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(19) **United States**(12) **Patent Application Publication****Wallace et al.**(10) **Pub. No.: US 2007/0197345 A1**(43) **Pub. Date: Aug. 23, 2007**(54) **MOTIVATIONAL DISPLAYS AND METHODS
FOR EXERCISE MACHINE****Publication Classification**(51) **Int. Cl.****A63B 71/00** (2006.01)**A63B 22/04** (2006.01)(52) **U.S. Cl.** **482/8; 482/52**(76) Inventors: **Gregory Allen Wallace**, Mission Viejo,
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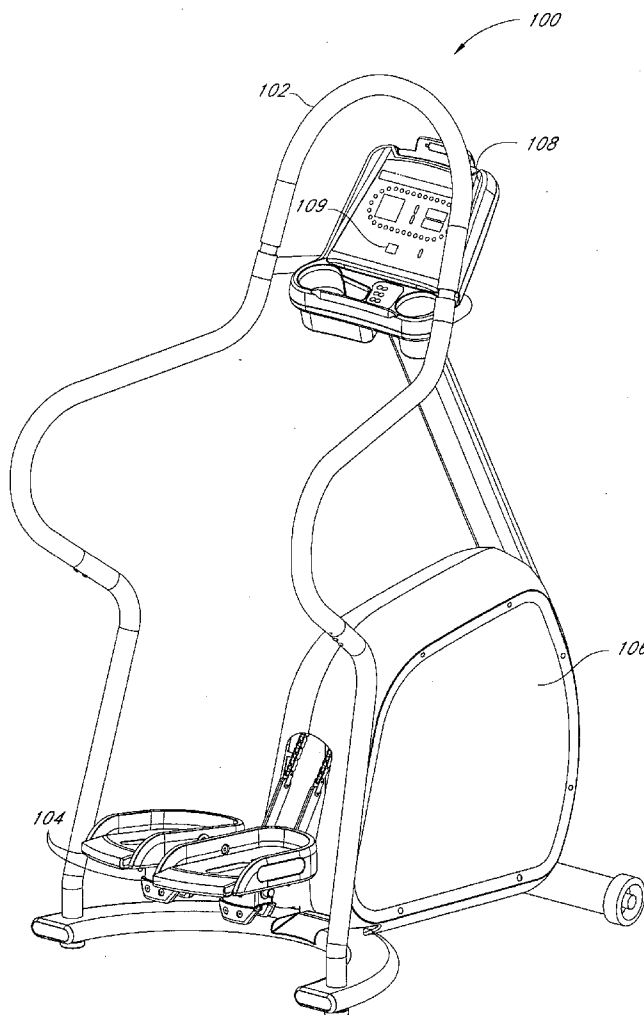
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ABSTRACT

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IRVINE, CA 92614 (US)(21) Appl. No.: **11/704,161**(22) Filed: **Feb. 8, 2007****Related U.S. Application Data**(60) Provisional application No. 60/772,625, filed on Feb.
13, 2006.

A stationary exercise machine includes a system for simulating a climb of a landmark or other selected geographic location or structure. The exercise machine includes an electronic control system that monitors pedal movement and that controls a display for depicting a progress in the simulated climb. For example, the control system may include a processor that determines the height of a selected landmark, determines the height of each selected step, monitors the number of steps in the simulated climb, and that outputs a signal for displaying the progress of the user's simulated climb. For instance, the display may include a silhouette of a block pyramid whose levels are filled in based on a percentage of the climb. In certain embodiments, the control system also adjusts a resistive load based on a current force of the user in pumping the pedals.



