(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 027 893 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.02.2009 Bulletin 2009/09

(21) Application number: **06757321.2**

(22) Date of filing: **14.06.2006**

(51) Int Cl.:
A63B 23/035 *(2006.01)* ***A63B 21/08*** *(2006.01)*

(86) International application number:
PCT/JP2006/311962

(87) International publication number:
WO 2007/144945 (21.12.2007 Gazette 2007/51)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

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(54) **EXERCISE DEVICE**

(57) The present invention is to provide an exercise apparatus which is applicable to a user including athletes and ordinary persons by providing an appropriate load. The exercise apparatus of the present invention for exercising muscles includes an exercise main body and a loading part. In addition, the loading part is configured to move in a direction where a load is applied to the muscles and in a direction where the muscles are relaxed.

FIG. 1A

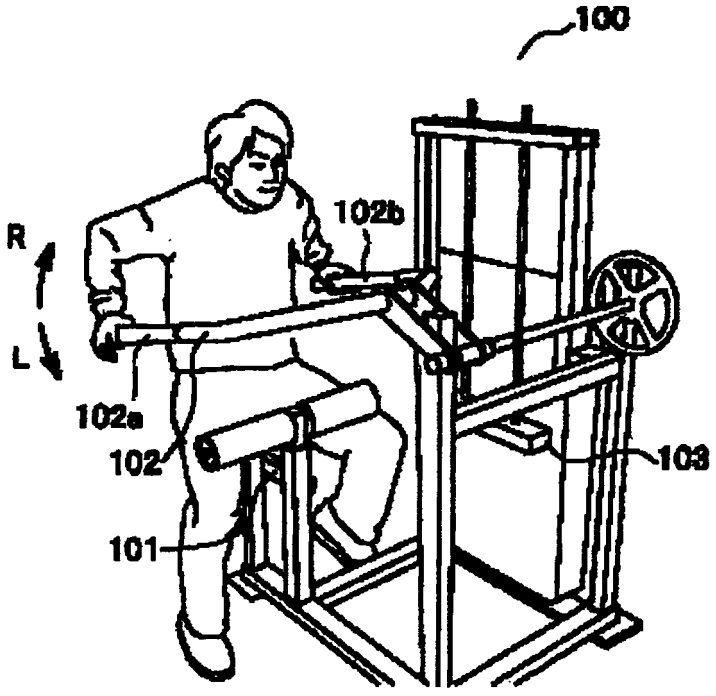

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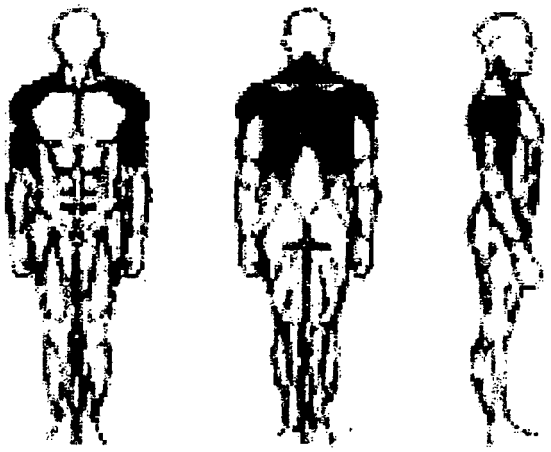
FIG. 1B



Description

TECHNICAL FIELD

[0001] The present invention relates to exercise apparatuses. More specifically, the present invention relates to an exercise apparatus which enables a user to exercise and relax his/her muscles.

BACKGROUND ART

[0002] In recent years, weight training or many kinds of muscle training has been conducted for various purposes. Such training is becoming widely popular among not only athletes but ordinary people including elderly persons, because they can develop necessary muscles as well as maintain and improve their health.

[0003] However, training may bring about various problems. For example, improper weight setting may apply an overload to the muscles of a person or may cause the rapid blood pressure rise.

[0004] On the other hand, current office automation is prone to force people to keep improper or the same pose for a long time. As a result, they suffer from a spinal curvature, backache or stiff neck. Hence, training apparatuses by which those troubles can be overcome have been in demand.

DISCLOSURE OF INVENTION

[0005] Accordingly, an object of the present invention is to provide an exercise apparatus which is applicable to both athletes and ordinary users by giving appropriate loads.

[0006] Another object of the present invention is to present an exercise apparatus which makes it possible to strengthen the muscles around the spine, hip joint, etc. of a user, thereby mending his/her backache or stiff neck during an exercise.

