(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 December 2015 (17.12.2015)

WIPO | PCT

(10) International Publication Number
WO 2015/191445 Al

(51) International Patent Classification:
A63B 22/02 (2006.01) *A63B 23/035* (2006.01)
A63B 22/12 (2006.01)

(21) International Application Number:
PCT/US20 15/034665

(22) International Filing Date:
8 June 2015 (08.06.2015)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/009,607 9 June 2014 (09.06.2014) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available):* AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available):* ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17 :

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.1 7(H))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.1 7(in))*

[Continued on next page]

(54) Title: CABLE SYSTEM INCORPORATED INTO A TREADMILL

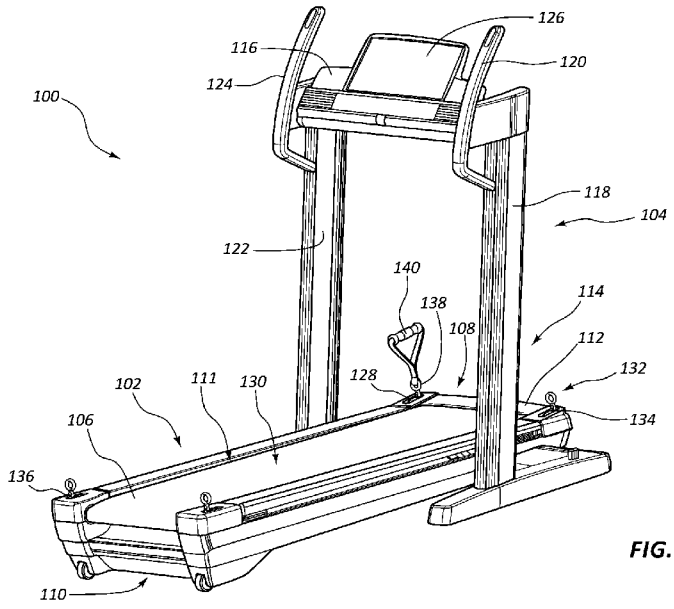

FIG. 1

(57) Abstract: A treadmill includes an opening formed in a surface of a running deck, a resistance mechanism incorporated into the running deck, and a cable threaded through the opening where the cable comprises a resistance end connected to the resistance mechanism and a pull end accessible through the running deck.

WO 2015/191445 A1

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

TITLE

Cable System Incorporated into a Treadmill

RELATED APPLICATIONS

[0001] This application claims priority to provisional Patent Application No. 62/009,607 titled "Cable System Incorporated Into a Treadmill" filed June 9, 2014, which application is hereby incorporated by reference for all that it discloses.

BACKGROUND

[0002] Aerobic exercise is a popular form of exercise that improves one's cardiovascular health by reducing blood pressure and providing other benefits to the human body. Aerobic exercise generally involves low intensity physical exertion over a long duration of time. Typically, the human body can adequately supply enough oxygen to meet the body's demands at the intensity levels involved with aerobic exercise. Popular forms of aerobic exercise include running, jogging, swimming, and cycling, among others activities. In contrast, anaerobic exercise typically involves high intensity exercises over a short duration of time. Popular forms of anaerobic exercise include strength training and short distance running.

[0003] Many choose to perform aerobic exercises indoors, such as in a gym or their home. Often, a user will use an aerobic exercise machine to have an aerobic workout indoors. One such type of aerobic exercise machine is a treadmill, which is a machine that has a running deck attached to a support frame. The running deck can support the weight of a person using the machine. The running deck incorporates a conveyor belt that is driven by a motor. A user can run or walk in place on the conveyor belt by running or walking at the conveyor belt' s speed. The speed and other operations of the treadmill are generally controlled through a control module that is also attached to the support frame and within a convenient reach of the user. The control module can include a display, buttons for increasing or decreasing a speed of the conveyor belt, controls for adjusting a tilt angle of the running deck, or other controls. Other popular exercise machines that allow a user to perform

aerobic exercises indoors include ellipticals, rowing machines, stepper machines, and stationary bikes, to name a few.

[0004] One type of treadmill is disclosed in U.S. Patent No. 5,527,245 issued to William T. Dalebout, et al. In this reference, an aerobic and anaerobic treadmill exercise system includes a treadmill apparatus, independent upper body exercise apparatus and independent lower body exercise apparatus. The independent upper body exercise apparatus and lower body exercise apparatus are integrally connected to the treadmill forming a unified exercise apparatus system. The upper body exercise apparatus may comprise independently movable arms used in conjunction with the treadmill for push-pull exercises or for butterfly-type exercises, an arm lift exercise apparatus, or an overhead pull type exercise apparatus. The lower body exercise apparatus may be a pull type apparatus. An adjustable cable resistance system is interconnected to the independent upper exercise apparatus and lower body exercise apparatus. Another type of treadmill is described in U.S. Patent No. 8,398,529 issued to Joseph K. Ellis, et al.

SUMMARY

[0005] In one aspect of the invention, a treadmill includes an opening formed in a surface of a running deck.

[0006] In one aspect of the invention, the treadmill includes a resistance mechanism incorporated into the running deck

[0007] In one aspect of the invention, the treadmill includes a cable threaded through the opening where the cable comprises a resistance end connected to the resistance mechanism and a pull end accessible through the running deck.

[0008] In one aspect of the invention, the resistance mechanism is a magnetic resistance mechanism.

[0009] In one aspect of the invention, the opening is formed in a corner of the running deck.

[0010] In one aspect of the invention, the surface is configured to support a user.

[0011] In one aspect of the invention, the resistance mechanism is disposed within the running deck.

[0012] In one aspect of the invention, the running deck comprises a deck frame and at least one pulley positioned to route the cable within the running deck is connected to the deck frame.

[0013] In one aspect of the invention, the treadmill comprises a motor that drives a tread belt of the running deck.

[0014] In one aspect of the invention, the pull end of the cable comprises a handle attachment.

[0015] In one aspect of the invention, the running deck is arranged to transition between a running orientation and a storage orientation about a pivot mechanism.

[0016] In one aspect of the invention, the pivot mechanism comprises an axle that supports a portion of the weight of the running deck.

[0017] In one aspect of the invention, the treadmill includes a first end of the axle that is configured to move within a first track formed along a first length of a first frame post of the treadmill and a second end of the axle is configured to move within a second track formed along a second length of a second frame post of the treadmill.

[0018] In one aspect of the invention, the first end comprises a first gear shaped to intermesh with a first rack of the first track and the second end comprises a second gear shaped to intermesh with a second rack of the second track.

[0019] In one aspect of the invention, the pull end is positioned to allow a user to pull the cable while the running deck is in the running orientation.

[0020] In one aspect of the invention, the pull end is positioned to allow a user to pull the cable while the running deck is in the running orientation.

[0021] In one aspect of the invention, a treadmill includes an opening formed in a surface of a running deck where the surface is configured to support a user when the running deck is oriented in a running orientation.

[0022] In one aspect of the invention, the treadmill includes a magnetic resistance mechanism disposed within the running deck.

[0023] In one aspect of the invention, the treadmill includes a cable threaded through the opening where the cable comprises a resistance end connected to the resistance mechanism and a pull end accessible through the running deck.

[0024] In one aspect of the invention, the running deck is arranged to transition between the running orientation and a storage orientation.

[0025] In one aspect of the invention, the pull end is arranged to allow the user to pull the cable with the running deck in either the running orientation or the storage orientation.

[0026] In one aspect of the invention, the running deck comprises a deck frame and at least one pulley positioned to route the cable within the running deck that is connected to the deck frame.

[0027] In one aspect of the invention, the pull end of the cable comprises a handle attachment.

[0028] In one aspect of the invention, the running deck is arranged to transition between the running orientation and the storage orientation about a pivot mechanism.

[0029] In one aspect of the invention, the pivot mechanism comprises an axle that supports a portion of the weight of the running deck.

[0030] In one aspect of the invention, a treadmill includes an opening formed in a corner of a surface of a running deck where the surface is configured to support a user when the running deck is oriented in a running orientation.

[0031] In one aspect of the invention, the treadmill includes a motor that drives a tread belt of the running deck.

[0032] In one aspect of the invention, the treadmill includes a magnetic resistance mechanism disposed within the running deck.

