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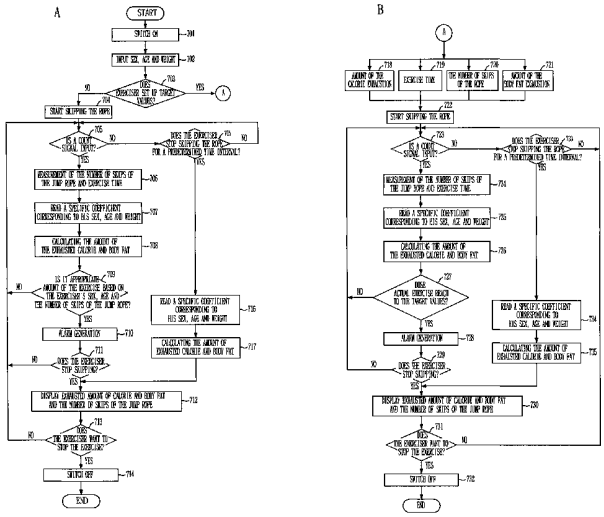
(54) Title: JUMP ROPE HAVING FUNCTION OF CALORY AND FAT EXHAUSTION AMOUNT MEASUREMENT



(57) Abstract: A jump rope having a function of calory and fat exhaustion amount measurement includes: a data reception means for receiving a data associated with exerciser, the data including a sex, an age, and a weight; a counting means for counting the number of jumping; a display means for displaying an exercise result, the exercise result including the number of jumping, a calory exhaustion amount, a fat exhaustion amount, and an exercise time; a storage means for storing a coefficient of calory exhaustion amount according to a previously measured statistical data; and a process means for calculating a calory exhaustion amount and a fat exhaustion amount based on the condition of the exerciser, the number of jumping, the time of exercise and controlling the display means to display the exercise result.

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JUMP ROPE HAVING FUNCTION OF CALORY AND FAT EXHAUSTION AMOUNT MEASUREMENT

Technical Field

The present invention relates to a jump rope used as sporting goods; and, more particularly, to a jump rope capable of giving the exerciser an indication when the most appropriately estimated amount of the exercise in skipping the jump rope, which is set on the basis of statistics from scientific measuring data, is achieved or an amount of exercise reaches to his predetermined goal, to thereby increase the efficiency of the exercise, and also the present invention relates to recordation media for implementing such a notification of the achievement of exercising goal.

Background Art

Generally, jump ropes, which is widely used as an exercising implement, is not tired to the specific time and place and have been considered as a living athlete and an ideal exercising implement having excellent effects. However, conventional jump ropes have a simple structure consisting of only rope and handle and they are then limited to some narrow-minded functions. Also, the exercisers are not interested in their exercise skipping the jump ropes so that they have a tendency to bore the exercisers and to make the exercisers abandoned. Accordingly, the conventional jump ropes are restricted in the exercisers' continuous training and in an improvement of exercising efficiency.

Disclosure of Invention

In accordance with an aspect of the present invention, there are provided a jump rope having a function to measure an amount of exhausted calorie and body fat, the jump rope comprising: an input means for inputting physical condition data of an exerciser, wherein the physical condition data include sex, age and weight information; a counting means for counting the number of skips of the rope; a display means for displaying exercise results, wherein the exercise results include the number of skips of the rope, an amount of exhausted calorie, an amount of exhausted body fat, or an exercise time; a storing means for storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; and a processing means for calculating the amount of exhausted calorie and body fat, based on an amount of actual exercise, by using the physical condition data, the number of skips of the rope provided by the counting means, the exercise time, the calorie exhaustion coefficient stored in the storing means and a body fat exhaustion coefficient, and for controlling the display means so that the exercise results are displayed on a screen.

In accordance with another aspect of the present invention, there are provided a method for measuring exhausted calorie and body fat of an exerciser, the method comprising the steps of: storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; inputting physical conditions data, wherein the physical condition data include sex, age and weight information; counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie

and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient; and displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

In accordance with further another aspect of the present invention, there are provided a method a method for measuring exhausted calorie and body fat of an exerciser, the method comprising the steps of: receiving and storing calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; inputting physical conditions data, wherein the physical condition data include sex, age and weight information; ascertaining a mode selected from auto and manual modes, wherein the auto mode automatically estimates an appropriate exercise amount for the exerciser and wherein the manual mode is set up by the exerciser; in case that the selected mode is the auto mode, counting the number of skips of a rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, estimating an appropriate exercise amount for the exerciser; and generating an alarm when the appropriate exercise amount is achieved; in case that the selected mode is the manual mode, receiving target values from the exerciser, counting the number of skips of the rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, and generating an alarm when the target values are

achieved; and displaying results of the exercise on a screen.

In accordance with still another aspect of the present invention, there are provided a computer-readable medium storing a program executable in a computer system comprising the functions of: storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; inputting physical conditions data, wherein the physical condition data include sex, age and weight information; counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient; and displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

In accordance with still another aspect of the present invention, there are provided a computer-readable medium storing a program executable in a computer system comprising the functions of: storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; inputting physical conditions data and target values set up by an exerciser, wherein the physical condition data include sex, age and weight information; counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient; generating an alarm when the target values are achieved and, when the target values are not, repeatedly carrying out the step of counting

the number of skips of the rope; and displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

In accordance with still another aspect of the present invention, there are provided a computer-readable medium storing a program executable in a computer system comprising the functions of: receiving and storing calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; inputting physical conditions data, wherein the physical condition data include sex, age and weight information; ascertaining a mode selected from auto and manual modes, wherein the auto mode automatically estimates an appropriate exercise amount for the exerciser and wherein the manual mode is set up by the exerciser; in case that the selected mode is the auto mode, counting the number of skips of a rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, estimating an appropriate exercise amount for the exerciser; and generating an alarm when the exercise reaches to the appropriate exercise amount; in case that the selected mode is the manual mode, receiving target values from the exerciser, counting the number of skips of the rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, and generating an alarm when the target values are achieved; and displaying results of the exercise on a screen.

Brief Description of Drawings

Fig. 1 is a perspective view illustrating a jump rope capable of measuring exhausted calories and body fat in accordance with the present invention;

Fig. 2A is a front view illustrating handles of the jump rope in accordance with an embodiment of the present invention;

Fig. 2B is a front view illustrating handles of the jump rope in accordance with another embodiment of the present invention;

Fig. 3 is a front view illustrating a rotation part of the jump rope in accordance with the present invention;

Fig. 4 is a schematic view illustrating a counting part included in the jump rope in accordance with the present invention;

Fig. 5 is a perspective view illustrating a rope of the jump rope in accordance with the present invention;

Fig. 6 is a block diagram illustrating the jump rope capable of measuring exhausted calories and body fat in accordance with the present invention;

Figs. 7A and 7B are flow charts illustrating a method for measuring exhausted calories and body fat in the jump rope in accordance with the present invention; and

Fig. 8 is a circuit diagram illustrating the jump rope capable of measuring exhausted calories and body fat in accordance with the present invention.

Best Mode for Carrying out the Invention

Fig. 1 is a perspective view illustrating a jump rope capable of measuring exhausted calories and body fat in accordance with the present invention.

Referring to Fig. 1, the jump rope capable of measuring exhausted calories and body fat includes handles 101 taken by the exerciser, a protrusion 102 formed on the handles 101, a rotation axis 103 for supporting the rotation of a rope 109 in the jump rope, a coupling part 104 for coupling the handles 101 to the rope 109, a fixing part 105 for fixing the rope 109 to the coupling part 104, a switching unit carrying out turn on and off operations and converting functions of the jump rope, a data input unit 107 for receiving data concerning physical strength of the exerciser such as sex, ages and weight, a displaying unit 108 for display the results of the exhausted calories and body fat, the number of skips of the jump rope, and exercise time, and the rope 109 for preventing eccentricity and increasing the turning force.

When the skipping is accomplished once, the rotation axis 103 is rotated by the turning force of the rope 109 and the number of turnings of the rotation axis 103 is counted.

The handles 101 made of a mixture of natural ores may irradiate far-infrared rays to increase vigor of the exerciser. Also, the surface of the handles 101 may have the protrusion 102 to stimulate spots (suitable for acupuncture) on the palms of the hands and to release a high-pressed pulsation and the protrusion 102 may prevent slippage by from the hands which are drenched in sweat.

