EXERCISING DEVICE FOR LOWER-BODY

Inventor: Jeong Cheol Kim, Daejeon (KR)

Appl. No.: 12/674,156
PCT Filed: Jun. 13, 2008
PCT No.: PCT/KRO8/03338
§ 371 (c)(1), (2), (4) Date: Feb. 18, 2010

Foreign Application Priority Data

Publication Classification
Int. Cl. A63B 22/04 (2006.01)

ABSTRACT

A lower body exercise device for use in a sitting position includes a base plate (10) placed on a floor; pivot frame portions (20a and 20b) having first ends which are pivotably coupled to one end of the base plate (10) and second ends to which pedal portions (22a and 22b) are attached; repulsive members (30a and 30b) installed between the base plate (10) and the pivot frame portions (20a and 20b) such that a pivot frame composed of the pivot frame portions (20a and 20b) can be pressed and pivoted toward the base plate (10) by external force and the repulsive members (30a and 30b) can upwardly bias the pivot frame to an original position when the external force is removed; and pedal force adjustment means (40) for adjusting pedal force of the pedal portions (22a and 22b) by varying elasticity of the repulsive members (30a and 30b).
EXERCISENG DEVICE FOR LOWER-BODY

TECHNICAL FIELD

[0001] The present invention relates to a lower body exercise device for use in a sitting position, which allows a user to take exercise in a room while sitting on a chair, and more particularly, to a lower body exercise device for use in a sitting position, which allows a student, an office worker, etc. involved in a sedentary lifestyle to frequently exercise lower body muscles and to stimulate acupoints on the sole of the foot while sitting on a chair so that blood circulation and metabolism can be promoted and various ill effects such as the deterioration of physical strength, the loss of concentration and weakened immunity due to lack of exercise can be avoided, which, in particular, has a simplified construction and a decreased number of component parts so that the device can be fabricated and distributed at a reduced cost, and in which the relative positions of pedal portions constituting a pedal can be easily changed in conformity with the size of a user's foot and the load of exercise can be adjusted in various ways so that the device can be commonly used by several people.

BACKGROUND ART

[0002] In general, since students, office workers, etc. are involved in a sedentary lifestyle almost all day long, various diseases can be caused in various bony and muscular system and in the internal organs due to lack of exercise. In particular, the lower body muscles are likely to be weakened, and in the case of females, smooth blood circulation between the upper and lower bodies is likely to be deteriorated so that lower body obesity may be caused. Nevertheless, it is difficult for the students or office workers to arrange time in the daytime to go to a health club or go out to take exercise. Therefore, if the motions in everyday life can be developed to exercise, it is possible to contribute to the promotion of health to some extent.

[0003] The conventional exercise devices for allowing a student or an office worker to take exercise while sitting on a chair, which have been disclosed in the art, include Korean Unexamined Patent Publication No. 1996-0016858 (published on Jun. 17, 1996) entitled “Massage Apparatus” which is an electrically vibrated type foot massager, Korean Utility Model Registration No. 284522 (registered on Jul. 23, 2002) entitled “Swivel Chair for Sports” in which a seating plate is eccentrically rotated to exercise the waist, Korean Utility Model Registration No. 341864 (registered on Feb. 3, 2004) entitled “The Foot to Press Down Roller” which is operated by placing both feet on finger-pressure plates and alternately pressing the finger-pressure plates, Korean Unexamined Patent Publication No. 2004-0040985 (published on May 13, 2004) entitled “Finger-pressure Equipment” which is operated such that, by placing the foot on a foot plate, finger-pressure protruberances are raised and lowered by a solenoid type actuator which is driven by electric power, to finger-press the sole of the foot, and Korean Unexamined Patent Publication No. 2004-0105527 (published on Dec. 16, 2004) entitled “A Chair Having a Part for Finger-pressing Sole of Foot” in which a rod member having rotation type finger-pressure protruberances is installed between the legs of a chair.

[0004] Since these conventional exercise devices are constructed to provide a simple massaging function or an amusement function, they cannot render substantial exercise effects and therefore cannot aid in solving the problems caused due to lack of exercise. Also, when performing massage using electricity, since noise is generated, concentration on study or office work can be interfered with.

[0005] In order to cope with these problems, the present applicant disclosed Korean Patent No. 518924 (registered on Sep. 20, 2005) entitled “A Lower Body Exercising Device with Foot Massager.” In this device, because a plurality of pivot frame portions are pivotally installed on one end of a base plate and compression coil springs are disposed between the pivot frame portions and the base plate, the number of parts increases. Also, a cover having the shape of a bellows made of rubber must be provided to cover the complicated internal construction, the manufacturing cost increases and the price of an end product is raised.

[0006] Further, the present applicant disclosed Korean Patent No. 720391 (registered on May 15, 2007) entitled “An Exercising Device for Lower Body” which is obtained by modifying the device disclosed in Korean Patent No. 518924 so that the construction is simplified and the number of parts is minimized.