[0033] In one aspect of the invention, the running deck comprises a deck frame and at least one pulley positioned to route the cable within the running deck is connected to the deck frame.

[0034] In one aspect of the invention, the treadmill includes a cable threaded through the opening where the cable comprises a resistance end connected to the resistance mechanism and a pull end accessible through the running deck.

[0035] In one aspect of the invention, the pull end of the cable comprises a handle attachment.

[0036] In one aspect of the invention, the running deck is arranged to transition between the running orientation and a storage orientation about a pivot mechanism.

[0037] In one aspect of the invention, the pivot mechanism comprises an axle that supports a portion of the weight of the running deck.

[0038] In one aspect of the invention, the treadmill includes a first end of the axle that is configured to move within a first track formed along a first length of a first frame post of the treadmill and a second end of the axle is configured to move within a second track formed along a second length of a second frame post of the treadmill.

[0039] In one aspect of the invention, the first end comprises a first gear shaped to intermesh with a first rack of the first track and the second end comprises a second gear shaped to intermesh with a second rack of the second track.

[0040] In one aspect of the invention, the pull end is arranged to allow the user to pull the cable with the running deck in either the running orientation or the storage orientation.

[0041] Any of the aspects of the invention detailed above may be combined with any other aspect of the invention detailed herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042] The accompanying drawings illustrate various embodiments of the present apparatus and are a part of the specification. The illustrated embodiments are merely examples of the present apparatus and do not limit the scope thereof.

[0043] **FIG. 1** illustrates a perspective view of an example of a treadmill in accordance with the present disclosure.

[0044] **FIG. 2** illustrates a top view of the treadmill depicted in FIG. 1 with a console and frame posts removed.

[0045] **FIG. 3** illustrates a top view of a corner of a running deck of the treadmill depicted in FIG. 1.

[0046] **FIG. 4** illustrates a side view of the treadmill depicted in FIG. 1.

[0047] **FIG. 5** illustrates a side view of the treadmill depicted in FIG. 1 with a running deck in a storage orientation.

[0048] **FIG. 6** illustrates a side view of the treadmill depicted in FIG. 1 with a running deck in a running orientation.

[0049] **FIG. 7** illustrates a top view of the treadmill depicted in FIG. 1 with a tread belt and a belt support surface removed.

[0050] **FIG. 8** illustrates a cross sectional view of an example of a resistance mechanism in accordance with the principles described in the present disclosure.

[0051] **FIG. 9** illustrates a side view of a frame post of a treadmill depicted in FIG. 1.

[0052] Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements.

DETAILED DESCRIPTION

[0053] The principles described herein include a treadmill that has a running deck configured to reside in a running orientation and a storage orientation. A pull cable and a pull cable resistance mechanism is also incorporated into the running deck. An opening in a running side of the running deck positions pull ends of the pull cable so that a user can pull the cables regardless of whether the running deck is in the running orientation or the storage orientation. For purposes of this application, the running side of the running deck includes any component of the running deck that is located on the same side of the running deck on which the user can walk or run. Such a running side includes rails, housing elements, structural elements and so forth incorporated into the running deck. A releasable handle may be connected to the cable's pull end to provide an easy grip to the user. The pull cable resistance mechanism resists the pulling force exerted by the user when pulling the pull cable.

[0054] Particularly, with reference to the figures, FIG. 1 depicts a treadmill 100. The treadmill 100 includes a running deck 102 that can support the weight of a user and that is attached to a frame 104. The running deck 102 incorporates a tread belt 106 that extends from a first pulley at a first location 108 to a second pulley at a second location 110. The underside of the tread belt's mid-section is supported by a low friction belt support surface 111 that allows the tread belt' s underside to move along the mid-section' s length without creating significant drag. The tread belt 106 is moved by a motor that is connected to the first pulley and is disposed within a housing 112 formed in a front portion 114 of the running deck 102. As the tread belt 106 moves, a user positioned on the tread belt 106 can walk or run in place by keeping up with the tread belt' s speed.

[0055] A control console 116 is also supported by the frame 104. In the example of FIG. 1, a first frame post 118 positions a first hand hold 120 near the control console 116, and a second frame post 122 positions a second hand hold 124 near the control console 116 such that a user can support himself or herself during exercise. The control console 116 allows the user to perform a predetermined task while simultaneously operating an exercise mechanism of the treadmill 100 such as control parameters of the running deck 102. For example, the control console may include controls to adjust the speed of the tread belt 106, adjust a volume of a speaker integrated into the treadmill 100, adjust an incline angle of the running deck 102, adjust a decline of the running deck 102, adjust a lateral tilt of the running deck 102, select an exercise setting, control a timer, change a view on a display 126 of the control console 116, monitor the user's heart rate or other physiological parameters during the workout, perform other tasks, or combinations thereof. Buttons, levers, touch screens, voice commands, or other mechanisms may be incorporated into the control console 116 incorporated into the treadmill 100 and can be used to control the capabilities mentioned above. Information relating to these functions may be presented to the user through the display 126. For example, a calorie count, a timer, a distance, a selected program, an incline angle, a decline angle, a lateral tilt angle, another type of information, or combinations thereof may be presented to the user through the display 126.

[0056] In the example of FIG. 1, openings 128 are formed in the running side 130 of the running deck 102. A pull end 132 of pull cables 134 are located at the openings 128. Each of the pull cables 134 are routed within the running deck 102 and just the pull ends 132 are accessible through the running deck 102. For example, the pull ends 132 may be located outside of the running deck 102. In some examples, the pull ends 132 may be flush with the running deck 102. In yet other examples, the pull ends 132 may be retracted within the openings 128, but in such an example, the user may be able to reach into the opening 128 to access the pull ends 132, pull an object connected to the pull ends 132 to access the pull ends 132, or retrieve the pull end 132 with another mechanism. Each of the pull cables 134 has a resistance end which is connected to a resistance mechanism located within the running deck 102. As a user pulls on the pull ends 132 of the pull cables 134, the resistance mechanism resists the movement. While this example has been described with reference to openings being formed in the running side 130 of the running deck 102, the openings 128 may be

formed in any appropriate location of the running deck 102. For example, the openings 128 may be formed in the sides or the underside of the running deck 102.

[0057] The resistance setting may be adjustable through the console 116. Thus, a user may adjust the resistance of the resistance mechanism to a desired level based on the user's strength and goals. The user may perform anaerobic exercises by pulling on the pull cables 134. Thus, the treadmill 100 in the example of FIG. 1 provides the user with an ability to perform both aerobic exercises and anaerobic exercises. Any appropriate type of resistance mechanism may be used. For example, the resistance mechanism may be a magnetic resistance mechanism. Such a magnetic resistance mechanism may provide the desired resistance while the running deck 102 is oriented in a running orientation or a storage orientation. In other examples, the resistance mechanism comprises weights, springs, elastomeric material, other types of resistance mechanisms, or combinations thereof.

[0058] The pull end 132 of the pull cables 134 may include a stopper 136 that has a cross sectional thickness greater than the openings 128 to prevent the pull end 132 from going inside of the openings 128. Such a stopper 136 may be a ball, bead, block, another type of shape, or combinations thereof. While this example has been described with a stopper, in other example, the pull ends do not incorporate a stopper 136. Further, in examples with stoppers, the stopper 136 may cause the pull ends to be located outside the running deck, inside the running deck, flush with a surface of the running deck, or combinations thereof.

[0059] Also, the pull end 132 may include an eyelet 138 or another type of attachment mechanism that allows a handle 140 to be attached to the pull end 132. In some examples, the user can tie straps of a handle 140 to the eyelet 138 or other type of attachment. In other examples, the user can use a carabineer to connect the handle 140 to the pull end 132. In yet other examples, the user can use a quick release mechanism to attach the handle 140. Some quick release mechanisms may include an ability to snap the handle 140 into the pull end 132. In such an example, the user may release the handles from the pull end 132 by squeezing a release mechanism.

[0060] FIG. 2 illustrates a top view of a treadmill 100 with the console and frame posts 118, 122 removed for illustrative purposes. In this example, an opening 128 is located at a first corner 200, a second corner 202, a third corner 204, and a fourth corner 206 of the

running deck 102. A pulley 208 is located within the openings 128 that guides the pull cable 134 as the user pulls.