Each of the above-mentioned elements of the jump rope in accordance with the present invention will be described in

detail.

Fig. 2A is a front view illustrating handles of the jump rope in accordance with an embodiment of the present invention.

Referring to Fig. 2A, a measuring device 204 is built in the handle for counting the number of skips of the jump rope and for calculating the exhausted calories and body fat based on variables from the exerciser, the counted number of skip of the jump rope, exercise time and statistic data, such as coefficients for measuring the exhausted calories and body fat, which are basically stored in a memory device

The handle 101 includes a display 203, a switching unit 201, a data input unit 202 and a rotating axis supporter 205. The display 203 indicates the exhausted calories and body fat, the exercise time and the number of skips of the jump rope, which is counted by the measuring device 204. Also, the switching unit 201 turns on/off the display 203 and a power supply to provide power to the jump rope according to the present invention and the data input unit 202 receives the exerciser's conditions, such as sex, ages and weight, and target values of the exerciser. The rotating axis supporter 205 fixes the rotation axis 103 to the handle 101.

Fig. 2B is a front view illustrating handles of the jump rope in accordance with another embodiment of the present invention. In Fig. 2B, the display, the switching unit and the data input unit are placed in the vicinity of the rope.

The jump rope according to the present invention has a pair of handles 101 and the measuring device 204 may be contained within only one of two handles. Accordingly, the difference between the two handles in their weight has to be controlled through a structural arrangement so that the exerciser feels

the same weight between the two handles.

Fig. 3 is a front view illustrating a rotation part of the jump rope in accordance with the present invention, showing a detailed connection between the handle 301, the rotation axis supporter 302, the rotation axis 303 and the coupling part 304.

Fig. 4 is a schematic view illustrating a counting part included in the jump rope in accordance with the present invention.

Referring tot Fig. 4, the turning force caused by the rotation of the jump rope is transmitted to the rotation axis 401 and a rotation plate 402 coupled to the rotation axis 401 and the number of turnings of the rope is counted. A magnetic block 403 is attached to the rotation plate 402 and then a sensor 404 counts the number of turnings of the rope by detecting the position of the magnetic block 403.

Fig. 5 is a perspective view illustrating the rope of the jump rope in accordance with the present invention

Referring now to Fig. 5, the rope according to the present invention is composed of an upper portion 501 and a central portion 502. The upper portion 501 is made of soft materials to maintain an original type without twist. The central portion 502 is made of materials which prevents the eccentricity and increase the turning force by weighting the center of the rope.

Fig. 6 is a block diagram illustrating the jump rope capable of measuring exhausted calories and body fat in accordance with the present invention.

Referring to Fig. 6, the switching unit 605 includes control buttons to turn on/off the power and to convert functions (the number of turnings the rope, reset, etc.) and the power supply 602 supply power to the handle in order to drive

the measuring device counting the exhausted calories and body fat.

The exerciser inputs his physical conditions, such as sex, ages and weight, and target values (for example, calories and body fat to be exhausted, exercise time and the umber of turnings the rope) through a data input and switching unit 606.

The counting unit 604 counts the number of turnings of the rope, by using the magnetic block and the sensor, which are attached to the rotation plate receiving the turning forces of the rope. The display 603, such as a liquid crystal display, indicates the number of counted turnings of the rope, the exhausted calories and body fat and the exercise time on a screen. The display 603 may provides a backlight function when the results are displayed on the screen

Also, an alarm generator 607 may give the exerciser alarms when the exercise reaches to an appropriate amount or to a target values set up by the exerciser.

A central processing unit 601 controls the above-mentioned elements and calculates an amount of the exhausted calories and body fat based on the input data of the exerciser' conditions, such as sex, age and weight, through the data input and switching unit 606, and the measured values from the counting unit 604, such as the number of counted turnings of the rope and the actual exercise time, and the statistics (i.e., coefficients for measuring the exhausted calories and body fat) from the previous measured data. At this time, when the exercise reaches to an appropriate amount or a target value, the central processing unit 601 controls the alarm generator 607 in order that the exerciser receives an alarm from the alarm generator 607. Also, the central processing unit 601 makes the

display 603 indicate the number of counted turnings of the rope, the exhausted calories and body fat and the exercise time on a screen.

The statistics may be obtained by measuring the exhausted calories and body fat in an actual exercise and an amount of the exhausted calories of statistics may be stored in a memory within the central processing unit 601 and an external memory (not shown).

The statistics related to the he exercise will be described in detail.

The statistics of the exercise amount are data, which are obtained by measuring the strength of the exercise, the exhausted calories, heart rate and by estimating an oxygen intake, the amount of exhausted calories and body fat, the heart rate and a lactic acid according to the number of turnings of the rope. Also, the statistics include a calorie exhaustion coefficient, which is established on the basis of exercise amount according to the sex and ages and calculated by a statistical numerical value and an equation (exhausted calorie (kcal)=weight (kg) x the number of turnings of the rope x the calorie exhaustion coefficient), and a body fat exhaustion coefficient for changing the calorie exhaustion into the body fat exhaustion calculated by a statistical numerical value and an equation (exhausted body fat (g)=weight (kg) x the number of turnings of the rope x the calorie exhaustion coefficient x the body fat exhaustion coefficient).

On the other hand, the calorie exhaustion coefficient has a specific value according to the sex and age. In the preferred embodiment of the present invention, 112 calorie exhaustion coefficients are shown in the following table [1]

for male and female of 5- to 60-years-old.

[Table 1]

age	calorie exhaustion coefficient	
	Male	Female
5	0.001441	0.001480
6	0.001445	0.001490
7	0.001450	0.001500
8	0.001400	0.001455
9	0.001355	0.001440
10	0.001295	0.001425
11	0.001328	0.001400
12	0.001361	0.001380
13	0.001394	0.001365
14	0.001427	0.001344
15	0.001460	0.001324
16	0.001493	0.001344
17	0.001526	0.001364
18	0.001536	0.001374
19	0.001546	0.001394
20	0.001550	0.001410
21	0.001545	0.001401
22	0.001535	0.001385
23	0.001517	0.001335
24	0.001464	0.001285
25	0.001411	0.001235
26	0.001358	0.001228
27	0.001303	0.001221
28	0.001296	0.001218

29	0.001289	0.001211
30	0.001282	0.001204
31	0.001275	0.001197
32	0.001268	0.001188
33	0.001261	0.001179
34	0.001259	0.001172
35	0.001258	0.001165
36	0.001257	0.001158
37	0.001256	0.001151
38	0.001255	0.001144
39	0.001254	0.001138
40	0.001253	0.001132
41	0.001250	0.001126
42	0.001249	0.001120
43	0.001248	0.001115
44	0.001247	0.001108
45	0.001246	0.001111
46	0.001245	0.001109
47	0.001243	0.001106
48	0.001242	0.001103
49	0.001241	0.001100
50	0.001240	0.001097
51	0.001239	0.001094
52	0.001238	0.001091
53	0.001237	0.001085
54	0.001236	0.001074
55	0.001235	0.001071
56	0.001234	0.001068
57	0.001233	0.001065

58	0.001232	0.001060
59	0.001231	0.001055
60	0.001230	0.001050

The amount of the exhausted calorie (kcal) is calculated as shown in following [Equation 1]:

[Equation 1]

Exhausted calorie (kcal) =weight (kg) x the number of turnings of the rope x the calorie exhaustion coefficient

For example, in the case where the weight of a 40-years-old man is 70kg and he has a 300 skips of the jump rope, the calorie exhaustion coefficient is "0.001253" in the above table [1] and, therefore, the corresponding amount of the exhausted calorie (kcal) may be read out automatically and this coefficient is obtained by multiplying the weight by the number of turnings of the rope as follows:

Exhausted calorie (kcal) =70 (kg) x 300 times x 0.001253 = 26.3 kcal

On the other hand, the body fat exhaustion coefficient, as a statistical numerical value based on actual experiment data, is used to change the calculated calorie exhaustion into the body fat exhaustion. The most precise value, in the preferred embodiment of the present invention, is 0.1428571. However, this value may have a variation down to three places of decimals. Accordingly, the body fat exhaustion coefficient is in a range of 0.1400000 to 0.1500000

The amount of the exhausted body fat (g) is calculated as shown in following [Equation 2]:

[Equation 2]

Exhausted body fat (g) =weight (kg) x the number of turnings of the rope x the calorie exhaustion coefficient x the body fat exhaustion coefficient

As a result, if the calorie exhaustion is calculated by equation [1], the amount of the exhausted body fat (g) is calculated by the multiplication of the calorie exhaustion and the body fat exhaustion coefficient. For example, in the case where the amount of the exhausted calorie calculated based on the conditions of the exerciser is 26.3 kcal, the amount of the exhausted body fat is as follows:

Exhausted body fat (g) =26.3 kcal (exhausted calorie) x 0.1428571300 (the body fat exhaustion coefficient) = 3.8gl

Figs. 7A and 7B are flow charts illustrating a method for measuring exhausted calories and body fat in the jump rope in accordance with the present invention.