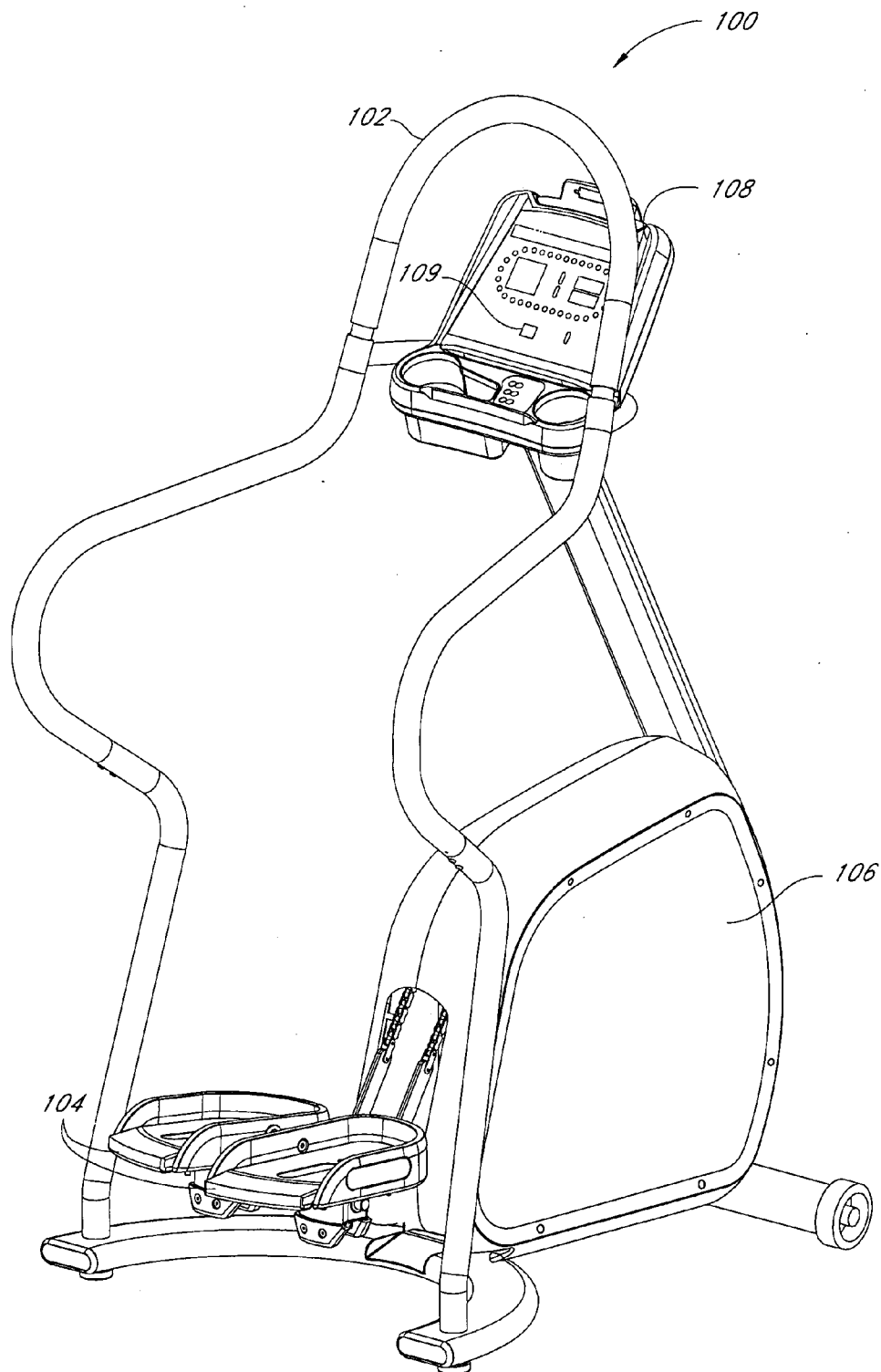


FIG. 1

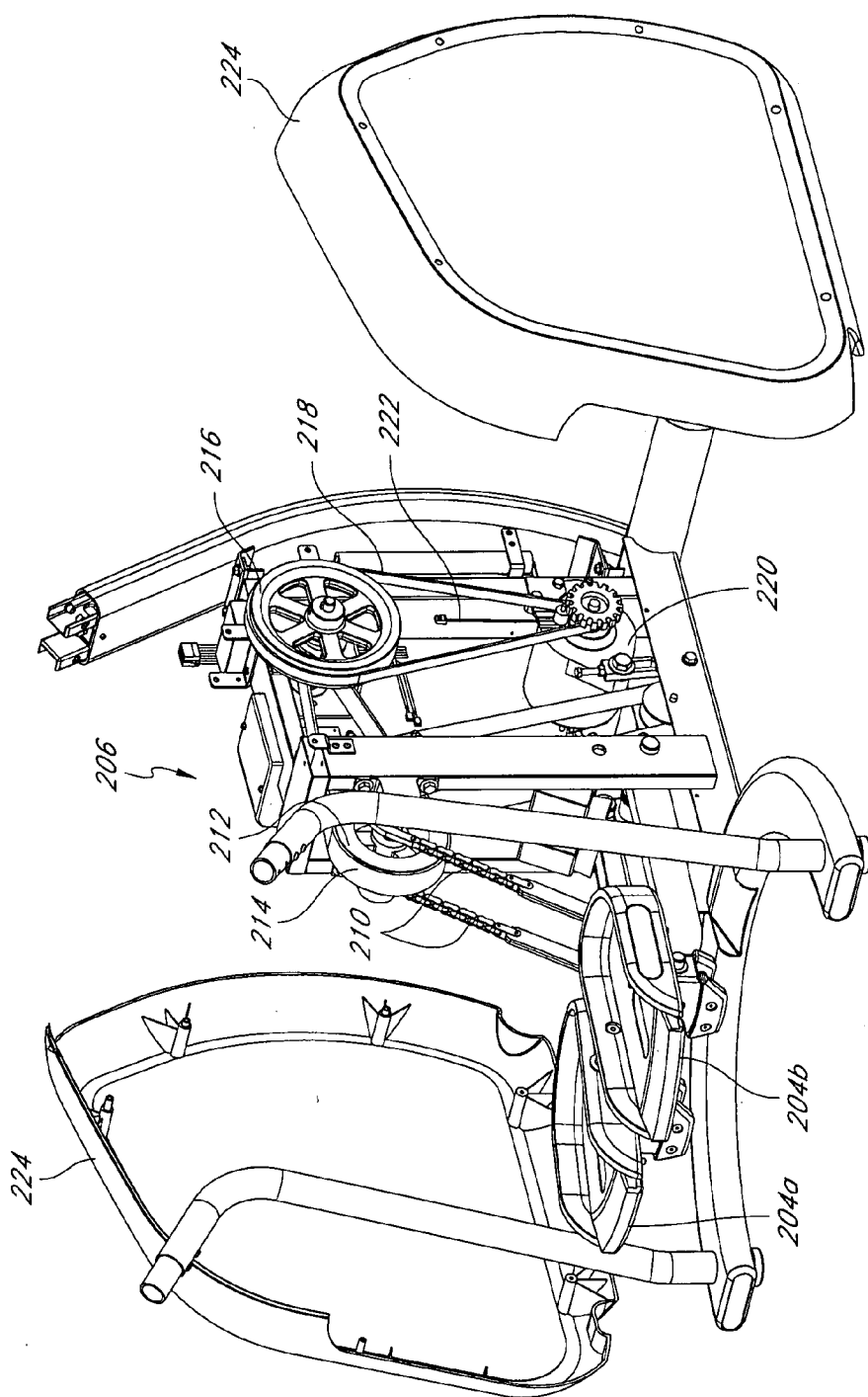


FIG. 2

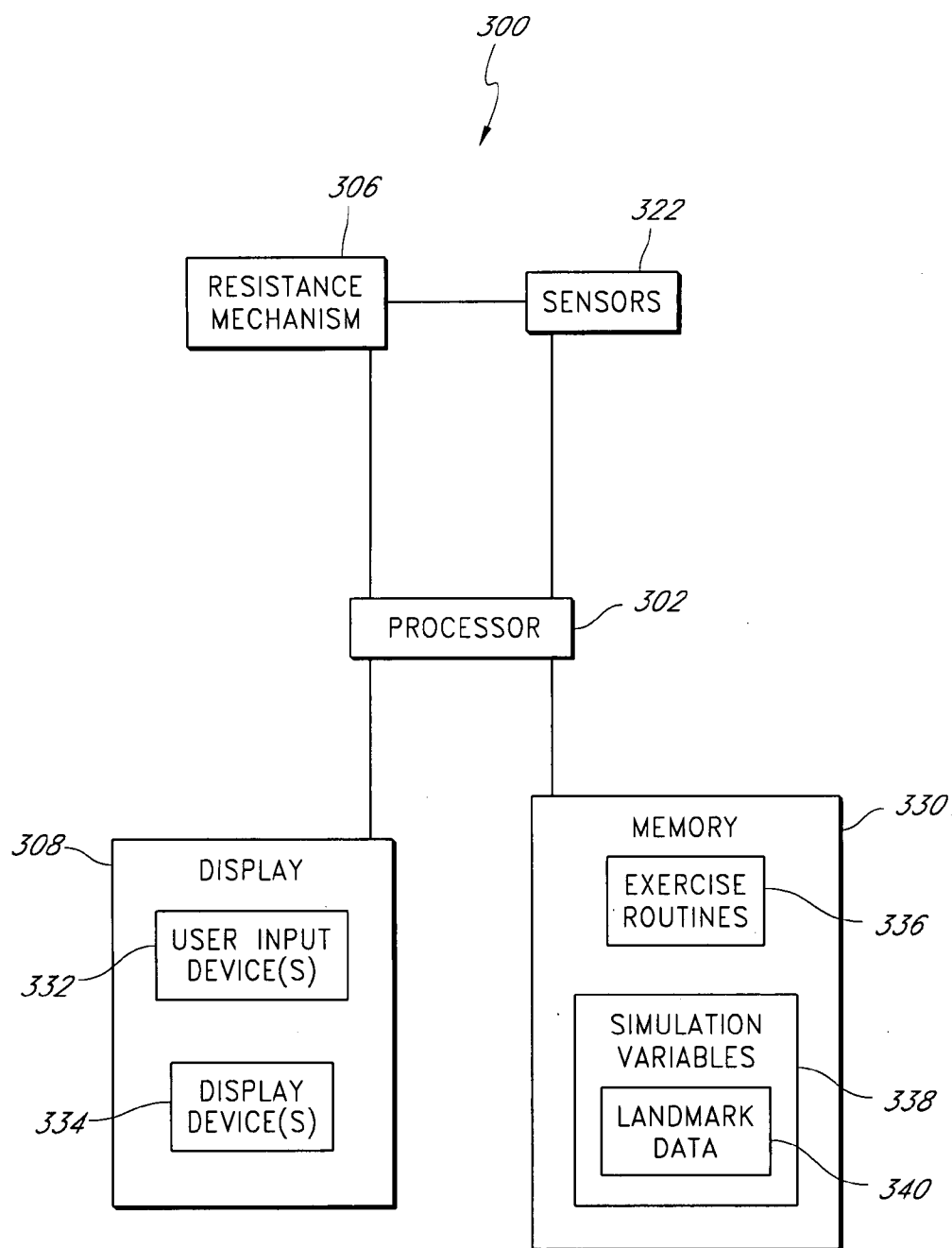


FIG. 3

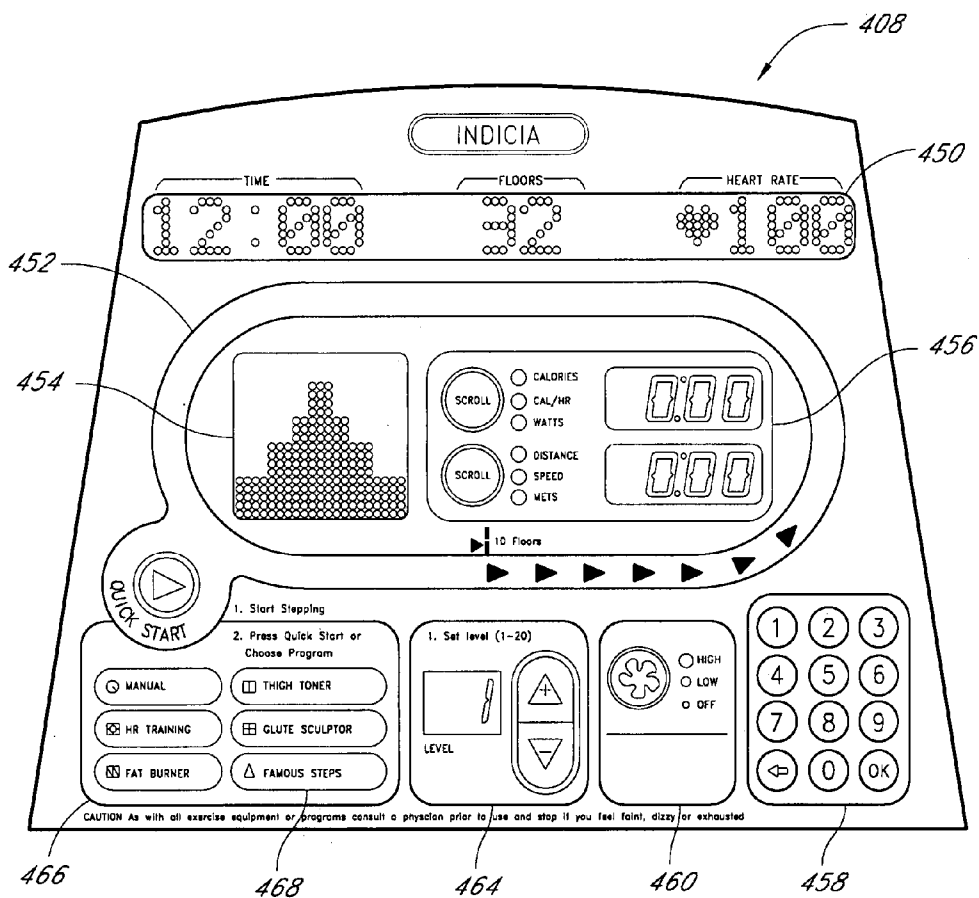


FIG. 4

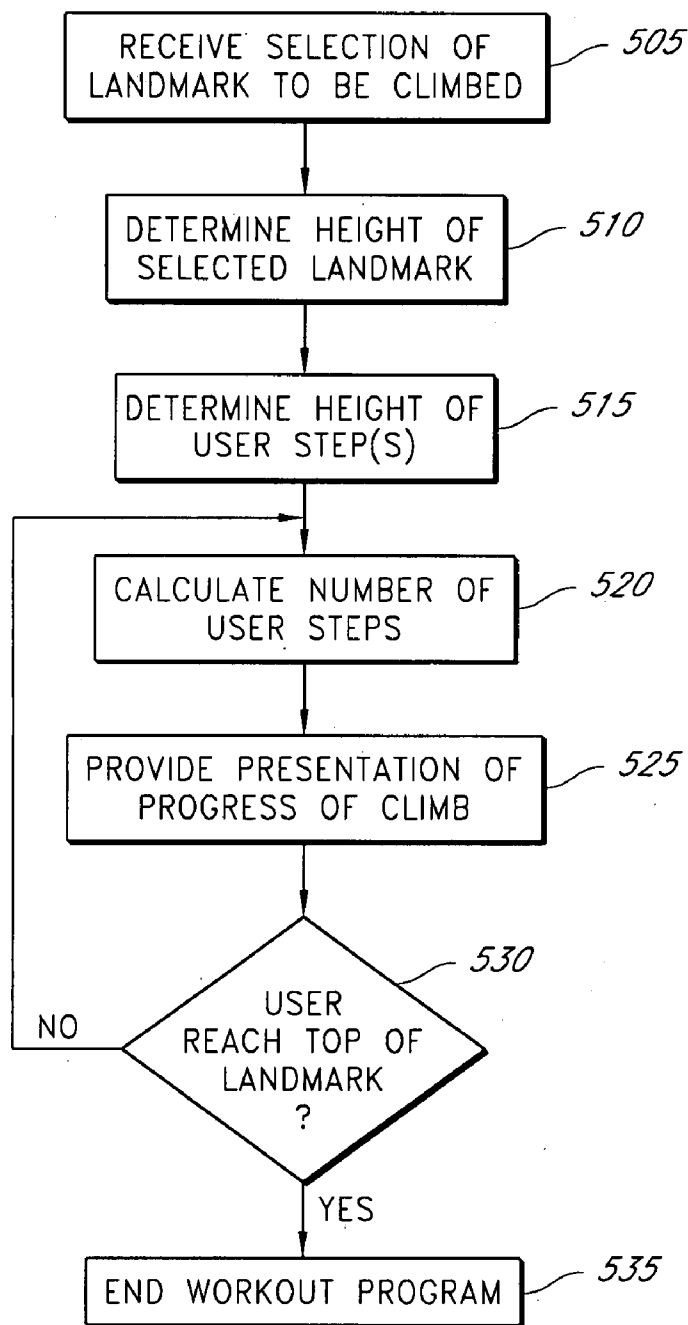


FIG. 5

MOTIVATIONAL DISPLAYS AND METHODS FOR EXERCISE MACHINE

RELATED APPLICATION

[0001] This application claims priority benefit under 35 U.S.C. §119(e) from U.S. Provisional Application No. 60/772,625, filed Feb. 13, 2006, which is hereby incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an exercise apparatus having a motivational display and electronic methods for motivating a user during a workout routine.

[0004] 2. Description of the Related Art

[0005] Trends towards physical fitness awareness have led to an increase in the number of individuals exercising to keep physically fit. Stationary exercise machines, such as stepping machines or “steppers,” have become popular choices for exercise enthusiasts who are unable to engage in outdoor exercise or who want to avoid the attendant inconvenience of outdoor exercise.

[0006] Indoor exercise, however, does have disadvantages. For example, users of stationary exercise machines generally experience the same environment each time they perform their exercise routines. For example, a user often goes to the same indoor workout facility and uses the same machine or group of machines. The surrounding “scenery” remains generally the same from day to day. Furthermore, users of stationary exercise machines often perform their exercise routines alone without interaction from others.

