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(54) **TREADMILL AND CONTROL METHOD THEREOF**

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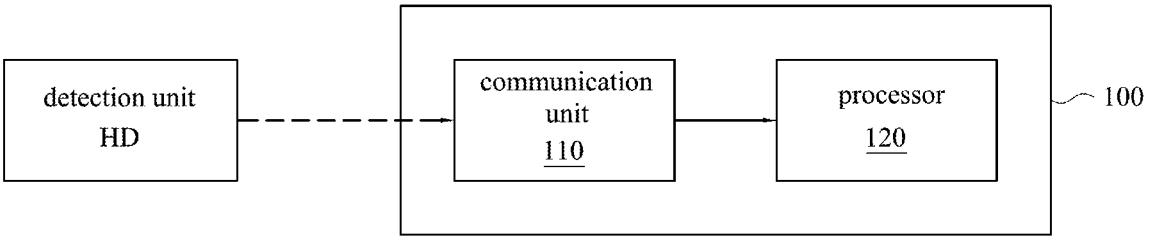
(57) **ABSTRACT**

A treadmill and a control method of the treadmill are provided. The treadmill includes a receiving unit and a processor. In the control method of the treadmill, at first, a communication unit is configured to receive heart rates of a user detected by a detection unit. Thereafter, the processor is configured to perform a running speed control operation to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rates of the user, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.