First, a user turns on the power switch at step 701 and inputs his physical conditions, such as sex, age and weight, at step 702.

The user selects one of auto and manual modes at step 703. The auto mode circulates the most appropriate amount of exercise suitable for the exercise (or user) and informs the user of such an appropriate amount. In the manual mode, the

exerciser himself inputs his target values (the exhausted calories and body fat, the exercise time and the number of skips of the jump rope) and the exerciser is informed that these measuring values reaches to the target values. The jump rope according to the present invention may have only one mode instead of such two modes.

If the exerciser selects the auto mode and starts skipping the jump rope at step 704, the central processing unit ascertains if count signals are inputted or not at step 705. If the count signals are inputted, the number of skips of the jump rope and the exercise time are counted at step 706 and a specific coefficient corresponding to his sex and age is selected and read out from the measurement coefficients which are made by the previously measured data and stored in table [1] at step 707.The amount of the exhausted calorie and body fat is calculated using the foregoing equations [1] and [2] at step 708.

Next, the most appropriate amount of exercise suitable for the exercise is estimated based on the exerciser's sex and age and the number of skips of the jump rope and the central processing unit determines if the actual exercise reaches to this estimated value at step 709. If so, an alarm is given the exerciser at step 710 and, if not, the count input is repeatedly carried out at step 705.

The central processing unit ascertains if the exerciser stops skipping the rope at step 711 and, if not, the count input is repeatedly carried out at step 705. If the exerciser stops skipping the rope, the number of skips of the rope, the exercise time, the exhausted calorie and body fat are displayed on a screen at step 712. At this time, the display may be performed

by the exerciser's option, which is previously set up by the exerciser, by a predetermined time interval, or by a select button.

After the appropriate amount of the skips, if the exerciser wants to continue the exercise at step 713, the count input is carried out again at step 705. If the exerciser wants to end the exercise at step 713, he turns off the power switch at step 714.

On the other hand, when the count signals are not input at step 705, the central processing unit ascertains if the exerciser stops skipping the rope for a predetermined time interval at step 715. If so, the display is carried out at step 712 after the corresponding measurement coefficient is read out from the previously provided coefficients which are stored in table [1] at step 716 and the amount of the exhausted calorie and body fat is calculated using the foregoing equations [1] and [2] at step 717. If not, the count input is carried out again at step 705.

When the exerciser selects the manual mode, in which he sets up the target values, the exerciser inputs any one of the required factors, i.e., the amount of the calorie exhaustion 718, the exercise time 719, the number of skips of the rope 720 and the amount of the body fat exhaustion 721. After inputting the factors, the exerciser starts skipping the jump rope at step 722 and then the input of the count signals is checked up at step 723. If the count signals are inputted, the number of skips of the jump rope and the exercise time are counted at step 724 and a specific coefficient corresponding to his sex and age is selected and read out from the measurement coefficients, which are made by the previously measured data and stored in table

[1] at step 725.The amount of the exhausted calorie and body fat is calculated using the foregoing equations [1] and [2] at step 726.

Next, the target amounts (calorie and body fat exhaustion, the number of skips of the jump rope or exercise time), which is set up by the exerciser, is estimated and the central processing unit determines if the actual exercise reaches to the target amount at step 727. If so, an alarm is given the exerciser at step 728 and, if not, the count input is repeatedly carried out at step 723.

The central processing unit ascertains if the exerciser stops skipping the rope at step 729 and, if not, the count input is repeatedly carried out at step 723. If the exerciser stops skipping the rope, the number of skips of the rope, the exercise time, the exhausted calorie and body fat are displayed on a screen at step 730. At this time, the display may be performed by the exerciser's option, which is previously set up by the exerciser, by a predetermined time interval, or by a select button.

After the actual exercise reaches to the target amount, if the exerciser wants to continue the exercise at step 731, the count input is carried out again at step 723. If the exerciser wants to end the exercise at step 713, he turns off the power switch at step 732.

On the other hand, when the count signals are not inputted at step 723, the central processing unit ascertains if the exerciser stops skipping the rope for a predetermined time at step 733. If so, the display is carried out at step 730 after the corresponding measurement coefficient is read out from the previously provided coefficients which are stored in table [1]

at step 734 and the amount of the exhausted calorie and body fat is calculated using the foregoing equations [1] and [2] at step 735. If not, the count input is carried out again at step 723.

Fig. 8 is a circuit diagram illustrating the jump rope capable of measuring exhausted calories and body fat in accordance with the present invention.

As shown in Fig. 8, the jump rope according to the present invention includes a data input and switching unit 800, a display 810, a counting unit 820, a central processing unit (CPU) 830 and an alarm generator 840.

The counting unit 820 may be implemented by a sensor. The count of the number of skips of the rope is carried out by detecting pluses generated when the magnetic block is rotated in the vicinity of the sensor. These pulses are inputted into a terminal RA0 of the CPU 830 and then the CPU 830 counts the input pulses.

The alarm generator 840 has a buzzer BZ1. The CPU 830 transfers a pulse to a base of the a transistor Q1 in order that the program of the CPU 830 makes a buzzing sound and the transistor Q1 then vibrates the buzzer. In the alarm generator 840, U2 is an integrated circuit (IC) for generating a melody. When a logic high level is applied to a terminal RA2 of the CPU 830, the pluses is generated at pin 3 and the pulses triggers the transistor Q1 so that the buzzer produces the corresponding melody.

On the other hand, in another embodiment of the present invention, it is possible to display the results (the number of skips of the rope, the amount of exhausted calories and body fat, the exercise time) as to the current exercise in progress.

Although the preferred embodiments of the present invention have been disclosed for illustrative purpose, those skilled in the art will appreciate that various modifications, additions and substitutes are possible, without departing from the scope and spirit of the present invention as described in the accompanying claims

The present invention makes the exerciser take an appropriate exercise based on statistics of measured data (the calorie exhaustion coefficient and the body fat exhaustion coefficient, etc.), by calculating the most appropriate amount of exercise, e.g., the number of the rope skipping, amount of calorie and physical fat consuming, etc, according to physical conditions, such as sex, age and weight of the exerciser and notifying proper amount of exercise to the exerciser by an alarm.

The present invention can maximize efficiency of the exercise, by providing the exerciser with a systematic physical care according to the target values of the exercise (the number of skips of the rope, the amount of exhausted calories and body fat, the exercise time) and by providing the exerciser with the alarm when he reaches to the target values.

The present invention gives an energy increasing efficiency from a far infrared rays by mixing natural ores with a handle part material and stimulates spots on the body suitable for acupuncture of a palm and get rid of a high-pressed pulsation by a finger-pressure therapy function and prevents a slipping during the exercise caused by a sweat secretion of the palm by a project form of a surface of the handle part.

The present invention increases a weight of a center portion of the jump rope from each end of the rope to make it

being a center of gravity so that an eccentric strength is prevented and a rotary power is increased.

Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A jump rope having a function to measure an amount of exhausted calorie and body fat, the jump rope comprising:

an input means for inputting physical condition data of an exerciser, wherein the physical condition data include sex, age and weight information;

a counting means for counting the number of skips of the rope;

a display means for displaying exercise results, wherein the exercise results include the number of skips of the rope, an amount of exhausted calorie, an amount of exhausted body fat, or an exercise time;

a storing means for storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises; and

a processing means for calculating the amount of exhausted calorie and body fat, based on an amount of actual exercise, by using the physical condition data, the number of skips of the rope provided by the counting means, the exercise time, the calorie exhaustion coefficient stored in the storing means and a body fat exhaustion coefficient, and for controlling the display means so that the exercise results are displayed on a screen.