[0007] To address at least some of the attendant drawbacks of indoor exercise, several conventional exercise machines include user interfaces for motivating the user during his or her exercise routine. For example, certain treadmills and/or steppers include a motivational track comprised of multiple light emitting diodes (LEDs) arranged in a substantially oval shape. As the user progresses through the workout, the display updates the track display to show the user his or her progress and/or to motivate the user to complete the exercise routine. Similarly, some conventional steppers display to the user information regarding how high in vertical feet the user has “climbed” during the exercise routine and/or how much time has elapsed during the exercise routine. For example, the display may indicate how many steps the user has taken during the exercise routine.

[0008] Such display information, however, is relatively disconnected from the variety of experiences and self-fulfillment that may be encountered when engaging in outdoor exercise. In particular, the nature of the display information does not substantially change from day-to-day or between successive exercise routines. Furthermore, the lengths of exercise routines associated with the display information are generally for a preprogrammed or user-selected period of time.

[0009] Certain traditional stationary exercise machines also include preprogrammed workouts that relate to a general type of terrain. For example, the user may select a workout that includes a high resistance to simulate the climbing of or running up of a steep incline. Yet other

exercise machines allow a user to record information during a period of outdoor physical exercise. This information is then used by the exercise machine to vary the exercise resistance to simulate, for example, slopes and wind resistance, associated with the outdoor physical exercise.

SUMMARY OF THE INVENTION

[0010] However, even in light of the foregoing, traditional stationary exercise machines do not provide the user with a motivational exercise routine that simulates or approximates the scaling of a particular object of general or specific interest, such as, for example, a well-known landmark. Accordingly, what is needed is an exercise machine that provides the user with a variety of motivational exercise routines and/or displays for simulating the climb of defined objects.

[0011] In certain embodiments of the invention, a stepper exercise machine provides a user with a workout program that allows the user to simulate the scaling of one or more landmarks. In further certain embodiments, the stepper exercise machine adjusts the pedal resistance experienced by the user during exercising in response to changes in the user's weight and/or pedal cadence.

[0012] For example, in certain embodiments, the user selects an input key, such as a “landmark” or “FAMOUS STEPS™” key to initiate a preprogrammed workout program. The user selects at least one of a plurality of objects that he or she would like to “climb” during his or her exercise routine by alternatively pumping the stepper pedals. The stepper exercise machine determines the height of the selected object and the height of the user's step during exercising to calculate a total number of steps required by the user to scale the object. In certain embodiments, the display of the exercise machine depicts a graphical representation (e.g., a block pyramid) of the selected object and fills in horizontal portions of the display as the user progresses through the climb.

[0013] In certain embodiments, the stepper machine also varies the resistive load experienced by the user during exercising based on a user's weight and/or pedal cadence. In an embodiment, the foregoing is accomplished with a stepper machine including a pulley assembly that drives an alternator based on pumping of the pedals. In such an embodiment, the exercise machine may include one or more sensors and feedback circuitry that adjusts the resistance of the alternator to provide for a substantially constant rotation of the alternator, independent of the user's weight and/or pedal cadence.

[0014] For purposes of summarizing the disclosure, certain aspects, advantages and novel features of the invention have been described herein. It is to be understood that not necessarily all such advantages may be achieved in accordance with any particular embodiment of the invention. Thus, the invention may be embodied or carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other advantages as may be taught or suggested herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 illustrates a perspective view of a stepper exercise machine according to an embodiment of the invention.

[0016] FIG. 2 illustrates an exploded view of an exemplary embodiment of a resistance region of the stepper exercise machine of FIG. 1.

[0017] FIG. 3 illustrates a block diagram of an exemplary embodiment of a control system of the stepper exercise machine of FIG. 1.

[0018] FIG. 4 illustrates an exemplary embodiment of an electronic display of the stepper exercise machine of FIG. 1.

[0019] FIG. 5 illustrates a simplified flowchart of an exemplary embodiment of a workout program process executable by the control system of FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] In certain embodiments of the invention, a stationary exercise machine, such as a stepper, simulates the climbing of one or more predefined objects of general or specific interest. For example, the stationary exercise machine may include a user interface, such as a motivational display, that informs the user of his or her progress in “climbing” the selected object. For instance, the exercise machine may correlate an amount of the user’s exercise with climbing a particular percentage or portion (e.g., number of floors) of the object.

[0021] In certain embodiments, the user is able to initiate a workout program by selecting from a list of predefined objects, such as landmarks, or is able to input information regarding a particular object that he or she would like to climb during an exercise routine. The exercise machine may monitor the number of user steps and/or step height to calculate the user’s progress up and/or down the object. In certain further embodiments, the exercise machine may also adjust a resistive load experienced by the user during exercising in response to changes in the user’s weight and/or cadence. For instance, the foregoing may be accomplished with a stepper machine including a pulley assembly that drives an alternator based on pumping of the pedals. In such an embodiment, the exercise machine may include one or more sensors and feedback circuitry that adjusts the resistance of the alternator to provide for a substantially constant rotation of the alternator, independent of the user’s weight and/or pedal cadence.

[0022] In certain embodiments of the invention, the user selects an input key, such as a “landmark” or “FAMOUS STEPST[™]” key to initiate a preprogrammed workout program. The user selects at least one, of a plurality of objects that he or she would like to “climb” during his or her exercise routine by alternatively pumping the stepper pedals. The stepper exercise machine determines the height of the selected object and the height of the user’s step during exercising to calculate a total number of steps required by the user to scale the object. In certain embodiments, the display of the exercise machine depicts a graphical representation (e.g., a block pyramid) of the selected landmark and fills in horizontal portions of the display as the user progresses through the climb.

[0023] The features of the systems and methods will now be described with reference to the drawings summarized above. The drawings, associated descriptions, and specific implementation are provided to illustrate embodiments of the invention and not to limit the scope of the disclosure.

[0024] FIG. 1 illustrates an exercise machine 100 comprising a stepper according to an embodiment of the invention. In other embodiments, the exercise machine 100 may advantageously comprise other stationary exercise machines having electronically controlled resistance mechanisms, such as, for example, stairclimbers, natural runners, stationary bicycles, elliptical machines, rowing machines, treadmills, climbing machines, skiing machines, skating machines, and the like.

[0025] As shown in FIG. 1, the exercise machine 100 comprises a user positioning mechanism 102, such as a curved, supportive handrail assembly, a resistance applicator 104, such as independently operated pedals, an electronically controlled resistance mechanism 106, and an interactive display 108. FIG. 1 also illustrates a particular innovative structure for the handrail assembly, comprising an angled structure to reduce hand slippage due to perspiration and to provide for more comfortable hand and wrist positioning. The handrail assembly, which wraps around the display 108, further offers a “steering wheel” effect with numerous choices for hand position for each individual user’s preferred stepping positioning.

[0026] Furthermore, the exercise machine 100 may be advantageously self-contained such that the exercise machine 100 provides substantially all of its own electrical power for operation through the exerciser’s input. In other embodiments, the exercise machine 100 may operate at least partially on an AC power supply and/or one or more batteries.

[0027] As will be understood by a skilled artisan from the disclosure herein, a user can position himself or herself on the pedals, optionally balance using the handrail assembly, and perform exercises by pumping the pedals similar to climbing up stairs. Similarly, in the context of other stationary exercise machines, such as, for example, treadmills, stationary bicycles, a natural runners, an artisan will recognize the appropriate motion of activity that causes a user to exercise while using the particular exercise machine.