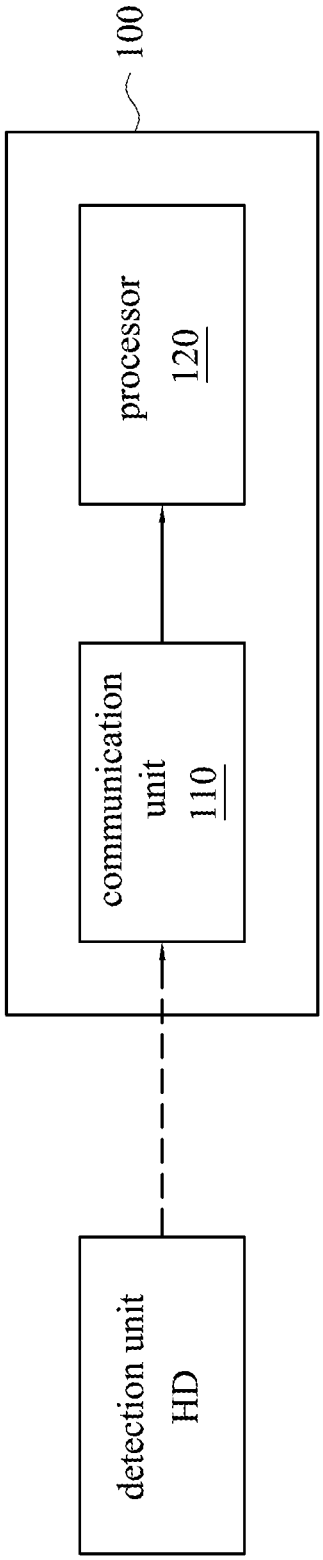

100
processor
120
communication
unit
110
detection unit
HD

FIG. 1

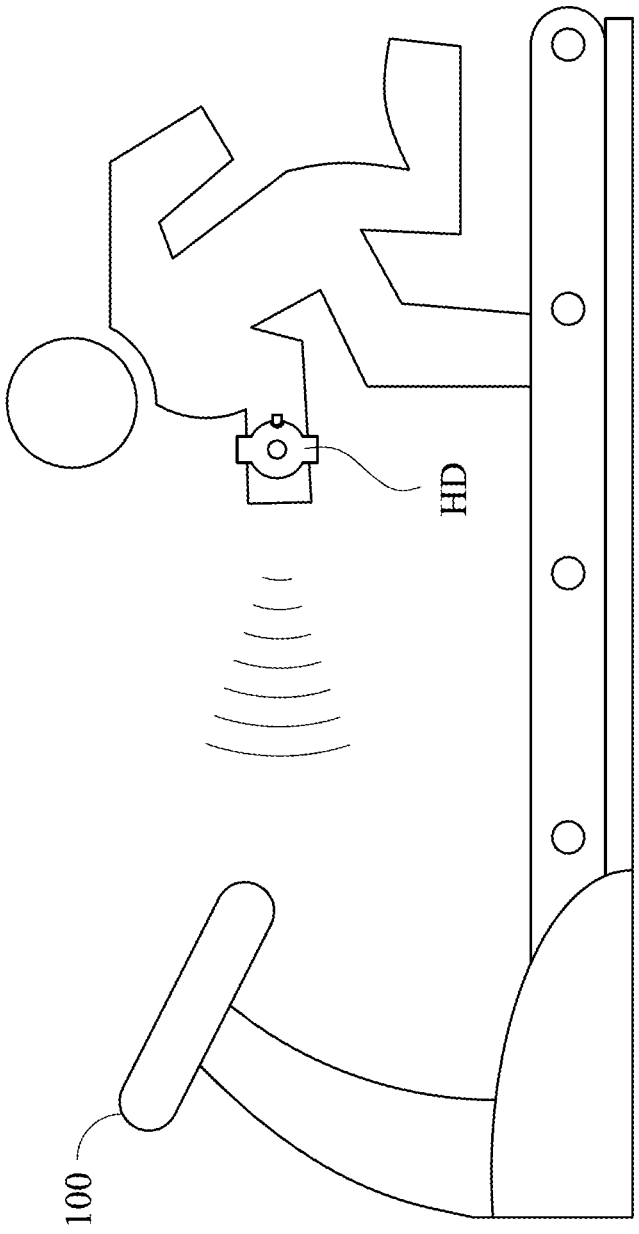


FIG. 2

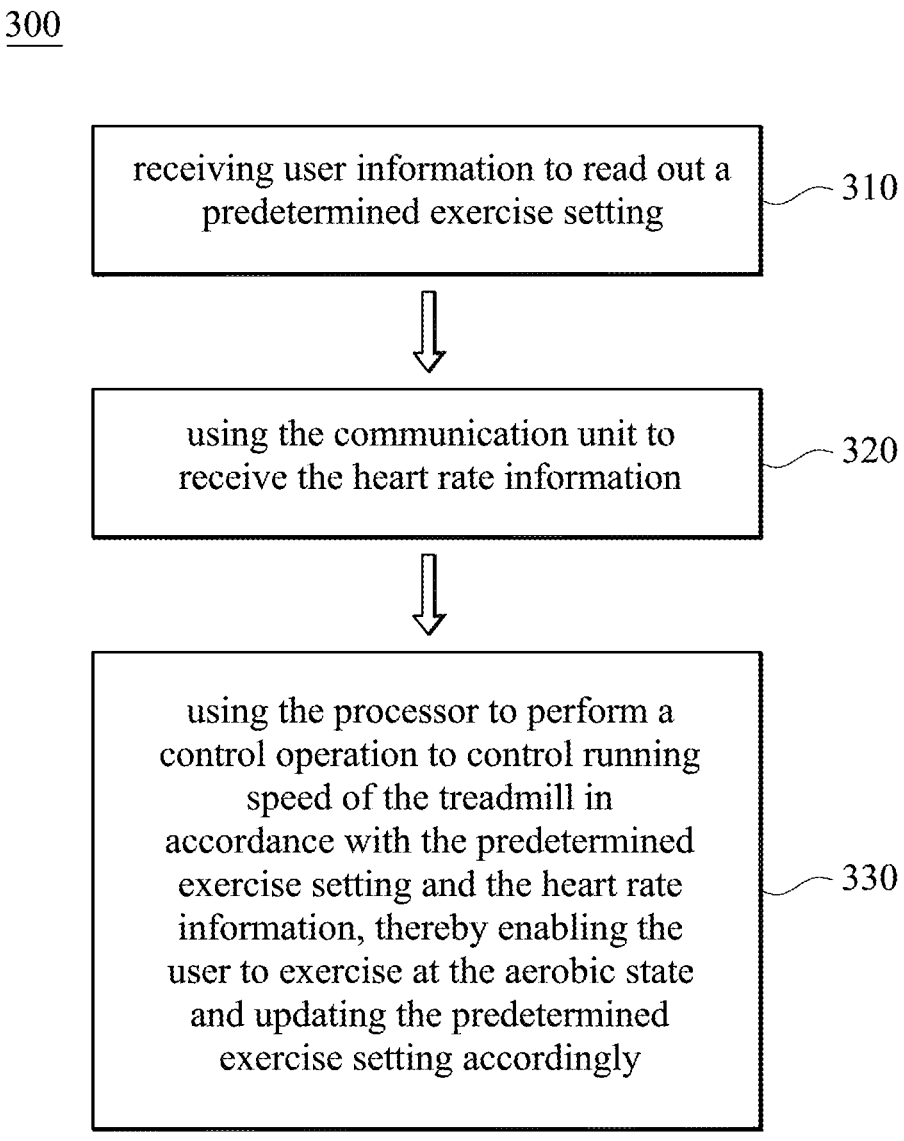

300
receiving user information to read out a predetermined exercise setting
310
using the communication unit to receive the heart rate information
320
using the processor to perform a control operation to control running speed of the treadmill in accordance with the predetermined exercise setting and the heart rate information, thereby enabling the user to exercise at the aerobic state and updating the predetermined exercise setting accordingly
330

