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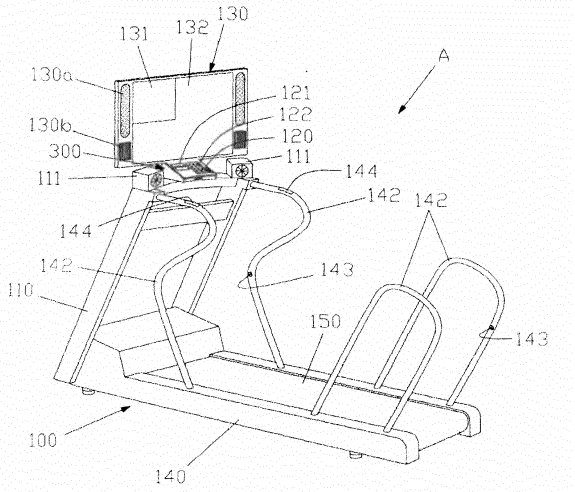
(54) TREADMILL HAVING A DEVICE FOR A VIRTUAL WALKING COURSE IMAGE AND METHOD FOR DRIVING THE TREADMILL

(57) The present invention relates to a treadmill having a device for a virtual walking course image, and to a method for driving the treadmill. The treadmill is structured such that the treadmill may be used within a restricted space and has a separate image device which enables a user to select, using a selection unit, a course from a virtual walking course image menu installed in the device for a virtual walking course image, and then images of, e.g., each course of the Olle trail of Jeju Island, each course of the Dulle pass of Jiri Mountain, the course of the Yunjung road of Yeouido, and major domestic and foreign marathon courses, are outputted to a monitor. The speed of the image displayed on the monitor changes with the walking speed of the user. In a slope mode in which the walking course has sloped and curved road sections, a driving belt of the treadmill operates according to the mode to realize the corresponding slope. Thus, the treadmill of the present invention has effects in that the user may enjoy exercising continuously without boredom since the user experiences the feeling of actually walking along a real course even though the treadmill is used within the restricted space. Further, a storage device stores and manages walking records of the user, thereby enabling a personal exercise record to be checked, and the whole course may be divided into several courses in case of a long-distance walk. Further, the treadmill of the present invention has effects in that the screen of the monitor is split into two or more screens to respectively display two or more different videos to thereby enable the user to watch a broadcast program such as news while walking along a virtual walking course so as to thereby increase the utility of the treadmill.

Fig. 1A



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Description

Technical Field

[0001] The present invention relates, in general, to a treadmill having a virtual walking/running image display device and a virtual walking/running method thereof and, more particularly, to a treadmill having a virtual walking/running image display device and a method of driving the treadmill, which can set image screens required to walk/run along various courses, on a treadmill installed in an exercise space used by the general public, such as a sports center, or installed at home, by using an image display device, thus allowing a user to exercise for a long time while maintaining interest in exercise without becoming bored thanks to various types of image content related to virtual walking/running, and which can set the inclination of the treadmill in conjunction with the incline and curve images of a virtual walking/running course on a video monitor, thus allowing the user to exercise with a high sense of realism.

Background Art

[0002] Generally, a treadmill, which is sports equipment used at home or a specific place such as a health club, is fixedly installed and used in an indoor area.

[0003] Such a treadmill is advantageous in that it is installed indoors, and thus a user can exercise regardless of season and weather conditions, but it is problematic in that the treadmill is configured to allow the user to continuously and repeatedly exercise in an unchanged space, so that the user is easily weary of exercising due to a monotonous usage environment, and thus gives up his or her exercise halfway.

[0004] In order to solve this problem, inventions for attaching various types of image display devices to existing treadmills and allowing users to exercise while viewing screens have been devised. However, such an invention is still limited in that users cannot feel provided content useful because the content is unilaterally and uniformly provided, and thus those problems have not yet been solved.

Disclosure

Technical Problem

[0005] The present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a treadmill having a virtual walking/running image display device and a method of driving the treadmill, which install various virtual walking/running course programs in the treadmill and allow a user to select a desired virtual walking/running image course using an installed image display device and to take running exercise while viewing the virtual walking/running image course, thus allowing the user to continuously exercise while feeling a sense of realism, without becoming bored.

[0006] Another object of the present invention is to provide a treadmill having a virtual walking/running image display device and a method of driving the treadmill, which can adjust the driving speed and inclination angle of the running belt of the treadmill in conjunction with the uphill road, downhill road, and curved road of a virtual walking/running course, thus enabling running exercises to be enjoyed with a sense of realism.

[0007] A further object of the present invention is to provide a treadmill having a virtual walking/running image display device and a method of driving the treadmill, which can simultaneously divide a screen into two or more sub-screens, thus enabling two or more pieces of image content to be simultaneously viewed.