[0028] In certain embodiments, the display 108 provides feedback on various workout parameters, including, for example, current and aggregate data related to the current or historical workout. As shown in FIG. 1, the display 108 also provides for user input, such as, for example, the selection of a particular workout routine, a resistance level, and other user-related data.

[0029] As illustrated in FIG. 1, the display 108 further includes a “landmark” input 109. In certain embodiments, selection of the “landmark” input 109 initiates a workout program that allows a user to simulate a climb of a particular object or landmark, such as a man-made structure, a geographic location, combinations of the same or the like. In such embodiments, the display 108 may provide details of a progress of the user’s climb up the object, up multiple objects, track multi-session progress up one or more objects, time per object(s), combinations of the same or the like.

[0030] FIG. 2 illustrates further details of an electronically controlled resistance mechanism 206 usable by an exercise machine, such as the stepper exercise machine 100 of FIG. 1. As shown in FIG. 2, the resistance mechanism 206 generally comprises a pulley system and is operatively coupled to pedals 204a and 204b through linkage 210. As

the user, alternatively activates the pedals **204a** and **204b**, the linkage **210** drives angular movement of a first wheel **212**, which in turn causes rotation of a first belt **214**. Rotation of the first belt **214** in turn causes rotation of a flywheel **216** which is rotatably attached through a second belt **218** to an alternator **220**.

[0031] In the illustrated embodiment, the resistive load is a dynamic load and is determined, at least in part, by the alternator **220**. A skilled artisan will recognize from the disclosure herein, however, that any type of load may be utilized in connection with the electronically controlled resistance mechanism **206** of FIG. 2 and/or the exercise machine **100** of FIG. 1. For instance, in certain embodiments, the resistance mechanism **206** may comprise generators, friction brakes, pony brakes, air brakes, dynamometers, and other types of dynamic or controllable load devices, combinations of the same or the like in place of, or in combination with the alternator **220**.

[0032] Furthermore, although the resistance mechanism **206** is shown as operatively coupled to pedals **204a** and **204b** through the linkage **210**, other embodiments of the invention may utilize alternative means of coupling. For example, the pedals **204a** and **204b** may operably connect to the resistance mechanism **206** through a shaft, chain, transmission, belt, other means for transmitting or transforming motion, combinations of the same or the like.

[0033] With continued reference to FIG. 2, also illustrated is a sensor **222** that monitors rotation of the alternator **220**. For example, the sensor **222** may communicate data indicative of the movement (rotation) of the alternator **220** to processing circuitry. The processing circuitry may use such information in feedback circuitry to dynamically control the resistive load of the resistance mechanism **206**. As illustrated, the resistance mechanism **206** further includes a housing **224** that surrounds and protects the mechanical and electrical components located therewithin.

[0034] In certain embodiments, the resistance mechanism **206** of FIG. 2 and/or the stepper exercise machine of FIG. 1 may include one or more stepper configurations disclosed in U.S. Pat. No. 6,511,402 issued on Jan. 28, 2003, which is hereby incorporated herein by reference in its entirety.

[0035] FIG. 3 illustrates a block diagram of an exemplary embodiment of a control system **300** usable by an exercise machine, such as the exercise machine **100** of FIG. 1. As shown, the control system **300** comprises a processor **302** that communicates with an electronically controlled resistance mechanism **306**, a display **308**, at least one sensor **322** and a memory **330**.

[0036] In general, the processor **302** receives user input through the display **308** and/or information from the sensor **322** relating to the user's operation of the exercise machine. The processor **302** may also access and/or store information, such as data and/or executable instructions, in the memory **330**. The processor **302** is further capable of generating signals for adjusting the resistive load of the resistance mechanism **306** and/or controlling the output of the display **308**.

[0037] For example, in certain embodiments, the processor **302** comprises a general or a special purpose microprocessor and communicates with the at least one sensor **322** to receive input indicative of the user's stepping cadence while

performing one or more exercises. In certain embodiments, the sensor **322** may generate a tach pulse each partial or full revolution of the alternator **220**. For instance, the sensor **322** may comprise a magnetic encoder capable of sensing the rotation of a gear having a plurality of metal teeth that rotate with rotation of the alternator **220**.

[0038] In certain embodiments, the sensor **322** comprises an RPM sensor or other like device capable of measuring the angular velocity and/or direction of the alternator **220**, a force sensor for detecting a stepping force applied by the user, combinations of the same or the like. The sensor **322** may also comprise a localized processing module and/or an optical sensor, a potentiometer, a reed switch, a magnetic sensor, one or more encoding devices, encoder disks, combinations of the same or the like.

[0039] The display **308** can have any suitable construction known to an artisan to display information and/or to motivate the user about current or historical exercise parameters, progress of the user's workout, and the like. As illustrated in FIG. 3, the processor **302** communicates with the display **308** to receive user input through at least one user input device **332** and to provide user output through at least one display device **334**.

[0040] The user may input information, such as, for example, initialization data or resistance level selections, through the user input device **332**. Such initialization data may include, for instance, the weight, age, and/or sex of the user, the workout program selection(s), other demographic information, combinations of the same or the like. A skilled artisan will recognize from the disclosure herein a wide variety of other data usable to calculate exercise progress or parameters, including a wide variety of fitness parameters, physiological parameters and the like. The user input device **332** may comprise, for example, buttons, keys, a heart rate monitor, a touch screen, a personal digital assistant (PDA), cellular phone or the like. Moreover, an artisan will recognize from the disclosure herein a wide variety of devices usable to collect user input.

[0041] Furthermore, the display device **334** of the display **308** may provide the user with information relating to his or her exercise routine, such as for example, the selected workout program, the user's pedal cadence, the time expended or remaining in the exercise routine, the number of simulated floors remaining or climbed, the simulated velocity, the user's heart rate, combinations of the same or the like. The display device **334** may comprise, for example, LED matrices, a 7-segment liquid crystal display (LCD), a motivational track, combinations of the same and/or any other device or apparatus that is used to display information to a user.

[0042] In certain embodiments, the processor **302** communicates with the memory **330** to retrieve and/or to store data and/or program instructions for software and/or hardware. As shown, the memory **330** stores exercise routine data **336**, which may include for example user profiles, and simulation variables **338** usable to provide a workout to the user. For instance, the exercise routine data **336** and simulation variables **338** may be used by the processor **302** in calculating the appropriate resistive load to be applied by the resistance mechanism **306** during appropriate portions of the user's workout.

[0043] As shown in FIG. 3, the simulation variables **338** in the memory **330** further include object or landmark data **340**.

In certain embodiments, the landmark data **340** includes electronic information relating to one or more structures or locations for which the user may simulate a climb. For example, the landmark data may include information representing an actual height and/or elevation of an object, such as a landmark, which may be combined with other stored and/or calculated data, such as the user's weight, the estimated height of the user's step, and the like, to determine how many steps the user must complete in his or her exercise routine to scale the object.

[0044] In certain embodiments, the display **308** may provide the user with a certain number of steps/floors to be climbed to reach the top of predetermined objects or landmarks. For example, during an exercise routine, the user may be provided with the choice of climbing at least one of a plurality of man-made or natural landmarks, including, but not limited to, the Leaning Tower of Pisa, the Taj Mahal, the Great Pyramid, the Space Needle, the Petronas Towers, the Empire State Building, the CN Tower, the Sears Tower, and the Eiffel Tower. For instance, climbing the Leaning Tower of Pisa may require approximately 293 steps by the user, while climbing the Eiffel Tower may require approximately 2,731 steps by the user.