FIG. 3

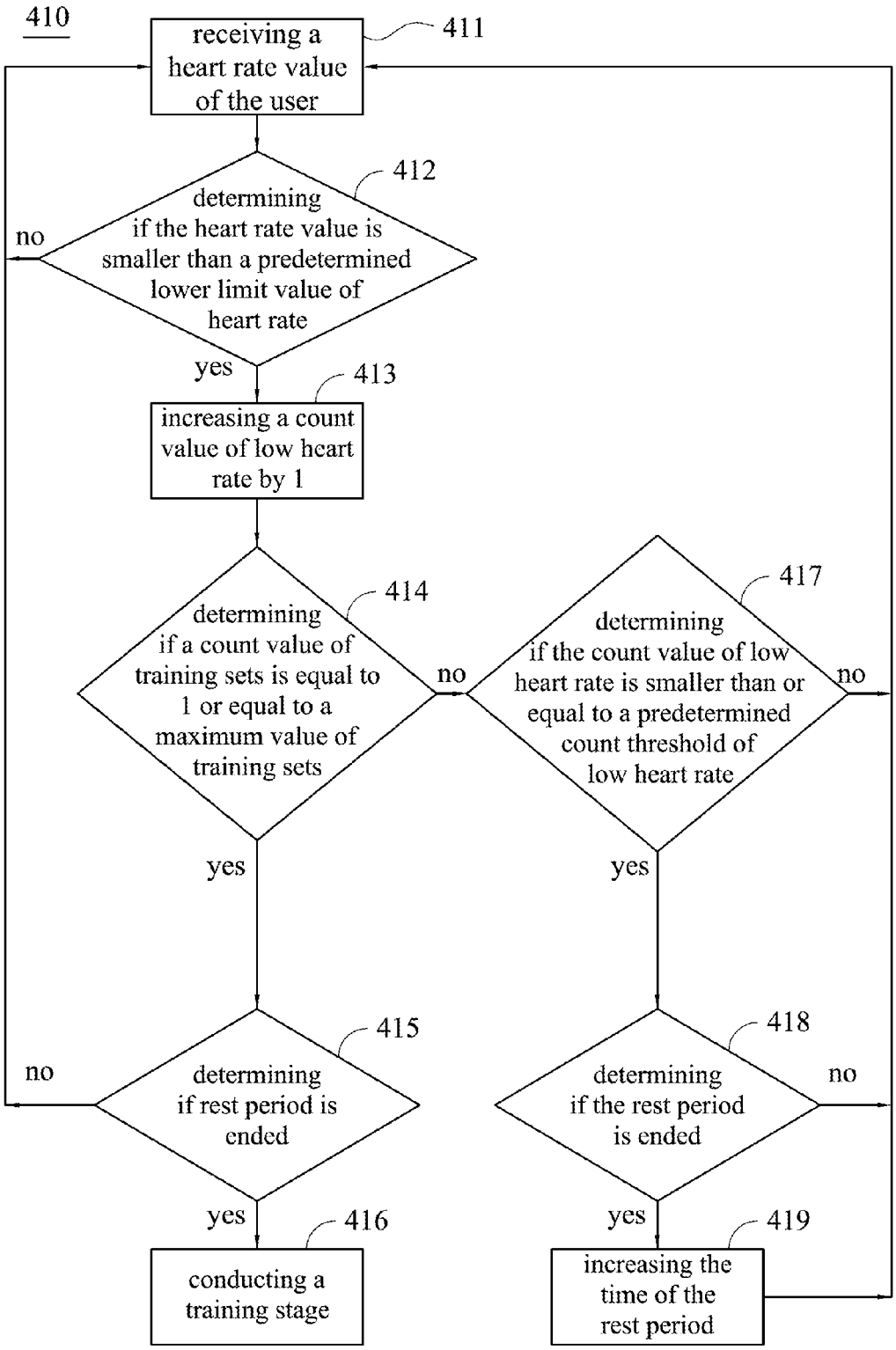

410
receiving a heart rate value of the user
411
determining if the heart rate value is smaller than a predetermined lower limit value of heart rate
412
no
yes
increasing a count value of low heart rate by 1
413
determining if a count value of training sets is equal to 1 or equal to a maximum value of training sets
414
no
yes
determining if the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate
417
no
yes
determining if rest period is ended
415
no
yes
conducting a training stage
416
determining if the rest period is ended
418
no
yes
increasing the time of the rest period
419

FIG. 4

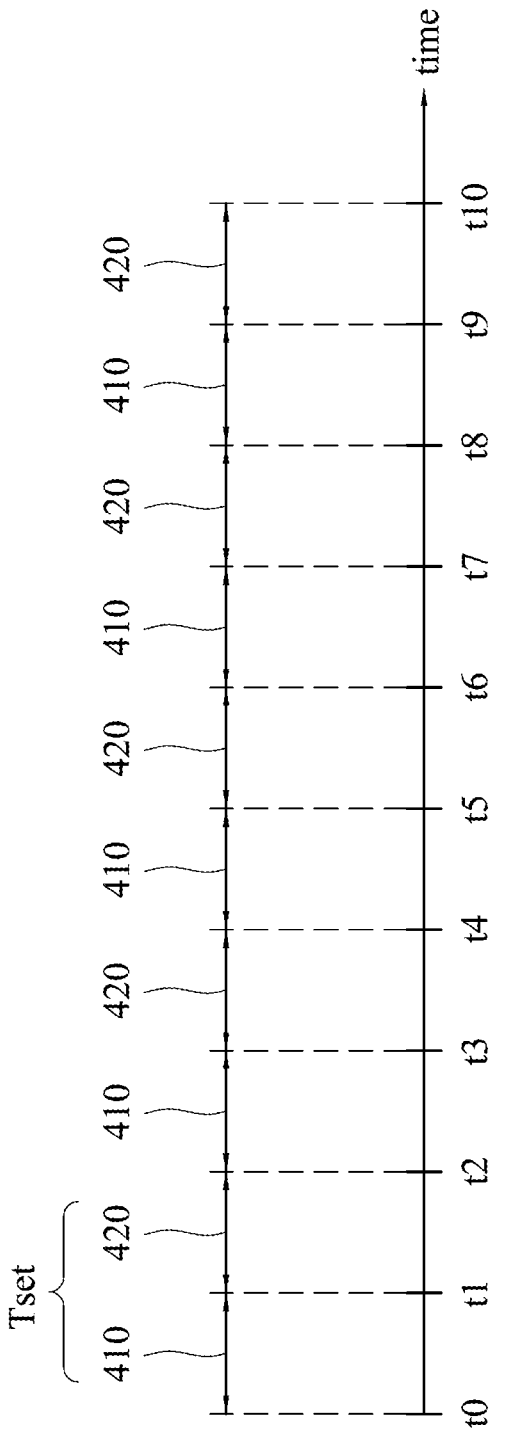

time
t0
t1
t2
t3
t4
t5
t6
t7
t8
t9
t10
Tset
410
420
410
420
410
420
410
420
410
420
410
420