[0061] An axle 210 is positioned in a front section 212 of the running deck 102 that extends beyond the width 214 of the running deck 102. Thus, a first end 216 and a second end 218 of the axle 210 protrude beyond the edges 220 of the running deck 102. The first end 216 and the second end 218 are configured to engage the first frame post 118 and the second frame post 122 through a pinion 222 attached to each of the first end 216 and second end 218. A motor may cause the axle 210 to rotate, which turns the pinions 222 of the first and second ends 216 and 218. When the pinions 222 rotate in a first direction, the pinions 222 climb upwards along a track incorporated into the first and second frame posts 118, 122. When the pinions 222 rotate in a second direction, the pinions 222 descend along the track incorporated into the first and second frame posts 118, 122.

[0062] While this example has been described with specific reference to a pinion 222 attached to the ends 216, 218 of the axle 210, any appropriate attachment mechanism may be used in accordance with the principles described in the present disclosure. For example, a racket, a cam assembly, another type of gear, another type of mechanism, of combination thereof may be used.

[0063] FIG. 3 illustrates a top view of a corner 200 of a running deck 102 of the treadmill 100. In this example, the corner 200 includes an opening 128 with a pulley 208 disposed therein. The pulley 208 may rotate as the pull cable 134 moves to reduce friction between the pull cable 134 and the running deck's covering. Further, the pulley 208 may guide the pull cable 134 to move in desirable directions.

[0064] The opening 128 may include an opening width 300 and an opening length 302. The opening length 302 may be aligned with the length of the running deck 102. Further, the opening length 302 may be long enough to accommodate the length of the pulley 208 and thickness of the pull cable 134. The opening width 300 is wide enough to accommodate the thickness of the pull cable as well. The pulley 208 includes a V-shaped trough 304 shaped to center the pull cable 134 within the opening 128.

[0065] FIG. 4 illustrates a side view of a treadmill 100. In this example, the running deck 102 is oriented in a running orientation 400. Such a running orientation 400 orients the running deck so that a user can walk or run in place on the running side 130 of the

running deck 102. In some examples, the running deck 102 is substantially parallel with the surface upon which the treadmill 100 is supported while in the running orientation 400. However, in other examples, the running deck is inclined to increase the difficulty of the user's workout while in the running orientation 400.

[0066] The axle 210 depicted in the example of FIG. 2 may be incorporated into the treadmill 100 where the axle's first and second ends 216, 218 are connected to the first and second frame posts 118, 122 respectively. The first and second ends 216, 218 of the axle 210 may be connected to the frame posts 118, 122 in such a way that the first and second ends 216, 218 can move along the length of the frame posts 118, 122. For example, the first and second ends 216, 218 may include a pinion gear that moves up or down a toothed track incorporated into the frame posts 118, 122. A motor may rotate the axle 210 to cause pinions to engage the track to move the axle 210 in either the up or down direction. As the axle 210 moves, the front section 212 of the running deck 102 moves with the axle 210. Thus, the rotation of the axle 210 can adjust the incline/decline slope of the running deck 102 as well as position the running deck 102 into a storage orientation 402.

[0067] The storage orientation 402 may be an orientation of the running deck 102 where the length of the running deck 102 is substantially aligned with the length of the frame posts 118, 122. In such a position, the treadmill 100 takes up less floor space.

[0068] As the axle 210 positions the front section 212 of the running deck 102, a rear section 404 of the running deck moves with the front section 212. The rear section 404 is supported by wheels 406 that reduce the friction between the floor and the underside of the running deck 102.

[0069] FIG. 5 illustrates a side view of the treadmill 100 with a running deck 102 in a storage orientation 402. With the running deck 102 in the storage orientation 402, the openings 128 position the pull ends 132 of the pull cable 134 at angles that are well suited for a user to work out specific target muscles. For example, the openings 128 formed in the front section 212 of the running deck 102 may be positioned at an appropriate height for the user to pull the pull cable 134 to work out his upper back muscles, tricep muscles, chest muscles, and other muscles.

[0070] While the running deck 102 is in the storage orientation 402, the user may attach the handles 140 to any of the pull ends 132 as desired. For example, the user may

attach a handle 140 to pull ends 132 that are positioned within in openings 128 formed in the front section 212 or the rear section 404 of the running deck 102. A base 500 of the treadmill may remain stationary as the running deck 102 transitions between the storage orientation 402 and the running orientation 400. The base 500 may have a sufficient weight to keep the running deck upright as the user pulls on the pull cables 134 in situations where the user attaches the handles to the pull ends 132 positioned in the front section while the running deck is in the storage orientation 402. Thus, the weight of the base 500 may stabilize the treadmill 100 as the user performs anaerobic exercises when the running deck 102 is in the storage orientation 402. The pull ends 132 positioned in the rear section 404 are well suited to allowing the user to work out his upper back muscles, bicep muscles, chest muscles, and other muscles when the running deck 102 is in the storage orientation 400.

[0071] FIG. 6 illustrates a side view of the treadmill 100 with a running deck 102 in a running orientation 400. In this example, the user may pull any of the pull cables 134 while standing on the running deck 102. Such an arrangement is convenient for a user who desires to use the pull cables 134 without having to orient the running deck 102 into the storage orientation 402.

[0072] FIG. 7 illustrates a top view of the treadmill 100 with a tread belt 106 and a belt support surface 111 removed. In this example, the openings 128 are positioned in a first corner 200, a second corner 202, a third corner 204, and a fourth corner 206 of the running deck 102. An opening pulley 208 is disposed within each of the openings 128 to guide the pull cables 134 as the user pulls the pull cable 134. Additional internal pulleys 700 are positioned within the running deck 102 that route the pull cables 134 such that the pull ends 132 are positioned at the openings 128 and the resistance ends are attached to the resistance mechanism. In the example of FIG. 7, the pull cables 134 have been removed for illustrative purposes.

[0073] In the example of FIG. 7, the resistance mechanism is a magnetic resistance mechanism with a flywheel 702. The flywheel 702 may be made of a magnetically conductive material. In some examples, just a rim 704 or sections of the flywheel 702 are made of magnetically conductive material. An arm 706 is positioned adjacent to the flywheel 702, which is configured with a magnet that is constructed to resist movement of the flywheel 702. As the user pulls one of the pull cables 134, the flywheel rotates. However, the amount

of resistance applied to the flywheel 702 depends on the strength of the magnet in the arm 706 and the proximity of the arm 706. In some examples, the resistance is adjusted by adjusting the strength of the magnet. In other examples, the resistance is adjusted by changing the position of the arm 706 to change the arm's proximity to the flywheel 702.

[0074] In some examples, the flywheel 702 is oriented to rotate in a single direction. In such situations, the rotations of the flywheel can be counted with a sensor within the running deck 102. Such a flywheel rotation count can be used to determine how many times the flywheel has rotated, how fast the flywheel is rotating, and other parameters about the user' s workout. Such parameters may be used to determine an amount of calories burned during the user's workout, the force the user is exerting to pull the pull cables 134, other parameters, or combinations thereof.

[0075] A motor 708 may be positioned within the running deck 102 to rotate the axle 210. In some examples, a single motor is used. However, in other examples, multiple motors are used to move the running deck 102.

[0076] FIG. 8 illustrates a cross sectional view of a resistance mechanism of the treadmill 100. In this example, a central shaft 800 is rigidly connected to a body 802 of the flywheel 702. A bearing subassembly 804 is disposed around the central shaft 800 and is configured to transfer a rotational load imparted in a first direction to the flywheel 702 resulting from a user pulling on the pull cable 134. Concentric to the central shaft 800 and the bearing subassembly 804 is a spool subassembly 806 which is connected to at least one of the pull cables 134.

[0077] In a retracted position, a portion of a pull cable 134 connected to the spool subassembly 806 is wound in slots 808 formed in the spool subassembly 806. As the pull cable 134 is pulled by the user during a workout, the pull cable 134 exerts a force tangential to the spool subassembly 806 in the first direction and rotates the spool subassembly 806 in the first direction as the pull cable 134 unwinds. In some examples, a counterweight cable or a spring cable that is also connected to the spool subassembly 806 winds up in the slots 808 of the spool subassembly 806. This motion shortens the available amount of the counterweight cable or the spring cable and causes at least one of the counterweights to be moved or springs to be stretched. In examples with counterweights, when the force on the pull cable ceases, the force of gravity on the counterweight pulls the counterweight back to its

original position, which imposes another tangential force in a second direction on the spool subassembly 806 causing it to unwind the counterweight cable in the second direction. The motion of the counterweight cable unwinding, causes the pull cable 134 to rewind back into the slots 808 of the spool subassembly 806. This motion pulls the pull cable 134 back into the running deck 102 until the stoppers 136 attached to the pull ends 132 of the pull cables prevent the pull cables from entering the openings 128. In other examples, springs or other mechanisms can be used to retract the pull cables 134 back into the running deck 102.

