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(54) **USER INTERFACE METHODS AND APPARATUS FOR CONTROLLING EXERCISE APPARATUS**

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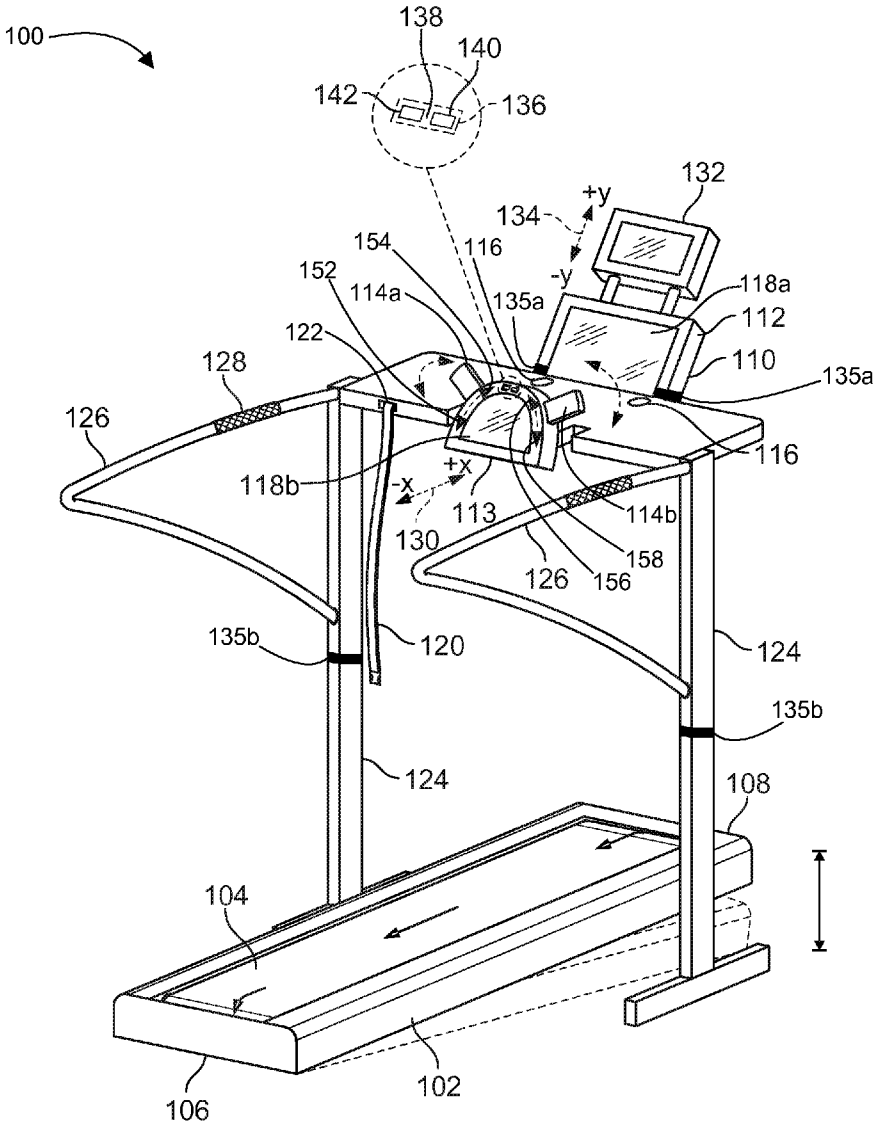
(57) **ABSTRACT**

User interface methods and apparatus for controlling exercise apparatus are disclosed. An example user interface includes an exercise parameter input and an indicator associated with the exercise parameter input, and a control unit to activate the indicator in response to a training routine to prompt a user of the exercise apparatus to adjust an operation of the exercise apparatus via the exercise parameter input.



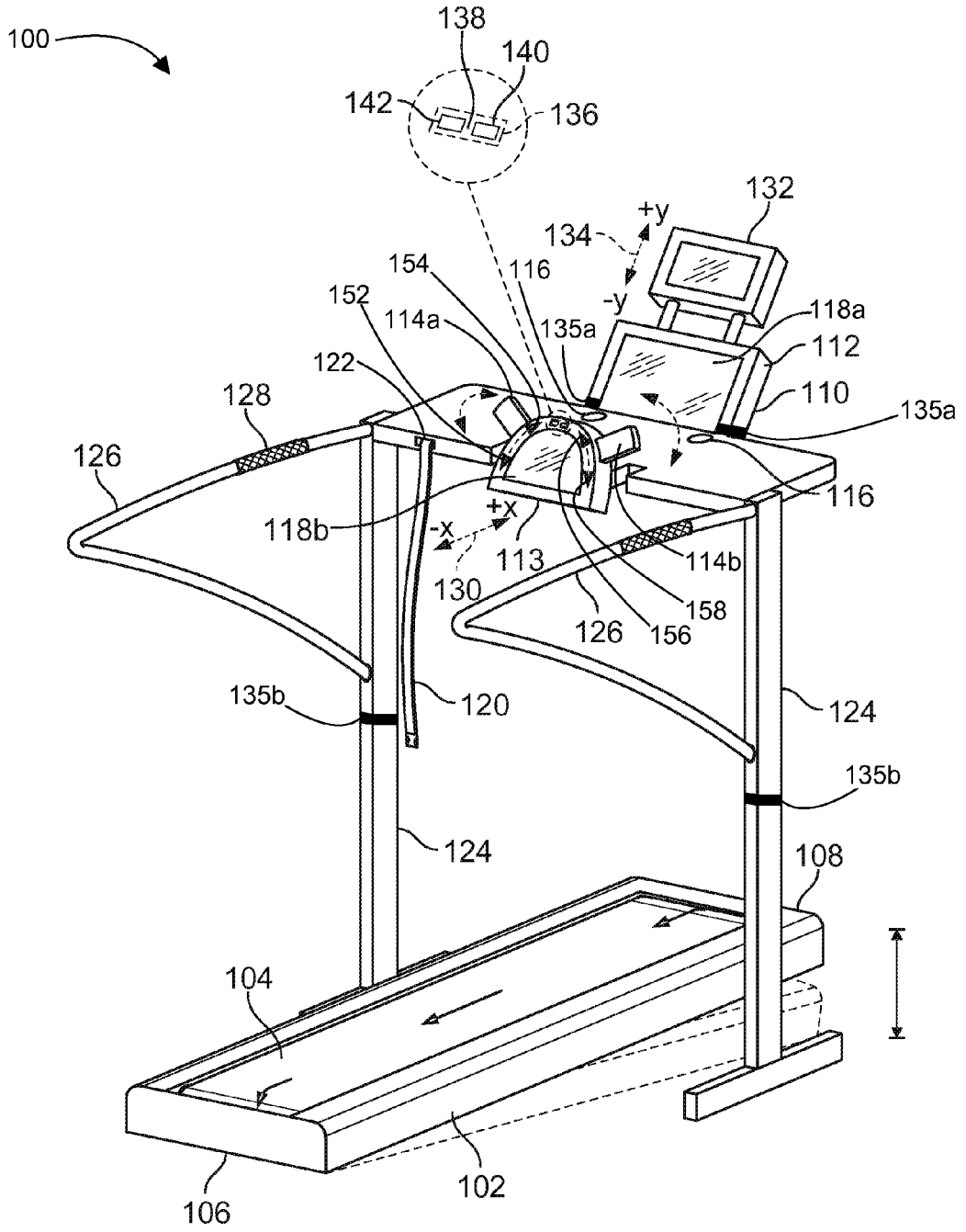

100
138
140
142
136
132
+y
134
-y
154
116
152
114a
135a
118a
112
122
110
128
135a
126
116
118b
+x
-x
113
114b
130
158
126
156
135b
120
124
135b
124
108
104
102
106