[0045] A skilled artisan will recognize from the disclosure herein a wide variety of other objects or landmarks that may be used in embodiments of the invention. For example, the user may be given the option to climb Mount Everest, Mount Kilimanjaro, or the like. In yet other embodiments, the memory **330** may receive user-programmed information relating to additional objects and/or landmarks. For instance, the user may be provided with the option of inputting a name and height of a particular landmark to be used in a simulated climb.

[0046] In yet other embodiments, the user may simulate a climb of a plurality of objects and/or landmarks during a single exercise routine, or a simulated climb of a single object and/or landmark may take place over a plurality of exercise routines extending over one or more days. In such embodiments, the memory **330** may store, such as in a user profile, the progress of a particular user in climbing a particular landmark or set of landmarks.

[0047] Furthermore, the landmark data **340** may further include resistive load data usable to simulate characteristics, such as a slope, associated with an object and/or particular portions of the object. For example, steeper portions of a landmark may be associated with a higher resistive load than other portions of a landmark having less of an incline.

[0048] In certain embodiments, the processor **302** and the memory **330** are housed within the display **308**. In other embodiments of the invention, the processor **302** and/or the memory **330** are located within the resistance mechanism **306**, such as on a load control board, or within or on other locations on the exercise machine. In yet other embodiments, the processor **302** and/or memory **330** are located external to, or remote to, the exercise machine. In yet other embodiments of the invention, a portion of the processor **302** may be housed in the display **308** and another portion of the processor **302** may be located within the resistance mechanism **306**.

[0049] As also will be understood by a skilled artisan from the disclosure herein, the memory **330** may comprise ran-

dom access memory (RAM), ROM, on-chip or off-chip memory, cache memory, or other more static memory such as magnetic or optical disk memory. The memory **330** may also access and/or interact with CD-ROM data, PDAs, cellular phones, laptops, portable computing systems, wired and/or wireless networks, combinations of the same or the like.

[0050] Although the control system **300** is disclosed with reference to particular embodiments, a skilled artisan will recognize from the disclosure herein a wide number of alternatives for the processor **302**, the sensor **322**, the resistance mechanism **306**, the memory **330**, and/or the display **308**. For example, the processor **302** may comprise an application-specific integrated circuit (ASIC) or one or more modules configured to execute on one or more processors. The modules may comprise, but are not limited to, any of the following: hardware or software components such as software object-oriented software components, class components and task components, processes, methods, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, applications, algorithms, techniques, programs, circuitry, data, databases, data structures, tables, arrays, variables, or the like.

[0051] For exemplary purposes, a method of operation of the control system **300** will now be described with reference to the elements depicted in FIG. 3, wherein the resistance mechanism **306** further includes an alternator. To begin an exercise routine, the user preferably positions himself or herself on the stepper and inputs certain initialization data in the display **308** through the user input device(s) **332**. As mentioned, such initialization data may include a particular workout program or level, the desired length (in time or floors) of the workout, the user's weight, a resistance level for the workout, combinations of the same or the like.

[0052] The user begins exercising by preferably alternatively pumping the pedals. Both of the pedals are advantageously spring loaded so that the user exerts a certain amount of force to lower the pedal against the return spring force. When the user lifts his or her foot, the spring contracts and raises the pedal to its return position. Both a distributed frictional load of resistance mechanism **306** as well as the amount of energy put into the spring return extensions of the pedals have a mechanical power input which is proportional to how fast the user steps, which in turn is related to the speed at which alternator turns.

[0053] In certain embodiments, the sensor **322** provides an alternator speed signal to a machine loadable software program executed by the processor **302**. For instance, in certain embodiments, the speed signal is multiplied by one or more scaling factors to produce a power value, which is indicative of the mechanical power, P_{mech} , input into the stepper. The one or more scaling factors may be theoretically estimated and/or empirically determined. The total power input into the stepper, P_{input} , may be calculated by summing P_{mech} and the total electrical power, P_{elec} , being consumed by the stepper.

[0054] In certain embodiments, this total input power, P_{input} , is used to maintain a substantially constant rotation of the alternator. For instance, the user may input through the user input device(s) **332** a desired power level that may be quantitatively calibrated in terms of calories per hour, calories per minute, watts, horsepower, Joules per minute or the

like. In any case, the user may select a value, N , which is a goal value indicating the power at which the user wishes to maintain his input or her into the stepper. The selected value N is used by the processor 302 to generate a set power level, P_{set} .

[0055] The processor 302 compares the total input power, P_{input} , to the set power level, P_{set} . The difference between the two values results in an error signal indicating the margin by which the user's actual power output exceeds or lags the power level which is desired. From this error signal, the processor 302 develops a command signal according to the specific requirements and nature of the stepper. For example, the command signal may be used to create a pulse width modulated field command signal in a feedback circuit to dynamically set the mechanical load provided by the resistance mechanism 306, such as through pulse width modulation of the field coil currents in the alternator.

[0056] In certain embodiments, the power output by the alternator is principally controlled by the pulse width modulation of the current in the alternator field coils. If the user slows down his or her stepping rate, the processor 302 outputs the command signal to cause the alternator to provide a greater load so that the amount of power that the user inputs into the stepper remains substantially constant.

[0057] Likewise, if the user should lean on the handrail assembly provided with the stepper, the force on the pedals from the user's feet decreases, and again the processor 302 modulates the field coil currents of the alternator to increase the load so that approximately the same amount of power is input into the machine by the user.

[0058] In certain embodiments, if the level of exercise is sufficiently high to drive the voltage of the alternator above a predetermined level, then excess power may be dumped into a dissipative resistive load in the same manner as is implemented with respect to slowing or increasing of speed of stepping of the user or different distributions of the user's weight.

[0059] Likewise, if a first user leaves the stepper and a heavier second user begins exercising on the stepper at the same power input setting, the heavier user is able to maintain the power setting input by the lighter first user at a lower stepping rate. In such a circumstance, the control system 300 senses the increased torque applied to the alternator through the pedals. The resistance or load provided by the alternator and/or shunted to the dissipative resistive load is adjusted to keep the input power or metabolic power of the user approximately constant.

[0060] FIG. 4 illustrates an exemplary embodiment of an electronic display 408 usable by the exercise machine 100 of FIG. 1. As shown, the display 408 includes a message window 450, a motivational track 452, a profile window 454, and information windows 456 that are capable of providing information to a user. In addition, FIG. 4 shows the display 408 comprising a numeric keypad 458, a fan control 460, a resistance level control 464 and program keys 466, which are capable of receiving input from the user.

[0061] FIG. 4 shows the message window 450 displaying information regarding the duration of a workout, the number of "floors" the user has climbed, and the heart rate of the user. In other embodiments, the message window 450 may provide informational messages to the user, instructions

during program initialization, feedback during the exercise routine, and/or summaries of workout data when the user completes the routine. The message window 450 may also display the name(s) of the object(s) and/or landmark(s) being climbed by the user during the exercise routine.

[0062] The motivational track 452 provides the user with his or her progress throughout the exercise routine. As shown, each round of the motivational track 452 corresponds to ten floors climbed by the user during his or her exercise routine. In other embodiments, the motivational track 452 may correspond to a higher or lower number of floors, or each highlighted portion (e.g., arrow) of the track 452 may correspond to a number of steps by the user.