Technical Solution

[0008] In order to accomplish the above objects, the present invention provides a treadmill having a virtual walking/running image display device, including a setting unit set in a select panel unit of the treadmill and configured to allow a user to select a virtual walking/running course and set walking/running conditions such as Identification (ID) and password, a speed control unit configured to analyze data of a selected virtual walking/running course in real time and control a belt drive motor and an incline motor control unit, a screen speed control unit configured to analyze and convert an electrical signal from the input power unit of the belt drive motor and control a screen speed of a video monitor, a data storage unit configured to store the ID, password, and exercise history of a user and the course information of virtual walking/running courses, the incline motor control unit configured to receive information about an inclined section and a curved section among pieces of information about the virtual walking/running course, and control incline drive motors in conjunction with the inclined and curved conditions of the virtual course, a main control unit organically connected to the respective control units and configured to control the control units, and the video monitor configured to simultaneously divide a screen into two or more sub-screens and enable two or more pieces of image content to be simultaneously viewed depending on a selection of the user.

[0009] In order to accomplish the above objects, a method of driving a treadmill includes the steps of 1) turning on power of the treadmill, 2) inputting walking/running conditions to a setting unit, 3) driving a belt drive motor, and initiating operation of a running belt, 4) a speed control unit determining whether a section is an inclined or curved section, based on data provided by a data storage unit, 5) if it is determined that the section is neither the inclined section nor the curved section, driving the belt drive motor and operating the running belt in a normal mode under control of the speed control unit, 6) controlling a screen speed using a screen speed control unit,

7) if it is determined at 4) that the section is the inclined or curved section, driving incline drive motors in an incline mode under control of the speed control unit and an incline motor control unit, and 8) storing data.

Advantageous Effects

[0010] The treadmill having a virtual walking/running image display device and a method of driving the treadmill according to the present invention are configured such that a separate image display device is installed on a treadmill used in a limited space and such that, if a user selects a virtual walking/running course image menu set in the virtual walking/running image display device using a setting unit, an image such as that of each course of Olle Trail in Jeju Island, each course of Dulle Trail of Jiri Mountain, the course of Yunjung Road of Yeouido, or each of domestic/foreign principal marathon courses is displayed, and are configured such that, depending on the walking/running speed of the user, the speed of the image on the video monitor is changed, and in the incline of a walking/running course and the incline mode of a curved section, a running belt is operated while forming an inclined surface corresponding to the incline or incline mode in conjunction with the incline or the incline mode, so that there is an advantage in that, even if the treadmill is used in a limited space, the user can feel a sense of realism as if he or she were walking/running along a real course, thus continuously and pleasantly exercising without becoming bored. Further, there is an advantage in that, in a storage unit, walking/running history is stored and managed to enable personal exercise history to be searched for, and, in the case of a long-distance walking/running course, the entire course can be divided into multiple courses to allow the user to walk/run along the divided courses, and in that the screen of the video monitor is divided into two or more sub-screens to display two or more different pieces of image content, so that the user can watch a broadcast such as a news program while walking/running along a virtual walking/running course, thus increasing the usefulness of the treadmill.

Description of Drawings

[0011]

Figs. 1a and 1b are a schematic perspective view and a longitudinal sectional view, respectively, of a treadmill according to a first embodiment of the present invention;

Fig. 2 is a configuration diagram showing the principal components of the treadmill having a virtual walking/running image display device according to a first embodiment of the present invention;

Fig. 3 is a block diagram showing the treadmill having an image display device according to a first embodiment of the present invention; and

Fig. 4 is an operation flowchart showing the treadmill having an image display device according to a first embodiment of the present invention.

Best Mode

[0012] Hereinafter, a preferred first embodiment of the present invention will be described in detail with reference to the attached drawings.

[0013] Fig. 1a is a schematic perspective view showing a treadmill A having a virtual walking/running image display device according to a first embodiment of the present invention.

[0014] As shown in Figs. 1a and 1b, the treadmill A having the virtual walking/running image display device according to the first embodiment of the present invention is configured such that a controller body 300 is installed at the center of the top of a support 110 installed upright on the front portion of a treadmill body 100, and such that a panel monitor 121 for displaying the operating status of the treadmill and a selection panel unit 120 are installed on the controller body 300.

[0015] The selection panel unit 120 is implemented as a touch panel and has a setting unit 122 composed of a plurality of buttons.

[0016] As shown in Fig. 2, the controller body 300 includes a main control unit 310 configured to control various types of control units, a data storage unit 380 connected to the main control unit 310 and configured to store information about a plurality of virtual walking/running courses, a speed control unit 340 connected to the main control unit 310 and configured to analyze and convert information about each walking/running course, received from the data storage unit 380, in real time, and transmit signals to a belt drive motor 160 and an incline motor control unit 370, the incline motor control unit 370 connected to the main control unit 310 and configured to control incline motors when an incline mode appears in the virtual walking/running course information, a screen speed control unit 360 connected to the main control unit 310 and configured to output a real-time screen based on the virtual walking/running course information and to control the speed of the output screen, and the selection panel unit 120 provided with the setting unit 122.