FIG. 1A

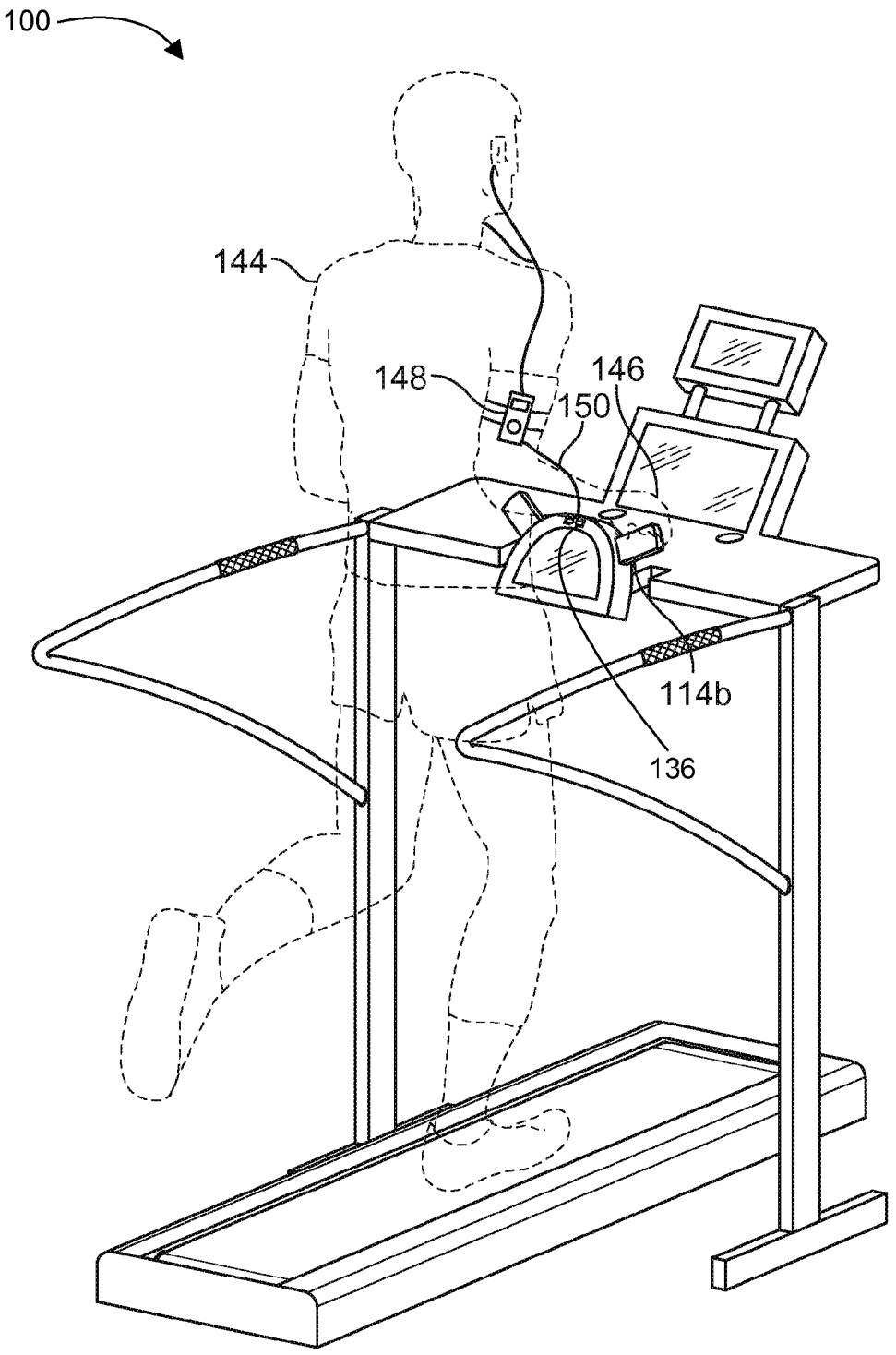


FIG. 1B

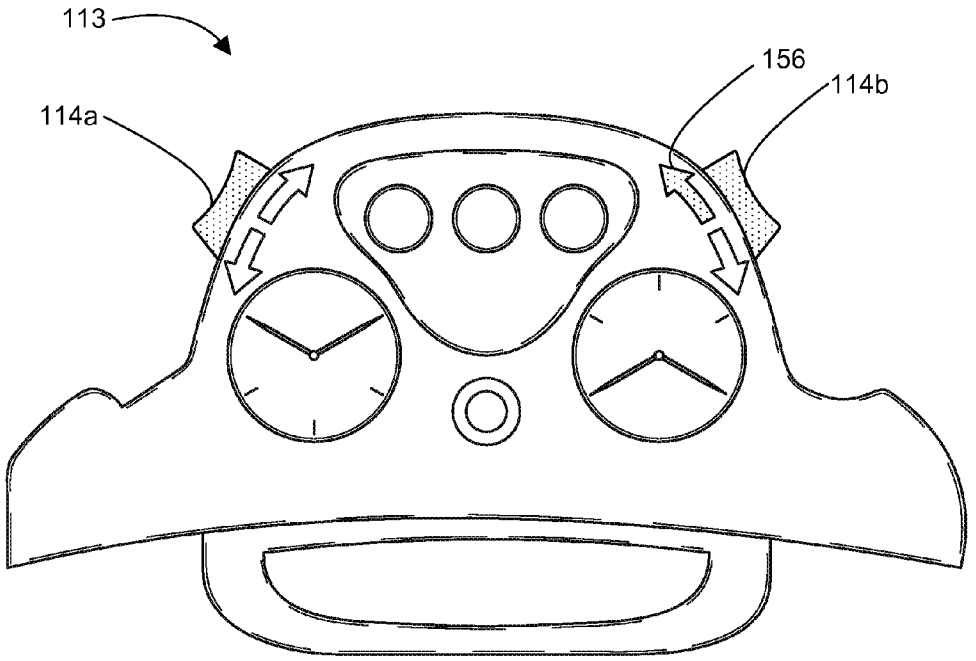


FIG. 2A

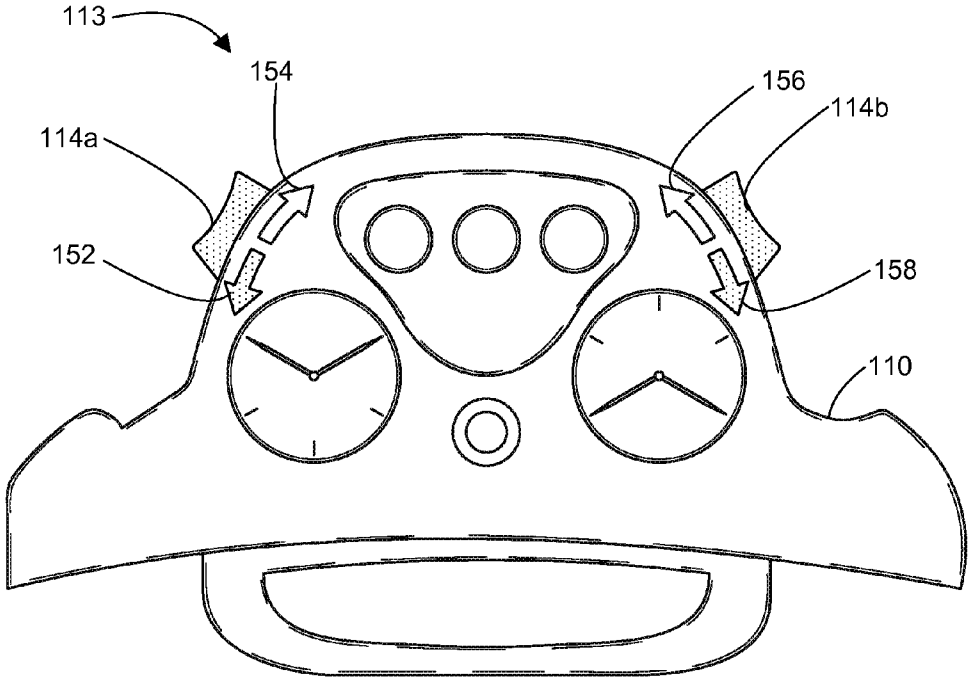


FIG. 2B

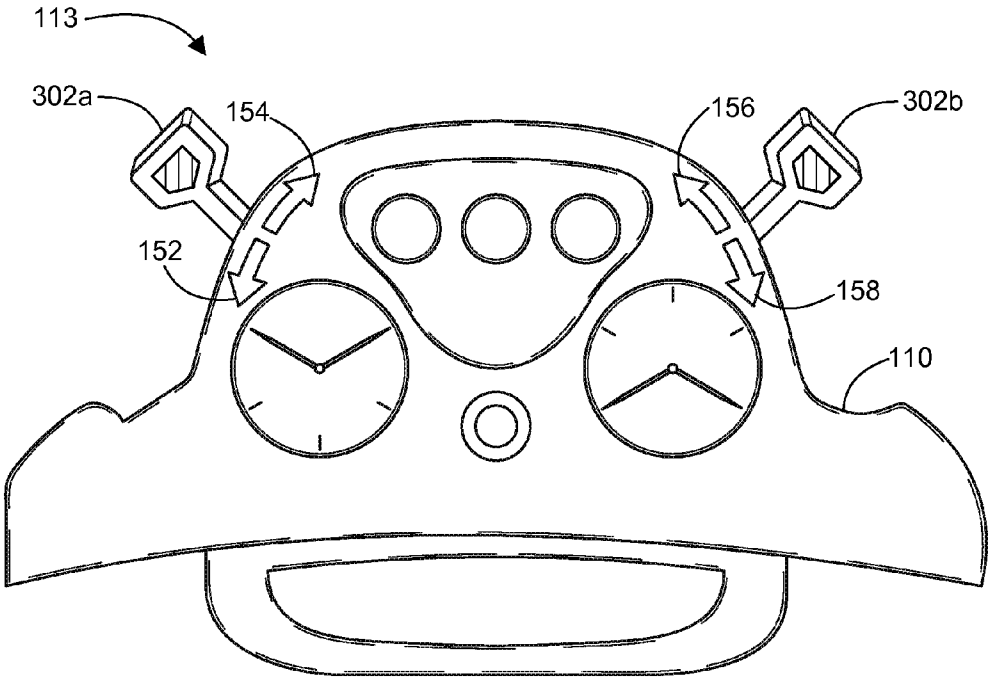

113
302a
154
156
302b
152
158
110

FIG. 3

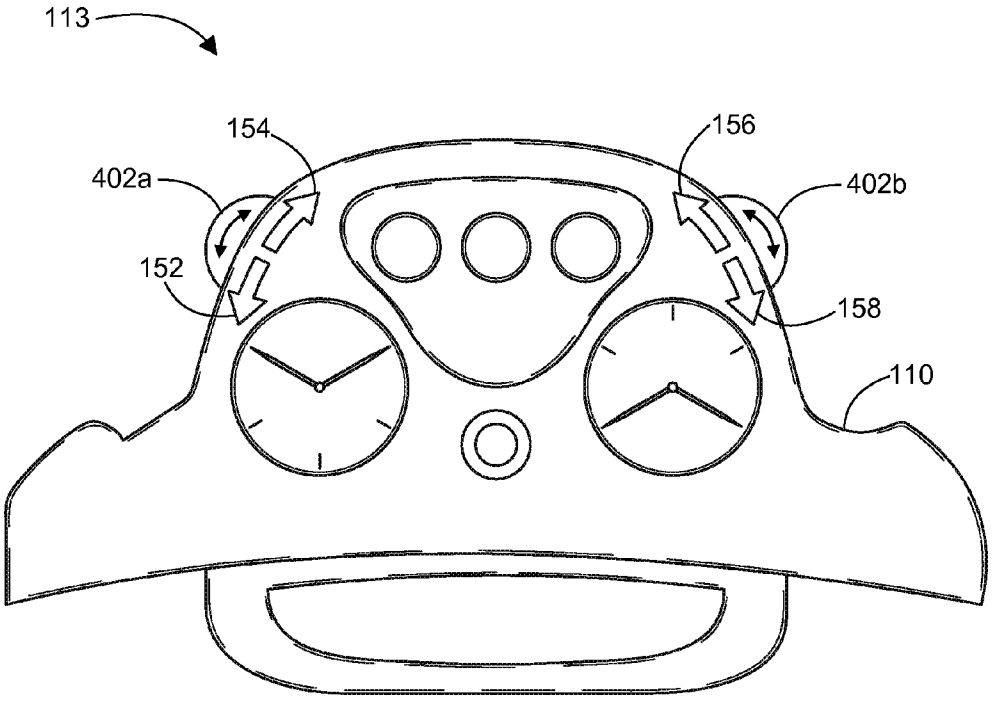

113
154
156
402a
402b
152
158
110

FIG. 4

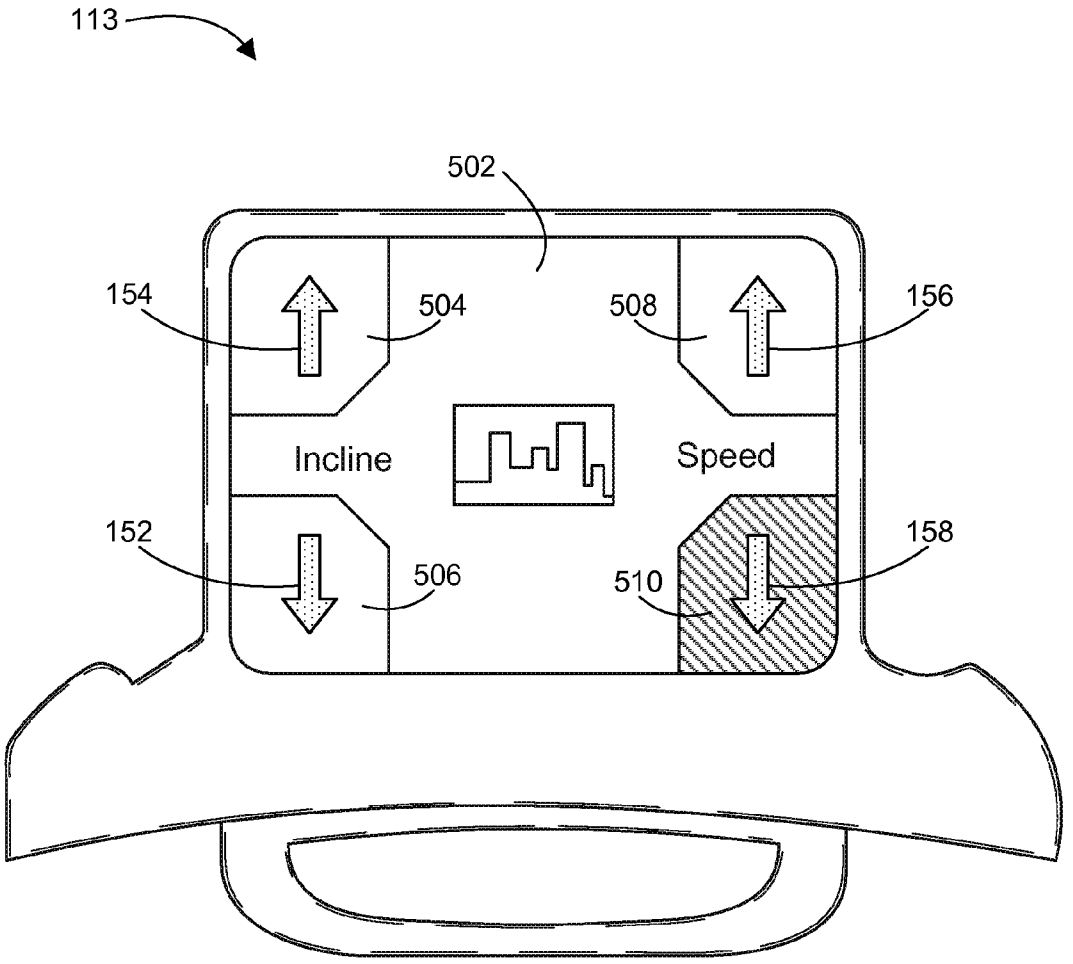


FIG. 5

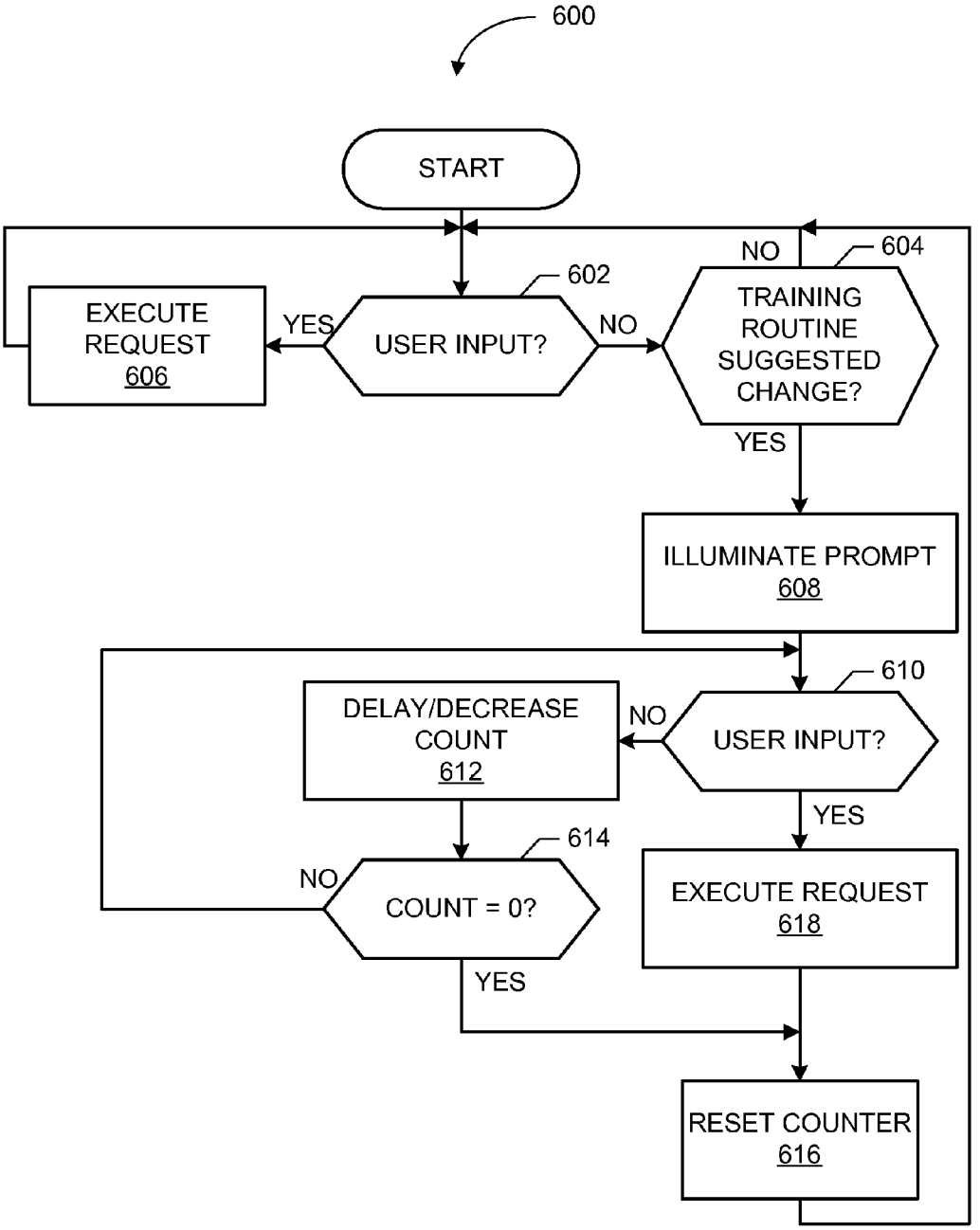

600
START
602
USER INPUT?
YES
EXECUTE REQUEST 606
NO
604
TRAINING ROUTINE SUGGESTED CHANGE?
NO
YES
ILLUMINATE PROMPT 608
610
USER INPUT?
NO
DELAY/DECREASE COUNT 612
YES
EXECUTE REQUEST 618
614
COUNT = 0?
NO
YES
RESET COUNTER 616

FIG. 6

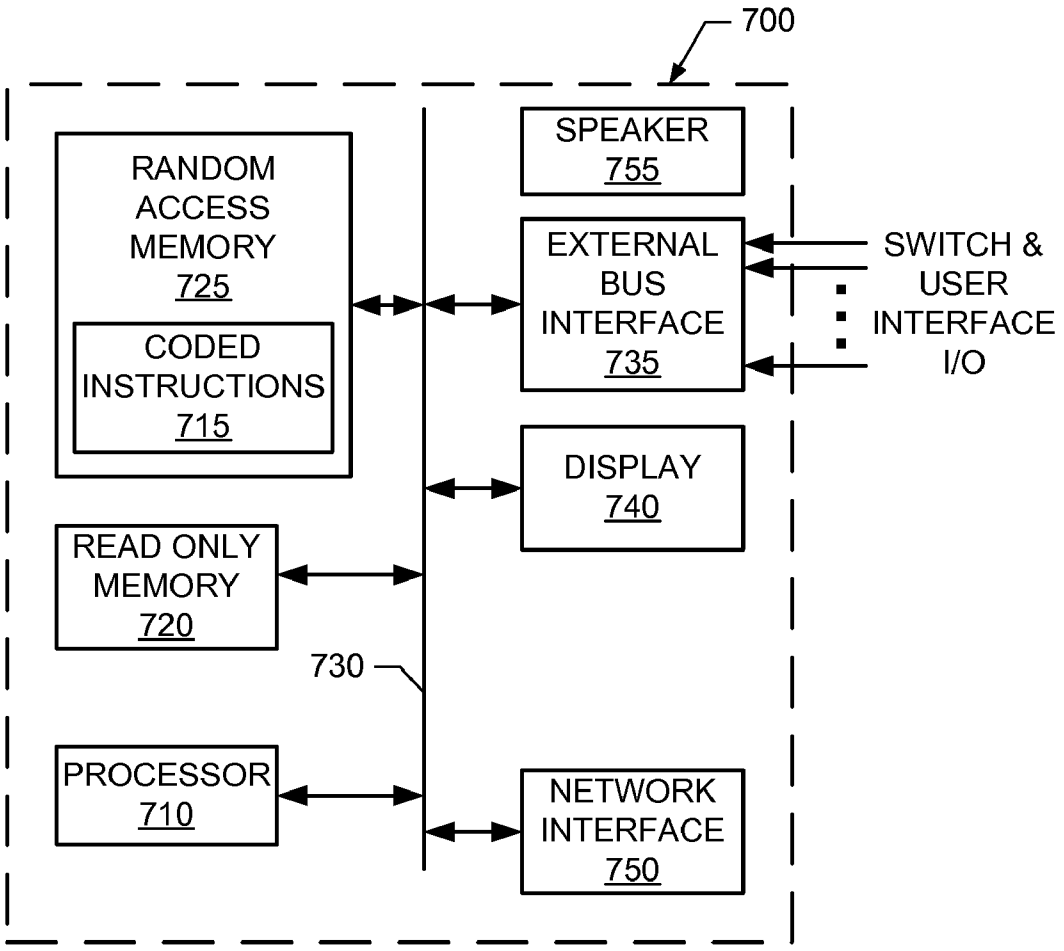

700
SPEAKER
755
RANDOM
ACCESS
MEMORY
725
CODED
INSTRUCTIONS
715
EXTERNAL
BUS
INTERFACE
735
SWITCH &
USER
INTERFACE
I/O
DISPLAY
740
READ ONLY
MEMORY
720
730
PROCESSOR
710
NETWORK
INTERFACE
750

FIG. 7

USER INTERFACE METHODS AND APPARATUS FOR CONTROLLING EXERCISE APPARATUS

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates generally to exercise equipment control and, more specifically, to user interface methods and apparatus for controlling exercise apparatus.

BACKGROUND OF RELATED ART

[0002] Modern exercise apparatus often provides adjustable exercise parameters during use. For example, treadmills typically enable users to adjust platform speed and/or platform incline. Similarly, other exercise