2. The jump rope as recited in claim 1, further comprising a alarm generator for providing am alarm for the exerciser when the exerciser has an appropriate amount of the exercise or when an amount of the exercise reaches to a target value which is set up by the exerciser.

3. The jump rope as recited in claim 1, wherein the processing means includes an operating means for performing following equation:

Exhausted calorie (kcal)=weight (kg) x the number of turnings of the rope x calorie exhaustion coefficient

4. The jump rope as recited in claim 3, wherein the calorie exhaustion coefficient has a value as shown in following table:

age	calorie exhaustion coefficient	
	Male	Female
5	0.001441	0.001480
6	0.001445	0.001490
7	0.001450	0.001500
8	0.001400	0.001455
9	0.001355	0.001440
10	0.001295	0.001425
11	0.001328	0.001400
12	0.001361	0.001380
13	0.001394	0.001365
14	0.001427	0.001344
15	0.001460	0.001324
16	0.001493	0.001344
17	0.001526	0.001364
18	0.001536	0.001374
19	0.001546	0.001394
20	0.001550	0.001410
21	0.001545	0.001401
22	0.001535	0.001385

23	0.001517	0.001335
24	0.001464	0.001285
25	0.001411	0.001235
26	0.001358	0.001228
27	0.001303	0.001221
28	0.001296	0.001218
29	0.001289	0.001211
30	0.001282	0.001204
31	0.001275	0.001197
32	0.001268	0.001188
33	0.001261	0.001179
34	0.001259	0.001172
35	0.001258	0.001165
36	0.001257	0.001158
37	0.001256	0.001151
38	0.001255	0.001144
39	0.001254	0.001138
40	0.001253	0.001132
41	0.001250	0.001126
42	0.001249	0.001120
43	0.001248	0.001115
44	0.001247	0.001108
45	0.001246	0.001111
46	0.001245	0.001109
47	0.001243	0.001106
48	0.001242	0.001103
49	0.001241	0.001100
50	0.001240	0.001097
51	0.001239	0.001094

52	0.001238	0.001091
53	0.001237	0.001085
54	0.001236	0.001074
55	0.001235	0.001071
56	0.001234	0.001068
57	0.001233	0.001065
58	0.001232	0.001060
59	0.001231	0.001055
60	0.001230	0.001050

5. The jump rope as recited in claim 1, wherein the processing means includes an operating means for performing following equation:

Exhausted body fat (g)=weight (kg) x the number of turnings of the rope x calorie exhaustion coefficient x body fat exhaustion coefficient

6. The jump rope as recited in claim 5, wherein the body fat exhaustion coefficient is in a range of 0.1400000 to 0.1500000h.

7. The jump rope as recited in claim 6, wherein the body fat exhaustion coefficient is 0.1428571.

8. The jump rope as recited in claim 2, wherein the target value is any one of the amount of exhausted calorie, the amount of exhausted body fat, the exercise time and the number of skips of the rope.

9. A method for measuring exhausted calorie and body fat

of an exerciser, the method comprising the steps of:

storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises;

inputting physical conditions data, wherein the physical condition data include sex, age and weight information;

counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient; and

displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

10. The method as recited in claim 9, further comprising the steps of:

estimating an appropriate exercise amount for the exerciser; and

generating an alarm when the exercise reaches to the appropriate exercise amount and, when the exercise does not reach to the appropriate exercise amount, repeatedly carrying out the step of counting the number of skips of the rope.

11. The method as recited in claim 9, further comprising the steps of:

inputting target values set up by the exerciser;

generating an alarm when the target values are achieved and, when the target values are not, repeatedly carrying out the step of counting the number of skips of the rope.

12. A method for measuring exhausted calorie and body fat of an exerciser, the method comprising the steps of:

receiving and storing calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises;

inputting physical conditions data, wherein the physical condition data include sex, age and weight information;

ascertaining a mode selected from auto and manual modes, wherein the auto mode automatically estimates an appropriate exercise amount for the exerciser and wherein the manual mode is set up by the exerciser;

in case that the selected mode is the auto mode, counting the number of skips of a rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, estimating an appropriate exercise amount for the exerciser; and generating an alarm when the appropriate exercise amount is achieved;

in case that the selected mode is the manual mode, receiving target values from the exerciser, counting the number of skips of the rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, and generating an alarm when the target values are achieved; and

displaying results of the exercise on a screen.

13. The method as recited in claim 12, further comprising

the step of displaying results measured up to now when the exerciser stops skipping the rope, wherein the measured results include the number of skips of the rope , an amount of exhausted calorie, an amount of body fat and an exercise time which are calculated based on the number of skips of the rope , the exercise time, physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient.

14. The method as recited in claim 12, wherein the target value is any one of the amount of exhausted calorie, the amount of exhausted body fat, the exercise time and the number of skips of the rope.

15. The method as recited in claim 12, wherein the amount of exhausted calorie is calculated as follows:

Exhausted calorie (kcal)=weight (kg) x the number of turnings of the rope x calorie exhaustion coefficient

16. The method as recited in claim 15, wherein the calorie exhaustion coefficient has a value as shown in following table:

age	calorie exhaustion coefficient	
	Male	Female
5	0.001441	0.001480
6	0.001445	0.001490
7	0.001450	0.001500
8	0.001400	0.001455
9	0.001355	0.001440
10	0.001295	0.001425
11	0.001328	0.001400
12	0.001361	0.001380

13	0.001394	0.001365
14	0.001427	0.001344
15	0.001460	0.001324
16	0.001493	0.001344
17	0.001526	0.001364
18	0.001536	0.001374
19	0.001546	0.001394
20	0.001550	0.001410
21	0.001545	0.001401
22	0.001535	0.001385
23	0.001517	0.001335
24	0.001464	0.001285
25	0.001411	0.001235
26	0.001358	0.001228
27	0.001303	0.001221
28	0.001296	0.001218
29	0.001289	0.001211
30	0.001282	0.001204
31	0.001275	0.001197
32	0.001268	0.001188
33	0.001261	0.001179
34	0.001259	0.001172
35	0.001258	0.001165
36	0.001257	0.001158
37	0.001256	0.001151
38	0.001255	0.001144
39	0.001254	0.001138
40	0.001253	0.001132
41	0.001250	0.001126

42	0.001249	0.001120
43	0.001248	0.001115
44	0.001247	0.001108
45	0.001246	0.001111
46	0.001245	0.001109
47	0.001243	0.001106
48	0.001242	0.001103
49	0.001241	0.001100
50	0.001240	0.001097
51	0.001239	0.001094
52	0.001238	0.001091
53	0.001237	0.001085
54	0.001236	0.001074
55	0.001235	0.001071
56	0.001234	0.001068
57	0.001233	0.001065
58	0.001232	0.001060
59	0.001231	0.001055
60	0.001230	0.001050

17. The method as recited in claim 12, wherein the amount of body fat is calculated as follows:

Exhausted body fat (g)=weight (kg) x the number of turnings of the rope x calorie exhaustion coefficient x body fat exhaustion coefficient

18. The method as recited in claim 17, wherein the body fat exhaustion coefficient is in a range of 0.1400000 to 0.1500000h.

19 The method as recited in claim 17, wherein the body fat exhaustion coefficient is 0.1428571.

20. A computer-readable medium storing a program executable in a computer system comprising the functions of:

storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises;

inputting physical conditions data, wherein the physical condition data include sex, age and weight information;

counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient; and

displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

21. The computer-readable medium as recited in claim 20, further comprising the functions of:

estimating an appropriate exercise amount for the exerciser; and

generating an alarm when the exercise reaches to the appropriate exercise amount and, when the exercise does not reach to the appropriate exercise amount, repeatedly carrying out the step of counting the number of skips of the rope.

22. A computer-readable medium storing a program executable in a computer system comprising the functions of:

storing a calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises;

inputting physical conditions data and target values set up by an exerciser, wherein the physical condition data include sex, age and weight information;

counting the number of skips of a rope and an exercise time and calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient;

generating an alarm when the target values are achieved and, when the target values are not, repeatedly carrying out the step of counting the number of skips of the rope; and

displaying results of the exercise on a screen, wherein the results include the number of skips of the rope, the calculated amounts of calorie and body fat, the exercise time.