[0078] As the spool subassembly 806 rotates in the first direction, the bearing subassembly 804 is configured to transfer the rotational load from the spool subassembly 806 to the central shaft 800 which transfers the rotational load to the flywheel body 802. As a result, the flywheel 702 rotates with the spool subassembly 806 in the first direction as the user pulls on the pull cables 134. However, as the spool subassembly 806 rotates in the second direction imposed by the counterweights, springs, or other mechanism returning to their original positions, the bearing subassembly 804 is not configured to transfer the rotational load from the spool subassembly 806 to the central shaft 800. Thus, no rotational load is transferred to the flywheel body 802. As a result, the flywheel 702 remains in its rotational orientation as the spool subassembly 806 rotates in the second direction. Consequently, the flywheel 702 moves in just the first direction.

[0079] While this example has been described with specific reference to the flywheel 702 rotating in just a single direction, in other examples, the flywheel is configured to rotate in multiple directions. Further, while this example has been described with reference to a specific arrangement of cables, pulleys, counterweights and/or springs, these components of the cable exercise machine 10 may be arranged in other configurations.

[0080] A sensor 812 can be arranged to track the rotational position of the flywheel 702. As the flywheel 702 rotates from the movement of the pull cables 134, the sensor 812 can track the revolutions that the flywheel 702 rotates. In some examples, the sensor 812 may track half revolutions, quarter revolutions, other fractional revolutions, or combinations thereof.

[0081] The sensor 812 may be any appropriate type of sensor that can determine the rotational position of the flywheel 702. Further, the sensor 812 may be configured to determine the flywheel's position based on features incorporated into the flywheel body 802,

the magnetically conductive rim 704, or the central shaft 800 of the flywheel 702. For example, the sensor 812 may be a mechanical rotary sensor, an optical rotary sensor, a magnetic rotary sensor, a capacitive rotary sensor, a geared multi-turn sensor, an incremental rotary sensor, another type of sensor, or combinations thereof. In some examples, a visual code may be depicted on the flywheel body 802, and the sensor 812 may read the orientation of the visual code to determine the number of revolutions or partial revolutions. In other examples, the flywheel body 802 includes at least one feature that is counted as the features rotate with the flywheel body 802. In some examples, a feature is a magnetic feature, a recess, a protrusion, an optical feature, another type of feature, or combinations thereof.

[0082] The sensor 812 can send the number of revolutions and/or partial revolutions to a processor as an input. The processor can also receive as an input the level of resistance that was applied to the flywheel 702 when the revolutions occurred. As a result, the processor can cause the amount of energy or number of calories consumed to be determined. In some examples, other information, other than just the calorie count, is determined using the revolution count. Further, the processor may also use the revolution count to track when maintenance should occur on the machine, and send a message to the user indicating that maintenance should be performed on the machine based on usage.

[0083] In some examples, the sensor 812 is accompanied with an accelerometer. The combination of the inputs from the accelerometer and the sensor 812 can at least aid the processor in determining the force exerted by the user during each pull. The processor may also track the force per pull, the average force over the course of the workout, the trends of force over the course of the workout, and so forth. For example, the processor may cause a graph of force per pull to be displayed to the user. In such a graph, the amount of force exerted by the user at the beginning of the workout verses the end of the workout may be depicted. Such information may be useful to the user and/or a trainer in customizing a workout for the user.

[0084] The number of calories per pull may be presented to the user in a display of the console 116. In some examples, the calories for an entire workout are tracked and presented to the user. In some examples, the calorie count is presented to the user through the display, through an audible mechanism, through a tactile mechanism, through another type of sensory mechanism, or combinations thereof.

[0085] While this example has been described with reference to the resistance mechanism being a magnetic resistance mechanism, any appropriate type of resistance mechanism may be used. For example, a braking system, a pneumatic system, a hydraulic system, an elastic system, a spring system, or another type of system may be used to resist the movement of the pull cables 134. In the example of FIG. 7, the resistance mechanism is positioned inside of the running deck 102. However, in other examples, the resistance mechanism may be located outside of the running deck 102. In one such example, the resistance mechanism is attached to the underside of the running deck.

[0086] FIG. 9 illustrates a side view of a frame post 118 of a treadmill 100. In this example, the frame post 118 includes a track 900 incorporated into the thickness of the frame post 118. The track 900 may include a toothed rack 902 into which the pinion 904 of the first end 216 of the axle 210 engages. A motor 708 is arranged to rotate the axle 210. As the axle 210 rotates, the pinion 904 attached to the first end 216 rotates with the axle 210. As the pinion 904 rotates, the pinion climbs or descends the toothed rack 902 such that the axle 210 (and thus the front section 212 of the running deck) moves with the axle 210.

[0087] While this example has been described with specific reference to an axle 210, toothed rack 902 and pinion 904, any appropriate mechanisms to move the front section 212 of the running deck 102 may be used in accordance with the principles described in the present disclosure. For example, a hydraulic mechanism may be used to move the front section 212 along the length of the frame posts 118, 122. In another example, multiple pinions may be driven by multiple motors to move the front section 212 along the length of the frame posts 118, 122. In yet other examples, magnetic, compressed gas, springs, other types of mechanism, or combinations thereof may be used to move the front section 212 along the lengths of the frame posts 118, 122.

INDUSTRIAL APPLICABILITY

[0088] In general, the invention disclosed herein may provide an exercise device that allows a user to perform both aerobic and anaerobic exercises. For example, the exercise device may be a treadmill with a running deck on which the user can walk or run in place. In addition to the tread belt of the running deck, the treadmill may also incorporate pull cables that allow the user to perform pulling anaerobic exercises. The ends of the pull cables may

be disposed in any appropriate location on the running deck or other location on the treadmill. In one example, the ends of the pull cables are positioned into openings that are formed in the running side of the running deck. A stopper prevents the ends of the pull cables from slipping into the running deck. The user can attach a handle to the ends of the pull cables. In other examples, the ends of the pull cables are permanently equipped with handles, a sufficient length of the cable for gripping, another gripping mechanism, or combinations thereof.

[0089] In some examples, the movement of the pull cables is resisted by a resistance mechanism disposed within the running deck. Thus, the tread belt can be positioned over the resistance mechanism. In some examples, the tread belt circumscribes the location where the resistance mechanism is located. Any appropriate type of resistance mechanism may be used, including a magnetic resistance mechanism. The resistance mechanism may be an independent mechanism from the mechanism that drives the tread belt. For example, the resistance mechanism may include a magnetic flywheel, and independent a motor drives the tread belt. Thus, the tread belt may be operated independently of the resistance mechanism. In some examples, however, movement of the tread belt also moves the resistance mechanism. In some examples, the treadmill includes an operational protocol that prevents the tread belt and the resistance mechanism to be operated at the same time even though the resistance mechanism is separate from the mechanism that drives the tread belt. However, in other examples, the tread belt and the resistance mechanism can be operated at the same time.

[0090] The running deck of the treadmill may include a running orientation and a storage orientation. A running orientation may include those orientations where a user can walk and/or run on the running deck. The storage orientation may include those orientations where a length of the running deck is substantially aligned with the length of the frame posts of the treadmill. The running deck may transition between such orientations by lifting the front section of the running deck. As the front section of the running deck is raised, the rear section of the running deck is dragged behind the front section. Wheels incorporated into the rear section of the running deck support the rear section as the rear section moves with the front portion. The wheels also reduce the friction between the weight of the running deck and the support structure (e.g. the floor upon which the treadmill rests).