FIG. 5

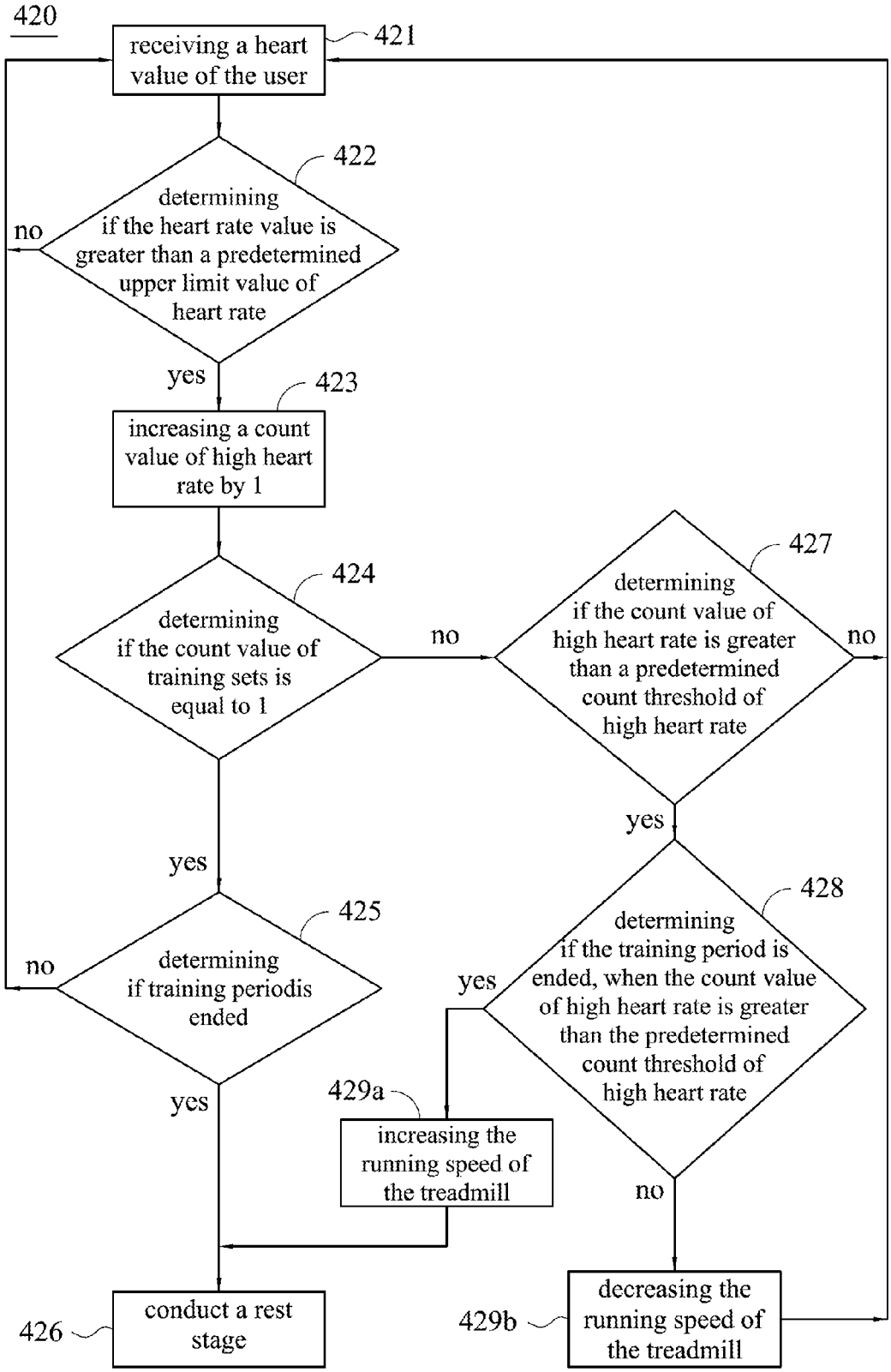

420
receiving a heart value of the user
421
determining if the heart rate value is greater than a predetermined upper limit value of heart rate
422
no
yes
increasing a count value of high heart rate by 1
423
determining if the count value of training sets is equal to 1
424
no
determining if the count value of high heart rate is greater than a predetermined count threshold of high heart rate
427
no
yes
yes
determining if training periodis ended
425
no
yes
determining if the training period is ended, when the count value of high heart rate is greater than the predetermined count threshold of high heart rate
428
yes
429a
increasing the running speed of the treadmill
no
conduct a rest stage
426
decreasing the running speed of the treadmill
429b