[0017] That is, the selection panel unit 120 is electrically connected to the data storage unit 380 through the main control unit 310.

[0018] Further, the controller body 300 including the selection panel unit 120 having the panel monitor 121 and the setting unit 122 formed on the top thereof is connected to a video monitor 130, and then a virtual walking/running image display device B is implemented.

[0019] On the video monitor 130, a fragrance generation unit 130b and a speaker part 130a for generating sounds related to virtual walking/running courses in conjunction with the virtual walking/running courses are installed. The speaker part 130a is installed to output sounds in a wireless manner through earphones (not shown) inserted into the ears of the user. The fragrance

generation unit 130b causes negative ions or phytoncide fragrance. As the video monitor 130, a monitor having a size of at least 30 inches must be installed so as to implement walking/running with a sense of realism.

[0020] In the present embodiment, the video monitor 130 is installed on the top of the support 110, but it may be installed to be supported by a separate stand (not shown) due to the problem of vibration. On the top of the support 110, electric fans 111 may be installed to dry the perspiration of the user or cool off the user.

[0021] Four incline drive motors 151 are installed at four corners of a running belt 150 on a deck 140, on which the user will stand and run, in the treadmill body 100 of the treadmill A. A driven shaft 150a is installed in the front portion of the running belt 150, and is installed to rotate using a power transmission belt 161 through which the rotary power of the belt drive motor 160 is transferred.

[0022] Guide handles 142 are installed upright on the front and rear portions of the top of the deck 140 of the treadmill body 100, and photo-sensors 143 are installed on the respective guide handles 142 and are configured such that a front photo-sensor 143 installed on the front guide handles 142 generates a warning sound against the danger of the forward approach of the user and such that a rear photo-sensor 143 senses the danger of the rearward fall of the user on the running belt 150 and generates a warning sound against the danger. Further, emergency stop switches 144 are formed on the front guide handles 142, thus stopping the operation of the running belt 150 in an emergency.

[0023] Fig. 2 is a configuration diagram showing a relation between the principal components of the treadmill body 100 having a virtual walking/running image display device according to a first embodiment of the present invention, and Fig. 3 is a block diagram showing a relation between the components of the virtual walking/running image display device according to the present invention.

[0024] A treadmill A having the virtual walking/running image display device is configured such that, when walking/running conditions, such as identification (ID), password, a walking/running course, and season, are entered using the setting unit 122 formed on the selection panel unit 120, and a walking/running start button is turned on, a walking/running information signal for a virtual walking/running course stored in the data storage unit 380 is transferred to the speed control unit 340. The speed control unit 340 analyzes and converts, in real time, information about each walking/running course received from the data storage unit 380, and then controls the belt drive motor 160 and the incline motor control unit 370.

[0025] The data storage unit 380 stores information about a plurality of virtual walking/running courses in addition to information such as the ID, password, and exercise history of the user, and such virtual walking/running course information includes images of the corresponding course and information about the height, curve, distance, etc. of each section of the corresponding course obtained by a Geographic Information System (GIS). For example, such virtual walking/running course information may be a Chuncheon marathon course, for which an image of a course for walking/running along the lakeside of Uiam Dam is produced with a length of about 4 hours (this is designated as a "Chuncheon full-course marathon stream"). Such a Chuncheon full-course marathon stream is produced to include eight divided sectional streams, each being played for about 30 minutes, and the user may load a desired sectional stream and use it for walking/running exercise. At this time, screen speed may be changed according to the doubled-speed of the video monitor 130 and may run along a marathon course of an hour (at double speed) or of an hour and a half (at 3x speed) by means of exercise taken for 30 minutes.

[0026] When the received information indicates an inclined or curved section based on the information stored in the data storage unit 380, the speed control unit 340 functions to operate individual incline drive motors 151 by transferring information about the corresponding section to the incline motor control unit 370 using a preset program while functioning to control the speed of the belt drive motor 160 to speed corresponding to the operation speed of the motors 151.

[0027] That is, the belt drive motor 160 is operated using a program preset to be operated slow on an uphill road and to be operated fast on a downhill road, in proportion to the degree of the inclination.

[0028] The screen speed control unit 360 analyzes the intensity of input power of the belt drive motor 160, converts the input power intensity into a signal, and controls the speed of the video monitor 130. In this way, the screen speed of the video monitor 130 may be associated with the rotational speed of the belt drive motor 160.