[0007] The device disclosed in Korean Patent No. 720391 is fabricated such that the relative positions of pedal portions can be changed in conformity with the size of a user's foot. However, in order to change the relative positions of the pedal portions, since the bolts or screw-type adjusters attached to both sides of the pedal portions must be loosened and then tightened using a separate tool, inconvenience is caused. Also, because the fastened states of the adjusters are likely to be changed by the repeated use of the exercise device, the pedal portions are likely to be fluctuated in forward and rearward directions.

[0008] In addition, in Korean Patent No. 720391, since the elastic force of springs for applying pedal force to the pedal portions cannot be adjusted, it is impossible to adjust a load of exercise in conformity with a user's physical strength.

DISCLOSURE OF INVENTION

Technical Problem

[0009] Accordingly, the present invention has been made in an effort to solve the problems occurring in the related art, and an object of the present invention is to provide a lower body exercise device for use in a sitting position, which allows the relative positions of pedal portions constituting a pedal to be easily changed in conformity with the size of a user's foot and the load of exercise to be adjusted in conformity with the user's physical strength.

[0010] Another object of the present invention is to provide a lower body exercise device which ensures convenient use and easy adjustability of exercise load and has a simplified construction and a decreased number of component parts so that the fabrication cost can be reduced.

Technical Solution

[0011] In order to achieve the above objects, according to one aspect of the present invention, there is provided a lower body exercise device for use in a sitting position, comprising a base plate placed on a floor; pivot frame portions having first ends which are pivotally coupled to one end of the base plate by a shaft and second ends to which pedal portions are attached; a plurality of repulsive members installed between the base plate and the pivot frame portions such that a pivot frame composed of the pivot frame portions can be pressed
and pivoted toward the base plate by application of external force and the repulsive members can upwardly bias the pivot frame to an original position when the external force is removed; and pedal force adjustment means for adjusting pedal force of a pedal composed of the pedal portions by varying elasticity of the repulsive members.

[0012] According to another aspect of the present invention, the pedal portion is moved forward and rearward by a pedal adjustor so that relative positions of the pedal portions can be changed to conform to a size of a user’s foot. Also, the pedal adjustor comprises a movable element flexibly coupled to a lower surface of the pedal portion, a nut secured to a lower portion of the movable element to be open in forward and rearward directions, and a thumb bolt installed to project out of a rear end of the pivot frame portion and threaded into the nut.

[0013] According to another aspect of the present invention, the exercise device further comprises a latch for holding the pivot frame portions folded to the base plate. The latch has grips formed on both widthwise ends thereof and an engagement panel formed on a widthwise middle portion thereof such that an engagement part formed on a lower surface of the rear end of the pivotal frame portion can be engaged with the engagement panel, and is installed such that the latch can be moved in the forward and rearward directions along guide grooves defined in a lengthwise middle portion of the base plate; and slots are defined in the base plate to extend in the forward and rearward directions such that the engagement part of the pivot frame portion can be inserted through the slots.

[0014] According to another aspect of the present invention, the pedal force adjustment means comprises a fixing block into which first ends of the repulsive members are fitted, a bolt which is fastened to a rear end of the fixing block, a guide groove which is defined on a lower surface of the base plate, a hole which is perforated through a rear wall of the guide groove, and a thumb nut which is threaded with the bolt outside of the hole, such that the fixing block having the bolt fastened thereto is moved in the forward and rearward directions in the guide groove by rotating the thumb nut.

[0015] Further, in order to achieve the above objects, according to another aspect of the present invention, there is provided a lower body exercise device for use in a sitting position, comprising a base plate; a fixed shaft horizontally supported by a front end of the base plate at a raised position; pivot frames pivotably coupled to respective left and right ends of the fixed shaft; and torsion springs fitted on the fixed shaft and having both ends which are supported by the pivot frames and the base plate such that the pivot frames can be held in a lifted state.

[0016] According to another aspect of the present invention, each of left and right pivot frames is composed of a first pivot frame portion which has a relatively long length and a second pivot frame portion which has a relatively short length, a rear pedal portion is pivotably coupled to an upper surface of the first pivot frame portion so that a user’s rearfoot portion can be placed on the rear pedal portion, a front pedal portion is pivotably coupled to a rear upper surface of the second pivot frame portion so that the user’s forefoot portion can be placed on the front pedal portion, holes are defined through front ends of the first and second pivot frame portions such that a shaft bolt to be detachably coupled to the fixed shaft is inserted through the holes, an external thread is formed on a distal end of the shaft bolt, and an internal thread is formed in the fixed shaft.

[0017] According to another aspect of the present invention, finger-pressure protuberances for stimulating acupuncture points on the sole of a foot are attached onto the rear and front pedal portions, and pressing force of the finger-pressure protuberances can be adjusted by varying elasticity of springs.