equipment or apparatus such as stationary bicycles, elliptical trainers, climbers, steppers, etc. may enable users to adjust exercise speed, resistance, and/or stroke length during use of the apparatus. Such adjustable exercise apparatus often provides one or more predetermined pre-programmed training routines that a user may follow during a workout. Such routines automatically adjust the exercise parameters throughout the routine, such as by changing speed, changing incline (e.g., in the case of a treadmill), changing resistance, and/or various combinations thereof. The routines typically execute as a series of intervals (e.g., speed step functions) of varying intensity, execute gradual changes of speed and/or incline, and/or execute a relatively constant exercise (e.g., a single speed and/or small speed adjustments over time). Such routines may also be based on the weight, age, percent body fat, and/or target heart rate of the user, and/or such routines may be custom tailored for particular health or fitness objectives of the user.

[0003] While many users are content to follow predetermined pre-programmed training routines as provided and/or set the speed, resistance, and/or incline parameters at fixed levels throughout a workout, other users may wish to make one or more adjustments to the parameters during the workout. During the workout, many users exhibit a natural rhythm, gait, and/or body motion when using an exercise apparatus. However, a user's natural body motion typically includes an arm motion that results in the user's hands extending in a direction that is generally in-front of the user rather than down near a side of the exercise apparatus (e.g., one or more rails of a treadmill) where the parameter adjustment button(s) may be located. Additionally, some users may wish to make one or more adjustments to the exercise apparatus parameters during part of the workout, while accepting predetermined pre-programmed routine settings during other parts of the workout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. **1**A is an illustration of a treadmill incorporating an example user interface.

[0005] FIG. **1**B is an illustration of the treadmill of FIG. **1**A being used by a runner.

[0006] FIGS. **2**A and **2**B illustrate example manners of displaying a prompt to a user via the example user interface of FIG. **1**.

[0007] FIGS. **3**-**5** illustrate example manners of receiving user inputs via the example user interface of FIG. **1**.

[0008] FIG. **6** illustrates a flowchart representative of an example process that may be carried out to implement the example user interfaces shown in FIGS. **1**, **2**A, **2**B, and **3**-**5**.

[0009] FIG. **7** illustrates an example processor system that may be used to implement the example apparatus and methods described herein.