[0007] As a result of thorough study on the above objects, the inventor, et al. have found a fact that proper exercises are possible by subjecting muscles to appropriate relaxing and loading movements. Moreover, the inventor, et al. have discovered various exercises that are applicable to muscles, based on a result of further study on this fact.

[0008] Thus, the present invention is an exercise apparatus for exercising muscles, which is constituted of an exercise main body and a loading part. In addition, the loading part is configured to move in directions where a load is applied to the muscles and where the muscles are relaxed.

[0009] The above exercise apparatus is applicable to various apparatuses including dip, chest press, lat pull down, total hip, leg press and hip adapter apparatuses.

Effect of the invention

[0010] In the present invention, the relaxing and loading (stretching) movements can be conducted as a series of movements.

BRIEF DESCRIPTION OF DRAWINGS

[0011]

Fig. 1A is a schematic view of an exercise apparatus according to a first embodiment of the present invention;
Fig. 1B is a view depicting muscle portions exercised by this exercise apparatus;
Fig. 2A is a schematic view of an exercise apparatus according to a second embodiment of the present invention;
Fig. 2B is a view depicting muscle portions exercised by this exercise apparatus;
Fig. 3A is a schematic view of an exercise apparatus according to a third embodiment of the present invention;
Fig. 3B is a view depicting muscle portions exercised by this exercise apparatus;
Fig. 4A is a schematic view of an exercise apparatus according to a fourth embodiment of the present invention;
Fig. 4B is a view depicting muscle portions exercised by this exercise apparatus;
Fig. 5A is a schematic view of an exercise apparatus according to a fifth embodiment of the present invention;
Fig. 5B is a view depicting muscle portions exercised by this exercise apparatus;
Fig. 6A is a schematic view of an exercise apparatus according to a sixth embodiment of the present invention; and
Fig. 6B is a view depicting muscle portions exercised by this exercise apparatus.

BEST MODE FOR CARRYING OUT THE INVENTION

[0012] An explanation will be given below, of embodiments of the present invention, with reference to attached drawings. However, the present invention is not limited to these embodiments. Any exercise apparatus should fall within the scope of the present invention as long as possessing two functions: a function of relaxing muscles on purpose (thereinafter, merely referred to as a "relaxing movement") and a function of applying a load to muscles (expand movement: thereinafter, merely referred to as a "loading movement"). In each of the embodiments of the present invention, typically the relaxing movement is done at first, and followed by, the loading movement is done. However, the present invention is not limited to this order. Alternatively, the relaxing movement may be done after the loading movement, or both move-

ments may be repeated alternately.

[0013] Note that the term of an "exercise" herein means that both relaxing and loading movements are applied to the muscles of a user. Hence, said exercise is distinct from conventional exercises representing the loading movement alone.

(First embodiment: Dip)

[0014] First, a dip apparatus 100 according to a first embodiment of the present invention will be described. Fig. 1A is a schematic view of the exercise apparatus according to the first embodiment of the present invention, and Fig. 1B is a view showing muscle portions exercised by this exercise apparatus.

[0015] The dip apparatus 100 mainly comprises a seat part 101 on which a user is to sit, an exercise part 102 including grip means 102a and 102b which are a predetermined distance away from each other in such a way that the user takes hold of them with their hands, and an arm 102c which is joined to the grip means and which is parallel to the horizontal surface of the seat part, and a loading part 103 which is coupled to the exercise main body and which applies a load thereto. Materials of this apparatus are not limited to specific ones as long as the objects and effects of the present invention are not impaired. Accordingly, they may be selected appropriately among conventionally known materials (e.g. metal such as steel or aluminum, ceramic, plastic and carbon).

[0016] The dip apparatus 100 according to the first embodiment of the present invention is an apparatus for exercising a latissimus dorsi muscle, a rhomboideus muscle, a deltoid muscle, biceps brachii muscles and a trapezial muscle, and it is configured to perform the relaxing movement in addition to the loading movement which conventional dip apparatuses carry out.

[0017] Specifically, the loading part 103 mainly includes loading means (for example, weights) for applying a downward, vertical load to the exercise part 102 with respect to the seat part, coupling means for transmitting the load of the weights to the exercise part 102 (also having the same function in the following embodiments), and relax direction moving means for moving the exercise part 102 in the direction opposite to that in which the loading mean gives the load.

[0018] The coupling means may be composed of a chain, a reel around which the chain is wound, and a shaft for transferring the load of the loading means to the exercise part 102, as shown in Fig. 1A. Further, the relax direction moving means can be implemented by setting the margin of the length of the chain (in the upper portion in this embodiment) for the relaxing movement or by switching the directions using a gear (the same fashion applying for the following embodiments).