[0018] According to still another aspect of the present invention, elastic force of the torsion spring, which is installed between first pivot frame portions and the base plate, can be adjusted in a multi-stepwise manner by elastic force adjustment means which is arranged in the base plate so that a load of exercise can be adjusted. The elastic force adjustment means comprises a lever which has a handle attached to an upper end thereof and a pinion secured to a lower end thereof, and a slider which has a rack formed on one portion thereof to be meshed with the pinion of the lever and a support part formed in the shape of steps on the other portion thereof to support a middle portion of the torsion spring.

[0019] According to a still further aspect of the present invention, the rear pedal portion is composed of an upper plate, an intermediate plate and a lower plate, protuberance installation grooves are defined in the upper plate such that the finger-pressure protuberances and the springs are installed in the protuberance installation grooves, the upper plate and the intermediate plate are detachably coupled to each other by an engagement shoulder and an elastic projection, and the upper plate having the intermediate plate coupled thereto is fastened to the lower plate by a bolt.

ADVANTAGEOUS EFFECTS

[0020] Thanks to the features of the lower body exercise device according to the present invention, after a user has studied or done office work for a long time while sitting on a chair, if he or she wants to take a rest or feels sleepy, the user can exercise lower body muscles by placing both feet on the divided type pedals of respective exercise devices while sitting erect by straightening himself or herself and by applying force to and pressing the pedals alternately or simultaneously. By sequentially pressing the divided pedal portions of each pedal, all muscles for moving a forefoot portion including five toes, a midfoot portion and a heel portion, all muscles for moving the ankle, and all muscles for pressing the foot are used. Therefore, since it is possible to effectively exercise lower body muscles, various ill effects due to lack of exercise can be avoided and distracted attention can be concentrated, whereby the efficiency of study and office work can be increased.

[0021] Further, while the lower body muscles are exercised, the acupuncture points on the soles of the feet are stimulated by finger-pressure protuberances on the pedals. As a consequence, various internal organs of the human body can be activated and blood circulation can be promoted, whereby various diseases of the user can be naturally healed and the user’s health can be ameliorated. In particular, because the relative positions of pedal portions constituting each pedal can be easily changed in conformity with the size of the user’s foot, the exercise device can be commonly used by all family members, and because the load of exercise can be adjusted in conformity with the physical strength of the user, lower body muscles can be exercised in an appropriate and efficient manner.

[0022] Moreover, in the present invention, by the fact that left and right pedals are pivotably coupled to a single base
the number of component parts can be decreased, and since the exercise device has a simplified construction, the manufacturing cost can be reduced so that a customer can purchase and use the device at a reasonable cost. Also, with the load of exercise adjusted in conformity with the user’s physical strength, the positions and the pressures of the finger-pressure protuberances can be regulated in conformity with the user’s physical characteristics.

The above objects, and other features and advantages of the present invention will become more apparent after a reading of the following detailed description taken in conjunction with the drawings. Before describing the embodiments of the present invention, it is to be understood that the terms or words used in this description and the following claims must not be construed to have meanings which are general or can be found in a dictionary. Therefore, considering the notion that an inventor can most properly define the concepts of the terms or words to best explain his or her invention, the terms or words must be understood as having meanings or concepts that conform to the technical spirit of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view illustrating a lower body exercise device in accordance with one embodiment of the present invention,

FIG. 2 is an assembled perspective view illustrating the lower body exercise device in accordance with one embodiment of the present invention,

FIG. 3 is a perspective view illustrating the state in which the pivot frame portions shown in FIG. 2 are folded,

FIG. 4 is a side sectional view illustrating the lower body exercise device in accordance with one embodiment of the present invention, with the pivot frame portions unfolded,

FIG. 5 is a side sectional view illustrating the lower body exercise device in accordance with one embodiment of the present invention, with the pivot frame port ions folded,

FIG. 6 is a sectional view illustrating the adjusted state of a pedal adjustor according to one embodiment of the present invention,

FIG. 7 is a sectional view illustrating the adjusted state of pedal force adjustment means according to one embodiment of the present invention,

FIG. 8 is sectional views illustrating the states in which pedal portions are sequentially pressed with a foot placed on the lower body exercise device in accordance with one embodiment of the present invention,

FIG. 9 is a perspective view illustrating a lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention,

FIG. 10 is a partially exploded perspective view of the lower body exercise device for use in a sitting position shown in FIG. 9,

FIG. 11 is a plan view of the lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention,

FIG. 12 is a side view of the lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention,

FIG. 13 is side sectional views of the lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention,

FIG. 14 is a view illustrating the use of the lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention,

FIG. 15 is a sectional view illustrating a variation of the pedal shown in FIG. 9, and

FIG. 16 is a perspective view illustrating a lower body exercise device for use in a sitting position in accordance with still another embodiment of the present invention.