FIG. 6

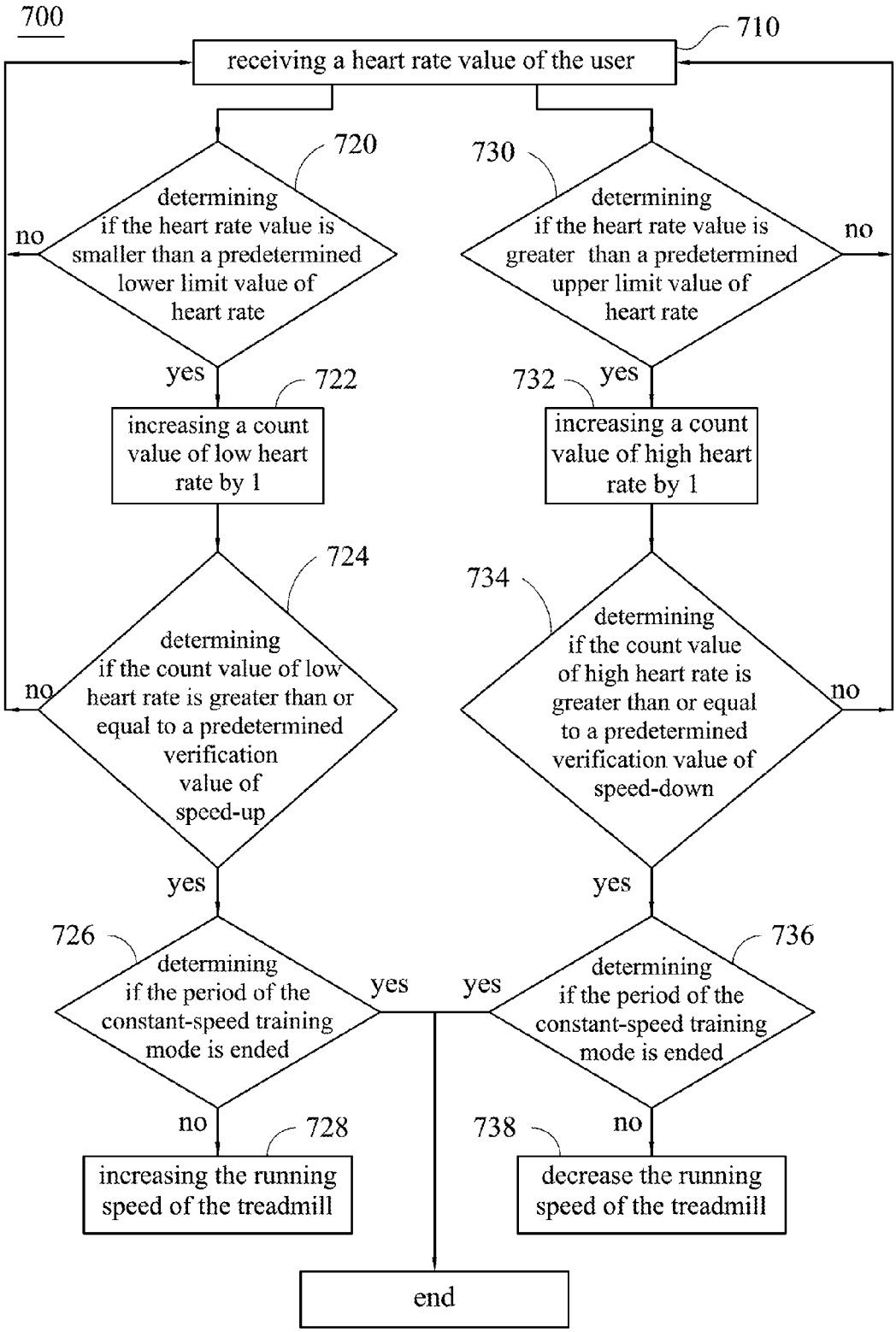

700
receiving a heart rate value of the user
710
720
determining if the heart rate value is smaller than a predetermined lower limit value of heart rate
no
yes
722
increasing a count value of low heart rate by 1
724
determining if the count value of low heart rate is greater than or equal to a predetermined verification value of speed-up
no
yes
726
determining if the period of the constant-speed training mode is ended
no
728
increasing the running speed of the treadmill
730
determining if the heart rate value is greater than a predetermined upper limit value of heart rate
no
yes
732
increasing a count value of high heart rate by 1
734
determining if the count value of high heart rate is greater than or equal to a predetermined verification value of speed-down
no
yes
736
determining if the period of the constant-speed training mode is ended
yes
yes
no
738
decrease the running speed of the treadmill
end

FIG. 7

TREADMILL AND CONTROL METHOD THEREOF

RELATED APPLICATIONS

[0001] This application claims priority to Taiwan Application Serial Number 104141122, filed Dec. 8, 2015, which is herein incorporated by reference.

BACKGROUND

[0002] Field of Invention

[0003] The present invention relates to a treadmill and a control method of the treadmill.

[0004] Description of Related Art

[0005] Since people have fewer chances to do outdoor sports activities, a treadmill has become popular indoor fitness equipment. The treadmill is a machine used to simulate the acts of walking and running. The treadmill may include a rubber belt driven by a motor to rotate around two rollers. A user walks or runs on a surface of the rubber belt as the rubber belt rotates for the purpose of exercise.

[0006] In general, the treadmill allows the user to select a training time and a running speed of the treadmill. However, the user may not understand whether the training time and the running speed selected can achieve a good exercise result.

SUMMARY

[0007] One object of the present invention is to provide a treadmill and a control method of a treadmill to enable a user to exercise in aerobic state in accordance with a predetermined exercise setting and heart rate values of the user, and to update the predetermined exercise setting accordingly. Therefore, the user can obtain a better exercise result and avoid dangers.

[0008] In accordance with an embodiment of the present invention, the treadmill includes a communication unit and a processor. The communication unit is configured to receive heart rate information of a user transmitted by a detection unit. The processor is configured to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rate information, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

[0009] In accordance with an embodiment of the present invention, the treadmill includes a communication unit and a processor. The communication unit is configured to receive heart rate information of a user transmitted by a detection unit. The processor is configured to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rate information, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

[0010] In accordance with another embodiment of the present invention, in the control method of the treadmill, at first, heart rate information of a user transmitted by a detection unit through a communication unit is received. Then, a running speed control operation is performed by a processor to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rate information, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention can be more fully understood by reading the following detailed description of the embodiment, with reference made to the accompanying drawings as follows:

[0012] FIG. **1** is a functional block diagram of a treadmill in accordance with an embodiment of the present invention;

[0013] FIG. **2** is schematic diagram showing the treadmill and a detection unit in accordance with an embodiment of the present invention;

[0014] FIG. **3** is a schematic diagram showing a flow chart of a control method of a treadmill in accordance with embodiments of the present invention;

[0015] FIG. **4** is a schematic diagram showing a flow chart of a rest stage of the intermittent training mode in accordance with an embodiment of the present invention;

[0016] FIG. **5** is a schematic diagram showing rest stages and training stages in accordance with an embodiment of the present invention;

[0017] FIG. **6** is a schematic diagram showing a flow chart of a training stage of the intermittent training mode in accordance with an embodiment of the present invention; and

[0018] FIG. **7** is a schematic diagram showing a flow chart of a constant-speed training mode in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

[0019] Reference will now be made in detail to the present embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

[0020] Referring to FIG. **1**, FIG. **1** is a functional block diagram of a treadmill **100** in accordance with an embodiment of the present invention. The treadmill **100** includes a communication unit **110** and a processor **120**. The communication unit **110** is configured to receive heart rate information transmitted by a detection unit HD and to transmit the heart rate information to the processor **120**, as shown in FIG. **2**. In the present embodiment, the detection unit HD is a heart rate belt or a heart rate bracelet, and the communication unit **110** wirelessly receives the heart rate information (for example, heart rate values) detected by the detection unit HD. However, embodiments of the present invention are not limited thereto. The processor **120** is electrically connected to the communication unit **110** and a driving device (not shown) of the treadmill **100** to control the running speed of the treadmill **100** in accordance with the heart rate information of the user and a predetermined exercise setting of the user, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

[0021] In this embodiment, the aerobic state is defined as a heart rate in a range of 60%-80% of a maximum heart rate of the user. In other words, the processor **120** of this embodiment can control the running speed of the treadmill **100** to enable the heart rate of the user to be in a range of 60%-80% of a maximum heart rate of the user for obtaining a better exercise effect. In other embodiments of the present invention, the user can adjust the value of the heart rate corresponding to the aerobic state in accordance with actual demands.

