipped or rotated onto the left wheel 72 and right wheel 64.

It may also be seen in FIG. 1 that the support structure has associated therewith a pair of rigid non-movable handles. The left rigid non-movable handle 80 includes a first portion 82 that is connected to the left upright 44 near its upper or distal end 81. The first portion 82 extends rearwardly to a second portion 84 that extends downwardly towards the foot means 38. A third portion 86 is interconnected to the second portion to extend inwardly toward the upright 44 and is here preferably shown to be rigidly secured such as by welding 88 to the left upright 44.

The right rigid non-movable handle 90 is here shown to include a first portion 92 that is connected at the upper end 91 of the upright 46 to extend rearward from the right upright member 46. A second portion 94 is shown connected to the first portion 92 to extend downwardly toward the foot means 38. A third portion 96 extends from the second portion inwardly toward the right upright member 46 and is here shown to be secured such as by welding 98 to the right upright 46.

It can be seen that the pair of rigid non-movable handles 80 90 define a space 100 therein between. That space 100 may be said to create a cage-like effect because the rigid handles 90 and 80 extend rearwardly (toward the rear end member 22) when the tread deck 12 is oriented in the first position shown in FIG. 1. The space 100 is here oriented over the forward part of the endless belt 24. The length 83 of the upper portions 82 and 92 of the handles 80 and 90 may be selected to increase or decrease the size of the space 100 and more particularly the volume. Thus, a user positioned at or proximate the mid point 50 on the endless belt 24 may perceive the handles 80 and 90 as near the user's hands for easy grasping to maintain balance when on the endless belt 24 and perceive the space 100 as a cage-like area toward which the user may move; and in turn the user may feel more stable or secure.

In FIG. 1, it can also be seen that the exercise treadmill 10 of the present invention has a control console 102 which is connected to a support bar 104 that is attached to and extends between the left upright 44 and the right upright 46. The console 102 has operating controls such as actuator 106 to operate the treadmill 10 and indication means which may be used by the operator to determine various parameters associated with the exercise being performed. The console 102 may also have a cup or glass holder 108 so that the user may position a liquid refreshment for use during the course of performing exercise.

The treadmill of FIG. 1 also includes a latching structure and more particularly a receiving mechanism 110, which is more fully discussed hereinafter.

It may also be seen in FIG. 1 that the left rigid non-movable handle 80 is fastened to the left upright 44 at its upper end 81 by a mechanical clamping structure 368 to be



5,772,560

7

discussed more fully hereinafter. Similarly, the right rigid non-movable handle **90** is similarly attached by a clamping structure **114** and is more fully discussed hereinafter.

The control console **102** of FIG. 1 also has associated therewith a safety lock or key mechanism **116** with a loop structure **118** associated therewith for attachment about the waist or to the user. The safety lock or key structure **116** is configured so that if a user moves toward the rear end member **22** on the endless belt **24**, a key (not shown) is removed from the control console thereby interrupting the electrical power to the motor driving the endless belt for a motorized treadmill.

Referring now to FIG. 2, the reorienting treadmill is shown with the tread base **12** reoriented relative to the support structure **14** to the second position in which the rear end member **22** of the tread base **12** is positioned towards the upright structure **42** of the support structure **14**. In this configuration, it can be seen that the treadmill **10** is significantly more compact, occupying less floor space of the associated support surface.

As can be better seen in FIG. 4, the tread base **12**, the left side **16** and the right side **18** are here formed to present relatively flat mating surfaces. Similarly, the front end member **20** and rear end member **22** each present a flat surface to receive a portion of the perimeter **122** of the pan or rigid surface **32**. That is, the flat surface portion **124** of the left side, the flat surface portion **126** of the rear end member **22**, the flat surface portion **128** of the right side **18** and the flat surface portion **130** of the front end member **20** are desirably formed to be in substantially the same plane to present a substantially flat surface to mate and register with the flat surface **132** formed along the perimeter **122** of the rigid surface **32**.

The rigid surface **32** is here shown to be unitarily formed of a plastic-like material to present an essentially rigid underside **120**. Although rigid, it may be made of material thin enough to be flexible or to deflect without breaking. The rigid surface **32** here has a recess **134** formed in it proximate the rear end **22** to provide a convenient hand position for the user to move or reorient the tread base **12** from the first position or exercise position shown in FIG. 1 to the second position or storage position shown in FIG. 2.

It may also be seen that rigid surface **32** has a housing portion **136** formed proximate the front end member **20** to cover operating structure such as the motor **138**, the flywheel **140**, and the driving belt **148**. The housing **136** also covers the electrical motor controlling mechanism **150**, as well as the mechanism necessary to operate the inclination structure as more fully discussed hereinafter.

In FIG. 2, the underside **120** of the tread base **12** is here shown with the pan or rigid surface **32** in position. The tread base **12** without the pan or rigid surface **32** leaves operating structure such as the motor **138**, electrical components **150** and the inclination system **152** exposed (FIG. 4). Aside from an undesirable visual appearance, the exposed components can be hazardous, providing sharp edges, points and structure against which items or things may bump or snag. Similarly, there is a risk of exposing electrical components to moisture, as well as exposing the user to an electrical shock hazard if the treadmill is inadvertently not turned off.

It may also be noted that the rigid surface **32** may be formed to cover only a portion of the exposed components or may be formed into multiple removable sections, if desired, to facilitate assembly or repair.

As better seen in FIG. 4, the flat surfaces **126**, **128**, **130** and **124** have a plurality of apertures **154** formed therein to

8

receive screws **156** to secure the rigid surface **32** or pan to form the underside of the tread base **12**.

As better seen in FIG. 2, the rigid surface **32** has an aperture **158** formed therein for the left leg **160** to extend therethrough. A similar aperture **162** is formed to pass the right foot **34** therethrough. It may be noted that the right foot **34** has a wheel **164** appended proximate its distal end **166**. Similarly, the left foot **160** has a wheel **168** appended proximate its distal end **170**. The wheels **164** and **168** are rotatably attached to facilitate movement on a support surface when the tread deck **12** is positioned in the first position. Other guides, skids or the like may be used to facilitate movement of both the feet **134** and **160** on the support surface.

Turning now to FIG. 3, an alternate configuration of a reorienting treadmill is shown, which is similar to the reorienting treadmill shown in FIGS. 1 and 2. As shown in FIG. 3, a reorienting treadmill **200** has a right foot **204** and a left foot **202**. It also has a right upright **208** and a left upright **210** attached to and extending upward from the right foot **204** and a left foot **202**. A tread base **216** has a front end **218** with a protective cap **220** positioned as shown. The tread base **216** has a left side **222** and a right side **224** with an endless belt **226** positioned between to receive a user comparable to the endless belt **24** in FIG. 1.