DESCRIPTION OF REFERENCE NUMERALS

FOR MAIN PARTS IN DRAWINGS

10, 10b: base plates 11: shaft hole
12: support shaft 13: bobbin type washer
14: buffer pad 15: groove
17: fixed shaft 18: internal thread
20a, 20b: pivot frame portions 22a, 22b: pedal portions
22: shaft bolt 23: external thread
23: engagement part 24: buffer pad
25: finger-pressure protuberance 26: magnet
27: support member 30: pivot frame
30a, 30b: first and second pivot frame portions
30c, 30d: repulsive members 31: rear pedal portion
31a: upper plate 31b: intermediate plate
31c: lower plate
31d: protuberance installation groove
31e: bolt 32: front pedal portion
33: finger-pressure protuberance
34, 35: holes 36: spring
40: pedal force adjustment means
40a, 40b: torsion springs 41: fixing block
41a: fitting groove 42: bolt
43: guide groove 44: rear wall
45: hole 46: thumb nut
50: pedal adjustor
50a, 50b: elastic force adjustment means
51: handle 52: movable element
52a: pinion 53: lever
54: nut 54a: rack
55: support part 56: slider
56: thumb bolt 60: latch
61: guide groove 62: grip
64: engagement panel 66: slot
67: cap 70: cover

31a: elastic projection 31b: engagement shoulder
30a: counter

MODE FOR THE INVENTION

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein.

FIG. 1 is an exploded perspective view illustrating a lower body exercise device in accordance with one embodiment of the present invention. FIGS. 2 and 3 are assembled perspective views of the lower body exercise device in accordance with one embodiment of the present invention, respectively illustrating the folded and unfolded states of pivot frame portions, and FIGS. 4 and 5 are side sectional views respectively corresponding to FIGS. 2 and 3.
Referring to FIGS. 1 through 5, a lower body exercise device according to the present embodiment includes a base plate 10 placed on a floor; pivot frame portions 20a and 20b having first ends which are pivotally coupled to one end of the base plate 10 by a shaft and second ends to which pedald portions 22a and 22b are attached; a plurality of repulsive members 30a and 30b installed between the base plate 10 and the pivot frame portions 20a and 20b such that a pivot frame constituted by the pivot frame portions 20a and 20b can be pressed and pressed toward the base plate 10 by the application of external force and the repulsive members 30a and 30b can upwardly bias the pivot frame to an original position when the external force is removed; and pedal force adjustment means 40 for adjusting the pedal force of a pedal composed of the pedal portions 22a and 22b by varying the elasticity of the repulsive members 30a and 30b.

The lower body exercise device according to the present embodiment further includes a pedal adjustor 50 for adjusting the width between the pedal portions 22a and 22b and a latch 60 for holding the pivot frame portions 20a and 20b folded to the base plate 10 when the exercise device is not in use.

While the repulsive members 30a and 30b are illustrated in the present embodiment as comprising torsion springs as shown in the drawings, it is conceivable that the repulsive members comprise magnets for generating repulsive force between the upper surface of the base frame 10 and the lower surfaces of the pivot frame portions 20a and 20b, in place of the torsion springs. In this case of using magnets, the pedal force can be adjusted by replacing the magnets with other ones having different magnetic force or adjusting a magnetic force application distance. Of course, it is to be noted that these modifications fall under the scope of the present invention.

The base plate 10 has shaft holes 11 defined at one end thereof to pivotally couple the pivot frame portions 20a and 20b to the base plate 10. A support shaft 12 is fitted through the shaft holes 11 such that the pivot frame portions 20a and 20b are pivotally coupled to the base plate 10 by the support shaft 12. The intermediate portions of the repulsive members 30a and 30b are fitted on the support shaft 12. At this time, in order to prevent the support shaft 12 and the repulsive members 30a and 30b made of metallic materials from being brought into direct contact with each other and ensure smooth operation of the repulsive members 30a and 30b during twisting and untwisting thereof, a bobbin type washer 13 made of synthetic resin is interposed between the support shaft 12 and the repulsive members 30a and 30b.

A groove 15 is defined in the upper surface of one end, that is, the front end, of the base plate 10 such that a buffer pad 14 is received in the groove 15 to prevent a shock from occurring and noise from being generated when the pivot frame portions 20a and 20b are pressed. The groove 15 provides a marginal space for allowing the pivot frame portions 20a and 20b to be assembled without applying a load to the repulsive members 30a and 30b when coupling the pivot frame portions 20a and 20b to the base plate 10 by the support shaft 12. That is to say, by inserting the first ends, that is, the front ends, of the pivot frame portions 20a and 20b into the groove 15 in the state in which the buffer pad 14 is not received in the groove 15, the pivot frame portions 20a and 20b can be assembled in the state in which they are maximally separated from the base plate 10 so that the repulsive members 30a and 30b are not twisted.