[0022] Referring to FIG. **3**, FIG. **3** is a schematic diagram showing a flow chart of a control method **300** of a treadmill in accordance with embodiments of the present invention. In the control method **300**, at first, a step **310** is performed to read out a predetermined exercise setting, for example a running speed of the treadmill. In this embodiment, a user may input personal identification data to the treadmill **100**, and then the treadmill **100** can read out the predetermined exercise setting of the user in accordance with the personal identification data. For example, the predetermined exercise setting may be stored in the treadmill **100** in advance to help the treadmill **100** to read out the predetermined exercise setting. However, embodiments of the present invention are not limited thereto. In some embodiments, the predetermined exercise setting can be stored in a cloud device, and the treadmill **100** can access the predetermined exercise setting through the communication unit **110** and an internet. In other embodiments, the user can input the predetermined exercise setting into the treadmill **100** in accordance with actual demands.

[0023] Then, a step **320** is performed to use the communication unit **110** to receive the heart rate information transmitted by the detection unit HD. In an embodiment of the present invention, the heart rate information includes heart rate values of the user, and the heart rate value is defined as a number of heart beats per minute. However, embodiments of the present invention are not limited thereto.

[0024] Thereafter, a step **330** is performed to use the processor **120** to perform a control operation to control running speed of the treadmill **100** in accordance with the predetermined exercise setting and the heart rate information. In the embodiment of the present invention, the control operation of the step **330** controls the running speed of the treadmill **100** in accordance with the heart rate information and the predetermined exercise setting of the user, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly. Therefore, when the user completes a running training, the predetermined exercise setting of the user is updated for the next time when the user uses the treadmill **100** again to enable the user to obtain a better exercise effect. The running speed control operation in the embodiments of the present invention includes an intermittent training mode and a constant-speed training mode. The user can choose one of the intermittent training mode and the constant-speed training mode to exercise in accordance with actual demands. The intermittent training mode and the constant-speed training mode are respectively introduced as below.

[0025] Referring to FIG. **4**, FIG. **4** is a schematic diagram showing a flow chart of a rest stage of the intermittent training mode in accordance with an embodiment of the present invention. In this embodiment, the running speed control operation provides the intermittent training mode for the user. The intermittent training mode includes rest stages **410** and training stages **420** which are interlaced to each other, as shown in FIG. **5**. In this embodiment, a period from a time point t**0** to a time point t**10** defines a running training. The running training includes five training sets Tset, and each of the training sets Tset includes one rest stage **410** and one training stage **420**. The training stage **420** provides a higher running speed, and the rest stage **410** provides a lower running speed.

[0026] In the running speed control operation in this embodiment, at first, the rest stage **410** is performed. In the rest stage **410**, at first, a step **411** is performed to receive a heart rate value of the user. Thereafter, a step **412** is performed to determine if the heart rate value is smaller than a predetermined lower limit value of heart rate. In this embodiment, the predetermined lower limit value of heart rate is defined to be 60% of maximum heart rate of the user. Then, a step **413** is performed when the heart rate value is smaller than the predetermined lower limit value of heart rate. In the step **413**, a count value of low heart rate is increased by 1. In this embodiment, the processor **120** includes a counter module used to store the count value of low heart rate. The count value of low heart rate is increased by 1, when the heart rate value received in the rest stage **410** is smaller than the predetermined lower limit value of heart rate.

[0027] Then, a step **414** is performed to determining if a count value of training sets is equal to 1 or equal to a maximum value of training sets (i.e., 5 in this embodiment). In this embodiment, the processor **120** includes a counter module used to store the count value of training sets. When a new training set Tset is conducted, the count value of training sets is increased by 1. For example, the count value of training sets is equal to 1 at the time point t**1**, since the user is conducting a first training set of the five training sets. For another example, the count value of training sets is equal to 3 at the time point t**5**, since the user is conducting a third training set of the five training sets.

[0028] Thereafter, a step **415** is performed when the count value of training sets is equal to 1 or equal to the maximum value of training sets. In the step **415**, it is determined that if a time period of the rest stage (hereinafter referred to as rest period) is ended. When the rest period is ended, a step **416** is performed to conduct the training stage **420**. In this embodiment, the processor **120** includes a timing module used to calculate training time to help the running speed control operation.

[0029] Returning to step **414**, a step **417** is performed when the count value of training sets is not equal to 1 and not equal to the maximum value of training sets. In the step **417**, it is determined that if the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate. In this embodiment, the predetermined count threshold of low heart rate is 2. However, embodiments of the present invention are not limited thereto. In other embodiments of the present invention, the predetermined count threshold of low heart rate can be determined in accordance with actual demands of the user.

[0030] Then, a step **418** is performed when the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate. In the step **418**, it is determined that if the rest period is ended. Thereafter, a step **419** is performed to increase a time length of the rest period when the rest period is ended. For example, when the processor **120** determines that the rest period is ended at time point t**3** and the count value of low heart rate is smaller than or equal to the predetermined count threshold of low heart rate, the processor **120** increases the rest period by 1 minute and the predetermined exercise setting is updated accordingly. Therefore, the time points t**3**, t**5**, t**7** and t**9** at which the rest stages **410** are ended are respectively delayed for 1 minute to provide enough rest time for the user.