DETAILED DESCRIPTION

[0010] The example exercise apparatus described herein include user interfaces having input mechanisms to enable users to adjust operating parameters of the exercise apparatus. The input mechanisms may include one or more switches, buttons, levers, and/or keypads to facilitate user control and/or data entry. Users may interact with the interface input mechanisms to enter a weight, an age, a target heart rate, a percent body fat, and/or select one or more pre-programmed training routines. Examples of exercise apparatus include, but are not limited to, stationary bicycles, elliptical trainers, climbers, steppers, rowers, and/or treadmills. For ease of illustration and description, the example user interface methods and apparatus are described below in connection with a treadmill. However, the user interface methods and apparatus described herein may more generally apply to any type of exercise apparatus, without limitation.

[0011] Referring to FIG. **1**, an example treadmill **100** is shown with a base **102** that houses a moving platform **104** on which a user may walk, jog, and/or run. The base **102** includes a pivot end **106** and an incline/decline end **108**, which may be raised and/or lowered to various heights based on user settings and/or programmed training routines. For example, the moving platform **104** is deemed to be at an incline position when the relative angle formed between the pivot end **106** and the incline/decline end **108** results in an angle above a zero horizontal level. On the other hand, the moving platform **104** is deemed to be at a decline position when the relative angle formed between the pivot end **106** and the incline/decline end **108** results in an angle below the zero horizontal level. In the illustrated example, the speed of the moving platform **104** and the incline/decline end **108** are controlled by a control unit **110** having a user interface **112** and an activity zone, console, or user interface **113**. The activity zone, console, or user interface **113** may include, but is not limited to, toggle switches **114***a* and **114***b*, buttons, levers, touch sensors, membrane switches, and trackballs. Similarly, the user interface **112** may also employ toggle switches, buttons **116**, membrane switches, trackballs, and touch sensitive screens **118***a* and **118***b*. The example control unit **110** may also monitor a safety strap **120** that attaches to the user and/or the user's clothing, and which causes the moving platform **104** to stop if the strap **120** is pulled away or disengaged from a mounting slot **122**. As described above, other types of exercise apparatus may use the example methods and apparatus described herein. For example, a stationary bicycle may include the activity console **113**, which includes the toggle switches **114***a*, **114***b*, buttons, levers, touch sensors, membrane switches, touch sensitive screens **118***a* and **118***b*, and/or trackballs. In the case where the activity console **113** is used with a stationary bicycle, the activity console **113** may allow the user to adjust an exercise time, a pedaling resistance, and/or select a particular training routine.

[0012] The example treadmill **100** also includes vertical rails **124** that are mounted to the base **102** and which support the control unit **110**, the user interface **112** components, and the activity console **113** (e.g., the toggle switches **114***a* and **114***b*, the buttons, the levers, the touch sensors, the membrane switches, the touch sensitive screen **118***b*, and/or the trackballs). Additionally, the vertical rails **124** provide support for

arms **126** that extend generally perpendicular from the vertical rails **124** and which are generally parallel with the base unit **102**. The arms **126** allow a user to support himself/herself while walking, jogging, and/or running on the moving platform **104**. However, persons having ordinary skill in the art will appreciate that a user who exceeds about 4.5 miles per hour is generally considered to be running. As such, placing hands on the arms **126** becomes cumbersome and is typically not done because the user would no longer be moving his or her arms in a natural manner, thereby increasing the chances of tripping.

[0013] In the illustrated example, the treadmill **100** includes handgrip electrodes **128** to allow the user to monitor their heart rate. The user's heart rate may be displayed on a screen (e.g., a television screen, a liquid crystal display (LCD) screen, a high definition screen, etc.) of the user interface **112** and/or the activity console **113**, and/or transmitted to a heart rate monitor worn by the user (e.g., a watch with heart rate functionality and/or display). As described above, to reduce the possibility of tripping and/or awkward body motions when the user exceeds about 4.5 miles per hour, the heart rate functionality is disabled. Similarly, any other user interface pads, switches, buttons, and/or toggles that are located on the arms **126**, which may result in awkward body motion(s) when the user exceeds about 4.5 miles per hour may also be disabled.

[0014] To minimize the possibility of tripping and/or other accidents that may occur due to a user's arms moving in a manner inconsistent with a natural gait and body motion, the activity console or user interface **113** is positioned to be in front of a user (e.g., within an activity zone of the user) rather than at the user's side (e.g., on the arms **126** at or near the handgrip electrodes **128**). In other words, for the example treadmill **100** in FIG. **1**, exercise parameter input(s) are positioned on the activity console **113** to be approximately aligned with a forward central portion of the exercise equipment.

[0015] The example activity console **113** may accommodate users having various body types by telescoping and/or tilting, as needed. For example, taller users having a longer stride may consume more of the moving platform **104** when running, walking, and/or jogging. As such, a taller user may prefer that the example activity console **113** be retracted, that is, nearer the user interface **112** by telescoping along a positive x-axis **130**. Additionally, the taller user may prefer that the example activity console **113** be tilted in a generally upward manner to allow a more direct view of the screen **118***b*. Such tilting may occur in a direction generally perpendicular to the x-axis **130**. Without limitation, the example activity console **113** may pivot, rotate, and/or tilt with respect to all three coordinate axes (i.e., the x-axis **130** and a y-axis and z-axis, both of which are orthogonal to each other and the x-axis **130**). For example, the activity console **113** may be mounted to the treadmill **100** via a ball-and-socket joint to facilitate one or more pivot locations, rotation locations, and/or tilt locations.

[0016] In the illustrated example of FIG. **1**A, the treadmill **100** includes an auxiliary display **132** mounted to the user interface **112**. The example auxiliary display **132** may be an LCD screen, a cathode ray tube (CRT) display, a plasma display, a touch sensitive display, or similar display to facilitate viewable media for a user of the treadmill **100**. For example, the auxiliary display **132** may present broadcast television media, cable and/or satellite media, music videos, movies, and/or training videos during a workout by the user. The user may interact with the user interface **112** to adjust the displayed media content by, for example, adjusting a channel selection, adjusting a volume level, and/or selecting control parameters of the example treadmill (e.g., increase/decrease speed, increase/decrease incline/decline, increase/decrease moving platform **104** hardness, etc.).

[0017] Additionally, the user may physically adjust the auxiliary display **132** in a telescoping manner along a y-axis **134**, adjust the user interface **112** along the y-axis **134** via telescoping joints **135***a*, and/or adjust the height of the vertical rails **124** along a general direction of the y-axis **134** via telescoping joints **135***b*. Without limitation, telescoping, rotation, and/or tilting motions of the activity console **113**, the user interface **112**, the auxiliary display **132**, and/or the vertical rails **124** may be accomplished by interaction with the toggle switches **114***a*, **114***b*, the buttons **116**, and/or touch sensitive buttons of the example touch sensitive screens **118***a*, **118***b*. In the illustrated example of FIG. **1**A, such tilting, telescoping, and/or rotation motions invoked by user interaction are accomplished via one or more motors within the example treadmill **100**. For example, servo motors may be located within the vertical rails **124** proximate the telescoping joints **135***b* to move the vertical rails **124** in a motion generally parallel to the y-axis **134**.

[0018] In the illustrated example of FIG. **1**A, the activity console **113** includes a media port **136** to interface with one or more media devices. For example, the media port **136** may be adapted to accept, via a headphone port **138**, a pair of headphones owned and/or otherwise preferred by the user of the treadmill **100**. Some users may prefer to receive various training prompts privately, and/or may prefer to listen to music with headphones that deliver superior fidelity versus external speakers (not shown) of the example treadmill **100**. Additionally or alternatively, the user may use headphones with the headphone port **138** to drown-out ambient noise of the environment in which the example treadmill **100** is being used. Although the illustrated example of FIG. **1**A shows the media port **136** on the example activity console **113**, the media port **136** may also be located on the user interface **112**, on the auxiliary display **132**, in proximity to the mounting slot **122**, and/or in proximity to the buttons **116**.

[0019] Volume control of audio output of the example headphone port **138** may be adjusted via the user interface **112**, such as, for example, via the touch screen **118***a* and/or via one or more buttons **116** of the user interface **112**. Without limitation, volume control may alternatively or additionally be accomplished via the activity console **113**. The user may move the toggle switches **114***a*, **114***b* to adjust the volume of the headphone port **138** output, and/or select alternate audio output content such as, for example, alternate radio stations. Without limitation, audio output of the headphone port **138** may be controlled by the touch display **118***b* of the example activity console **113**.