The pivot frame portions 20a and 20b are formed in a manner such that the front relatively short pivot frame portion 20a is accommodated in the rear relatively long pivot frame portion 20b and the front ends of the pivot frame portions 20a and 20b are pivotally coupled to the base plate 10 by the common support shaft 12.

The pedald portions 22a and 22b are pivotally coupled to the respective second ends, that is, the rear ends, of the pivot frame portions 20a and 20b. The front pedald portion 22a is installed to be capable of moving forward and rearward, and the rear pedald portion 22b is pivotally coupled at a fixed position.

Therefore, in the exercise device according to the present embodiment, when used by another user having a different foot size, the pedal portion 22a corresponding to the forefoot portion of the user can be moved forward to conform to the increased size of the user or rearward to conform to the decreased size of the user, as a result of which the exercise device can be commonly used by several people.

An engagement part 23, which is open in the forward direction, is formed on the lower surface of the rear end of the front pivot frame portion 20a such that the engagement part 23 can be held engaged with the base plate 10 by the latch 60 which will be described later in detail. A buffer pad 24 is attached to the lower surface of the rear end of the rear pivot frame portion 20b so as to prevent a shock from occurring and noise from being generated when the pedal portion 22b is pressed and the pivot frame portion 20b is brought into contact with the base plate 10.

Preferably, as shown in the drawings, finger-pressure protruberances 25 or magnets 26 for stimulating the sole of the foot when exercising the lower body muscles are formed on or attached to the pedald portions 22a and 22b. The finger-pressure protruberances 25 can be independently or areally detached from the pedald portions 22a and 22b so that the distribution of the finger-pressure protruberances 25 can be altered in conformity with the size of a user’s foot or the finger-pressure protruberances 25 can be moved and attached to other positions desired by each user. The pedald portions 22a and 22b are supported by support members 27 so that they can be pivotable while being flexibly supported by the support members 27.

As can be readily seen from the drawings, the support members 27 can be formed of elastomicer material to have a corrugated sectional shape. Alternatively, it is possible to use magnets for applying repulsive force between the lower surfaces of the pedald portions 22a and 22b and the upper surfaces of the pivot frame portions 20a and 20b.

When the exercise device is used, the repulsive members 30a and 30b allow the pivot frame portions 20a and 20b to be unfolded from the upper surface of the base plate 10 as shown in FIG. 4 to define a large angle therebetween, and when the exercise device is not used, the repulsive members 30a and 30b allow the pivot frame portions 20a and 20b to be folded to the upper surface of the base plate 10 as shown in FIG. 5 to define a small angle therebetween. To this end, first ends of the repulsive members 30a and 30b are fitted into fitting grooves 41a defined in the upper surface of a fixing block 41 which can be moved in the forward and rearward directions on the lower surface of the base plate 10. The fixing block 41 can be moved in the forward and rearward directions on the lower surface of the base plate 10 by the pedal force adjustment means 40 in such a way as to change the degree to which the repulsive members 30a and 30b are twisted so that
the elastic force applied to the pivot frame portions 20a and 20b can be adjusted to be decreased or increased.

[0088] The repulsive members 30a and 30b are formed of spring steel. Preferably, the elasticity of the repulsive members 30a and 30b are determined such that the elasticity of the repulsive member 30a is greater than that of the repulsive member 30b, so that the pedal portion 22a corresponding to the forefoot portion and the midfoot portion can be initially pressed by the application of small force and the pedal portion 22b corresponding to the rearfoot portion can be pressed by the application of large force.

[0089] As can be readily seen from the drawings, in the pedal force adjustment means 40, a bolt 42 is fastened to the rear end of the fixing block 41 defined with the fitting grooves 41a into which the first ends of the repulsive members 30a and 30b are fitted. The bolt 42 passes through a hole 45 which is perforated through the rear wall 44 of the guide groove 43 defined on the lower surface of the base plate 10. A thumb nut 46 is threaded with the bolt 42 outside of the hole 45 such that the fixing block 41 having the bolt 42 fastened thereto can be moved in the forward and rearward directions in the guide groove 43 by rotating the thumb nut 46. As the fixing block 41 is moved rearward, the angle defined by the repulsive members 30a and 30b decreases so that the force for upward biasing the pivot frame portions 20a and 20b is increased, as a result of which the pedal force of the pedal portions 22a and 22b can be increased. In the similar manner, if the fixing block 41 is moved in the opposite direction, the pedal force of the pedal portions 22a and 22b can be decreased. The reference numeral 70 designates a cover.