As here shown in FIG. 3, a front roller **228** is positioned to extend between the left side **222** and the right side **224**. The front roller **228** has an axis **230** with an axle **232** extending therethrough to rotate about axis **230**. The front roller **228** extends into the right upright **206** and the left upright **210** to function as a base axis similar to base axis **52**. It may be also noted that the right foot **204** has a wheel **234** rotatably mounted by axle **236** within the right foot **204**. Similarly, the left foot **202** has a left wheel **238** rotatably positioned within the left foot **202** by an axle **240**.

As earlier noted, FIG. 4 shows a portion of the treadmill **10** of FIGS. 1 and 2. The treadmill **10** of FIGS. 1 and 2 is preferably a motor driven treadmill having a controller **150** interconnected by conductors **250** to motor **138**. The motor rotates to operate a pulley **146**, as well as a flywheel **140**. The pulley **146** drives a belt **148** which, in turn, drives a pulley **144** connected to the front or drive pulley **252** about which the endless belt **256** is trained.

As can be seen in FIG. 4, the front roller or drive pulley **252** is connected to the right side **18** by a bushing **258**. The pulley **252** is similarly connected to the left side **16** by a bushing **260**.

As can be seen in FIG. 4, the motor **138** and the controller **150** are positioned between the front end member **20** and the rotation or base axis **52** to, in turn, position their mass or weight and control the location of the center of gravity. That is, the weight of the motor and the electrical components **150** create a cantilever effect because the mass thereof is displaced toward the front end member **20** a distance **262** to act as a counter balance upon rotation of the tread deck **12** from the first position shown in FIG. 1 to the second position shown in FIG. 2, as well as here in FIG. 4.

As also seen in FIG. 4, a cross support **264** is interconnected such as by welding between the left side **16** and the right side **18** in order to receive the incline mechanism **152**. That is, an incline mechanism **152** shown here in FIG. 4, as well as in the exploded view of FIG. 5, includes a motor **264** interconnected through a reduction gear mechanism **266** and pinion **270** to a rack **268**. Operation of motor **265** causes the pinion **270** to drive the rack **268** forward and rearward **272** to, in turn, drive an extension **274**. The rack **268** is connected

5,772,560

9

to the extension 274 by a pin 276 or any other acceptable mechanical means.

The motor 265 and the reduction gear 266 are connected by a metal or rigid strap 278 to a bracket 280. The strap 278 has an aperture formed therein to receive a pin 282. Spacer 284 maintains the strap 278 in alignment. Thus, the motor 265 with reduction gear 266 is pivotally connected to the cross member 265. The motor 264 is electrically controlled via conductors 286 from the controller 150 which, in turn, receives control signals from the control panel 102.

The extension 274 is here rotatably connected by a pin 288 to a cantilever 290 that is secured such as by welding to a cross member 292. The cross member 292 is connected to extend between and to be secured such as by welding to the right foot 34 and the left foot 160.

As better seen in FIG. 5, the rack 268 is connected by a pin 276 which is here secured by a threaded nut 294 or by a compression nut (not here shown). Similarly, the extension 274 is rotatably connected by pin 288 to the cantilever 290 by a pin 288 held in place by a cotter pin 296.

As also seen in FIG. 5, the right foot 34 has wheel 164 secured thereto by a bolt 298 secured in place by nut 300. The left foot 160 has a left wheel 168 secured thereto by bolt 302 and nut 304.

An alternate configuration of an inclination system is shown in FIG. 6. A leg 306 with a wheel 308 appended at its distal end 310 is rotatably secured to a side 312 of a tread base to rotate about an axle 314. A cantilever 320 is secured such as by welding to the cross member 318. An extension 322 is rotatably attached to the cantilever 320 to rotate about a bolt or pin 324.

The extension 322 is connected at its proximal end 325 by a pin or nut and bolt 326 to a pneumatic spring 328. The pneumatic spring 328 contains gas under pressure, a chamber and a movable piston.

The pneumatic spring 328 is operable by operation means which here includes an actuation means. More specifically, the operation means includes a cable 330 within a sheath 332. The cable 330 is connected to actuation means such as actuator 333 for operation by a user positioned on the endless belt of the tread deck when the tread deck is positioned in the first position for use in performing exercises. Movement of the actuator 333 causes the cable to move, in turn, operating the lever 334 to contact a pin 336 associated with the pneumatic spring 328. Compression of the pin 336 operates the cylinder to cause the piston rod 338 to extend or retract to thereby move rearward 340 or forward thereby causing the cantilever 320 to rotate clockwise 342 and, in turn, cause the cross member 318 to rotate 319 clockwise (increase inclination) or counter clockwise (to decrease inclination) as here shown in FIG. 6. Rotation of the cross member 318 clockwise 342 causes the foot 306 to rotate relative to the side 312 and, in turn, the endless belt to in turn vary the inclination of the side 312 and the endless belt relative to the support surface.

In order to increase the elevation, the user may move his weight rearward on the endless belt. That is, the user may move (such as in FIG. 1) from the forward portion of the tread base towards the rear portion of the tread base to, in turn, vary the lever arm and increase the force downward on the foot 306 to, in turn, urge the extension 322 inward or outward and, in turn, cause the inclination to increase or decrease. The force of the user moving rearward on the front deck is sufficient to overcome and exceed the force being exerted by the pneumatic spring 328. It can be seen that the pneumatic spring 328 is secured to a bracket 345 that is

10

rotatably attached by a pin 344 to a cross member 346 which is secured to and in between the opposite sides of a tread base (not here shown) such as side 312.

In reference to FIG. 7, instead of a pneumatic cylinder, a coil spring 350 is positioned within a cylindrical housing 352 shown in cutaway. The cylindrical housing 352 is rotatably attached to rotate about a pin 354 at one end. The cylindrical housing 352 also has an extension 356 with an aperture 358 for rotatable connection to an extension such as extension 322.

In operation, the spring mechanism of FIG. 7 may be used to vary the inclination of the endless belt of the tread base by the user varying the rotation of associated feet, such as foot 306. The foot may be pinned by positioning a pin or bolt through an aperture passing through one or both sides of the tread base, such as side 312, and one of a plurality of apertures formed in the foot such as foot 306. The user may use his hand or his foot to apply downward pressure to the tread base in order to vary the inclination to overcome the force of the spring 350.