[0029] Further, the treadmill A having the virtual walking/running image display device has a double speed walking/running function. The double speed walking/running function executed by the image display device B allows the user to enjoy interesting exercise based on various experiences in such a way that, when the user selects the double speed walking/running function using the setting unit 122, the screen speed of the video monitor 130 in the treadmill A is increased by a designated scale factor regardless of the speed of the running belt 150 by the screen speed control unit 360 based on a preset program and then the user may walk/run along a long-distance course for a short period of time. Such a double speed walking/running function is operated using a double speed function used in a typical digital Television (TV) or Digital Versatile Disk (DVD).

[0030] For example, in the case of a Chuncheon marathon course image played using a double speed walking/running function, when it is desired to run, for 30 minutes, along the first sectional stream and the second sectional stream of a Chuncheon full-course marathon stream produced with a length of 4 hours, if a 2x speed function is selected and walking/running is conducted, the user may view an image corresponding to walk-

ing/running along a 1-hour marathon course as a 1-hour image corresponding to the first and second sectional streams has passed, by means of exercising for 30 minutes. Such a double speed walking/running function is implemented to extract only components configuring an I picture from a specific location of a stream written in a large-capacity storage device with reference to the stored information, and transfer the extracted components to a Moving Picture Experts Group (MPEG) decoder, thus enabling walking/running to be conducted.

[0031] Fig. 4 is a flowchart showing an embodiment of the present invention.

[0032] When a user turns on the power of the treadmill A according to the present invention, enters his or her ID and password using the setting unit, selects a walking/running course, and starts walking/running, the data storage unit 380 initiates the generation of a data signal for the selected course. The speed control unit 340 that received the signal analyzes and converts the received signal in real time, and controls the speed of the belt drive motor 160, so that the belt drive motor 160 is operated depending on the controlled speed. The screen speed control unit 360 analyzes and converts an electrical signal from the input unit of the belt drive motor 160, and then controls the screen speed of the video monitor 130.

[0033] If the signal received from the data storage unit 380 is information about an incline mode related to an inclined section or a hill section, the speed control unit 340 separately transmits the signal to the incline motor control unit 370, and the incline motor control unit 370 analyzes and converts the received signal, and then controls the incline drive motors 151. That is, when a walking/running course is an uphill section, two front incline drive motors 151 are driven to be rotated to the right, so that the running belt 150 is forwardly and upwardly inclined, thus enabling the uphill section to be implemented. Simultaneously, the speed of the belt drive motor 160 is controlled to be low by the speed control unit 340, so that the speed of the running belt 150 becomes low while the screen speed is also controlled to be low by the screen speed control unit 360, thus completing the walking/running conditions of the virtual walking/running course.

[0034] In contrast, on a downhill road, operation contrary to that of the uphill road is performed, but the speed of the running belt 150 is controlled with the running belt 150 being forwardly and downwardly inclined at an angle close to a horizontal state on the downhill road, in consideration of the characteristics of the treadmill and the safety of the user.

[0035] Further, in a curved section, the speed control unit 340 transmits curve data received from the data storage unit 380, and the incline motor control unit 370 analyzes and converts the curve data, differently controls the heights of the four incline drive motors 151, and then implements a virtual curved inclined surface on the deck 140.

[0036] In the case of a right curved section, the running belt 150 is upwardly moved while the right incline drive motors 151 are combined and rotated to the right, so that the left surface of the running belt 150 is raised and the right surface of the running belt 150 is lowered, thus enabling the shape of the right curve to be implemented.

[0037] Further, even in a section in which an incline and a curve overlap each other, such functions may be combined to implement the section.

[0038] Furthermore, the present invention may store the ID, password, and personal walking/running history of the user in the data storage unit 380, may divide the entire long-distance course into sections and separately walk/run along the divided sections for respective dates in the case of long-distance course walking/running, and may store and refer to the walking/running history of the user for respective periods, thus enabling the amount of exercise for each person to be managed.

[0039] In the present invention, the video monitor 130 includes the function of dividing a single screen into two sub-screens 131 and 132 or more sub-screens and simultaneously displaying multiple screens depending on the user's selection, and then provides the function of allowing the user to watch a TV broadcast while viewing a virtual walking/running course image, by means of the function.

[0040] As described above, although the present invention has been described with reference to the specific preferred embodiment of the present invention, it should be understood that the present invention is not limited to the above embodiment and various modifications and changes can be implemented by those skilled in the art, without departing from the scope and spirit of the invention.

Industrial Applicability

[0041] Since, for a treadmill having a virtual walking/running image display device and a method of driving the treadmill according to the present invention, it is possible to repeatedly produce and execute the same product in normal treadmill manufacturing factories, the present invention may be considered to have industrial applicability.