23. A computer-readable medium storing a program executable in a computer system comprising the functions of:

receiving and storing calorie exhaustion coefficient which is obtained by statistics from a measured amount of previous exercises;

inputting physical conditions data, wherein the physical condition data include sex, age and weight information;

ascertaining a mode selected from auto and manual modes, wherein the auto mode automatically estimates an appropriate exercise amount for the exerciser and wherein the manual mode is set up by the exerciser;

in case that the selected mode is the auto mode, counting

the number of skips of a rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, estimating an appropriate exercise amount for the exerciser; and generating an alarm when the exercise reaches to the appropriate exercise amount;

in case that the selected mode is the manual mode, receiving target values from the exerciser, counting the number of skips of the rope and an exercise time, calculating an amount of exhausted calorie and an amount of body fat based on the physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient, and generating an alarm when the target values are achieved; and

displaying results of the exercise on a screen.

24. A computer-readable medium as recited in claim 23, further comprising the function of:

displaying results measured up to now when the exerciser stops skipping the rope, wherein the measured results include the number of skips of the rope , an amount of exhausted calorie, an amount of body fat and an exercise time which are calculated based on the number of skips of the rope , the exercise time, physical condition data, a calorie exhaustion coefficient and a body fat exhaustion coefficient.

FIG. 1

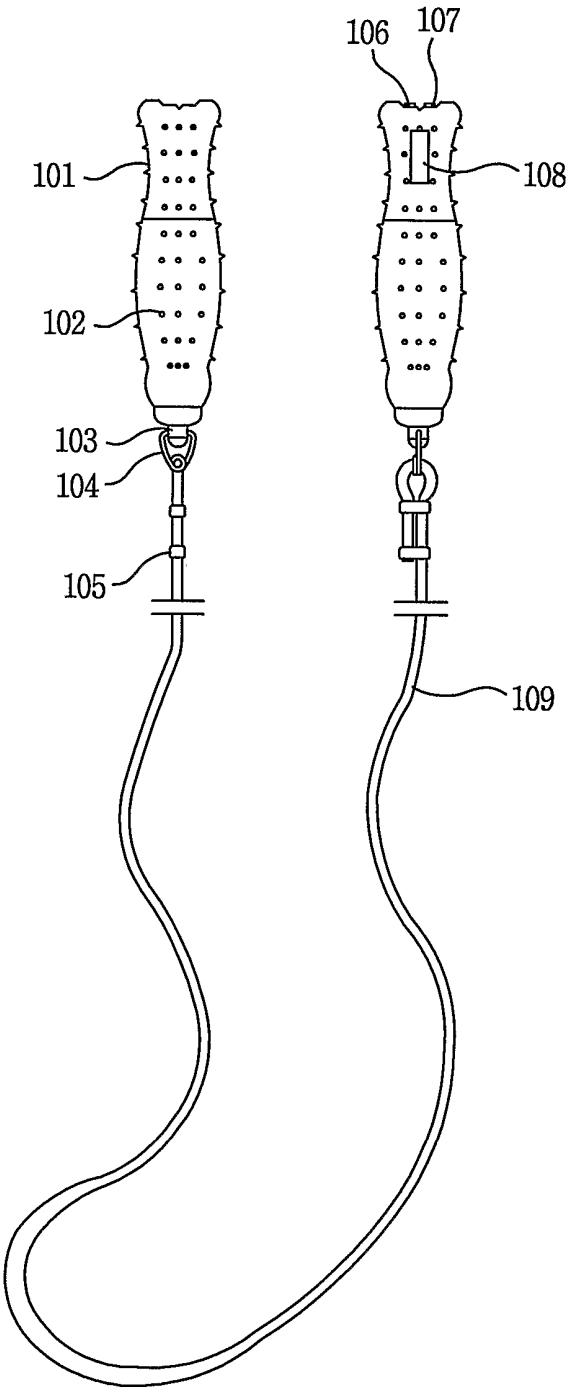


FIG. 2A

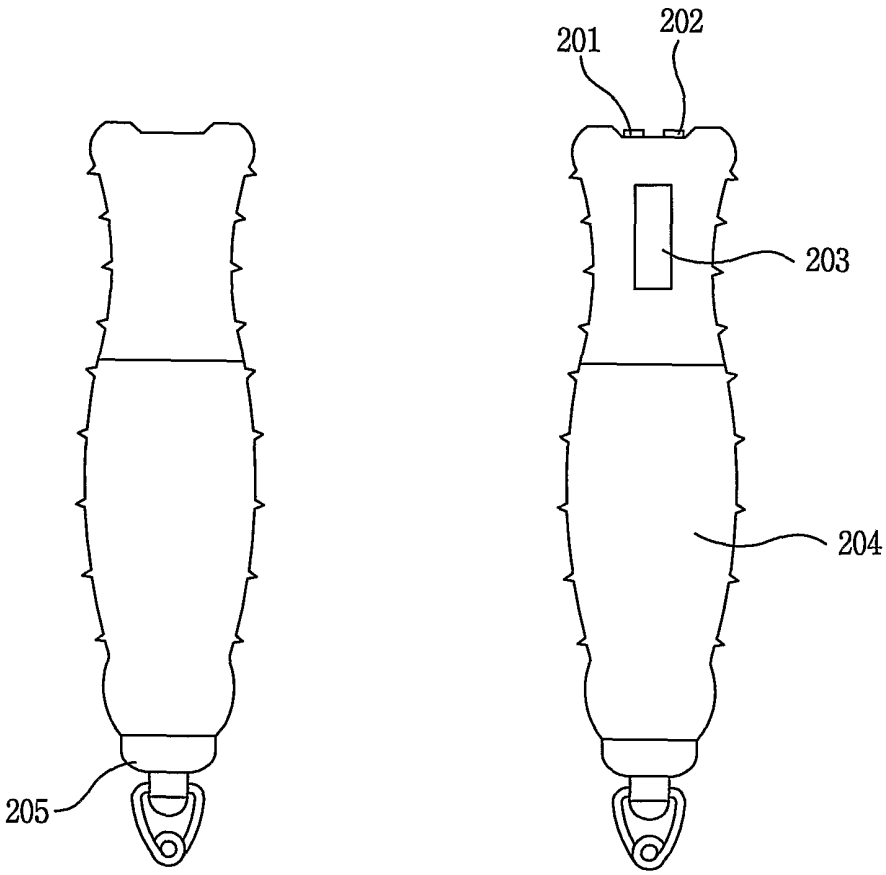


FIG. 2B

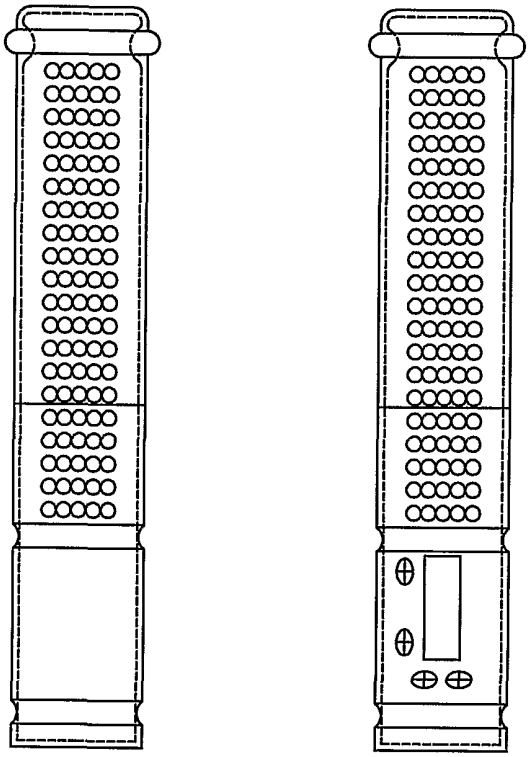


FIG. 3

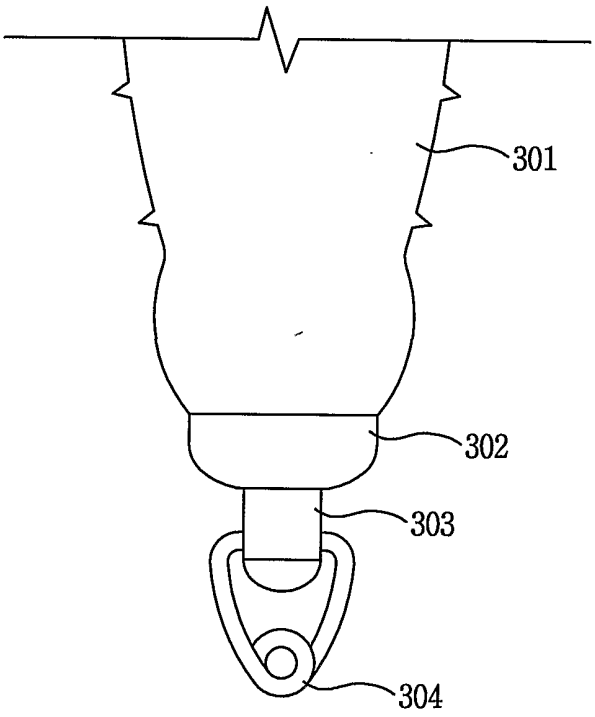


FIG. 4

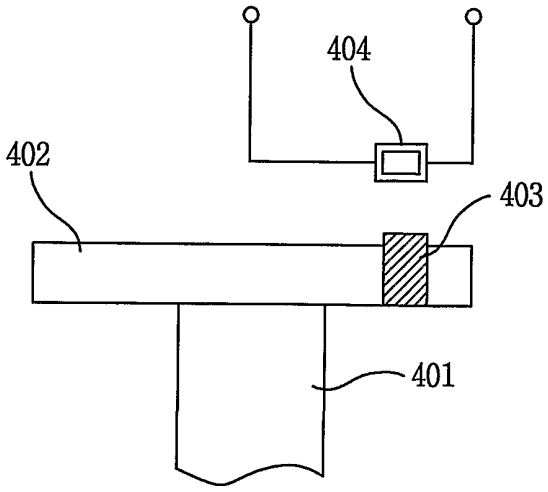


FIG. 5

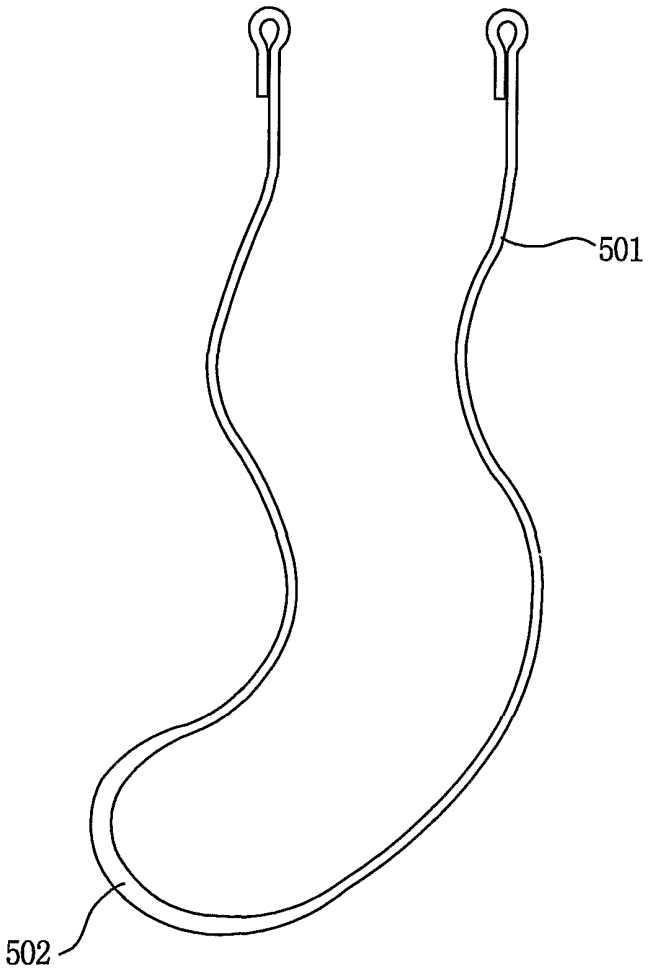


FIG. 6

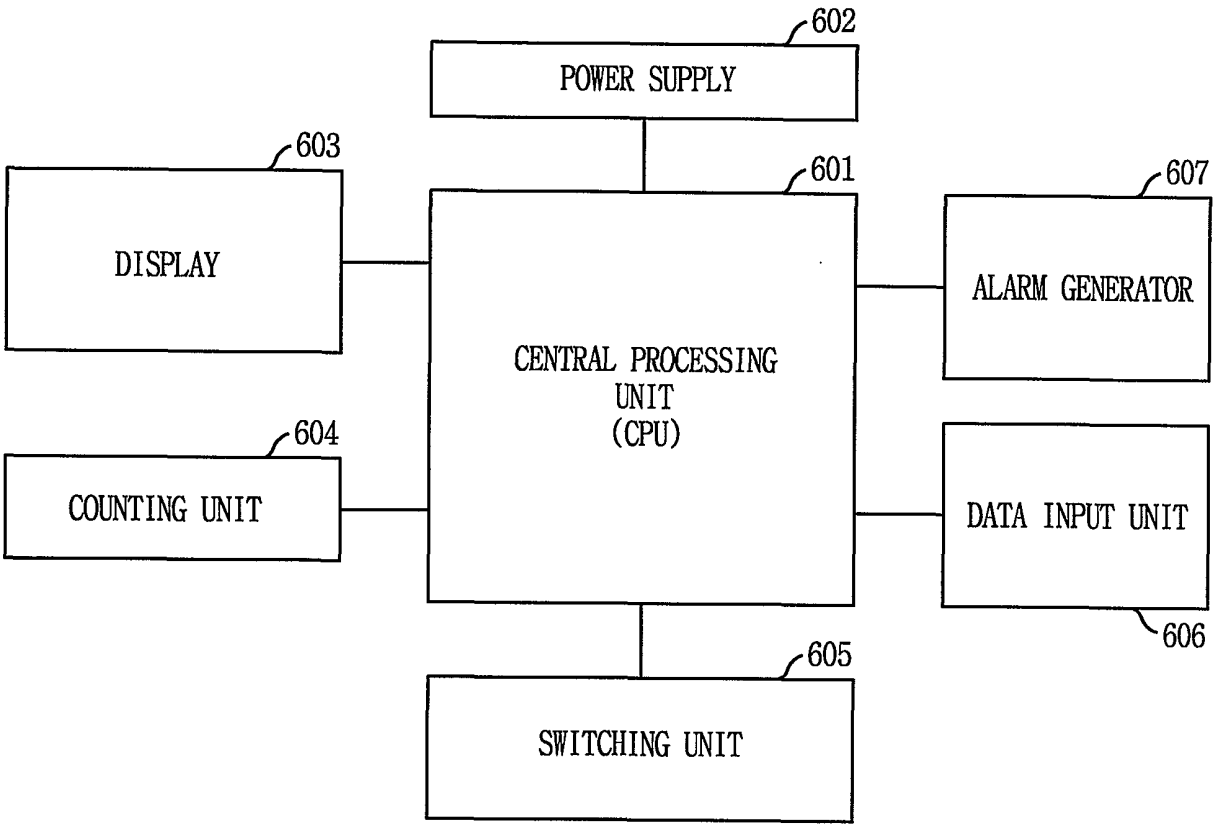

602
POWER SUPPLY
603
DISPLAY
601
CENTRAL PROCESSING UNIT (CPU)
607
ALARM GENERATOR
604
COUNTING UNIT
DATA INPUT UNIT
606
605
SWITCHING UNIT