Turning now to FIG. 8, the latching mechanism 110 is here shown in an exploded view in association with the left upright member 44 of the upright structure 42. As can be seen in FIG. 8, the upward or distal end 360 of the upright 44 reveals that the upright 44 is, in fact, a hollow rectangular channel. One surface 362 of the upright 44 is formed with an arcuate recess 364 formed to receive the circular in cross section left non-movable rigid handle 80 and more particularly the first portion 82 of the left non-movable handle. The inner end 366 of the first portion 82 is positioned within the hollow portion of the upright 44 as shown. A top clamp 368 is sized and configured to snugly fit over the distal end 360 of the upright 44. The top clamp 368 has apertures 370 formed in one side 372. Similar apertures 374 are formed in the opposite side 376 (FIG. 9). Associated screws 378 and 380 pass through the apertures 370 and 374 to register with corresponding apertures 363 formed in the upright 44 to secure the top clamp 368 and the inner end 366 thereto.

As can be seen, the clamping structure 368 has a semi-circular portion 384 formed to register with the first portion 82 of the left rigid handle structure to snugly hold the first portion 82 of the left rigid handle structure 80 in place and to resist or inhibit outward 386 movement of the first portion 82 of the left rigid handle structure.

In FIG. 8, it can also be seen that the top clamp 368 securely receives the support bar 104 into an appropriately sized aperture 388. The support bar 104 is sized in cross section to snugly and slidably insert into the aperture 388. A base 390 is shown secured or fastened to the support bar 104. The base 390 is fastened by either welding, gluing, brazing or similar means as desired. The control console 102 is fastened to the base 390.

As hereinbefore discussed, the treadmill 10 of the present invention may include latching means adapted to the tread base 12 and to the upright structure 42. The latching means is operable for releasably attaching the tread base 12 in the second position to the upright structure 42. The latching means includes a receiving mechanism 391 which is configured to receive a latch member such as latch bar 393 (FIG. 4). The latch member is configured to removably connect to the receiving mechanism 391. As here shown, the receiving mechanism 391 is attached to the top clamp 368 which functions as a housing. The top clamp 368 is positioned at the distal end 360 of the left upright 44.

The latch member is shown in FIG. 4 to be a cylindrically shaped bar 393 that extends outwardly and normally from

5,772,560

11

the left side 16. As the tread base 12 is rotated upwardly from the first position towards the second or storage position, the latch member moves inwardly 394 towards the cam surface 396 of lever member 398. As here seen, the lever member 398 is rotatably attached to the top clamp 368 within a housing 399 to rotate about a pin 400 that functions like an axle. The lever member 398 rotates between a first position, as shown in FIG. 9, and a second position in which the lever member 398 is rotated counterclockwise 402. That is, the latch member is urged against the cam surface 396 thereby generating a force to urge the cam end 404 of the lever member 398 downwardly against a resistance. That resistance is here provided by a spring means. The spring means may be any form of acceptable spring, including a coil spring, a leaf spring or even a clock spring associated with the pin 400. However, as illustrated in FIG. 9, the spring as here shown is a block of an elastically deformable polyurethane sponge 406 or any other rubber-like or elastically compressible substance. In other words, any acceptable spring may be used to urge the lever member 398 from a displaced or second position to the at rest or first position as shown in FIG. 9.

The lever member 398 has a lower surface 408 configured to act against the sponge 406 to compress it upon counterclockwise rotation 402. Counterclockwise rotation 402 can also be effected by grasping the handle means 410 formed at a distal end 412. The handle mean is formed by shaping the distal end 412 to provide a space 414 between the distal end 412 and the upper surface 416 of the top clamp 368 so the user may place one's finger about the distal end 412 and, more particularly, about the handle 410 in order to urge it in a counterclockwise direction 402 out of the housing 399. Therefore, the lever member 398 may be manually rotated so that the latch member may be moved from the receiving portion 418. As here seen, the receiving portion 418 is a cylindrically shaped recess sized and shaped to receive the cylindrically shaped bar 393.

In use, the tread base 12 may be moved from the first position as shown in FIG. 1 to the second position shown or storage position in FIG. 2. In moving from the first position to the second position, the bar 393 is urged against the cam surface 396 as hereinbefore stated. The user may grasp the left rigid handle structure 80, the right rigid handle structure 90, or both, while pushing on the rear end 22 or the rigid surface 32 to urge the tread base 12 and, in turn, the latch member into the receiving portion 418. Upon entry of the latch member into the receiving portion 418, the sponge 406 may operate to urge the lever member 398 from a displaced position (not shown) to the first position as shown in FIG. 9.

Those skilled in the art may recognize that other forms and shapes of a receiving portion 418, as well as a latch member, may be used in order to facilitate an automatic latching arrangement of the type herein described. Similarly, the lever member 398 may be configured in a variety of shapes in order to permit displacement by a latch member on a cam surface following which the latch member enters a space or area provided to inhibit movement of the latch member from that space.

It may also be recognized that the lever member 398 may be positioned either on the distal end 360 of the left upright 44 or similarly on the distal end 91 of the right upright 46. Similarly, the lever 398 with a housing may be positioned on the tread base 12 to intersect with a latch member associated with the left upright 44 or right upright 46, as desired.

Turning now to FIG. 10, a simplified representation of a reorienting treadmill 420 is shown similar to the treadmill 10

12

shown in FIG. 1. The treadmill 420 is shown from the side view with a right upright 422 connected to a right foot 424 at an angle 426 here shown to be about 15°. The angle 426 may be from about zero to about 25°. The angle 426 is selected in order to position the center of gravity 440 of tread base 434, as well as the center of gravity 458 of the overall treadmill, as more fully discussed hereinafter.

As can be seen in FIG. 10, the illustrated treadmill has a control panel 428 connected to a cross support 430 which extends between the right upright 422 and the left upright (not shown). The treadmill 420 also has a right rigid handle structure 432 connected to the right upright 422. It also similarly has a left rigid handle structure connected to the left upright (not here shown). As here shown, the tread base 434 has a rear end 436 which extends upwardly as shown when the tread base 434 is positioned in the second or storage position as shown in FIG. 10.