[0090] The pedal adjustor 50 adopts a threading adjustment scheme similar to the pedal force adjustment means 40. The pedal adjustor 50 includes a movable element 52 which is flexibly coupled to the lower surface of the pedal portion 22a, a nut 54 which is secured to the lower portion of the movable element 52 to be open in the forward and rearward directions, and a thumb bolt 56 which is installed to project out of the rear end of the pivot frame portion 20a and is threaded into the nut 54.

[0091] The latch 60 is installed such that it can be moved in the forward and rearward directions along guide grooves 61 which are defined in the lengthwise middle portion of the base plate 10. To this end, grips 62 are formed on both widthwise ends of the latch 60, and an engagement panel 64 is formed on the widthwise middle portion of the latch 60 such that the engagement part 23 formed on the lower surface of the rear end of the pivot frame portion 20a can be engaged with the engagement panel 64. Slots 66 are defined in the base plate 10 to extend in the forward and rearward directions such that the engagement part 23 of the pivot frame portion 20a can be inserted through the slots 66. The unexplained reference numeral 67 designates a cap for preventing the latch 60 fitted into the guide grooves 61 from being unintentionally released.

[0092] FIG. 8 is sectional views illustrating the states in which the pedal portions are sequentially pressed with a foot placed on the lower body exercise device in accordance with one embodiment of the present invention. First, in the exercise device according to the present invention, a user can exercise lower body muscles by placing both left and right feet on two respective exercise devices while sitting erect on a chair by straightening himself or herself and by applying force to and pressing pedals alternately or simultaneously as if pedaling on a bicycle. Initially, only the pedal portion 20a corresponding to the forefoot portion is pressed and no substantial force is applied to the foot. Then, with substantial force applied through the forefoot and the rearfoot portions of the foot, the two pedal portions 22a and 22b are simultaneously pressed.

[0093] Accordingly, since the pedal portions 22a and 22b are pressed such that the user applies force to the forefoot and the midfoot portions of the foot and then finally applies force to the forefoot, the midfoot and the rearfoot portions of the foot, all the lower body muscles can be used and thereby exercised.

[0094] In other words, in the exercise device according to the present invention, instead of simply applying force to press a pedal, force must be applied to the forefoot portion including the toes, the midfoot portion, and the rearfoot portion including the heel so as to press the pedal portions 22a and 22b. Hence, not only the muscles associated with the foot but also the muscles of the leg for moving the ankle are used, whereby the lower body can be efficiently exercised in a sitting posture.

[0095] Furthermore, in the present invention, in addition to the exercise of the lower body as described above, since the sole of the foot is automatically finger-pressed by the finger-pressure protuberances, the acupoints on the sole of the foot can be stimulated to accomplish finger-pressure treatment effect. Thus, blood circulation between the upper and lower bodies and the metabolism can be promoted, as a result of which it is possible to aid in the treatment of lower body obesity, the abdominal and spinal muscles can be strengthened, and a sitting posture can be straightened.

[0096] Hereinbelow, another embodiment of the present invention will be described with reference to the attached drawings.

[0097] FIGS. 9 through 13 illustrate a lower body exercise device for use in a sitting position in accordance with another embodiment of the present invention. The lower body exercise device according to the present embodiment includes a base plate 10’ placed on a floor; a fixed shaft 20’ horizontally supported by the front end of the base plate 10’ at a raised position; pivot frames 30’ pivotably coupled to the respective left and right ends of the fixed shaft 20’; and torsion springs 40a’ and 40b’ fitted to the fixed shaft 20’ and having both ends which are supported by the pivot frames 30’ and the base plate 10’ such that the pivot frames 30’ can be held in a lifted state.

[0098] Each of left and right pivot frames 30’ is composed of a first pivot frame portion 30a’ which has a relatively long length and a second pivot frame portion 30b’ which has a relatively short length. A rear pedal portion 31’ is pivotably coupled to the upper surface of the first pivot frame portion 30a’ so that a user’s rearfoot portion can be placed on the rear pedal portion 31’, and a front pedal portion 32’ is pivotably coupled to the rear upper surface of the second pivot frame portion 30b’ so that the user’s forefoot portion can be placed on the front pedal portion 32’.

[0099] Holes 34’ and 35’ are defined through the front ends of the first and second pivot frame portions 30a’ and 30b’ such that a shaft bolt 22’ to be detachably coupled to the fixed shaft 20’ is inserted through the holes 34’ and 35’. An external thread 23’ is formed on the distal end of the shaft bolt 22’, and an internal thread 21’ is formed in the fixed shaft 20’.