[0020] The example media port **136** may also be adapted to receive a portable memory device at a memory port **140**. The portable memory device may include, but is not limited to, a universal serial bus (USB) type memory, a compact flash (CF) memory, and/or a secure digital (SD) memory. The portable memory device may permit the user to consume personalized media while using the example treadmill **100** such as, for example, music tracks (e.g., MP3 files), video, and/or images for display on the example auxiliary display **132**, the display **118***a* of the user interface **112**, and/or the display **118***b* of the

example activity console **113**. Additionally, the example memory port **140** may receive the portable memory device to facilitate personalized training profiles and/or personalized settings for the example treadmill **100**. For example, the user may have configuration data stored on the memory device to execute a particular training routine, display a particular scenery/background image, and/or tune to a particular radio station. The user may also store workout result information to the portable memory device such as, for example, workout elapsed time, calories burned, and/or distance. If the user pursues a workout goal such as, for example, 50 miles per week, then the example memory port **140** may allow the control unit **110** to store progress data to the portable memory device.

[0021] Without limitation, the memory port **140** may allow the user to access electronic books, educational information, training information and/or suggested workout activities. Persons having ordinary skill in the art will appreciate that portable memory devices received by the example memory port **140** allows the user to skip data entry activities such as, for example, the user's weight, age, text font size on the display **118***a*, **118***b*, preferred workout routine, preferred radio station, preferred television program/station, and/or username and password credentials for e-mail access.

[0022] Service personnel may use the example memory port **140** to update firmware and/or run diagnostic utilities of the example treadmill **100**. The portable memory device may be inserted into the memory port **140** to provide administrative credentials stored thereon that place the example treadmill **100** in a diagnostic and/or service mode. The service personnel may download system data associated with the treadmill to ascertain a general health status of the treadmill **100**. For example, the example control unit **110** may cause the memory port **140** to store treadmill parameters to the portable memory device (e.g., a USB jump drive) including, but not limited to, elapsed hours of operation, belt age, and/or number of miles used by the moving platform **104**.

[0023] The example media port **136** may also be adapted to receive, via a media device port **142**, a portable entertainment device such as, for example, an MP3 player (e.g., an iPOD®) and/or a personal digital assistant (PDA). In the illustrated example of FIG. **1**A, media from the portable media device connected to the example media device port **142** is presented to the user via speakers of the treadmill **100** in the event of audio-type media. However, in the event of video and/or image media, such media is displayed on the auxiliary display **132**, the display **118***a* of the user interface **112**, and/or the display **118***b* of the activity console **113**. Additionally or alternatively, the user may plug personal headphones into the media device connected to the media port **142** to allow the user listening privacy.

[0024] Media devices connected to the example media device port **142** may be controlled by the user interface **112** (e.g., via one or more buttons **116**, via the touch sensitive display **118**, etc.), and/or controlled via the example activity console **113**. For example, the user may move the toggle switch **114***a* in a generally upward and downward motion to navigate to various stored audio tracks. Similarly, the user may move the toggle switch **114***b* in a generally upward and downward motion to increase and decrease a volume level, respectively. User interface controls of portable media devices (e.g., an MP3 player) are relatively small compared to the toggle switches **114***a*, **114***b* of the activity console **113** and generally require fine motor skill for proper operation. As such, using such small controls of the portable media device may be particularly difficult while the user is walking, jogging, and/or running. As discussed in further detail below, the example activity console **113** facilitates user control of the treadmill **100** and/or media devices connected thereto in a manner that eliminates a need for fine motor skills while the user is walking, jogging, and/or running.

[0025] A user of the example treadmill **100** will exhibit a particular gait pattern and associated upper body movements while walking, jogging, and/or running. The upper body movements generally include arms swinging in opposing directions, where each arm swing moves forward in unison with the opposite leg. For example, as the user's left arm swings forward, the user's right arm swings backward or rearward while the user's right leg steps forward. Similarly, as the user's right arm swings forward, the user's left arm swings backward or rearward while the user's left leg steps forward. Typically, each arm swing reaches a full forward position when the opposite arm swing reaches a corresponding full rearward position. As such, when one of the user's arms is in a forward position, interaction with the example activity console **113** components, such as the example toggle switches **114***a* and **114***b*, is most easily accomplished. As shown in FIG. **1**B, the example activity console **113** is generally located at a height equal to a user's **144** abdomen, thereby providing a biomechanical advantage to the user **144** when attempting to interact with the activity console **113**. In particular, because the user's **144** hands generally converge at the abdominal area when walking, jogging, and/or running, the activity console **113** location is advantageously placed near this abdominal area.

[0026] FIG. **1**B illustrates the user **144** interacting with the example activity console **113** of the treadmill **100**. In particular, the user's right hand **146** is pushing down on the right toggle switch **114***b*. As discussed above, movement of the toggle switch **114***b* may allow the user **144** to reduce a volume level of a media device connected to the media port **136** of the activity console **113**. Additionally or alternatively, movement of the toggle switch **114***a* and/or **114***b* may cause other treadmill parameters to change including, but not limited to, treadmill speed, treadmill incline, treadmill mode settings, and/or a treadmill platform **104** hardness. In the illustrated example of FIG. **1**B, the user **144** is wearing a media device **148** communicatively connected to the media port **136** via a communication cable **150**. In response to movement of the toggle switches **114***a* and **114***b*, the control unit **110** transmits control signals to the media device **148** via the media port **136** to adjust volume and/or select media tracks. The user **144** may control the media device **148** via the user interface **112**, one or more buttons **116**, and/or control the media device **148** via the touch sensitive displays **118***a* and **118***b* of the user interface **112** and the activity console **113**, respectively.

[0027] While the illustrated example treadmill **100** of FIG. **1**B includes a communication cable **150** to facilitate control commands to the example media device **148**, commands may be wirelessly sent by the control unit **110**. For example, the control unit **110** may include a wireless transceiver to send and/or receive control commands via radio frequency (RF) signals compliant with one or more wireless communication standards including, but not limited to, Bluetooth® and 802.11x standards.

[0028] Awkward body motions often result when accessing user interfaces of some known exercise apparatus, such as a stationary exercise bicycle, an elliptical trainer, a climber, a

stepper, and/or a rower. For example, a person using an elliptical trainer typically maintains a forward facing position during their workout. As such, a greater biomechanical advantage may be maintained when user interface buttons, switches, keypads, and/or levers do not require that the forward facing user turn away to the side for such interaction.

[0029] In operation, a user may manually set the speed and/or the incline of the example treadmill **100**. Returning to the illustrated example of FIG. **1**A, the toggle switch **114***a* controls the incline and/or decline level of the incline/decline end **108**, and the toggle switch **114***b* controls the speed of the moving platform **104**. The toggle switch **114***a* for the incline/decline and the switch **114***b* for the speed are configured to facilitate control via gross motor movements, such as those that are typical of a user that is walking, jogging, and/or running. Generally speaking, gross motor movements are those that involve larger muscle groups and include a relatively lower degree of movement precision. For example, a user that moves his or her entire arm in a forward direction employs larger muscle groups to achieve such gross motor movements, but a user that attempts to sign his or her name generally employs smaller muscle groups to achieve the requisite movement precision for the signature. Persons having ordinary skill in the art will appreciate that larger user interface controls, such as the example toggle switches **114***a* and **114***b*, allow the user to more easily adjust parameters of the treadmill **100**, particularly when the user's hands are perspiring, the user is moving quickly (e.g., running), and/or when the user is exhausted and, thus less coordinated, due to a strenuous workout.

[0030] The control unit **110** may store one or more training routines in a memory and/or the control unit **110** may include an input/output (I/O) port to send/receive training routines from various sources including, but not limited to, a network connected to a computer, a computer operated by a personal trainer, a USB memory device, and/or the Internet. The I/O port may send/receive training routines and/or user information, such as user age, weight, body mass, etc., via a wired and/or wireless interface. As described above, the training routines may automatically adjust operating parameters of the treadmill **100** (and/or any other type of exercise apparatus) during the user's workout, such as increasing/decreasing speed and/or increasing/decreasing the angle of the incline/decline end **108**. As the routine executes, the operating parameters automatically adjust according to predetermined settings, and/or settings based on the user's weight, age, body fat percentage, height, and/or target heart rate. For example, younger users having a relatively lower weight and a relatively higher height may experience operating speeds on the example treadmill **100** during the routine that are higher than those for older users having a relatively higher weight and a relatively lower height. Accordingly, the user does not need to interact with the activity console **113** (such as the example toggle switches **114***a* and **114***b*) and may simply accept the predetermined or default speed and/or incline selections of the control unit **110** based on the training routine.