The tread base 434 is rotatably connected to rotate about a base axis 438. The center of gravity 440 of the tread base 434 is positioned to be spaced upwardly 444 from the base axis 438. That is, from FIG. 4 it can be seen that the tread base 12 (FIG. 1) and similarly the tread base 434 have mass. Various components such as the motor 138 and electronics 150 (FIG. 4) are positioned so that the center of gravity 440 of the tread base 434 is above base axis or axis of rotation 438. Thus, upon movement of the tread base 434 from its first position to its stored or second position as shown in FIG. 10, the center of gravity 440 passes through vertical alignment with the axis of rotation. The tread base 434 is rotated until the center of gravity 440 is displaced clockwise past the vertical 446 a distance 448 selected to stably retain the tread base 434 in the second position with or without a latching means as hereinbefore discussed. That is, the location of the center of gravity 440 of the tread base 434 clockwise past the vertical 446 creates a lever arm to hold the tread base 434 in the second or stored position as shown.

As hereinbefore stated, the center of gravity 440 is selected to be displaced above the axis of rotation 438 at a preselected distance 444. The distance 444 is selected so that the weight or mass of the tread base 434 when acting downwardly at the center of gravity 440 is displaced toward the axis of rotation 438 to minimize the amount of upward or lifting force needed at the rear end 436 to lift the tread base 434 and move it from the first position toward and into the second position. The location of the center of gravity 440 may vary based on the size, weight, construction and shape of each individual model of treadmill. However, the center of gravity 440 and more particularly the location of the center of gravity 440 is selected so that the total amount of lifting force necessary to lift the rear end 436 when the tread base 434 is in the first position is such that a normal user may be able to easily lift and rotate the tread base from the first position to the second position.

It may also be seen in FIG. 10, that the foot 424 has an angled forward surface 450. The wheel 452 positioned in the front or forward end 454 of the right foot 424 is positioned to rotate about an axle 456. The wheel 452 is positioned so that it does not contact the support surface until the upright or support structure 422 is rotated or displaced from a first or standing position to a displaced position here shown in phantom as 420' with the upright identified as 422'.

It may be noted that in the standing position, the center of gravity 458 of the entire treadmill 420 is determined by the weight and mass of all of the components of the treadmill 420 and may be the same as or displaced from the center of



5,772,560

13

gravity 440 of the tread base 434. The center of gravity 458 of the entire treadmill 420 is desirably positioned at a height or distance 460 which may be above or below the center of rotation 438 but nonetheless close to the center of rotation 438. However, it must be placed above the foot 424 in order to facilitate rotation of the treadmill 420 from the configuration and position shown in solid in FIG. 10 to that shown in phantom in FIG. 10.

Desirably, the center of gravity 458 is rotatable to a position 458' to be generally positioned over the axle 456 of the wheel 452 to minimize the downward force or the lifting force necessary to be exerted by the user when holding the treadmill 420 in the position shown in phantom in FIG. 10. Of course the, position shown in phantom in FIG. 10 is the position for moving or pushing the treadmill 420 about the support surface from one location to another.

The treadmill of FIG. 10 is formed to have a left handle and a right handle available for grasping by the user to facilitate holding and moving the treadmill 420 when in the position shown in phantom in FIG. 10. The left handle and the right handle may be any structural component readily available for grasping by the user, while the user is moving the treadmill 420 when the treadmill 420 is in the orientation shown in phantom in FIG. 10. More particularly, the rigid handle structure 432 on both the left and the right side may be grasped by the user potentially along the first portion such as the first portion 92 and 82 of the rigid handles shown in FIG. 2 and in FIG. 1. Similarly, the user may be able to grasp and hold a portion of the support bar 430 in order to hold on to and urge or move the treadmill 420 when supported on the right wheel 452, as well as the corresponding left wheel (not here shown). Also, a portion of the top clamp 368 as well as the bracket 114, shown in FIG. 1, extends outwardly or over the respective distal ends 81 and 91 of the upright supports 44 and 46. That is, the clamp 460 shown in FIG. 10 and the clamp on the left side (not shown) may be grasped by the user to support and hold the treadmill 420 for movement about the support surface while supported by the wheel 452 on the right side, as well as a wheel similarly positioned on the left side.

Turning now to FIG. 11, an alternate configuration of the treadmill 470 has a tread base 472 comparable to tread base 12 in FIGS. 1 and 2. Similarly, it has support structure 474 including a left upright 476 and a right upright 477. It also has left rigid handle structure 480 and right rigid handle structure 482. As also shown, the treadmill 470 has a movable left handle 484 which is rotatably attached to the left upright 476 with a hand-operated knob 478 useful to tighten or secure the handle 484 and increase resistance or decrease resistance to rotation. As can be seen, the handle 484 has a gripping portion 486 configured for grasping by a user. A right handle 490 is here shown to be pivotally attached at an axis 488 to rotate thereabout. The right handle 490 also has a grip portion 492 positioned for grasping or movement by a user in a back and forth 481 or pivotal movement when the user is positioned on the endless belt 494.

Returning now to FIG. 4, it may also be noted that the tread base 12 has a deck 500 which extends between and is connected to the left side 16 and the right side 18. The tread deck 500 may be formed of any acceptable rigid material which may be acceptable plywood materials with a wax or slippery upper surface over which the endless belt 24 is trained and moves.

It may also be noted that the tread base 12 of FIG. 4 has a rear pulley 502 connected to extend between the left side

14

and the right side. The rear pulley 502 is adjustably positioned and movable forwardly and rearwardly by a bolt structure 504 on the left side. On the right side, a bolt structure 506 with an associated spring 508 is provided to provide movable or adjustable tension to the rear pulley 502 so that in use, the endless belt remains centered on the front pulley 252 and the rear pulley 502. Similarly, guides 510 and 512 may be secured to the deck 500 to extend away therefrom. The return portion 513 of the endless belt 24 may ride against the guides 510 and 512 to further facilitate centering of the endless belt 24 on the pulley 252 and rear pulley 502.

It may be also noted from FIG. 4 that the tread base 12 has a length 514 which is here selected to facilitate performance of walking, jogging or running exercises as desired. That is, the length 514 may vary for treadmills configured for walking and treadmills configured for jogging and running. In turn, the length of the tread 24 itself will vary as desired.