FIG. 7A

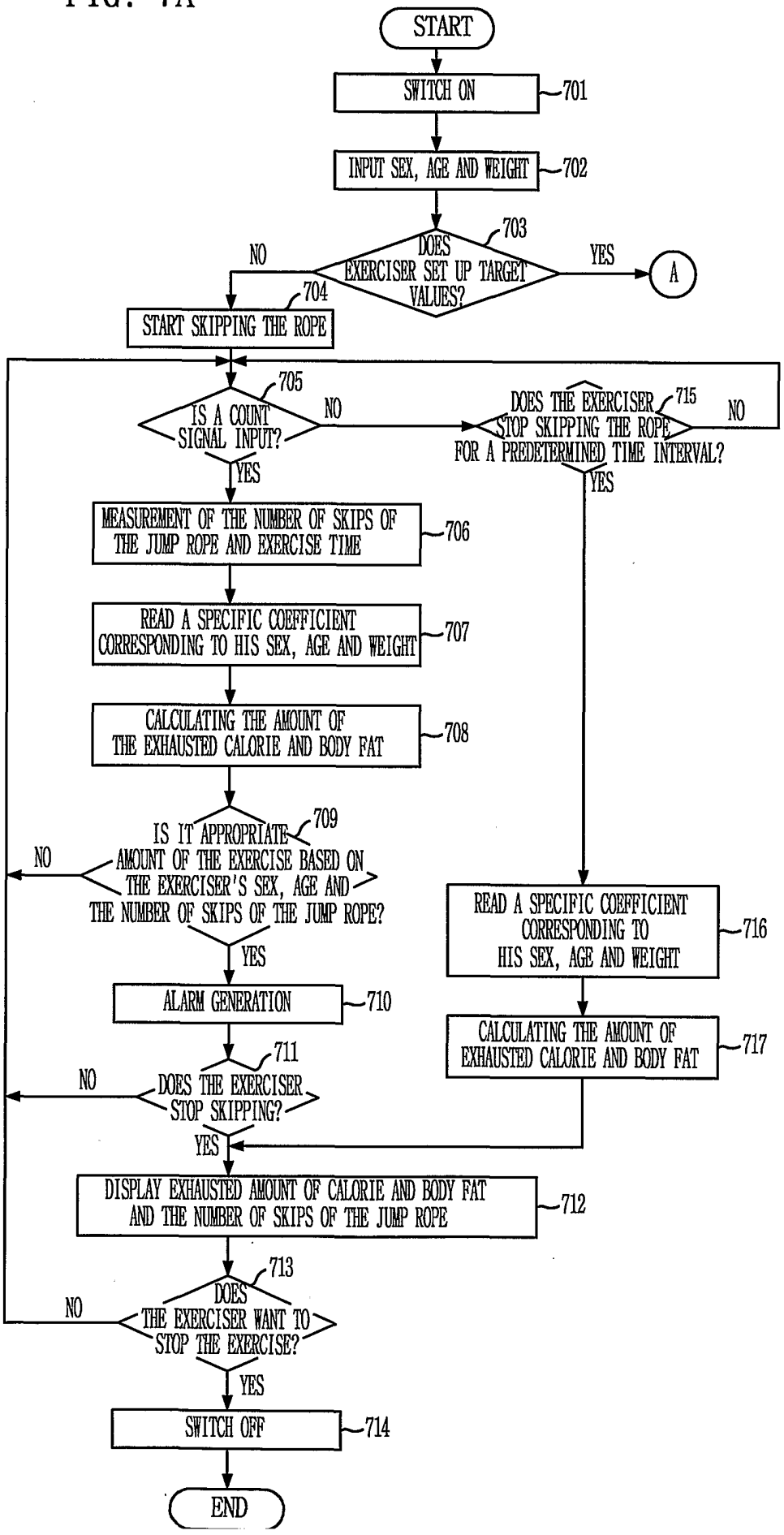
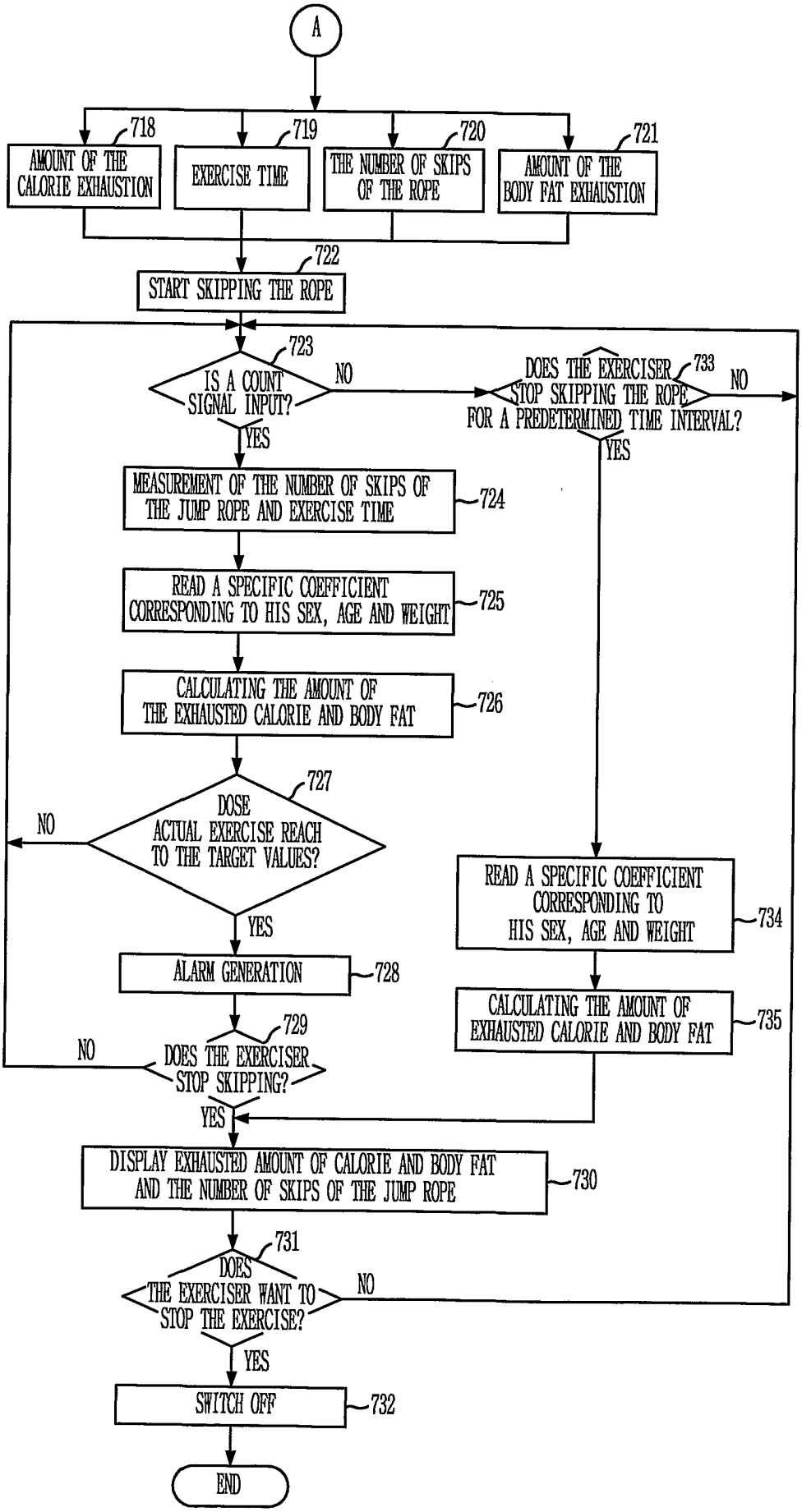

START
SWITCH ON
701
INPUT SEX, AGE AND WEIGHT
702
DOES EXERCISER SET UP TARGET VALUES?
703
NO
YES
A
START SKIPPING THE ROPE
704
IS A COUNT SIGNAL INPUT?
705
NO
YES
DOES THE EXERCISER STOP SKIPPING THE ROPE FOR A PREDETERMINED TIME INTERVAL?
715
NO
YES
MEASUREMENT OF THE NUMBER OF SKIPS OF THE JUMP ROPE AND EXERCISE TIME
706
READ A SPECIFIC COEFFICIENT CORRESPONDING TO HIS SEX, AGE AND WEIGHT
707
CALCULATING THE AMOUNT OF THE EXHAUSTED CALORIE AND BODY FAT
708
IS IT APPROPRIATE AMOUNT OF THE EXERCISE BASED ON THE EXERCISER'S SEX, AGE AND THE NUMBER OF SKIPS OF THE JUMP ROPE?
709
NO
YES
READ A SPECIFIC COEFFICIENT CORRESPONDING TO HIS SEX, AGE AND WEIGHT
716
ALARM GENERATION
710
CALCULATING THE AMOUNT OF EXHAUSTED CALORIE AND BODY FAT
717
DOES THE EXERCISER STOP SKIPPING?
711
NO
YES
DISPLAY EXHAUSTED AMOUNT OF CALORIE AND BODY FAT AND THE NUMBER OF SKIPS OF THE JUMP ROPE
712
DOES THE EXERCISER WANT TO STOP THE EXERCISE?
713
NO
YES
SWITCH OFF
714
END