[0031] On the other hand, some users may follow a training routine stored in the control unit **110** that suggests (rather than executes) one or more moving platform **104** speeds and/or incline levels. In the illustrated example of FIG. **1**, the treadmill **100** includes an increase incline indicator **154**, a decrease incline indicator **152**, an increase speed indicator **156**, and a decrease speed indicator **158**. The indicators **152-158** may be implemented using one or more (filament) light bulbs having one or more colors, as one or more light emitting diodes (LEDs) having one or more colors, as a cathode ray tube (CRT), and/or as a liquid crystal display (LCD) having one or more colors. Without limitation, the LCD indicators may be monochrome and, optionally, include a backlight. However, other illumination technologies may be employed including, but not limited to, organic displays, electronic ink (E-Ink), plasma, laser, and/or projection technologies. While arrow-shaped objects are illustrated in FIG. **1** for the increase incline indicator **154**, the example decrease incline indicator **152**, the example increase speed indicator **156**, and the example decrease speed indicator **158**, the indicators **152-158** may be configured to have any other shape.

[0032] The training routine stored in the control unit **110** and/or the external memory device causes the various indicators **152-158** to illuminate based on suggested speeds and/or incline levels. In the event that the user is feeling too exhausted to walk, jog, or run at a higher suggested speed, then the user may ignore the suggestion to move the speed toggle switch **114***b* in the direction of the illuminated increase speed indicator **156**. Similarly, in the event that the user wants to experience a workout that is more strenuous than the training routine suggests, then the user may advance the incline and/or the speed with the incline toggle switch **114***a* and/or the speed toggle switch **114***b*, respectively.

[0033] FIG. **2**A illustrates additional detail of the example activity console **113** of FIGS. **1**A and **1**B. In the illustrated example, the increase speed indicator **156** is illuminated to instruct the user that the training routine suggests the speed of the moving platform **104** should be increased. In the event that the user agrees with the training routine suggestion, the example speed toggle switch **114***b* is activated (e.g., slid) by the user in a direction generally parallel to the increase speed indicator **156** arrow. However, as discussed above, if the user chooses to not follow the suggested prompt by the training routine, the user may ignore the increase speed indicator **156** and continue walking, jogging, or running at the current speed.

[0034] Similarly, FIG. **2**B illustrates additional detail of the example activity console **113** of FIGS. **1**A and **1**B. In particular, the example activity console **113** of FIG. **2**B illustrates that the decrease incline indicator **152** and the decrease speed indicator **158** are illuminated, thereby suggesting to the user that the incline toggle switch **114***a* and the speed toggle switch **114***b* should be moved in the downward direction generally parallel to the indicators (**152**, **158**). Upon moving the toggle switches **114***a*, **114***b* in the suggested directions, the control unit **110** causes the incline/decline end **108** to decrease in relative height from the horizontal and the moving platform **104** to decrease in speed. However, the user is free to ignore both indicated suggestions, comply with both indicated suggestions, and/or comply with one of the two indicated suggestions, as desired.

[0035] Without limitation, the increase incline indicator **154**, the decrease incline indicator **152**, the increase speed indicator **156**, and/or the decrease speed indicator **158** may illuminate as a solid or continuous light or as a blinking light. Additionally, the indicators **152-158** may be any variety of colors and/or shapes. Further, the indicators **152-158** may operate in conjunction with a sound emitted by a speaker and/or a text message displayed on a screen of the example activity console **113**.

[0036] FIG. **3** illustrates another example user interface configuration that may enable a user to respond to training

routine prompts of the example activity console **113**. In the illustrated example activity console **113** of FIG. **3**, a toggle lever **302***a* enables the user to increase and/or decrease the incline of the example treadmill **100**, and a toggle lever **302***b* enables the user to increase and/or decrease the speed of the moving platform **104** of the example treadmill **100**. Similar to the example toggle switches **114***a* and **114***b*, the example toggle levers **302***a* and **302***b* allow the user to apply gross motor movements (as opposed to requiring fine motor movements) to generate a control signal in response to prompts from the training routine executed by the control unit **110** within and/or in communication with the activity console **113**. The toggle levers **302***a* and **302***b* may be movable in a direction generally parallel to the incline indicators **152** and **154**, and a direction generally parallel to the speed indicators **156** and **158**, respectively. However, the example toggle levers **302***a* and **302***b* may be configured to move in a direction parallel to that of the example moving platform **104**. For example, the user may move the example toggle lever **302***b* in a forward direction (i.e., the same direction as the moving platform **104**) to cause a speed increase, and move the example toggle lever **302***b* in a backward or rearward direction (i.e., a direction opposite to that of the moving platform **104**) to cause a speed decrease.

[0037] FIG. **4** illustrates yet another example configuration of the activity console **113**. In the illustrated example activity console **113** of FIG. **4**, a trackball **402***a* allows the user to increase and/or decrease the incline of the example treadmill **100**, and a trackball **402***b* allows the user to increase and/or decrease the speed of the moving platform **104** of the example treadmill **100**. The trackballs **402***a* and **402***b* may be configured to move in only two directions along a single axis of rotation. Accordingly, the user may rotate the trackball **402***a*, for example, in a direction generally parallel to that of the example increase incline indicator **154** to cause the incline/decline end **108** of the base **102** and/or platform **104** to increase in height (e.g., approach an alternate angle toward zero if in a decline position and/or approach an alternate angle greater than zero if in an incline position).

[0038] FIG. **5** illustrates yet another configuration of the example activity console **113**. In the illustrated example activity console **113** of FIG. **5**, the user is provided with a touch-screen monitor **502**. The touch-screen monitor **502** allows the user to view training routine instructions, media content, and/or broadcast programming during their workout. Additionally, the example touch-screen monitor **502** shown in FIG. **5** partitions the screen **502** into four separate regions **504**, **506**, **508**, and **510** to identify the increase incline indicator **154**, the decrease incline indicator **152**, the increase speed indicator **156**, and the decrease speed indicator **158**, respectively. In the event that the user wishes to increase and/or decrease the incline and/or the speed (e.g., in response to prompts via the indicators **154**, **152**, **156**, and **158**), the user touches the particular partition or region corresponding to the desired command. Accordingly, the partitions **504**, **506**, **508**, and **510** serve as an increase incline input, a decrease incline input, an increase speed input, and a decrease speed input, respectively. The relatively large partitions depicted in the example of FIG. **5** are to facilitate a user's accurate selection of the desired control, particularly when the user is tired and/or moving during exercise.

[0039] In the illustrated example touch-screen monitor **502** of FIG. **5**, the decrease speed indicator **158** is illuminated (i.e., shown as a crosshatched section) in response to the training routine suggestion to decrease the speed of the moving platform **104**. In the event that the user touches the crosshatched region (the input partition **510**), then the control unit **110** responds by reducing the speed of the moving platform **104**. The example indicators **152-158** may be displayed on the touch screen monitor **502** as an image overlay. Persons having ordinary skill in the art will appreciate that the touch-screen LCD and/or touch-screen CRT may display such images as bitmap images generated by the control unit **110**.

[0040] A flowchart representative of an example process **600** for implementing the example treadmill **100** and user interfaces of FIGS. **1**A, **1**B, **2**A, **2**B, and **3-5** is shown in FIG. **6**. The example process **600** may be implemented as machine readable instructions arranged as a program for execution by a processor, a controller, or similar computing device (e.g., the processor system **700** depicted in FIG. **7**). The program may be embodied in software stored on a tangible medium such as, for example, a flash memory, a CD-ROM, a floppy disk, a hard drive, a digital versatile disk (DVD), or a memory associated with the processor and/or controller, but persons of ordinary skill in the art will readily appreciate that the entire program and/or parts thereof could alternatively be embodied in firmware or dedicated hardware in a well-known manner (e.g., the program or example process **600** may be implemented by an application specific integrated circuit (ASIC), a programmable logic device (PLD), a field programmable logic device (FPLD), a programmable logic controller (PLC), a personal computer (PC), discrete logic, etc.). Also, one or more of the operations represented by the flowchart of FIG. **6** may be implemented manually. Further, although the example process **600** is described with reference to the flowchart illustrated in FIG. **6**, persons of ordinary skill in the art will readily appreciate that many other methods of implementing the example process **600** may alternatively be used. For example, the order of execution of the blocks may be changed, and/or some of the blocks described may be changed, substituted, eliminated, or combined.

[0041] The example process **600** determines (e.g., via the control unit **110**) if the user has triggered an input, such as the example incline increase/decrease, and/or the example speed increase/decrease inputs of FIGS. **1**A, **1**B, **2**A, **2**B, and **3-5** (block **602**). If not, then the example control unit **110** determines if the training routine is making a suggestion for the user to increase/decrease the incline and/or to increase/decrease the speed of the moving platform **104** (block **604**). If neither a user input (block **602**) occurs, nor a training routine suggestion (block **604**) occurs, then control is returned to block **602** to monitor for such inputs. However, if the user activates an input (block **602**), then the control unit **110** responds by executing the request (block **606**). For example, if the user slides the toggle switch **114***b* in an upward direction, then the control unit **110** causes the moving platform **104** to increase its speed.