To use the reorienting treadmill of FIGS. 1, 2 and 4, it can be seen that the user must first move the tread base 12 from the upright or the stored position shown in FIGS. 2 and 4, to the first or operating position shown in FIG. 1. In the first or operating position, the user stands on the endless belt 24 and walks, jogs or runs to perform exercises. If the user desires to vary the inclination, the user may operate the switch on the control panel 102 to electrically operate the electrical auto-incline system shown in FIGS. 5 and 4. Alternately, the user may operate or manipulate an actuation member to, in turn, actuate a pneumatic cylinder of an inclination system such as that shown in FIG. 6 and move his or her weight back and forth on the endless belt to vary the downward movement and control inclination. Upon selection of the desired inclination, the user may, thereafter, operate control panel 102 through the use of safety switches and operating switches to energize the motor, such as motor 138 to, in turn, power the tread while performing exercises. In order to operate the treadmill in an electric configuration, the user must obviously provide energy to the system by inserting the plug 516 (FIG. 4) into a conveniently available wall outlet.

Referring now to FIGS. 12 and 13, an alternate reorienting treadmill 500 is shown. The reorienting treadmill 500 is similar to the treadmill of FIGS. 1, 2 and 4. It has support structure 502 with a tread base 504. The support structure 502 has a left foot 506 and a comparable spaced apart right foot (not shown) with interconnecting cross supports (not shown) to define a footprint similar to the footprint for the treadmill of FIGS. 1 and 2. The support structure 502 also has a left upright 508 and a spaced apart right upright (not shown), each secured to the respective left foot 506 and right foot by any means to provide a secure connection. Welding, bolts or the like are contemplated as acceptable means.

The tread base 504 is rotatably attached to and between the left upright 508 and the right upright such as by bolts 510 or other similar pins, bars or the like to function as an axle. The tread base 504 is rotatable between a first position 512, seen in FIG. 12, and a second or stored position 514, seen in FIG. 13. The tread base 504 rotates about the bolts 510.

For some users, the amount of lifting force (LF) necessary to rotate the tread base 504 upward or counterclockwise (as shown) from the first position 512 toward the second position 514, may be large enough so that rotation is difficult.

In some configurations, components such as an inertia wheel or motor may be located forwardly 516 and, more specifically, forward 516 of the bolts 510. The weight of such components and the related portion of the tread base 504 forward 516 of the bolts 510 will act as a counterbalance

5,772,560

## 15

to reduce the lifting force (LF) required to reorient the tread base **504** between the first **512** and second **514** positions.

In FIGS. **12** and **13**, a lift assistance assembly is also provided to apply a force or torque urging the tread base **504** from the first position **512** toward the second position **514**. More specifically, a gas cylinder **505** is rotatably attached at one end to bracket **503** secured to the tread base **504**. That is, the piston rod **505A** has a bushing **505B** that is attached by a pin or bolt **505C**. At its other end, the gas cylinder **505** is attached to bracket **501** which is itself attached to the left foot **506** or a cross member (not shown) extending between the left foot **506** and the right foot. Alternatively, the gas cylinder may be attached to the right foot and the right side of the tread base **504** (not shown). The gas cylinder **505** has a bushing **505D** held to the bracket **501** by a pin or bolt **505E**.

In operation, the gas cylinder **505** applies a torque force (TF) in the direction illustrated. The torque force (TF) is spaced from the axle bolts **510** a distance D that may be varied to increase the leverage and in turn the torque in foot-pounds. That is, gravitational forces (GF) are exerted on the mass of the tread base **504** to develop a torque, causing the tread base **504** to rotate toward the first position. The force and the torque (TF) exerted by the cylinder **505** is selected so that the resulting required lifting force (LF) may be nominal (e.g. 5 to 20 pounds).

FIGS. **12** and **13** also show the left foot **506** with a plurality of floor supports **499A** and **499B** attached thereto and extending therebelow for contact with the support surface. The floor supports **499A** and **499B** are preferably made of a material that may have a high coefficient of friction to avoid sliding or walking of the machine on the support surface. The floor supports **499A** and **499B** are also sufficiently soft to reduce the risk of scratching or marring a support surface such as wood or tile.

A pivotal handle **498** is also shown rotatably attached by a bracket **497** fixedly secured to the upright **508** by bolts **497A** and **497B**. A resistance knob **496** is also shown that is operable by the user to vary the resistance to movement of the handle **498**. A fixed handle **495** is also shown in FIGS. **12** and **13**.

Referring now to FIG. **14**, an alternative form of reorienting treadmill **590** is shown. It has a tread base **592** that is reorientable **593** from a first position **594** to a second position similar to the treadmills of FIGS. **1** and **2**. The tread base **592** rotates **593** about bolts **596** which are attached to left upright **598** and right upright (not shown). The left upright **598** and the right upright (not shown) are each attached to a respective left foot support **600** and a right foot support (not shown). Near the rear **602** of the tread base **592**, a pair of spaced apart supports are attached to support the tread base on a support surface. The left and right supports each have a leg **604** that is snugly and slidably movable in a housing **606**. The leg **604** has a plurality of apertures **608** which can be placed in registration with an aperture **610** in both sides of the housing. A pin **612** is insertable through the apertures **610** and **608** to position the leg **604** at a selected distance from the tread base **592** and to, in turn, vary the inclination of the tread base **592** relative to the support surface.

The treadmill **590** of FIG. **14** is shown with a flywheel housing **614** at its front end. The flywheel is connected to the endless belt (not shown) and receives energy from the user operating the endless belt of the tread base **592**. It also delivers energy to that endless belt as the user performs walking, running or jogging exercise when the user is suspended and not in contact with the endless belt.

## 16

Turning now to FIGS. **15** and **16**, an alternate elevation system **511** is shown attached proximate the rear **602** of tread base **592**. The elevation system may have two spaced apart assemblies comparable to the assembly **513** shown. The assembly **513** has a generally rectangular planar member **519** which is secured to the tread base **592** in a generally vertical orientation. The planar member **519** may be fabricated of metal and secured to the metal frame of the treadmill by bolts, welding or the like.

The assembly **513** has a support **515** that is an elongate planar member having a first end **514** and a second end **516**. The first end **514** is shaped to be an elongate finger-like extension which functions as a stop for the pawl **518**. The support **515** further has a ratchet section having a plurality of recesses or notches **520** along its perimeter. In the support **515** illustrated in FIG. **15**, three distinct notches **520A**, **520B** and **520C** are formed in the perimeter **521**. In other configurations, 2 or 4 or more notches may be present. The first notch **520A** substantially corresponds to the perimeter of a section of the pawl **518** whereby the pawl **518** may be surrounded on a plurality of its sides when that pawl **518** is inserted into the first notch **520A**.

The second notch **520B** is defined by the sides **528** and **530** of the perimeter **521** of the support **515**. The third notch **520C** is defined by the sides **532** and **534** of the support **515**.