[0091] One of the advantages of the principles described in the present disclosure is that a user can use the pull cables regardless of whether the running deck is in the storage orientation, the running orientation, or an orientation therein between. Thus, the user does not have to reorient the running deck if the user desires to perform exercises while the running deck is in the storage and/or running orientations. In some examples, specific angles from which the user desires to pull the pull cables to target a specific muscle group may be better suited with the running deck in a different orientation. In such situations, the user can increase the number of angles from which the user can target muscle groups by changing the orientation of the running deck.

[0092] The orientation of the running deck may be controlled by the user through the console. In other examples, a remote controller may be used to control the orientation of the running deck. In yet other examples, the user has an option to adjust the orientation of the running deck manually.

[0093] Another benefit of the principles described in the present disclosure is that a magnetic resistance mechanism may be well suited for tracking parameters of the user's workout. Such parameters may include determining the number of calories burned by the user, the amount of force generated by the user during the user's lift, other parameters, or combinations thereof. Such details and/or calculations may be presented to the user in the display of the console. Further, the details of the user' s aerobic workout may also be presented to the user in the control console. Thus, the treadmill may be capable of tracking both the user's aerobic and anaerobic workouts, and may combine details, such as the calorie count, into to single display.

[0094] Another advantage of the principles described herein is that the space within the running deck can accommodate the pull cables. The pull cables can be routed within the running deck such that the length of the pull cables are concealed when the pull cables are not pulled out by the user. Further, an appropriate number of internal pulleys may be used within the running deck to appropriately route each of the pull cables to the appropriate opening in the running side of the running deck. In some cases, some of the internal pulleys are tensioning pulleys. Thus, the appropriate tensioning of the pull cables may also be accomplished within the running deck.

[0095] In some examples, the resistance mechanism is a magnetic resistance mechanism that is incorporated into the running deck. Such a resistance mechanism may have a substantial mass that is located in the rear section of the running deck. As the front section of the running deck is raised, the rear section of the running deck remains relatively close to the ground. By keeping the rear section low while when the front section is raised (e.g. such as when the running is in the storage orientation), the mass of the resistance mechanism stays close to the ground. Keeping the resistance mechanism's mass at a low elevation increases the treadmill's stability when the running deck is in the storage position.

WHAT IS CLAIMED IS:

1. A treadmill, comprising;
an opening formed in a surface of a running deck;
a resistance mechanism incorporated into the running deck; and
a cable threaded through the opening where the cable comprises a resistance end connected to the resistance mechanism and a pull end accessible through the running deck.

2. The treadmill of claim 1, wherein the resistance mechanism is a magnetic resistance mechanism.

3. The treadmill of claim 1, wherein the opening is formed in a corner of the running deck.

4. The treadmill of claim 1, wherein the surface is configured to support a user.

5. The treadmill of claim 1, wherein the resistance mechanism is disposed within the running deck.

6. The treadmill of claim 1, wherein the running deck comprises a deck frame and at least one pulley positioned to route the cable within the running deck is connected to the deck frame.

7. The treadmill of claim 1, wherein the treadmill comprises a motor that drives a tread belt of the running deck.

8. The treadmill of claim 1, wherein the pull end of the cable comprises a handle attachment.

9. The treadmill of claim 1, wherein the running deck is arranged to transition between a running orientation and a storage orientation about a pivot mechanism.

10. The treadmill of claim 9, wherein the pivot mechanism comprises an axle that supports a portion of a weight of the running deck.

11. The treadmill of claim 10, wherein a first end of the axle is configured to move within a first track formed along a first length of a first frame post of the treadmill and a second end of the axle is configured to move within a second track formed along a second length of a second frame post of the treadmill.

12. The treadmill of claim 11, wherein the first end comprises a first pinion shaped to intermesh with a first rack of the first track and the second end comprises a second pinion shaped to intermesh with a second rack of the second track.

13. The treadmill of claim 9, wherein the pull end is positioned to allow a user to pull the cable while the running deck is in the running orientation.

14. The treadmill of claim 9, wherein the pull end is positioned to allow a user to pull the cable while the running deck is in the storage orientation.

15. A treadmill, comprising;

an opening formed in a surface of a running deck where the surface is configured to support a user when the running deck is oriented in a running position;

a magnetic resistance mechanism disposed within the running deck;

a cable threaded through the opening where the cable comprises a resistance end connected to the magnetic resistance mechanism and a pull end accessible through the running deck;

the running deck is arranged to transition between a running orientation and a storage orientation; and

the pull end is arranged to allow the user to pull the cable with the running deck in either the running orientation or the storage orientation.

16. The treadmill of claim 15, wherein the running deck comprises a deck frame and at least one pulley positioned to route the cable within the running deck is connected to the deck frame.

17. The treadmill of claim 15, wherein the pull end of the cable comprises a handle attachment.

18. The treadmill of claim 15, wherein the running deck is arranged to transition between the running orientation and the storage orientation about a pivot mechanism.

19. The treadmill of claim 18, wherein the pivot mechanism comprises an axle that supports a portion of a weight of the running deck.

20. A treadmill, comprising;

an opening formed in a corner of a surface of a running deck where the surface is configured to support a user when the running deck is oriented in a running position;

a motor that drives a tread belt of the running deck;

a magnetic resistance mechanism disposed within the running deck;

the running deck comprises a deck frame and at least one pulley positioned to route a cable within the running deck is connected to the deck frame;

the cable is threaded through the opening where the cable comprises a resistance end connected to the magnetic resistance mechanism and a pull end accessible through the running deck;

the pull end of the cable comprises a handle attachment;

the running deck is arranged to transition between a running orientation and a storage orientation about a pivot mechanism;

the pivot mechanism comprises an axle that supports a portion of a weight of the running deck;

a first end of the axle is configured to move within a first track formed along a first length of a first frame post of the treadmill and a second end of the axle is configured to move within a second track formed along a second length of a second frame post of the

treadmill;

the first end comprises a first gear shaped to intermesh with a first rack of the first track and the second end comprises a second gear shaped to intermesh with a second rack of the second track; and

the pull end is arranged to allow the user to pull the cable with the running deck is in either the running orientation or the storage orientation.

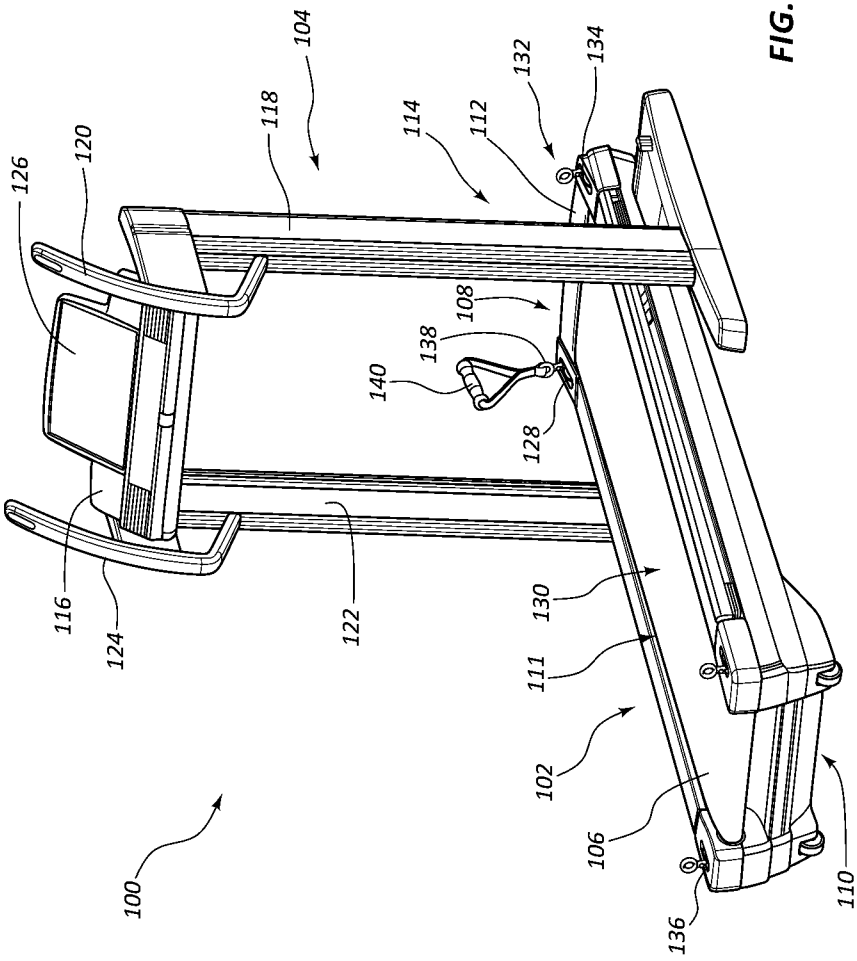
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FIG. 1