Claims

1. A treadmill having a virtual walking/running image display device, the treadmill being a treadmill (A) including a treadmill body (100) in which a running belt (150) of a deck (140) on which a user will stand and run is horizontally installed and a controller body (300) is installed at a center of a top of a support (110) installed upright on a front portion of the treadmill body, the controller body (300) being connected to a video monitor (130) to implement the virtual walking/running image display device, wherein:

   the controller body (300) comprises:

a main control unit (310) configured to control entirety of the controller body;
a data storage unit (380) connected to the main control unit (310) and configured to store information about a plurality of virtual walking/running courses;
a speed control unit (340) connected to the main control unit (310) and configured to analyze and convert the information about each walking/running course received from the data storage unit (380) in real time, and transmit resulting signals to a belt drive motor (160) and an incline motor control unit (370);
the incline motor control unit (370) connected to the main control unit (310) and configured to control incline motors when an incline mode occurs in the virtual walking/running course information;
the screen speed control unit (360) connected to the main control unit (310) and configured to output a real-time screen based on the virtual walking/running course information and control a speed of the output screen; and
a selection panel unit (120) connected to the main control unit (310) and configured to input Identification (ID) and password and to set walking/running conditions, such as a walking/running course and season,
wherein the controller body (300) is connected to the video monitor (130), thus enabling a virtual walking/running image display device (B) to be implemented,
wherein the treadmill body (100) comprises incline drive motors (151) installed at four corners of the running belt (150) of the deck (140) and configured to adjust heights of respective portions of the running belt (150) while being independently rotated to left or right by the incline motor control unit (370), and
wherein the video monitor (130) is configured to enable multiple screens to be simultaneously displayed by dividing a screen into two sub-screens (131 and 132) or more sub-screens, and enable double speed walking/running to be conducted.

2. A method of driving a treadmill, comprising:

a power-ON step of turning on power of a treadmill body (100);
an input step of inputting walking/running conditions to a setting unit (122);
an initiation step of initiating driving of a belt drive motor (160);
a section determination step of determining whether a section is a straight section, an inclined section or a curved section, based on data provided by a data storage unit (380),
a running belt operating step of, if it is determined at the section determination step that the section is the straight section, driving the belt drive motor (160) under control of a speed control unit (340), thus operating the running belt (150);
a screen speed control step of analyzing and converting an input signal, received from a power input unit of the belt drive motor (160), using a screen speed control unit (360), thus controlling a screen speed;
a step of, if it is determined at the section determination step that the section is the inclined or the curved section, vertically raising or lowering the running belt (150) by rotating the incline drive motors (151) to left or right while controlling a speed of the belt drive motor (160) so that the belt drive motor (160) is rotated fast or slow, under control of the speed control unit (340) and the incline motor control unit (370); and
a step of terminating running and storing data,
wherein at the screen speed control step, when double speed walking/running is performed, the screen speed of a video monitor (130) is increased by a set double speed regardless of a movement speed of the running belt (150), and wherein in a downhill course while running, the speed of the running belt (150) and the screen speed of the video monitor (130) are increased, and an inclination of the running belt (150) is maintained in a forwardly and downwardly inclined state.

3. The method of claim 2, wherein the method enables a long-distance walking/running course to be divided into multiple courses based on stored data and enables running exercise to be taken along the courses.