[0100] In the present embodiment, finger-pressure protuberances 33’ for stimulating the acupoints on the sole of a foot are attached onto the pedal portions 31’ and 32’. While the finger-pressure protuberances 33’ can be formed to have the
shape of simple protuberances as shown in the drawings, the present invention is not limited to the illustrate shape of the finger-pressure protuberances. In this connection, it can be envisaged that the finger-pressure of the finger-pressure protuberances 33' can be adjusted by the elasticity of springs 36' as shown in FIG. 15, pressing force of the finger-pressure protuberances 33' can be adjusted by varying elasticity of springs 36'. In this variation shown in FIG. 15, the finger-pressure protuberances 33' can be separated from the pedal portion 31', and the springs 36' comprise compression coil springs. In order to increase finger-pressure, the springs 36' can be replaced with those having greater elasticity. Also, the finger-pressure protuberances 33' can be formed to have various sizes so that finger-pressure protuberances 33' having different heights can be installed at proper positions on the sole of the foot.

[0101] In the variation shown in FIG. 15, the rear pedal portion 31' is composed of an upper plate 31'a', an intermediate plate 31'b' and a lower plate 31'c'. Protuberance installation grooves 31'a are defined in the upper plate 31'a such that the finger-pressure protuberances 33' and the springs 36' are installed in the protuberance installation grooves 31'a. The upper plate 31'a and the intermediate plate 31'b' are coupled to each other by an engagement shoulder 312 and an elastic projection 311 to be conveniently detached from each other. The upper plate 31'a having the intermediate plate 31'b' coupled thereto is fastened to the lower plate 31'c' by a bolt 31'e'.

[0102] In the present embodiment, the installation structure of the finger-pressure protuberances and the springs is not limited to that illustrated in the drawings and can be modified in a various ways by a person having ordinary knowledge in the art without departing from the technical concept of the present invention.

[0103] In the present invention, the finger-pressure protuberances 33' can be made of rubber, soft silicon or soft plastic without using the springs 36'.

[0104] The elastic force of the torsion spring 40'a, which is installed between first pivot frame portions 30'a and the base plate 10', can be adjusted in a multi-stepwise manner by elastic force adjustment means 50' which is arranged in the base plate 10' so that a load of exercise can be adjusted. Referring to FIG. 13, the elastic force adjustment means 50' includes a lever 53' which has a handle 51' attached to the upper end thereof and a pinion 52' secured to the lower end thereof, and a slider 56' which has a rack 54' formed on one portion thereof to be meshed with the pinion 52' of the lever 53' and a support part 55' formed in the shape of steps on the other portion thereof to support the middle portion of the torsion spring 40'a'.

[0105] The elastic force adjustment means 50' is not limited to the lever type illustrated in the drawing and can adopt any other types as long as the elastic force of the torsion spring 40'a' can be adjusted.

[0106] In a method for adjusting a load of exercise by the elastic force adjustment means 50', as can be readily seen from the side sectional view of FIG. 13, as the lever 53' is pushed forward, the slider 56' is gradually moved forward, and the position of the support part 55', which supports the middle portion of the torsion spring 40'a', is moved upward. Due to this fact, the torsion of the torsion spring 40'a' is increased so that the first pivot frame portion 30'a can be lifted with increased force. Therefore, since the user should increase the force for pressing the first pivot frame portion 30'a', a load of exercise can be elevated.

[0107] On the contrary, in order to decrease a load of exercise, as the lever 53' is pushed rearward, the slider 56' is gradually moved rearward, and the position of the support part 55', which supports the middle portion of the torsion spring 40'a', is moved downward. Due to this fact, the torsion of the torsion spring 40'a' is decreased so that the pedal portion can be pressed with decreased force. The reference numeral 12' designates a support bar which is detachably coupled to the left and right sides of the base plate 10' and functions to maintain the exercise device in a balanced state.

[0108] FIG. 16 is a perspective view illustrating a lower body exercise device for use in a sitting position in accordance with still another embodiment of the present invention. In the present embodiment, a counter 's' for counting the number of pressing the pedals is additionally provided so that a user can check the amount of exercise. At this time, the counter 's' is configured such that the number of pressing the pedal is counted by sensing the pedal using a sensor (not shown) so that the amount of exercise can be numerically displayed. Since this configuration of the counter is well known in the art, detailed description thereof will be omitted herein.

[0109] Although preferred embodiments of the present invention have been described 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.

1. A lower body exercise device for use in a sitting position, comprising:

   a base plate (10) placed on a floor;
   pivot frame portions (20a and 20b) having first ends which are pivotably coupled to one end of the base plate (10) by a shaft and second ends to which pedal portions (22a and 22b) are attached;
   a plurality of repulsive members (30a and 30b) installed between the base plate (10) and the pivot frame portions (20a and 20b) such that a pivot frame composed of the pivot frame portions (20a and 20b) can be pressed and pivoted toward the base plate (10) by application of external force and the repulsive members (30a and 30b) can upwardly bias the pivot frame to an original position when the external force is removed; and
   pedal force adjustment means (40) for adjusting pedal force of a pedal composed of the pedal portions (22a and 22b) by varying elasticity of the repulsive members (30a and 30b).