[0031] Referring to FIG. **6**, FIG. **6** is a schematic diagram showing a flow chart of a training stage **420** of the intermittent training mode in accordance with the embodiment of the present invention. In the training stage **420**, at first, a step **421** is performed to receive a heart value of the user. Thereafter, a step **422** is performed to determine if the heart rate value is greater than a predetermined upper limit value of heart rate. In this embodiment, the predetermined upper limit value of heart rate is defined to be 80% of maximum heart rate of the user. Then, a step **423** is performed to increase a count value of high heart rate by 1, when the heart rate value is greater than the predetermined upper limit value of heart rate. In this embodiment, the processor **120** includes a counter module used to store the count value of high heart rate. The count value of high heart rate is increased by 1, when the heart rate value received in the training stage **420** is greater than the predetermined upper limit value of heart rate.

[0032] Then, a step **424** is performed to determine if the count value of training sets is equal to 1. Thereafter, a step **425** is performed to determine if a time period of the training stage **420** (hereinafter referred to as training period) is ended when the count value of training sets is equal to 1. Then, a step **426** is performed to conduct the rest stage **410** when the training period is ended. Returning to the step **424**, a step **427** is performed when the count value of training sets is not equal to 1. In the step **427**, it is determined that if the count value of high heart rate is greater than a predetermined count threshold of high heart rate, in which the predetermined count threshold of high heart rate is greater than the count threshold of low heart rate. In this embodiment, the predetermined count threshold of high heart rate is 3, but embodiments of the present invention are not limited thereto. In other embodiments of the present invention, the predetermined count threshold of high heart rate can be determined in accordance with actual demands of the user.

[0033] Then, a step **428** is performed to determine if the training period is ended, when the count value of high heart rate is greater than the predetermined count threshold of high heart rate. When the training period is ended, a step **429***a* is performed to increase the running speed of the treadmill in the training stage **420** and to update the predetermined exercise setting accordingly, and the rest stage **410** is performed. When the training period is not ended, a step **429***b* is performed to decrease the running speed of the treadmill in the training stage **420** and to update the predetermined exercise setting accordingly. In this embodiment, the step **429***a* increases the running speed of the treadmill by 5%-10%, and the step **429***b* decreases the running speed of the treadmill by 5%-10%. However, embodiments of the present invention are not limited thereto.

[0034] It can be understood that the intermittent training mode provided by the control method of the treadmill of the embodiments of the present invention can adjust the rest time and the running speed, thereby enabling the user to exercise in aerobic state, and avoiding dangers. In addition, when the rest time and the running speed are adjusted, the predetermined exercise setting of the user is updated simultaneously. Therefore, the user can obtain a better exercise result in the intermittent training mode when excising next time.

[0035] Referring to FIG. **7**, FIG. **7** is a schematic diagram showing a flow chart of a constant-speed training mode **700** in accordance with an embodiment of the present invention. In the constant-speed training mode **700**, at first, a step **710** is performed to receive a heart rate value of the user. Thereafter, steps **720** and **730** are performed respectively to determine if the heart rate value is smaller than a predetermined lower limit value of heart rate, and to determine if the heart rate value is greater than a predetermined upper limit value of heart rate. In this embodiment, the predetermined lower limit value of heart rate is defined to be 60% of maximum heart rate of the user, and the predetermined upper limit value of heart rate is defined to be 80% of maximum heart rate of the user.

[0036] Regarding the step **720**, a step **722** is performed to increase a count value of low heart rate by 1, when the heart rate value is smaller than the predetermined lower limit value of heart rate. Then, a step **724** is performed to determine if the increased count value of low heart rate is greater than or equal to a predetermined verification value of speed-up. In this embodiment, the predetermined verification value of speed-up is 5, but embodiments of the present invention are not limited thereto. Thereafter, a step **726** is performed when the increased count value of low heart rate is greater than or equal to the predetermined verification value of speed-up. In the step **726**, it is determined that if the period of the constant-speed training mode **700** is ended. Then, a step **728** is performed to increase the running speed of the treadmill and to update the predetermined exercise setting accordingly, when the period of the constant-speed training mode **700** is not ended. Therefore, when the user chooses the constant-speed training mode **700** to exercise again, the treadmill can provide a higher running speed in accordance with the updated exercise setting. In this embodiment, the step **728** increases the running speed of the treadmill by 5%-10%, but embodiments of the present invention are not limited thereto.

[0037] Regarding the step **730**, a step **732** is performed to increase a count value of high heart rate by 1, when the heart rate value is greater than the predetermined upper limit value of heart rate. Then, a step **734** is performed to determining if the increased count value of high heart rate is greater than or equal to a predetermined verification value of speed-down. In this embodiment, the predetermined verification value of speed-down is 5, but embodiments of the present invention are not limited thereto. Then, a step **736** is performed when the increased count value of high heart rate is greater than or equal to the predetermined verification value of speed-down. In the step **736**, it is determined that if the period of the constant-speed training mode **700** is ended. Thereafter, a step **738** is performed to decrease the running speed of the treadmill and to update the predetermined exercise setting accordingly, when the period of the constant-speed training mode **700** is not ended. Therefore, when the user chooses the constant-speed training mode **700** to exercise again, the treadmill can provide a lower running speed in accordance with the updated exercise setting. In this embodiment, the step **738** decreases the running speed of the treadmill by 5%-10%, but embodiments of the present invention are not limited thereto. In some embodiments, the steps **726** and **736** may be omitted.

[0038] It can be understood that the constant-speed training mode provided by the control method of the treadmill of the embodiments of the present invention can update the predetermined exercise setting in accordance with the heart rate value of the user. When the user exercises in the constant-speed training mode again, the updated the prede-

termined exercise setting can enable the user to exercise in aerobic state and to avoid dangers.

[0039] It will be apparent to those skilled in the art that various modifications and variations can be made to the flow of the present invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the scope of the following claims.