The extension **536** may be viewed as being substantially a rectangularly configured section having a longitudinal axis **538** which is oriented to a horizontal axis **539** at an angle A. Given the essentially rectangular configuration of extension **536**, it should be understood that linear side **540** would also be oriented at an angle A to the horizontal. In a preferred construction, angle A may be within the range of 125 to 136 degrees and preferably 131 degrees.

The side **522** which extends from side **540** is oriented at an angle B from the horizontal. In preferred constructions, angle B may be within the range of zero to ten degrees, preferably four degrees. Side **524**, which extends from side **522**, is oriented at an angle C from the horizontal. Angle C is within the range of 22 to 34 degrees and preferably approximately 28 degrees. Side **526** which extends from side **524** is oriented at an angle D from the vertical. In preferred constructions, angle D may be within the range of 36 to 48 degrees and preferably 43 degrees.

Side **528** which extends from side **526** is oriented at an angle E from the horizontal. In a preferred construction, angle E is within the range of four to 15 degrees and preferably nine degrees. Side **530**, extending from side **528**, defines an angle F from the vertical. Angle F is preferably within the range of 17 to 29 degrees and preferably 23 degrees. Side **532**, which extends from side **530**, is oriented at an angle G from the horizontal. Angle G is within the range of five to fifteen degrees and preferably ten degrees. Side **534**, which extends from side **532**, is oriented vertically upright, i.e., at an angle of 90 degrees to the horizontal. Sides **526** and **530** are dimensioned to provide sufficiently deep notches to enable the top of the pawl **518** to be received in the notches **520B** and **520C** and form a detachable union with each notch to retain the support in a fixed orientation relative to the exercise apparatus.

The support **515** is rotatably connected to the planar member **519** by means of a pivot axle **542**. The pivot axle **542** is an elongate cylindrical member which extends outwardly and perpendicularly from the surface **521** of the planar member **519**. The axle **542** extends through a circular aperture **544** formed in the support **515**. The axle **542** may be fixedly secured to the planar member **519** while the

5,772,560

17

support **515** is rotatable about the axle **542**. Alternatively, the axle **542** may be fixedly secured to the support **515** and rotatably secured to the planar member **519**. The axle **542** may also be rotatably secured to the planar member **519** while the support **515** is rotatably secured to the axle **542**.

The end **516** of the support **515** may be adapted to a connection bar **546** which extends between two spaced apart supports. The opposing ends **548** of the bar **546** are fitted with end caps **550**. The end caps **550** are preferably fabricated from a material having a high coefficient of friction. The end caps **550** rest directly on the support surface and form the point of contact between the incline adjustment mechanism and the support surface. The opposite supports may be further interconnected to one another by means of a spacer bar **558**.

The pawl **518** is also a planar member having a somewhat rectangular configuration on one end **554** thereof and an angled surface **556** on its other end **558**. The pawl **518** is rotatably secured to the planar member **519** by a pivot axle **560**. Axle **560** may be configured as an elongate cylindrical shaft which is either fixedly or rotatably secured to the planar member **519** so that the pawl **518** is rotatable with respect to the planar member **519**.

A substantially V-shaped spring **562** is secured at its first end **564** to the planar member **519** by means of a pin **566**. The end **564** is formed into a substantially circular configuration which in turn is wrapped around the pin **566**. The opposing end **568** of the spring **562** is also formed into a generally circular configuration which in turn is also secured about a pin **570** which is affixed to the pawl **518**. The spring **562** is constructed to exert a force in the direction of arrow **572**. The spring **562** therefore urges the pawl **518**, and more specifically, the surface **556** to rotate clockwise into abutment against the support **515** proximate the notches **520A**, **520B** and **520C** of that support. Therefore, when the support **515** is rotated in a clockwise direction about axle **542**, for example by the operation of gravity as the end **602** of the tread base **592** is lifted, the pawl **518** is urged against the perimeter **521** of the support **515** which defines the notches. As the surface **556** of the pawl **518** is urged into one of the notches, the pawl **518** forms a detachable connection with the support **515**.

When the support **515** engages the support surface, such as a floor, the support **515** is urged to rotate in a counter-clockwise direction about its pivot axle **542**. Should the pawl **518** be secured in notch **520A** of the support **515** counter-clockwise rotation of support **515** is precluded by the pawl **518**. When the end **602** of the treadmill is lifted vertically, the weight of the bar **546** and other components at the end **516** of the support **515** urges the support **515** to rotate clockwise about the axle **542**. The spring **562** is configured such that the force applied to the pawl **518** is less than the torque or force urging clockwise rotation of the support **515**.

In lieu of the spring **562**, a weight may be attached to the pawl **518** to urge it to rotate clockwise from notch **520A** to notch **520B** and **520C**, but to rotate counterclockwise when the pawl **518** is urged to a more upright orientation by corner **574**. The operation of the assembly **513** is described more fully in U.S. patent application Ser. 539,249 filed Oct. 5, 1995, the disclosure of which is incorporated herein by reference.

It should be understood, however, that a non-motorized arrangement may also be used in which an inertia wheel comparable to a flywheel **140** is provided to provide or deliver torque or energy to the endless belt **24** while the user is walking, jogging or running.

18

Reference herein to the details of the illustrated embodiment is not intended to limit the scope of the claims which themselves recite those features which are regarded as essential to the invention.

What is claimed is:

1. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure; and

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position.

2. The treadmill of claim 1, wherein said lift means is a gas cylinder which continuously urges the tread base from said first position toward said second position.

3. The treadmill of claim 2, wherein said gas cylinder is attached to one of said left side and said right side at one end of the gas cylinder.

4. The treadmill of claim 3, wherein said upright structure has a left upright and a right upright with said tread base positioned therebetween, and wherein the other end of said gas cylinder is attached to the respective left upright and right upright.

5. The treadmill of claim 4, wherein said tread base rotates about an axis between said first position and said second position, and wherein said gas cylinder is attached to one of said left side and said right side between said axis and said rear.

6. The treadmill of claim 5, wherein the gas cylinder exerts a torque selected to be less than the torque of the gravitational force of the tread base.

7. A treadmill comprising:

support structure having feet means for positioning on a support surface and having a left upright structure and a right upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure to be rotatable about an axis of rotation between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure; and

a gas cylinder attached to said tread base between said rear and said axis of rotation and interconnected between one of said left side and said right side of said tread base and the corresponding one of said left upright structure and said right upright structure to continuously urge said tread base from said first position to said second position, said gas cylinder exerting a rotational torque less than the rotational torque of the gravitational force acting on the tread base in said first position.