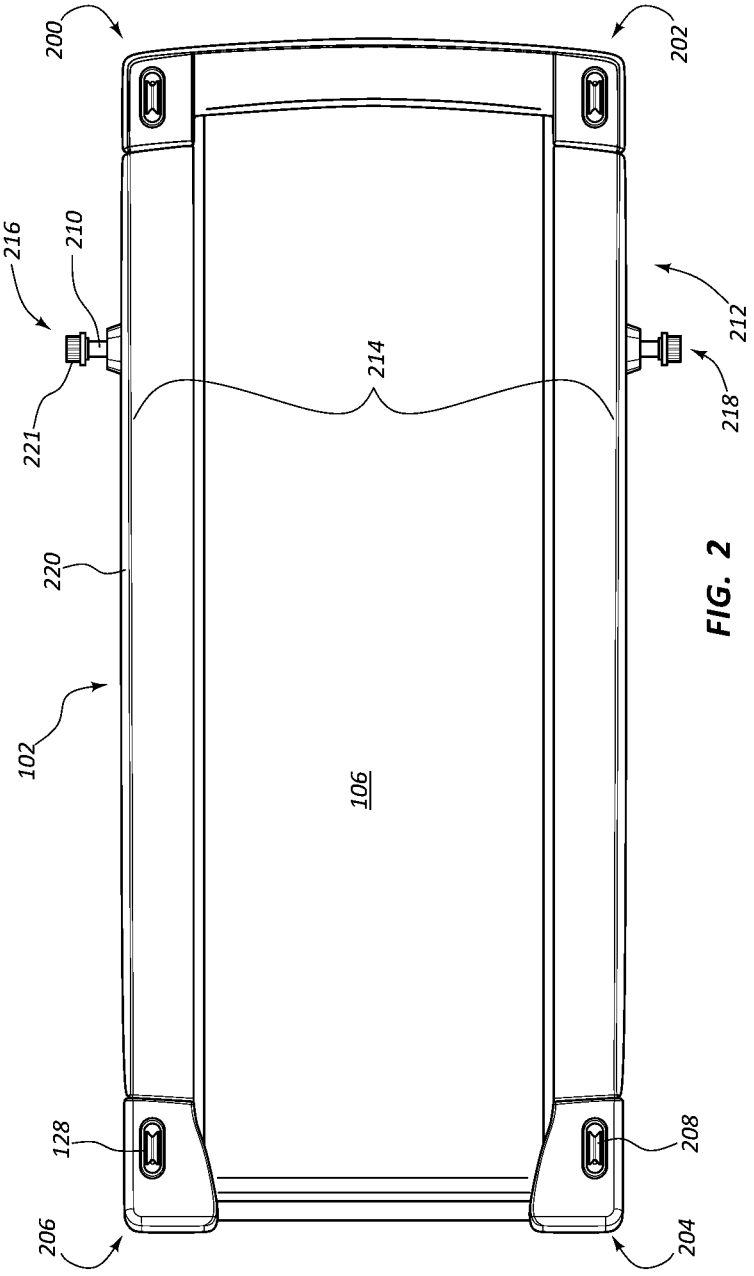


FIG. 2

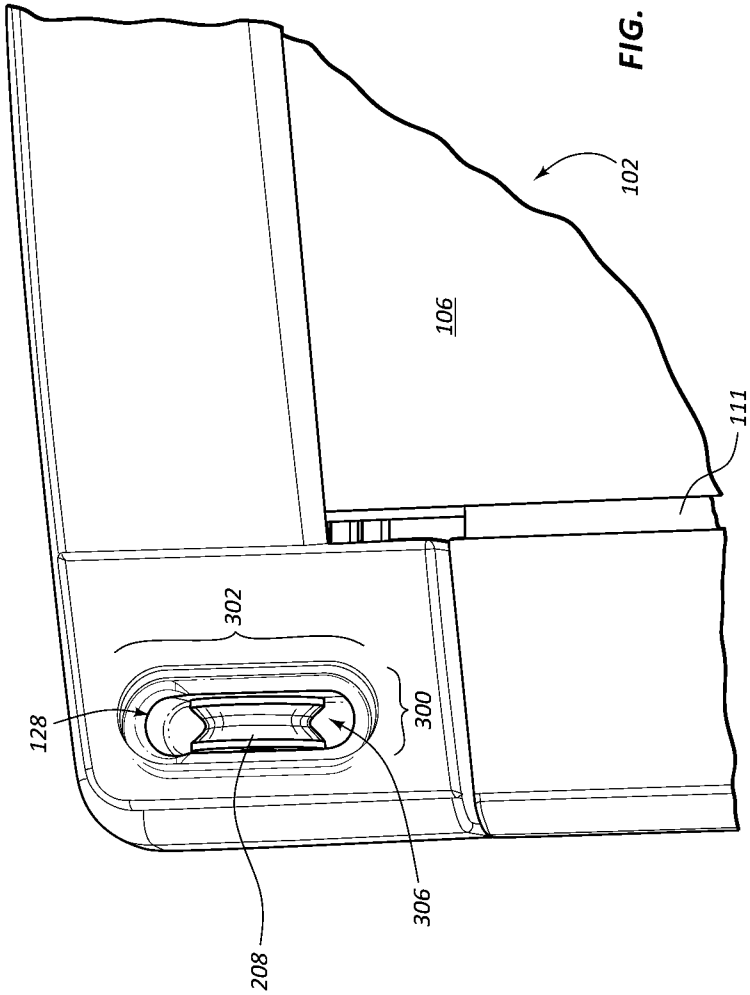


FIG. 3