Fig. 1A

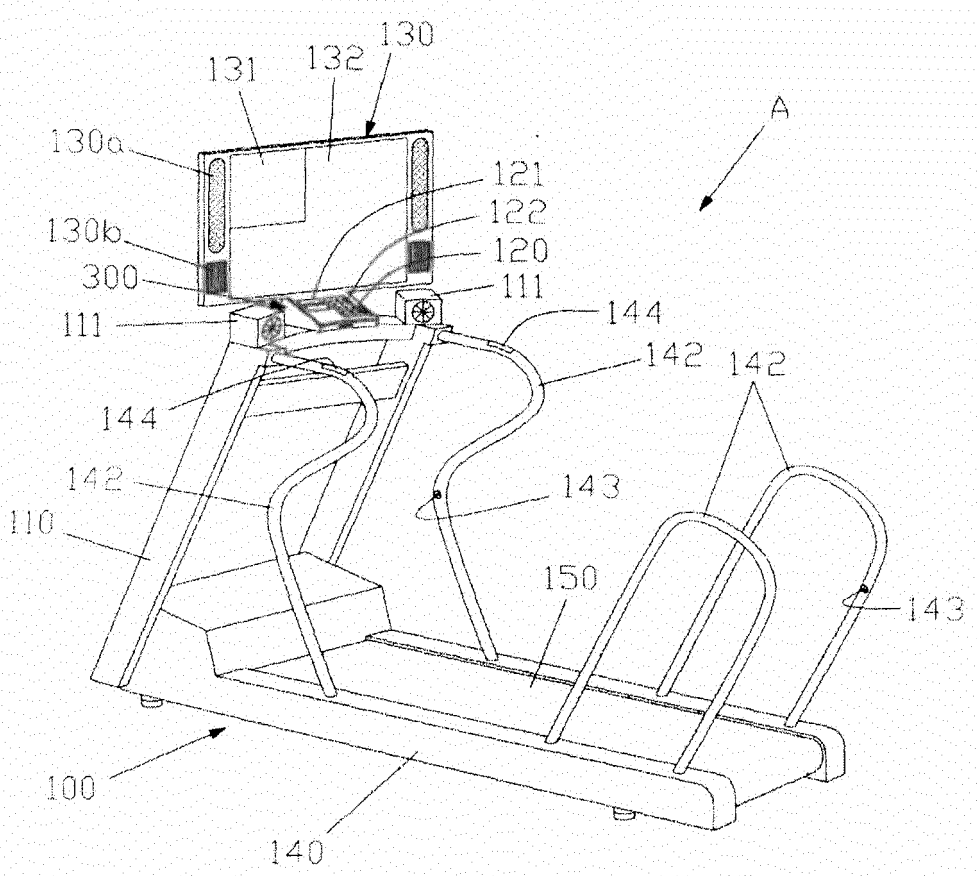

131
132
130
A
130a
121
122
130b
120
300
111
111
144
142
142
144
142
143
110
150
143
100
140