2. The exercise device according to claim 1, wherein the pedal portion (22a) is moved forward and rearward by a pedal adjustor (50) so that relative positions of the pedal portions (22a and 22b) can be changed to conform to a size of a user's foot.

3. The exercise device according to claim 1, further comprising:

   a latch (60) for holding the pivot frame portions (20a and 20b) folded to the base plate (10).

4. The exercise device according to claim 2, wherein the pedal adjustor (50) comprises a movable element (52) flexibly coupled to a lower surface of the pedal portion (22a), a nut (54) secured to a lower portion of the movable element (52) to be open in forward and rearward directions, and a
thumb bolt (56) installed to project out of a rear end of the pivot frame portion (20a) and threaded into the nut (54).  
5. The exercise device according to claim 3, wherein the latch (60) has grips (62) formed on both widthwise ends thereof and an engagement panel (64) formed on a widthwise middle portion thereof such that an engagement part (23) formed on a lower surface of the rear end of the pivot frame portion (20a) can be engaged with the engagement panel (64), and is installed such that the latch (60) can be moved in the forward and rearward directions along guide grooves (61) defined in a lengthwise middle portion of the base plate (10), and wherein slots (66) are defined in the base plate (10) to extend in the forward and rearward directions such that the engagement part (23) of the pivot frame portion (20a) can be inserted through the slots (66).  
6. The exercise device according to claim 1, wherein the pedal force adjustment means (40) comprises a fixing block (41) into which first ends of the repulsive members (30a and 30b) are fitted, a bolt (42) which is fastened to a rear end of the fixing block (41), a guide groove (43) which is defined on a lower surface of the base plate (10), a hole (45) which is perforated through a rear wall (44) of the guide groove (43), and a thumb nut (46) which is threaded with the bolt (42) outside of the hole (45), such that the fixing block (41) having the bolt (42) fastened thereto is moved in the forward and rearward directions in the guide groove (43) by rotating the thumb nut (46).  
7. A lower body exercise device for use in a sitting position, comprising:  
a base plate (10');  
a fixed shaft (20') horizontally supported by a front end of the base plate (10') at a raised position;  
pivot frames (30') pivotably coupled to respective left and right ends of the fixed shaft (20'); and  
torsion springs (40a' and 40b') fitted on the fixed shaft (20') and having both ends which are supported by the pivot frames (30') and the base plate (10') such that the pivot frames (30') can be held in a lifted state.  
8. The exercise device according to claim 7, wherein each of left and right pivot frames (30') is composed of a first pivot frame portion (30a') which has a relatively long length and a second pivot frame portion (30b') which has a relatively short length, a rear pedal portion (31') is pivotably coupled to an upper surface of the first pivot frame portion (30a') so that a user's rearfoot portion can be placed on the rear pedal portion (31'), a front pedal portion (32') is pivotably coupled to a rear upper surface of the second pivot frame portion (30b') so that the user's forefoot portion can be placed on the front pedal portion (32'), holes (34' and 35') are defined through front ends of the first and second pivot frame portions (30a' and 30b') such that a shaft bolt (22') to be detachably coupled to the fixed shaft (20') is inserted through the holes (34' and 35'), an external thread (23') is formed on a distal end of the shaft bolt (22'), and an internal thread (21') is formed in the fixed shaft (20').  
9. The exercise device according to claim 8, wherein finger-pressure protuberances (33') for stimulating acupoints on the sole of a foot are attached onto the rear and front pedal portions (31' and 32'), and pressing force of the finger-pressure protuberances (33') can be adjusted by varying elasticity of springs (36').  
10. The exercise device according to claim 8, wherein elastic force of the torsion spring (40a'), which is installed between first pivot frame portions (30a') and the base plate (10'), can be adjusted in a multi-stepwise manner by elastic force adjustment means (50') which is arranged in the base plate (10') so that a load of exercise can be adjusted.  
11. The exercise device according to claim 10, wherein the elastic force adjustment means (50') comprises a lever (53') which has a handle (51') attached to an upper end thereof and a pinion (52') secured to a lower end thereof, and a slider (56') which has a rack (54') formed on one portion thereof to be meshed with the pinion (52') of the lever (53') and a support part (55') formed in the shape of steps on the other portion thereof to support a middle portion of the torsion spring (40a').  
12. The exercise device according to claim 9, wherein the rear pedal portion (31') is composed of an upper plate (31a'), an intermediate plate (31b') and a lower plate (31c'), protuberance installation grooves (31d') are defined in the upper plate (31a') such that the finger-pressure protuberances (33') and the springs (36') are installed in the protuberance installation grooves (31d'), the upper plate (31a') and the intermediate plate (31b') are detachably coupled to each other by an engagement shoulder (312) and an elastic projection (311), and the upper plate (31a') having the intermediate plate (31b') coupled thereto is fastened to the lower plate (31c') by a bolt (31c').