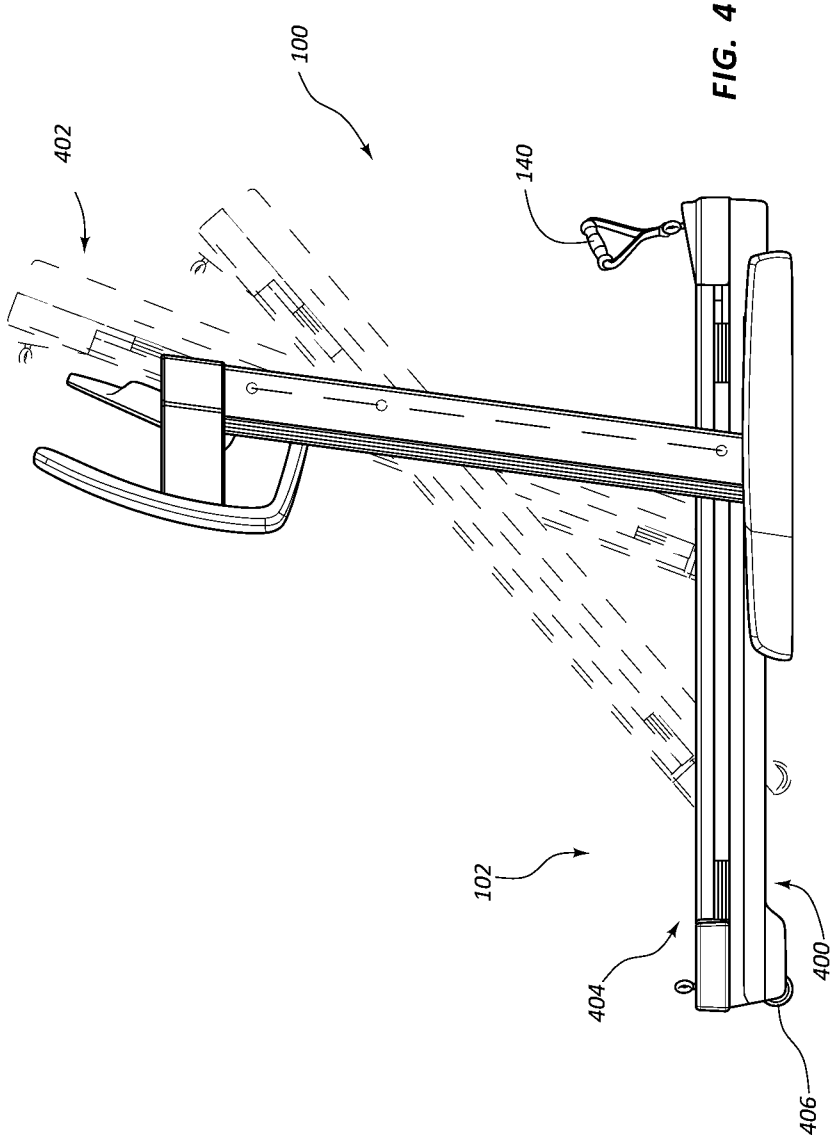


FIG. 4

FIG. 5

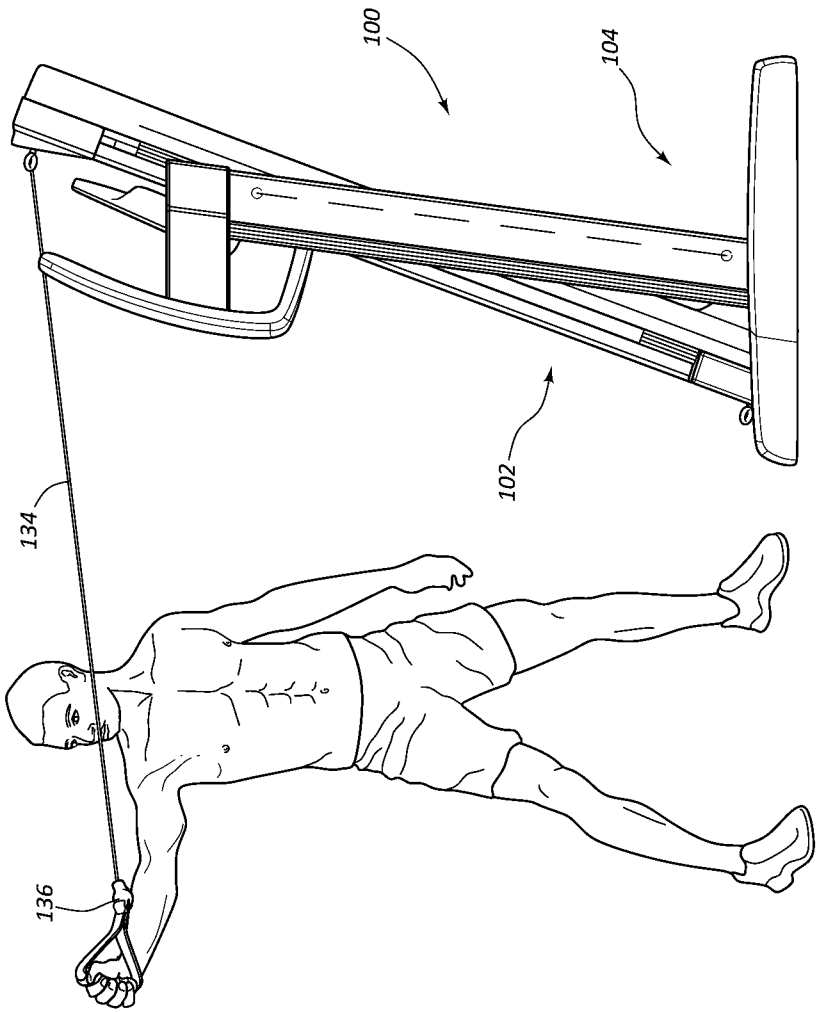
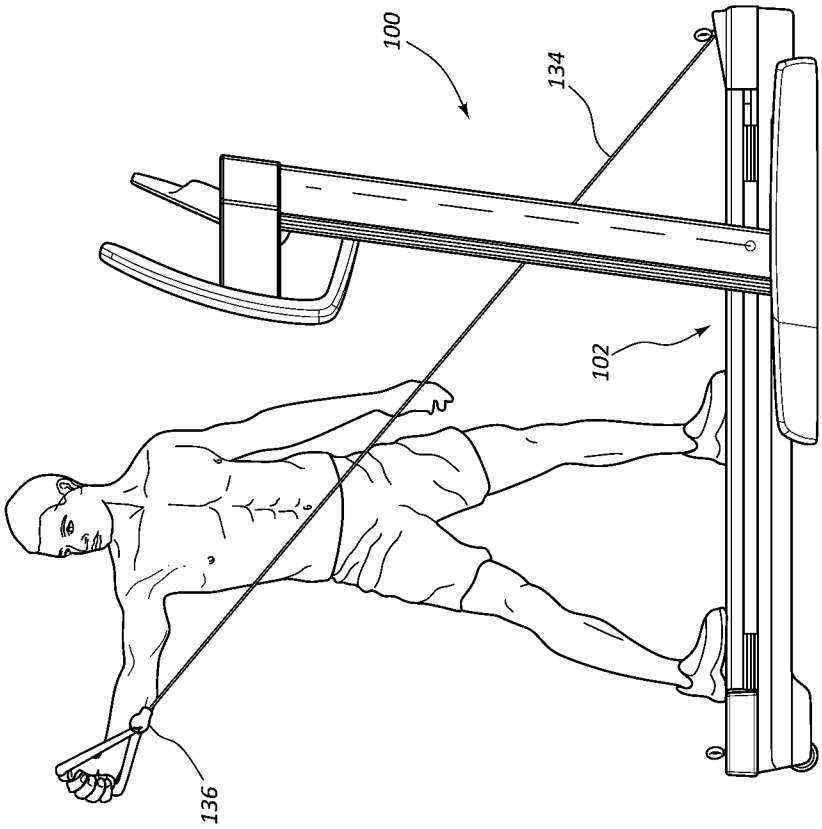