What is claimed is:

1. A treadmill, comprising:

a communication unit configured to receive heart rate information of a user transmitted by a detection unit; and

a processor configured to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rate information, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

2. The treadmill of claim **1**, wherein the heart rate information comprises a first heart rate value and a second heart rate value, and the processor is configured to perform an intermittent training program, and the intermittent training program comprises:

performing a rest stage to enable the treadmill to work at a predetermined low running speed in a rest period, the rest stage comprising:

receiving the first heart rate value of the user;

determining if the first heart rate value is smaller than a predetermined lower limit value of heart rate;

increasing a count value of low heart rate by 1 when the first heart rate value is smaller than the predetermined lower limit value of heart rate;

determining if a count value of training sets is equal to 1 or equal to a maximum value of training sets; and

determining if the rest period is ended when the count value of training sets is equal to 1 or equal to the maximum value of training sets; and

performing a training stage to enable the treadmill to work at a predetermined high running speed in a training period when the rest period is ended, wherein the predetermined high running speed is greater than the predetermined low running speed, and the training stage comprises:

receiving the second heart rate value of the user;

determining if the second heart rate value is greater than a predetermined upper limit value of heart rate;

increasing a count value of high heart rate by 1 when the second heart rate value is greater than the predetermined upper limit value of heart rate;

determining if the count value of high heart rate is greater than a predetermined count threshold of high heart rate;

determining if the training period is ended when the count value of high heart rate is greater than the predetermined count threshold of high heart rate; and

increasing a value of the predetermined high running speed and performing the rest stage when the training period is ended.

3. The treadmill of claim **2**, wherein the rest stage further comprises:

determining if the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate when the count value of training sets is not equal to 1 and not equal to the maximum value of training sets;

determining if the rest period is ended when the count value of low heart rate is smaller than or equal to the predetermined count threshold of low heart rate; and

increasing a time length of the rest period when the rest period is ended.

4. The treadmill of claim **1**, wherein the heart rate information comprises a plurality of heart rate values, and the processor is configured to perform a constant-speed training program to control the treadmill to work at a predetermined running speed, and the constant-speed training program comprises:

receiving one of the heart rate values of the user;

determining if the one of the heart rate values is smaller than a predetermined lower limit value of heart rate, or greater than a predetermined upper limit value of heart rate;

increasing a count value of low heart rate by 1, when the one of the heart rate values is smaller than the predetermined lower limit value of heart rate;

determining if the increased count value of low heart rate is greater than or equal to a predetermined verification value of speed-up; and

increasing the predetermined running speed, when the increased count value of low heart rate is greater than or equal to the predetermined verification value of speed-up.

5. The treadmill of claim **4**, wherein the constant-speed training program further comprises:

increasing a count value of high heart rate by 1 when the one of the heart rate values is greater than the predetermined upper limit value of heart rate;

determining if the increased count value of high heart rate is greater than or equal to a predetermined verification value of speed-down; and

decreasing the value of the predetermined running speed when the increased count value of high heart rate is greater than or equal to the predetermined verification value of speed-down.

6. A control method of a treadmill, comprising:

receiving heart rate information of a user transmitted by a detection unit through a communication unit; and

performing a running speed control operation by a processor to control a running speed of the treadmill in accordance with a predetermined exercise setting and the heart rate information, thereby enabling the user to exercise in aerobic state and updating the predetermined exercise setting accordingly.

7. The control method of claim **6**, wherein the heart rate information comprises a first heart rate value and a second heart rate value, and the running speed control operation speed comprises:

performing a rest stage to enable the treadmill to work at a predetermined low running speed in a rest period, the rest stage comprising:

receiving the first heart rate value of the user;

determining if the first heart rate value is smaller than a predetermined lower limit value of heart rate;

increasing a count value of low heart rate by 1 when the first heart rate value is smaller than the predetermined lower limit value of heart rate;

determining if a count value of training sets is equal to 1 or equal to a maximum value of training sets; and

determining if the rest period is ended when the count value of training sets is equal to 1 or equal to the maximum value of training sets; and

performing a training stage to enable the treadmill to work at a predetermined high running speed in a training period when the rest period is ended, wherein the predetermined high running speed is greater than the predetermined low running speed, and the training stage comprises:

receiving the second heart rate value of the user;

determining if the second heart rate value is greater than a predetermined upper limit value of heart rate;

increasing a count value of high heart rate by 1 when the second heart rate value is greater than the predetermined upper limit value of heart rate;

determining if the count value of high heart rate is greater than a predetermined count threshold of high heart rate;

determining if the training period is ended when the count value of high heart rate is greater than a predetermined count threshold of high heart rate; and

increasing a value of the predetermined high running speed and performing the rest stage when the training period is ended.

8. The control method of claim **7**, wherein the rest stage further comprises:

determining if the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate when the count value of training sets is not equal to 1 and not equal to the maximum value of training sets;

determining if the rest period is ended when the count value of low heart rate is smaller than or equal to a predetermined count threshold of low heart rate; and

increasing a time length of the rest period when the rest period is ended.

9. The control method of claim **6**, wherein the heart rate information comprises a plurality of heart rate values, and the running speed control operation comprises:

receiving one of the heart rate values of the user;

determining if the one of the heart rate values is smaller than a predetermined lower limit value of heart rate, or greater than a predetermined upper limit value of heart rate;

increasing a count value of low heart rate by 1, when the one of the heart rate values is smaller than the predetermined lower limit value of heart rate;

determining if the increased count value of low heart rate is greater than or equal to a predetermined verification value of speed-up; and

increasing the running speed of the treadmill, when the increased count value of low heart rate is greater than or equal to the predetermined verification value of speed-up.

10. The control method of claim **9**, wherein the running speed control operation further comprises:

increasing a count value of high heart rate by 1 when the one of the heart rate values is greater than the predetermined upper limit value of heart rate;

determining if the increased count value of high heart rate is greater than or equal to a predetermined verification value of speed-down; and

decreasing the value of the running speed of the treadmill when the increased count value of high heart rate is greater than or equal to the predetermined verification value of speed-down.

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