[0042] If the training routine includes a suggestion to increase and/or decrease the incline and/or speed (block **604**), then the control unit **110** causes the activity console **113** to illuminate the corresponding prompt for the user to view (block **608**). For example, if the training routine suggests that the user's speed should increase, then the control unit **110** sends a signal to the example increase speed indicator **154** to illuminate a solid or a continuous color and/or flash at a predetermined rate to attract the attention of the user. As discussed above, the example control unit **110** may invoke or activate any type of indicator including, but not limited to, the

example touch-screen indicators **152-158** of FIG. **5**. The example control unit **110** determines if the user responds to the training routine suggestion by monitoring the inputs (block **610**). If no response is received, the control unit **110** waits for a predetermined delay time period and decreases a counter (block **612**). If the counter does not equal zero (block **614**), then the example process **600** returns to block **610** to monitor for a user input. However, if the counter equals zero (block **614**), then it is assumed that the user is ignoring or has elected not to follow the training routine suggestion and the counter is reset (block **616**) before returning control to block **602** to monitor for user input.

[0043] Returning to block **610**, if the user does respond to the training routine suggestion, then the example control unit **110** responds to the user input by executing the request (block **618**). The counter is then reset (block **616**) before the example method **600** returns to block **602** to monitor for user input.

[0044] FIG. **7** is a schematic diagram of an example processor system **700** that may be used to implement the control unit **110**, user interface **112**, and/or the activity console **113** of FIGS. **1**A, **1**B, **2**A, **2**B, and **3-5**. The example processor system **700** of FIG. **7** includes a general purpose programmable processor **710**. The example processor **710** of FIG. **7** executes coded instructions **715** present in a main memory (e.g., within a random access memory (RAM) **725** as illustrated and/or within a read only memory (ROM) **720**). The example processor **710** may be any type of processing unit, such as a microprocessor from the AMD®, Sun® and/or Intel® families of microprocessors. The example processor **710** may execute, among other things, machine accessible instructions to perform the example process **600** of FIG. **6** to control the treadmill **100**.

[0045] The example processor **710** of FIG. **7** is in communication with the example main memory (including the ROM **720** and the RAM **725**) via a bus **730**. The example RAM **725** of FIG. **7** may be implemented by dynamic random access memory (DRAM), Synchronous DRAM (SDRAM), and/or any other type of RAM device, and the example ROM **720** of FIG. **7** may be implemented by flash memory and/or any other desired type of memory device. Access to the example memories **720** and **725** is typically controlled by a memory controller (not shown) in a conventional manner.

[0046] To receive input signals from the example incline increase/decrease inputs (e.g., **152** and **154**) and/or the example speed increase/decrease inputs **156** and **158**, the example control unit **110** of FIG. **1** includes any variety of conventional interface circuitry such as, for example, an external bus interface **735**. For example, the external bus interface **735** may provide one input signal path (e.g., a semiconductor package pin) for each switch of the example activity console **113**. Additionally or alternatively, the external bus interface **735** may implement any variety of time multiplexed interface to receive input signals from any number of additional and/or alternate activity console **113** inputs.

[0047] To display information for viewing by a user, the example processor system **700** includes any variety of display **740**, such as the example touch-screen **502** (e.g., an LCD touch-screen, a CRT touch-screen, etc.) discussed in connection with FIG. **5**.

[0048] To allow the example control unit **110** to interact with the user to upload and/or modify training routines, a network interface **750** may be employed, such as, for example, a wireless LAN interface in accordance with, for instance, the Institute of Electronics and Electrical Engineers (IEEE) 802.11b, 802.11g, 802.15.4 (a.k.a. ZigBee) etc. standards. The example processor **710** of FIG. **7** uses the example network interface **750** to obtain, edit, and/or delete training routines for an identified user.

[0049] To allow the example control unit **110** to generate sounds, the example processor system **700** includes any variety of speaker **755**. The example processor **710** of FIG. **7** can cause any variety of sounds such as, for example, a prompt alarm bell to be produced by the example speaker **755** of FIG. **7** while a user is exercising.

[0050] Although an example control unit **110** has been described as being implemented using the example processor system **700** of FIG. **7**, the control unit **110** may be implemented using any of a variety of other and/or additional devices, components, circuits, modules, etc. Further, the devices, components, circuits, modules, elements, etc. illustrated in FIG. **7** may be combined, re-arranged, eliminated and/or implemented in any of a variety of ways.

[0051] Accordingly, while the above specification described example apparatus, methods, and articles of manufacture, persons of ordinary skill in the art will readily appreciate that the examples are not the only way to implement such apparatus, methods, and articles of manufacture. Therefore, although certain example apparatus, methods, and articles of manufacture have been described herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all apparatus, methods, and articles of manufacture fairly falling within the scope of the appended claims either literally or under the doctrine of equivalents.

We claim:

1. An exercise apparatus comprising:

a user interface having an exercise parameter input and an indicator associated with the exercise parameter input; and

a control unit to activate the indicator in response to a training routine to prompt a user of the exercise apparatus to adjust an operation of the exercise apparatus via the exercise parameter input.

2. An exercise apparatus as defined in claim **1**, wherein the user interface is an activity console located in a forward central portion of the exercise apparatus.

3. An exercise apparatus as defined in claim **1**, wherein the exercise parameter input comprises at least one of an incline setting, a speed setting, or a resistance setting.

4. An exercise apparatus as defined in claim **1**, wherein the indicator comprises at least one of one or more light bulbs, one or more light emitting diodes, a cathode ray tube (CRT), or a liquid crystal display (LCD).

5. An exercise apparatus as defined in claim **4**, wherein the control unit is to generate a display of at least one of a shape or a color for the indicator and to generate the display of the indicator on at least one of the CRT or the LCD.

6. An exercise apparatus as defined in claim **5**, wherein the indicator is displayed as a graphic overlay with the exercise parameter input.

7. An exercise apparatus as defined in claim **6**, further comprising a touch-screen for user activation of the exercise parameter input.

8. An exercise apparatus as defined in claim **4**, wherein the control unit is to generate a display of the exercise parameter input on at least one of the CRT or the LCD.

9. An exercise apparatus as defined in claim **8**, wherein the CRT or the LCD includes a touch-screen.

10. An exercise apparatus as defined in claim **1**, wherein the indicator is proximate the exercise parameter input.

11. An exercise apparatus as defined in claim **1**, wherein the exercise parameter input comprises at least one of a toggle switch, a toggle lever, a trackball, or a touch-screen.

12. An exercise apparatus as defined in claim **11**, wherein the exercise parameter input operates via gross motor movements by the user.

13. An exercise apparatus as defined in claim **1**, wherein the exercise apparatus is at least one of a treadmill, an elliptical trainer, a climber, a stepper, a stationary bicycle, or a rower.

14. An exercise apparatus as defined in claim **1**, wherein the exercise parameter input is positioned on the user interface to be approximately aligned with a forward central portion of the exercise apparatus.

15. An exercise apparatus as defined in claim **1**, wherein the indicator comprises at least one arrow-shaped portion.

16. A method to control an exercise apparatus comprising:

automatically receiving a signal from a training routine indicative of a desired exercise parameter adjustment;

activating an indicator in response to the signal; and

determining if an exercise parameter input is activated by a user of the exercise apparatus in response to activation of the indicator.

17. A method to control an exercise apparatus as defined in claim **16**, wherein the signal is associated with at least one of a change in incline, a change in speed, or a change in resistance.

18. A method to control an exercise apparatus as defined in claim **16**, wherein activating the indicator comprises causing the indicator to illuminate.

19. A method to control an exercise apparatus as defined in claim **16**, further comprising executing the desired exercise parameter adjustment when the exercise parameter input is activated.

20. An article of manufacture storing machine readable instructions which, when executed, cause a machine to:

automatically receive a signal from a training routine indicative of a desired exercise parameter adjustment;

activate an indicator in response to the signal; and

determine if an exercise parameter input is activated by a user of the exercise apparatus in response to activation of the indicator.

21. An article of manufacture as defined in claim **20**, wherein the machine readable instructions, when executed, cause the machine to receive the signal of at least one of an incline change, a speed change, or a resistance change.

22. An article of manufacture as defined in claim **20**, wherein the machine readable instructions, when executed, cause the machine to illuminate the indicator.

23. An article of manufacture as defined in claim **20**, wherein the machine readable instructions, when executed, cause the machine to execute the desired exercise parameter adjustment when the exercise parameter input is activated.

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