FIG. 6



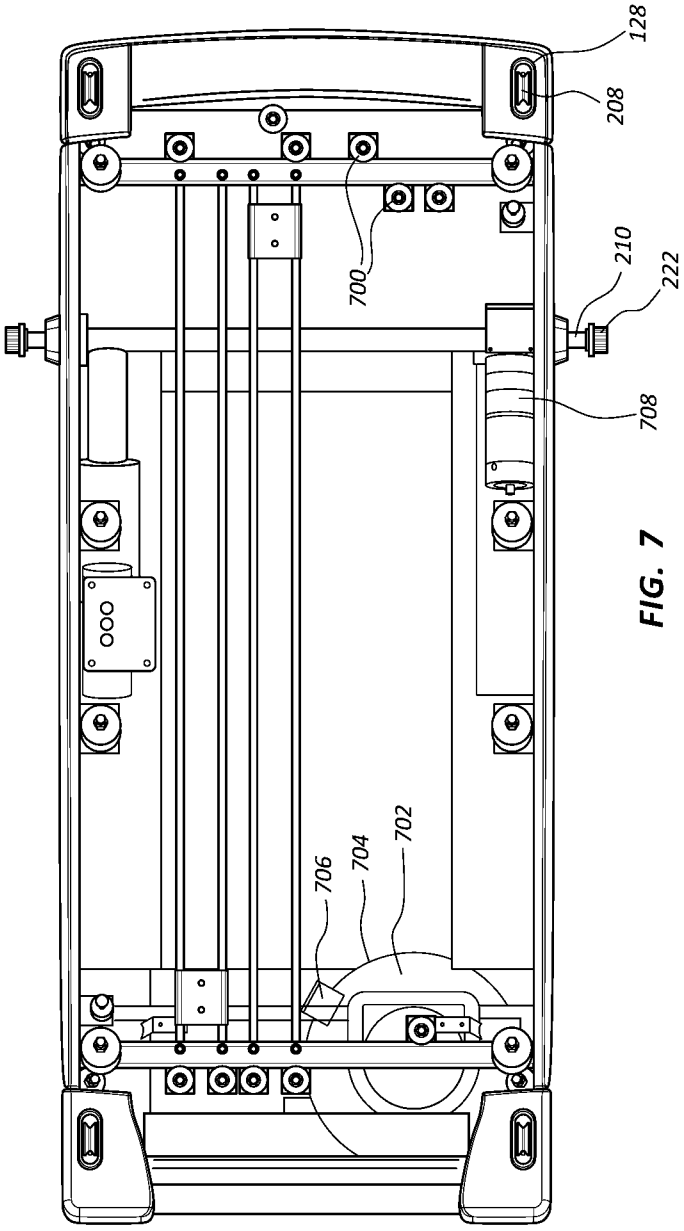


FIG. 7

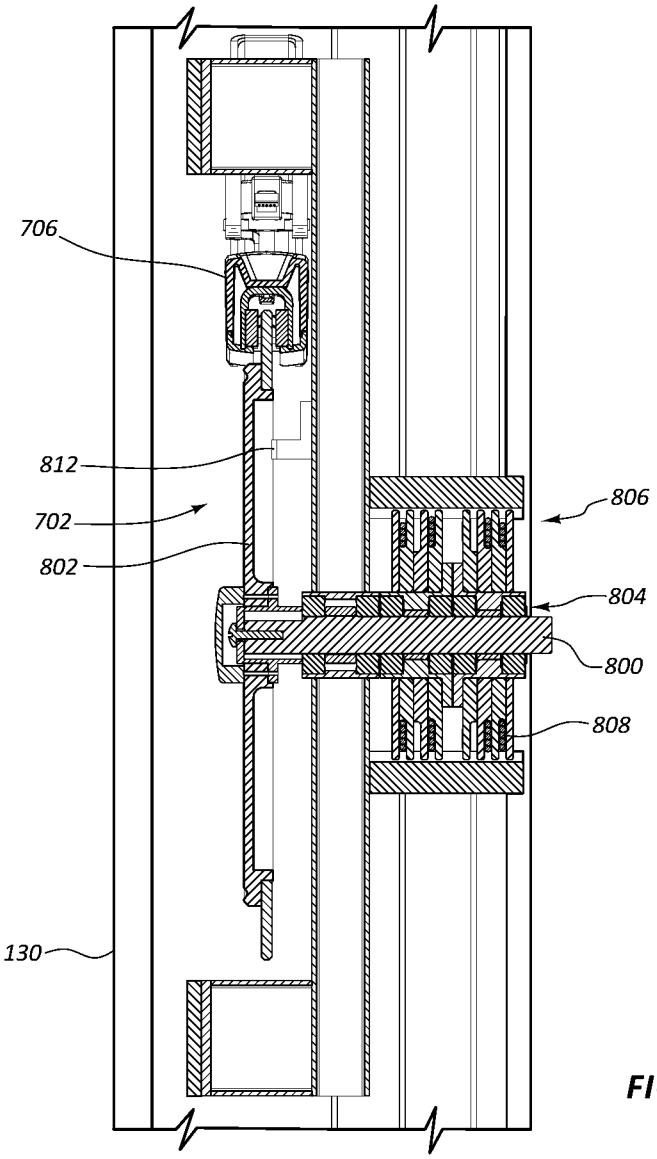


FIG. 8

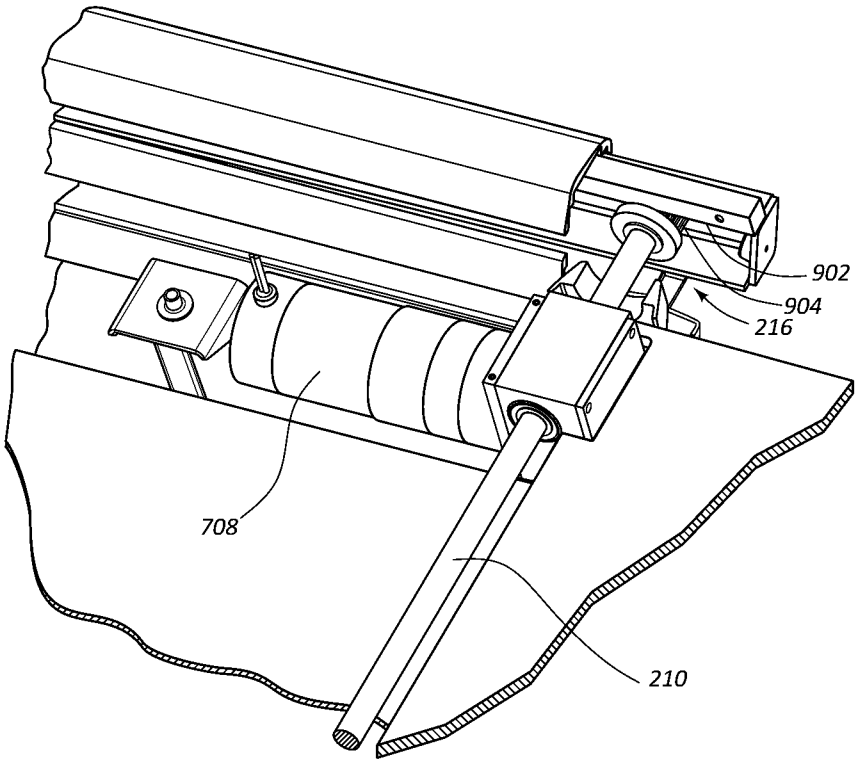


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/034665

A. CLASSIFICATION OF SUBJECT MATTER

A63B 22/02(2006.01)i, A63B 22/12(2006.01)i, A63B 23/035(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A63B 22/02; A63B ; A63B 22/00; A63B 2200; A63B 22/12; A63B 23/035

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & keywords: treadmill, cable, opening, resistance mechanism

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	W0 02-053234 A2 (WILKINSON) 11 July 2002 See claims 1, 6, 10; column 3, lines 31-38; column 5, lines 28-52; column 6, lines 2-3; column 9, lines 13-38; column 10, lines 31-39 and figures 1, 8-9.	1-8
Y		9-20
Y	US 2013-0123073 A1 (ICON HEALTH & FITNESS, INC.) 16 May 2013 See claims 1, 5, 7-8 and figure 1.	9-20
X	US 6123649 A (LEE et al.) 26 September 2000 See claims 1, 4, 7; column 4, lines 2-3; column 6, line 65 - column 7, line 39 and figures 16-17.	1-8
Y		9-20
X	US 7575537 B2 (ELLIS) 18 August 2009 See claims 1, 5 and figures 2-3, 14-15.	1-8
Y		9-20
X	US 6837830 B2 (ELDRIDGE) 04 January 2005 See claims 1, 3, 5, 8, 12-13 and figures 1-2.	1-8
Y		9-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 October 2015 (08. 10.2015)	**08 October 2015 (08.10.2015)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2015/034665

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02-053234 A2	11/07/2002	AU 2002-232894 Al	16/07/2002
		AU 2002-232894 A8	02/11/2006
		CA 2434165 Al	11/07/2002
		EP 1575676 A2	21/09/2005
		EP 1575676 A4	04/10/2006
		MX PA03006551 A	15/10/2004
		US 2002-0086779 Al	04/07/2002
		US 2004-0043873 Al	04/03/2004
		US 2004-0204294 A2	14/10/2004
		US 2005-0124471 Al	09/06/2005
		US 7775936 B2	17/08/2010
		WO 02-053234 A3	04/05/2006
		WO 2004-094003 A2	04/11/2004
		WO 2004-094003 A3	10/02/2005
		WO 2006-078778 A2	27/07/2006
		WO 2006-078778 A3	03/01/2008
US 2013-0123073 Al	16/05/2013	EP 2838623 Al	25/02/2015
		WO 2013-074243 Al	23/05/2013
US 6123649 A	26/09/2000	None	
US 7575537 B2	18/08/2009	CA 2777716 Al	21/04/2011
		CA 2777716 C	20/01/2015
		EP 2488261 Al	22/08/2012
		US 2008-0287267 Al	20/11/2008
		US 2009-0118103 Al	07/05/2009
		US 2011-0082011 Al	07/04/2011
		US 2011-0118090 Al	19/05/2011
		US 8007409 B2	30/08/2011
		US 8172729 B2	08/05/2012
		WO 2009-061674 Al	14/05/2009
US 6837830 B2	04/01/2005	AU 2003-287277 Al	07/06/2004
		AU 2003-287277 B2	07/12/2006
		CA 2504592 Al	21/05/2004
		CA 2504592 C	20/01/2009
		EP 1578503 A2	28/09/2005
		EP 1578503 A4	27/08/2008
		US 2004-0087418 Al	06/05/2004
		WO 2004-041367 A2	21/05/2004
		WO 2004-041367 A3	09/12/2004