[0063] The illustrated display 408 also includes the profile display 454, which illustrates the user's progress up and/or down a simulated climb of a selected object or landmark. For example, the profile display 454 may include a silhouette of a block pyramid that fills in horizontal rows or lines as the user climbs a predetermined percentage of the height of the selected landmark. In certain embodiments, the horizontal rows may also empty as the user "descends" the subject landmark.

[0064] Although the profile display 454 has been described with reference to particular embodiments, a skilled artisan will recognize from the disclosure herein a wide variety of display methods and arrangements for motivating a user during a simulated climb of an object and/or landmark. For example, in certain embodiments, the profile display 454 may depict the one or more landmarks (e.g., a graphical representation of the Eiffel tower) selected by the user for the exercise routine, or the profile display 454 may illustrate various objects and/or landmarks that have been climbed during an exercise routine (e.g., display the Leaning Tower of Pisa on the way to the top of the Sears Tower).

[0065] In yet other embodiments, the profile display 454 may illustrate one or more advanced graphics of a person climbing the landmark (e.g., Mount Everest), illustrate the descent of the user down the landmark, combinations of the same or the like. For instance, the profile display 454 may include video, photographs, graphic designs and/or animation that represents a user's progress.

[0066] For example, in certain embodiments, during a simulated climb of the Empire State building, the profile display 454 may display photographs of views from the Empire State Building that reflect the user's simulated climb height, and/or the profile display 454 may depict video footage of movement up a stairwell of the Empire State Building. In exercise routines wherein the user is simulating the climb of a particular geographic location, the profile display 454 may depict, for example, video of the user's progress up a particular trail or the like. Such information may be stored in a memory of the exercise machine and/or may be input by a user. For example, a user may record such information during an actual climb of the subject landmark, load the information into the display 408 or other component of the exercise machine, and then simulate the actual climb during one or more exercise routines.

[0067] FIG. 4 further illustrates the display 408 having the information window 456, which displays current and/or aggregate data related to the current workout, such as the

calories expended, the distance traveled, and the current speed. The illustrated display 408 also comprises the numeric keypad 458 usable to enter specific values for exercise parameters or like data, the fan control 460 usable to manually control the operation of a personal cooling fan, and the resistance level control 464 usable to manually increase or decrease the resistance level of an exercise routine.

[0068] FIG. 4 further illustrates the display 408 comprising multiple program keys 466 usable to select a desired preset program. In certain embodiments, selection of a particular program key 466 initiates a preset workout program. For example, program keys 466 may comprise: a “MANUAL” key that allows the user to input particular initialization parameters prior to and/or during the performance of an exercise routine; an “HR TRAINING” key that provides the user with exercise routines that are adapted to the user’s monitored heart rate; a “FAT BURNER” key that provides the user with exercise routines that are particularly adapted for weight loss; and “THIGH TONER” and “GLUTE SCULPTOR” keys that provide the user with muscle-specific exercise routines directed to improving muscle strength and/or tone. A skilled artisan will recognize from the disclosure herein a wide variety of preset programs that may be associated with the program keys 466.

[0069] As shown, the program keys 466 also comprise a “FAMOUS STEPS™” key 468. The “FAMOUS STEPS™” key 468 advantageously initiates an exercise routine in which the user is able to select from a number of landmarks to be scaled in a simulated climb. For instance, selection of the “FAMOUS STEPS™” key 468 may bring up a menu on the message window 450 and/or the profile display 454 listing the landmarks available for climbing during an exercise routine. In certain embodiments, each of the listed landmarks may also include a number of steps, an elevation, and/or a number of floors associated with the height of the particular landmark.

[0070] In yet other embodiments, the user is able to enter information regarding an object and/or landmark not initially stored in the memory of the stepper. For instance, the user may enter the name of the new landmark and data associated with the height of the new landmark (e.g., number of steps, number of floors, elevation, numerical representation of landmark height).

[0071] Although the “FAMOUS STEPS™” key 468 has been described with reference to particular embodiments, a skilled artisan will recognize from the disclosure herein a wide variety of alternative workout programs and/or settings associated with a selection of the “FAMOUS STEPS™” key 468. For example, in other embodiments, selecting the “FAMOUS STEPS™” key 468 may allow a user to complete one or more workout programs that were started during a previous exercise session but during which the user did not finish “scaling” the subject landmark.

[0072] FIG. 5 illustrates a flowchart of an exemplary embodiment of a workout program process 500. In certain embodiments, the process 500 is executed by the electronic control system 300 depicted in FIG. 3 to simulate a climb of a landmark.

[0073] As shown, the process 500 begins with Block 505 where the processor 302 receives through one of the user

input devices 332 on the display 308 a user-selection of a workout routine for simulating a climb of a landmark. For example, a user of a stepper machine having the display 408 depicted in FIG. 4 may select the “FAMOUS STEPS™” key 468. In certain embodiments, the processor 302 provides the user with an option to select one of a plurality of landmarks to be climbed. In other embodiments, the processor 302 may preselect the landmark, or the workout routine may default to a simulated climb of a specific landmark. In yet other embodiments, the user may input data indicative of a new landmark to be climbed during his or her exercise routine.

[0074] At Block 510, the processor 302 determines the height of the selected landmark to be climbed. For example, in certain embodiments, the processor 302 may access the landmark data 340 to determine a number of floors representing the height of the selected landmark. In other embodiments, the processor 302 may determine an elevation, a numerical height (e.g., number of feet, yards, meters or the like), or a number of steps indicative of the height of the landmark.

[0075] At Block 515, the processor 302 determines the height corresponding to each user step while the user is operating the stepping machine. For example, in certain embodiments, the processor 302 receives data from the sensors 322 regarding rotation of the alternator and calculates the corresponding step height of the user. In other embodiments, the processor 302 may calculate the step height of the user by sensing, with the sensors 322, movement of the pedals and/or rotation of a wheel, belt or other like rotating mechanism of the resistance mechanism 306.

[0076] In yet other embodiments, the step height is a predetermined height for each step. For instance, in certain embodiments, the predetermined height for each step may be between approximately seven inches and approximately ten inches, such as, for example, approximately eight inches.

[0077] At Block 520, the control system 300 calculates the number of steps by the user during his or her exercise routine. For instance, the one or more sensors 322 may directly monitor steps by the user and/or may sense a rotation of the alternator or other like mechanism to determine the number of user steps.

[0078] At Block 525, the processor 302 provides one or more output signals to the display 308 that are indicative of the user’s progress in the simulated climb of the landmark. The display 308, in turn, provides the user with a graphical representation of the user’s progress in the simulated climb. For example, the display 308 may depict through the one or more display devices 334 a silhouette of a block pyramid. As the user progresses through his or her climb, the display 308 fills in horizontal rows of the block pyramid to indicate a percentage of the climb that has been completed. In certain embodiments, the display 308 may also provide information regarding the number of floors, flights and/or steps left in the simulated climb of the landmark.

[0079] In determining the progress of the user’s climb, the processor 302 may calculate the number steps the user has taken during his or her exercise routine, determine the total height of represented by the number of steps, and compare the total step height with the height of the landmark.