Fig. 1B

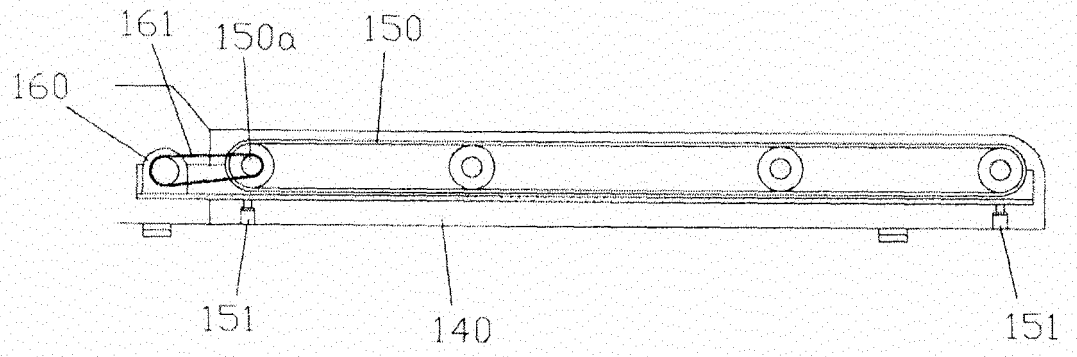

161
150a
150
160
151
140
151

Fig. 2

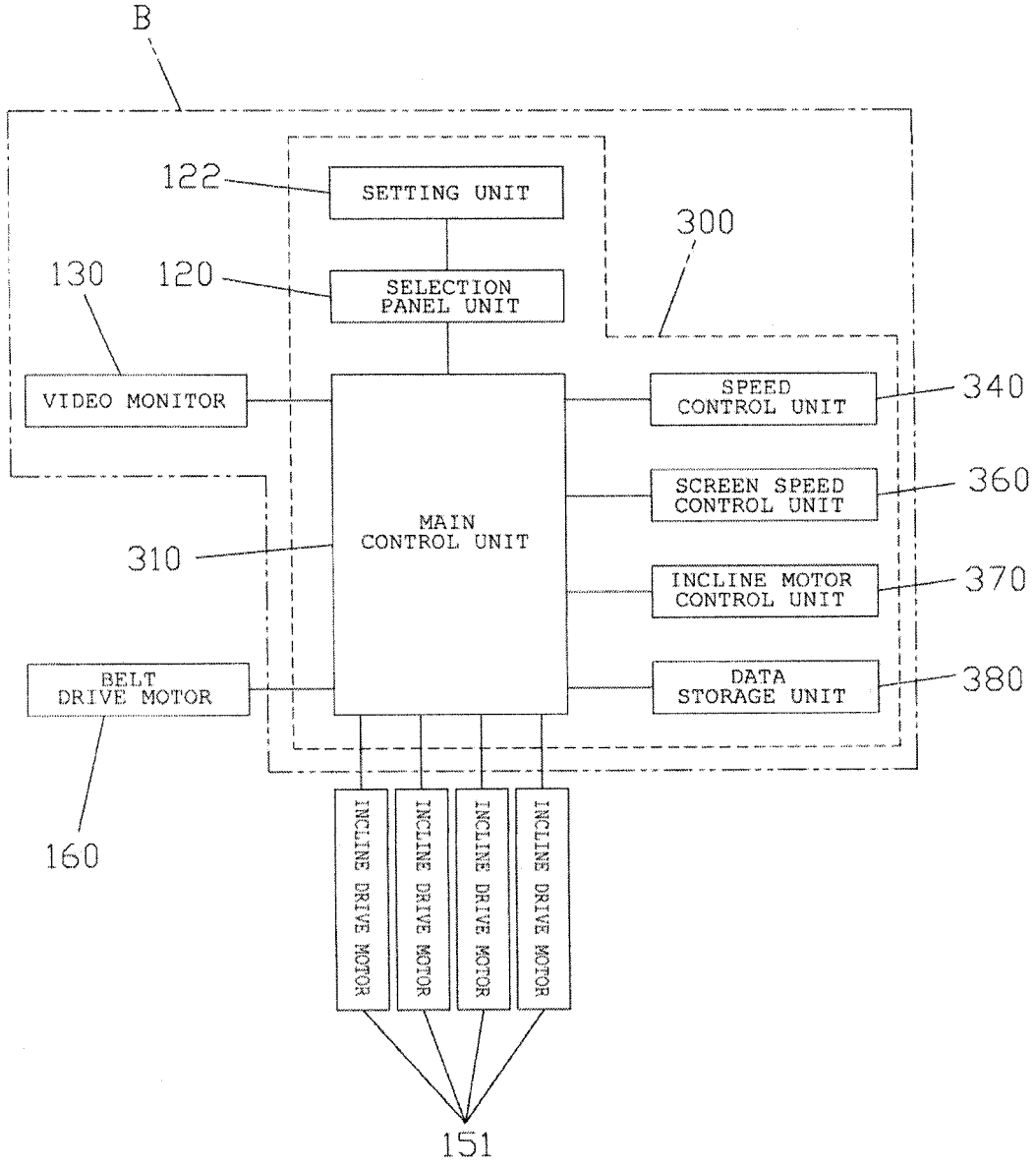

B
122
SETTING UNIT
300
130
120
SELECTION PANEL UNIT
VIDEO MONITOR
SPEED CONTROL UNIT
340
SCREEN SPEED CONTROL UNIT
360
MAIN CONTROL UNIT
310
INCLINE MOTOR CONTROL UNIT
370
BELT DRIVE MOTOR
DATA STORAGE UNIT
380
160
INCLINE DRIVE MOTOR
INCLINE DRIVE MOTOR
INCLINE DRIVE MOTOR
INCLINE DRIVE MOTOR
151