8. The treadmill of claim 7, wherein in said second position said tread base is positioned proximate said left upright and said right upright.

5,772,560

19

9. The treadmill of claim 8, wherein said tread base is rotatably connected to and between said left upright and said right upright.

10. The treadmill of claim 8, further including rear feet means positioned proximate the rear of said tread base to support said tread base on a support surface. 5

11. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means; 10

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure; 15

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position; and 20

means for stably retaining said tread base in said second position relative to said upright structure. 25

12. The treadmill of claim 11, wherein said means for stably retaining said tread base in said second position

20

includes providing said tread base with a mass configured to position the associated center of gravity of said tread base to stably retain said tread base in said second position when said tread base is moved to said second position.

13. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure to be rotatable about an axis of rotation spaced from said front toward said rear between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, said tread base having mass with a center of gravity positioned to retain said tread base in said second position when said tread base is in said second position; and

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 5,772,560  
DATED : June 30, 1998  
INVENTOR(S) : Scott R. Watterson, et al

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Figure 5, referring to the motor, change "264" to --265--;  
In Figure 8, change "399" to --391--;  
In Figure 12, change "502" to --620--;  
In Figure 13, change "502" to --620--;  
In Figure 13, change "50" to --501--;  
In Figure 13, both instances, change "499" to --499A-- and --499B-- respectively;  
In column 5, line 40, after "width" change "67L" to --67W--;  
In column 8, line 4, after "left" change "leg" to --foot--;  
In column 8, line 13, after "feet" change "134" to --34--;  
In column 8, line 31, after "right upright" change "206" to --208--;  
In column 8, line 63, after "motor" change "264" to --265--;  
In column 9, line 8, after "cross member" change "265" to --264--;  
In column 9, line 8, after "motor" change "264" to --265--;  
In column 10, line 40, delete "clamping structure" and insert --top clamp--;  
In column 16, line 47, change "15degrees" to --15 degrees--;  
In column 17, line 15, change "558" to --556--;  
In column 17, line 33, change "572" to --592--.

Signed and Sealed this

Twenty-second Day of December, 1998

Attest:



BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks



(12) **EX PARTE REEXAMINATION CERTIFICATE** (8828th)  
**United States Patent**  
**Watterson et al.**

(10) **Number:** **US 5,772,560 C1**  
(45) **Certificate Issued:** **Jan. 31, 2012**

(54) **REORIENTING TREADMILL WITH LIFT ASSISTANCE**

(58) **Field of Classification Search** ..... None  
See application file for complete search history.

(75) Inventors: **Scott R. Watterson**, Logan, UT (US);  
**William T. Dalebout**, Logan, UT (US);  
**Timothy O. Armstrong**, Providence, UT (US)

(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/011,768, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

(73) Assignee: **Wilmington Trust FSB**, Minneapolis, MN (US)

*Primary Examiner*—Jeffrey R. Jastrzab

**Reexamination Request:**

No. 90/011,768, Jun. 27, 2011

(57) **ABSTRACT**

**Reexamination Certificate for:**

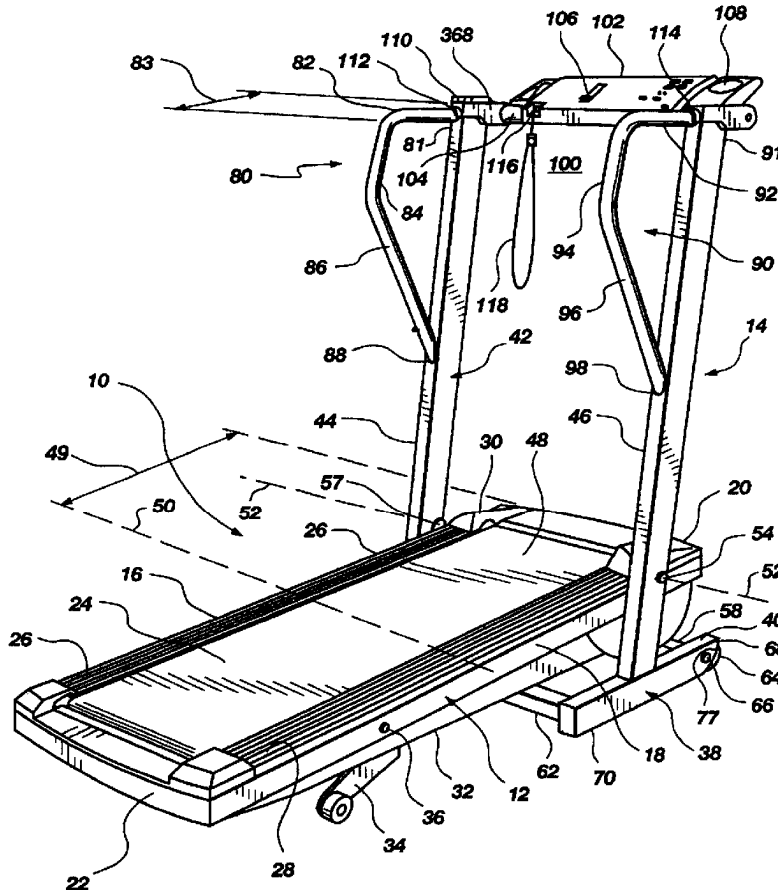
Patent No.: **5,772,560**  
Issued: **Jun. 30, 1998**  
Appl. No.: **08/593,802**  
Filed: **Jan. 30, 1996**

The treadmill has a tread base that is rotatably attached to and between a left upright and a right upright. The tread base is rotatable between a first position for performing exercises and an upright or storage position. A latching structure is provided to latch the tread base to the support structure. The treadmill also includes inclination structure for inclining the tread relative to the support surface when in the first position. The treadmill also includes rigid handles and in one configuration movable handles. The tread base also has a rigid undersurface or pan to fully enclose the underside of the tread base. A lift assist gas cylinder is also interconnected between the tread base and the feet attached to the uprights.

Certificate of Correction issued Dec. 22, 1998.

(51) **Int. Cl.**  
**A63B 22/02** (2006.01)

(52) **U.S. Cl.** ..... **482/54; 482/51**



US 5,772,560 C1

1

**EX PARTE  
REEXAMINATION CERTIFICATE  
ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

**Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-13 are cancelled.

New claims 14-37 are added and determined to be patentable.

14. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis between the first position and the second position;

a counterbalance mass positioned so that its center of gravity is located between the front of the tread base and said axis so as to counteract rotation of the tread base from said second position to said first position, wherein said counterbalance mass comprises an electric motor that is mounted to said frame and that is configured to rotate the endless belt; and

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position.

15. The treadmill of claim 14 wherein said lift means comprises a gas cylinder.

16. The treadmill of claim 14 further comprising a cover for the underside of the motor.

17. The treadmill of claim 14 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

18. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis between the first position and the second position; and

2

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position, wherein said lift means comprises a gas cylinder with a first end attached to the feet means and with a second end attached to the tread base at a point between said axis and the rear of said tread base.

19. The treadmill of claim 18 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

20. The treadmill of claim 18 wherein (a) said upright structure has a left upright and a right upright, defining an area disposed directly between the left and right uprights, with at least a portion of said tread base being positioned in the area disposed directly between the left and right uprights when in the first position, and wherein (b) when the tread base is in the first position, the gas cylinder applies a torque force to the second end of the gas cylinder that urges the second end of the gas cylinder in an upward direction away from said feet means so as to urge the tread base toward the second position, and wherein (c) a larger portion of the tread base is positioned in the area disposed directly between the left and right uprights in the second position than in the first position.

21. The treadmill of claim 20 wherein the second end of said gas cylinder is attached to a side of the tread base between a top surface and a bottom surface of the tread base, wherein the second end of the gas cylinder is located outside of the area disposed directly between said left upright and said right upright when the tread base is positioned in the first position.

22. The treadmill of claim 20 wherein as the tread base is being rotated into said second position from said first position, the second end of said gas cylinder passes into the area directly disposed between said left upright and said right upright.

23. The treadmill of claim 18 wherein, when the tread base is in the first position, the gas cylinder applies a torque force to the second end of the gas cylinder with a component that urges the second end of the gas cylinder towards said axis and with a component that urges the second end of the gas cylinder away from said feet means.

24. The treadmill of claim 23 wherein the second end of the gas cylinder, attached to the tread base, is disposed vertically above said axis when the tread base is in the second position.

25. The treadmill of claim 23 wherein, when the tread base is positioned for operation in the first position, the distance between the first end and the second end of the gas cylinder is less than the distance between the first end of the gas cylinder and the axis.

26. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis from the first position to the second position;

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position;

US 5,772,560 C1

3

one or more wheels, each attached to said feet means; and the tread base having a mass with a center of gravity that is positioned such that when said tread base is in the second position, the center of gravity is displaced from a vertical plane passing through said axis and in a direction toward said one or more wheels, thereby facilitating rotation of the treadmill about said one or more wheels when tilting the treadmill so that the treadmill can be rolled across the support surface.

27. The treadmill of claim 26, wherein the one or more wheels are suspended by the feet means so that they do not contact the support surface when the tread base is in the first position.

28. The treadmill of claim 26, wherein the one or more wheels are suspended by the feet means so that they do not contact the support surface when the tread base is in the second position unless the treadmill is sufficiently tilted in the direction of the one or more wheels so that the treadmill can be rolled across the support surface.

29. The treadmill of claim 26 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

30. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis between the first position and the second position;

a counterbalance mass positioned so that its center of gravity is located between the front of the tread base and said axis so as to counteract rotation of the tread base from said second position to said first position, wherein said counterbalance mass comprises an electric motor that is mounted to said frame and that is configured to rotate the endless belt; and

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position wherein said lift means comprises a gas cylinder with a first end attached to the feet means and with a second end attached to the tread base at a point between said axis and the rear of said tread base.

31. The treadmill of claim 30 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

32. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned

4

toward said support structure, wherein the tread base rotates about an axis from the first position to the second position;

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position wherein said lift means comprises a gas cylinder with a first end attached to the feet means and with a second end attached to the tread base at a point between said axis and the rear of said tread base;

one or more wheels, each attached to said feet means; and the tread base having a mass with a center of gravity that is positioned such that when said tread base is in the second position and the gas cylinder is fully extended, the center of gravity is displaced from a vertical plane passing through said axis and in a direction toward said one or more wheels, thereby facilitating rotation of the treadmill about said one or more wheels when tilting the treadmill so that the treadmill can be rolled across the support surface.

33. The treadmill of claim 32 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

34. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis between the first position and the second position;

said tread base further comprising a counterbalance mass positioned so that its center of gravity is located between the front of the tread base and said axis so as to counteract rotation of the tread base from said second position to said first position, wherein said counterbalance mass comprises an electric motor that is mounted to said frame and that is configured to rotate the endless belt;

lift means interconnected between said support structure and said tread base to urge said tread base from said first position to said second position;

one or more wheels, each attached to said feet means; and the tread base having a mass with a center of gravity that is positioned such that when said tread base is in the second position, the center of gravity of the tread base is displaced from a vertical plane passing through said axis and in a direction toward said one or more wheels, thereby facilitating rotation of the treadmill about said one or more wheels when tilting the treadmill so that the treadmill can be rolled across the support surface.

35. The treadmill of claim 34 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

36. A treadmill comprising:

support structure having feet means for positioning on a support surface and having upright structure extending upwardly from said feet means;



US 5,772,560 C1

5

a tread base having a frame that includes a front, a rear, a left side, a right side and an endless belt positioned between said left side and said right side, said frame being connected to said support structure spaced from said front toward said rear to be movable between a first position in which said endless belt is positioned for operation by a user positioned thereon and a second position in which said rear of said frame is positioned toward said support structure, wherein the tread base rotates about an axis between the first position and the second position;

said tread base comprising a counterbalance mass positioned so that its center of gravity is located between the front of the tread base and said axis so as to counteract rotation of the tread base from said second position to said first position, wherein said counterbalance mass comprises an electric motor that is mounted to said frame and that is configured to rotate the endless belt;

lift means interconnected between said support structure and said tread base to urge said tread base from said

6

first position to said second position wherein said lift means comprises a gas cylinder with a first end attached to the feet means and with a second end attached to the tread base at a point between said axis and the rear of said tread base;

one or more wheels, each attached to said feet means; and the tread base having a mass with a center of gravity that is positioned such that when said tread base is in the second position and the gas cylinder is fully extended, the center of gravity of the tread base is displaced from a vertical plane passing through said axis and in a direction toward said one or more wheels, thereby facilitating rotation of the treadmill about said one or more wheels when tilting the treadmill so that the treadmill can be rolled across the support surface.

37. The treadmill of claim 36 further comprising a latch for stably retaining the tread base in the second position relative to the support structure.

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