[0080] At Block 530, the processor 302 determines if the user has reached the top of the subject landmark during his

or her simulated climb. If the user has not reached the top of the landmark, the process 500 continues to monitor the number of user steps (Block 520). If the user has reached the top of the selected landmark, the process continues with Block 535 where the workout program terminates. For instance, in certain embodiments, the display 308 may provide the user with congratulatory remarks and/or may show a picture of the actual landmark climbed.

[0081] Although the workout program process 500 has been disclosed with reference to particular embodiments, a skilled artisan will recognize from the disclosure herein a wide variety of acts or blocks that may be included in the process 500. For example, the control system 300 may adjust a resistive load of the resistance mechanism 306 to provide for a substantially constant rotation of an alternator, such as is described in more detail above. Furthermore, the control system 300 may receive from either the user and/or from stored data (e.g., user profiles in the memory 330) information relating to physiological characteristics of the user.

[0082] A skilled artisan will also recognize from the disclosure herein that the blocks described with respect to the foregoing process 500 are not limited to any particular sequence, and the blocks relating thereto can be performed in other sequences that are appropriate. For example, described blocks may be performed in an order other than that specifically disclosed or may be executed in parallel, or multiple blocks may be combined in a single block. In addition, not all blocks need to be executed or additional blocks may be included without departing from the scope of the invention. For instance, instead of executing Blocks 515 and 520, the control system 300 may directly calculate the total distance "climbed" by the user by monitoring a total movement, such as a rotation, of the alternator or other component of the resistance mechanism 306.

[0083] Furthermore, a skilled artisan will recognize from the disclosure herein that one or more functions of embodiments of the exercise machine may be implemented, at least in part, in software that is executable on one or more processors. For instance, a software program executing on a processor of the exercise machine may perform one or more of the following: monitor a progress of an individual during one or more exercise machines, track and/or analyze trend data relating to one or more users' exercise routines, control one or more display graphics, combinations of the same or the like.

[0084] In further embodiments, a software program may export data relating to the user's performance during one or more exercise routines. The exported data may include information related to, for example, caloric expenditure, heart rate, distance climbed, workout program selection and/or completion, exercise speed, length of time to climb particular landmark(s), combinations of the same and the like. For instance, such exported data may be used by a therapist to evaluate a user's performance and/or to develop a workout schedule for the user. The user may use such data to generate a summary of his or her exercise performance, to compare his or her performance with previous performances or against performances of another user, or the like. Furthermore, the exported data may be transferred to a PDA, cellular phone or other computing device for further processing and/or analyzing.

[0085] While certain embodiments of the inventions have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the disclosure. It must be understood that in the context of the present invention, exercise machines described herein are to be construed as any type of exercise equipment or device whereby a human exerciser may translate exercise of any one of the limbs or portion of the body into a motion which is translated into a motive force capable of driving a load. Thus, an exercise machine may include rowing machines, treadmills, climbing machines, skiing machines, skating machines and any type of exercise or work load machine now known or later devised.

[0086] Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the methods and systems described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the disclosure.

What is claimed is:

1. A stationary exercise machine capable of simulating a climb of a structure or geographic location, the stationary exercise machine comprising:

- an electronically-controlled resistance assembly having an alternator;
- pedals operably attached to the resistance assembly such that a pumping movement of the pedals translates into rotation of the alternator;
- a sensor module capable of outputting a first signal associated with the rotation of the alternator;
- an electronic display; and

- a processor capable of receiving the first signal and outputting one or more control signals to adjust the electronic display to associate movement of the pedals with a progress of a climb of a landmark.

2. The stationary exercise machine of claim 1, wherein the resistance assembly comprises a pulley assembly.

3. The stationary exercise machine of claim 1, wherein the sensor module comprises an encoder capable of measuring rotation of the alternator.

4. The stationary exercise machine of claim 1, wherein the processor is further configured to receive data regarding a weight of the user.

5. The stationary exercise machine of claim 4, wherein the processor is capable of outputting one or more load control signals to adjust the resistance of the alternator based at least upon the weight of the user.

6. The stationary exercise machine of claim 1, wherein the landmark comprises a man-made object.

7. The stationary exercise machine of claim 1, wherein the landmark comprises a geographic location.

8. A method of manufacturing a stationary exercise machine capable of providing a motivational exercise program, the method comprising:

providing a frame comprising:

- a resistance assembly having a dynamic resistive load, and

pedals operably attached to the resistance assembly such that movement of the pedals translates into corresponding movement of at least a portion of the resistance assembly; and

providing a user interface capable of displaying exercise information correlating the movement of the pedals during an exercise routine with a progress of a climb of a selected object.

9. The method of claim 8, additionally comprising providing a sensor module capable of outputting a first signal associated with the movement of the pedals.

10. The method of claim 8, wherein the user interface comprises a screen.

11. The method of claim 10, wherein the screen comprises one of a liquid crystal display (LCD) and a light emitting diode (LED) screen.

12. The method of claim 8, wherein the exercise information includes a depiction of the selected object.

13. The method of claim 8, wherein the exercise information includes depictions of multiple objects during the exercise routine.

14. The method of claim 8, wherein the exercise information depicts a percentage of the climb of the selected object.

15. A stationary exercise machine responsive to a user performing an exercise, the stationary exercise machine comprising:

a sensor responsive to an amount of user exercise; and

a processor responsive to an output signal of the sensor indicative of the amount of user exercise, the processor being capable of outputting a progress of the user in a simulated climb of a predetermined object.

16. The stationary exercise machine of claim 15, wherein the stationary exercise machine comprises a treadmill machine.

17. The stationary exercise machine of claim 15, wherein the stationary exercise machine comprises a natural runner machine.

18. The stationary exercise machine of claim 15, wherein the stationary exercise machine comprises a stationary bicycle.

19. The stationary exercise machine of claim 15, wherein the stationary exercise machine comprises a stepper machine.

20. The stationary exercise machine of claim 19, further comprising a resistance mechanism responsive to a load signal from the processor, wherein the resistance mechanism is capable of adjusting a resistance experienced by the user while performing the exercise.

21. The stationary exercise machine of claim 20, wherein the resistance mechanism further comprises an alternator, wherein the sensor is responsive to rotation of the alternator to generate the output signal.

22. A machine loadable software program for a processor of a stationary exercise machine having a motivational display, the software program comprising:

first software instructions capable of determining a height of a selected object;

second software instructions capable of calculating a simulated climb height associated with a movement of pedals by a user; and

third software instructions capable of instructing a processor to output at least one control signal causing an electronic user interface to display a progress of a user in a simulated climb of the selected object.

23. The software program of claim 22, further comprising fourth software instructions capable of outputting exercise data to a computing device external to the stationary exercise machine.

24. The software program of claim 23, wherein the exercise data comprises information indicative of at least one of user heart rate, user caloric expenditure and exercise length.

25. A stepper machine having a motivational display, the stepper machine comprising:

means for receiving a user-applied force during a performance of a stepping exercise;

means for sensing a movement of said means for receiving, wherein said means for sensing is capable of outputting a first signal indicative of the movement of said means for receiving; and

means for displaying a progress of a simulated climb of a predetermined object based at least on said first signal.

26. The stepper machine of claim 25, further comprising means for processing the first signal and for outputting one or more control signals causing said means for displaying to display the progress of the simulated climb of the predetermined object.

27. The stepper machine of claim 25, further comprising means for applying a resistive load to increase or decrease a resistance experienced by a user while exercising based at least on an increase or decrease in the movement of said means for receiving.

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