Fig. 3

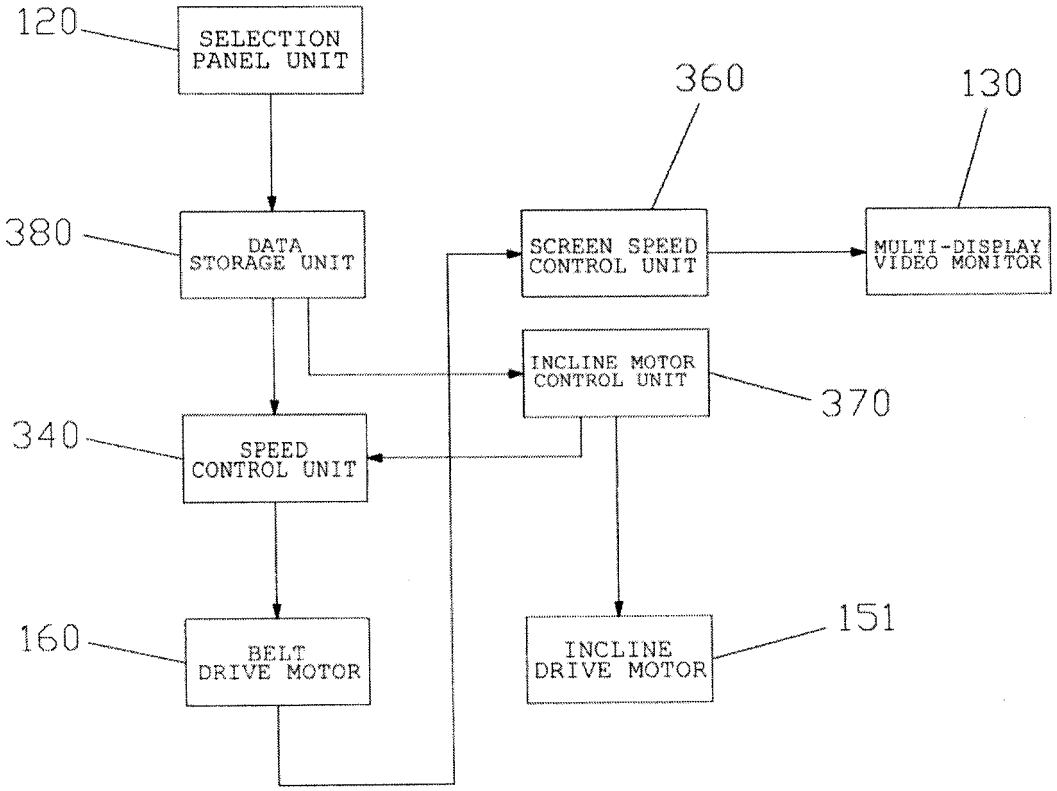
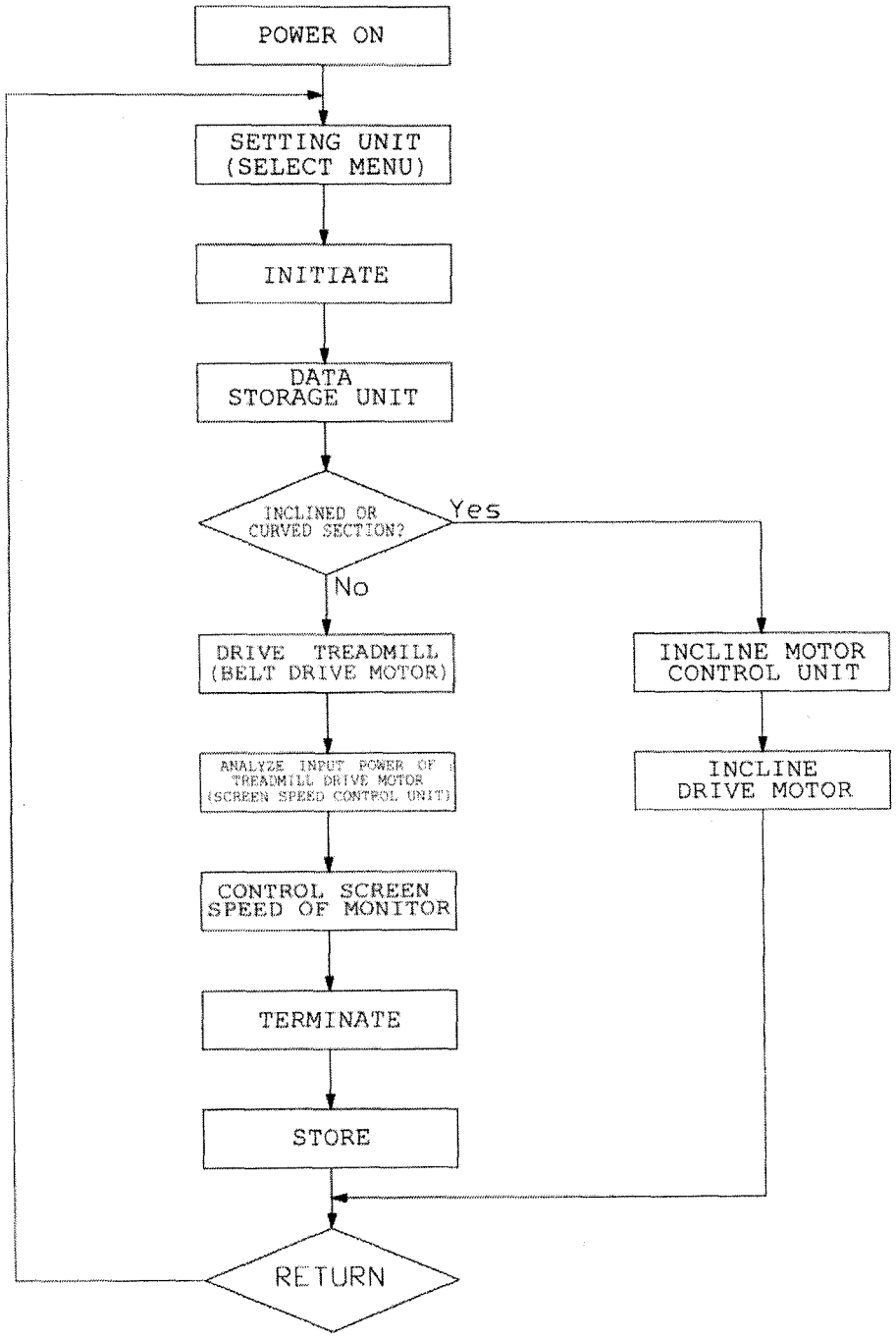

120
SELECTION PANEL UNIT
360
130
380
DATA STORAGE UNIT
SCREEN SPEED CONTROL UNIT
MULTI-DISPLAY VIDEO MONITOR
INCLINE MOTOR CONTROL UNIT
370
340
SPEED CONTROL UNIT
160
BELT DRIVE MOTOR
INCLINE DRIVE MOTOR
151

Fig. 4


POWER ON
SETTING UNIT (SELECT MENU)
INITIATE
DATA STORAGE UNIT
INCLINED OR CURVED SECTION?
Yes
No
DRIVE TREADMILL (BELT DRIVE MOTOR)
ANALYZE INPUT POWER OF TREADMILL DRIVE MOTOR (SCREEN SPEED CONTROL UNIT)
CONTROL SCREEN SPEED OF MONITOR
TERMINATE
STORE
RETURN
INCLINE MOTOR CONTROL UNIT
INCLINE DRIVE MOTOR