FIG. 7B


A
718
AMOUNT OF THE CALORIE EXHAUSTION
719
EXERCISE TIME
720
THE NUMBER OF SKIPS OF THE ROPE
721
AMOUNT OF THE BODY FAT EXHAUSTION
722
START SKIPPING THE ROPE
723
IS A COUNT SIGNAL INPUT?
NO
YES
733
DOES THE EXERCISER STOP SKIPPING THE ROPE FOR A PREDETERMINED TIME INTERVAL?
NO
YES
MEASUREMENT OF THE NUMBER OF SKIPS OF THE JUMP ROPE AND EXERCISE TIME
724
READ A SPECIFIC COEFFICIENT CORRESPONDING TO HIS SEX, AGE AND WEIGHT
725
CALCULATING THE AMOUNT OF THE EXHAUSTED CALORIE AND BODY FAT
726
727
DOSE ACTUAL EXERCISE REACH TO THE TARGET VALUES?
NO
YES
READ A SPECIFIC COEFFICIENT CORRESPONDING TO HIS SEX, AGE AND WEIGHT
734
ALARM GENERATION
728
CALCULATING THE AMOUNT OF EXHAUSTED CALORIE AND BODY FAT
735
729
DOES THE EXERCISER STOP SKIPPING?
NO
YES
DISPLAY EXHAUSTED AMOUNT OF CALORIE AND BODY FAT AND THE NUMBER OF SKIPS OF THE JUMP ROPE
730
731
DOES THE EXERCISER WANT TO STOP THE EXERCISE?
NO
YES
SWITCH OFF
732
END

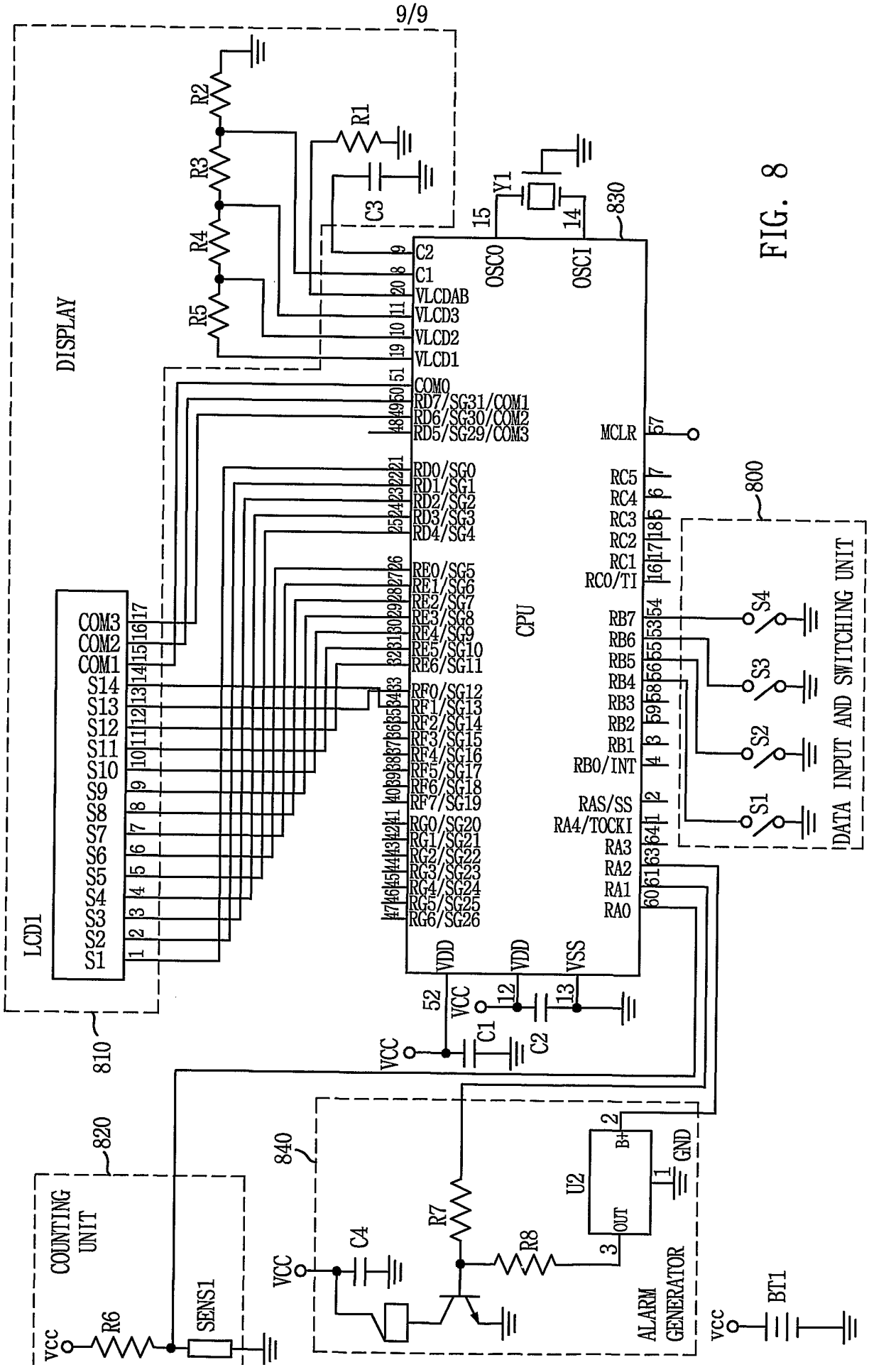

DISPLAY
LCD1
COM3
COM2
COM1
S14
S13
S12
S11
S10
S9
S8
S7
S6
S5
S4
S3
S2
S1
CPU
C2
C1
VLCDAB
VLCD3
VLCD2
VLCD1
COM0
RD7/SG31/COM1
RD6/SG30/COM2
RD5/SG29/COM3
RD0/SG0
RD1/SG1
RD2/SG2
RD3/SG3
RD4/SG4
RE0/SG5
RE1/SG6
RE2/SG7
RE3/SG8
RE4/SG9
RE5/SG10
RE6/SG11
RF0/SG12
RF1/SG13
RF2/SG14
RF3/SG15
RF4/SG16
RF5/SG17
RF6/SG18
RF7/SG19
RG0/SG20
RG1/SG21
RG2/SG22
RG3/SG23
RG4/SG24
RG5/SG25
RG6/SG26
OSC0
OSC1
MCLR
RC5
RC4
RC3
RC2
RC1
RC0/TI
RB7
RB6
RB5
RB4
RB3
RB2
RB1
RB0/INT
RAS/SS
RA4/TOCKI
RA3
RA2
RA1
RA0
VDD
VDD
VSS
VCC
VCC
R1
R2
R3
R4
R5
C3
Y1
C1
C2
S1
S2
S3
S4
DATA INPUT AND SWITCHING UNIT
COUNTING UNIT
SENS1
R6
VCC
C4
R7
R8
U2
B+
GND
OUT
ALARM GENERATOR
BT1
VCC
810
820
830
840
800

FIG. 8

International application No.
PCT/KR00/01162

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A63B 5/20

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

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 A63B, A61B, G06M

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

None

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

USPAT, FPD, PAJ "calory"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 1-265382 A (SEIKO EPSON) 23 October 1989	1, 9, 12
A	JP 6-176 A (TANITA) 11 January 1994	1, 9, 12
A	JP 7-80115 A (MATSUSHITA ELECTRIC WORKS) 28 March 1995	1, 9, 12
A	JP 2000060818 A (YA MAN) 29 February 2000	1, 9, 12

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevence

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 APRIL 2001 (30.04.2001)	02 MAY 2001 (02.05.2001)

Name and mailing address of the ISA/KR

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