[0019] Alternatively, the loading and relaxing movements may be switched by a switch, etc. as needed.

(Operation)

[0020] In the dip apparatus 100 of this embodiment, a user first sits on the seat part 100 and, then holds the grip means 102a and 102b with both hands, respectively.

[0021] Subsequently, the user lifts up the exercise part 102 (in the direction "R" of Fig. 1A). During this operation, the latissimus dorsi muscle, rhomboideus muscle, deltoid muscle, biceps brachii muscles, trapezial muscles, etc. shown in Fig. 1B are relaxed (the relaxing movement).

[0022] Following this, the user pushes down the exercise part 102. This operation is in this way (in the direction "L" of Fig. 1A).

[0023] An operation of a conventional dip apparatus is only to push down the exercise part 102. In contrast, the dip apparatus 100 of this embodiment presents both relaxing and loading movements.

[0024] Those two movements allow the slide movement of the blade bones, thereby expanding the movable range of the shoulder joints. In addition, since the blade bones rotate upward, the movable range of the shoulder joints is also expanded. This results in the enhancement of flexibility of the muscles around the shoulder joints, which is effective to stiff necks. Especially, those two movements have an effect on stiff necks from which many women suffer. Moreover, they effectively allow athletes to acquire a smooth golf swing and prevent them from sustaining tennis and baseball elbows.

(Second embodiment; Chest press)

[0025] Next, a description will be given, of a chest press apparatus 200 according to a second embodiment of the present invention. Fig 2A is a schematic view of the exercise apparatus according to the second embodiment of the present invention, and Fig 2B is a view depicting muscle portions exercised by this exercise apparatus.

[0026] As shown in Fig 2A, the chest press apparatus 200 is an apparatus for mainly exercising a greater pectoral muscle, triceps brachii muscles and deltoid muscles. Furthermore, it mainly includes a seat part 201 on which a user is to sit, an exercise main body 202 that is constituted of an arm portion placed surrounding the seat part 201 and that can be held by the user while sitting and stretching his/her arms upward, and a loading part 203 that is placed parallel to the exercise main body and behind the seat part, that is coupled to the exercise main body, and that gives a load to the exercise main body forward and backward.

[0027] The loading part 203 gives a forward load to the loading part and is movable backward with respect to the loading part (refer to the loading part 103 of the first embodiment as to a movement mechanism of the loading part 203).

(Operation)

[0028] In the chest press apparatus 200 configured

above, a user first sits and, then straightens his/her spine by holding the upper parts of the arm portion of the exercise main body 202 while opening his/her arms. When the user moves the exercise main body 202 backward (or toward the loading part 203), his/her muscles are relaxed. Then, when he/she moves the exercise main body 202 forward, the muscles undergo a load. During the above operation, the greater pectoral muscle, triceps brachii muscles, deltoid muscle, etc., are exercised, which is effective to slight stoops, stiff shoulders due to age and baseball shoulders. In other words, muscles related to breathing which are throughout the chest are stretched. This makes it possible to expand the movable range of the shoulder joints and to enhance the flexibility of their surrounding muscles, thereby having an effect on stiff necks. In addition, the spine is made in a proper position, thus ensuring an excellent pose.

[0029] Moreover, the chest press apparatus 200 of this embodiment can be used effectively by athletes to acquire a smooth golf swing and to prevent their tennis and baseball elbows.

[0030] This effect cannot be realized simply by moving muscle under load conditions as in a conventional chest press apparatus, but can be achieved only by the apparatus of this embodiment.

[0031] Furthermore, this apparatus allows a user to do pullover so that his/her back muscles are stretched.

(Third embodiment: Lat pull down)

[0032] An embodiment will be given, of a lat pull down apparatus 300 according to a third embodiment of the present invention. Fig. 3A is a schematic view of the exercise apparatus according to the third embodiment of the present invention, and Fig. 3B is a view depicting muscle portions exercised by this exercise apparatus.

[0033] As shown in Fig. 3A, the lat pull down apparatus 300 of this embodiment is an exercise apparatus for mainly exercising a back muscle and biceps brachii muscles. Furthermore, it mainly includes a seat part 3001, an exercise main body 302 that is positioned above a user and that has arm parts to be held by the user while he/she is stretching the arms, and a loading part 303 that is coupled to the exercise main body 302 through a strip-shaped body such as a chain and that gives a vertical load thereto.

[0034] The seat part 301 is a seat part to be sat by a user and is inclined forward. If a user sits on the forward-inclined seat part 301, then his/her spine is straightened, that is, is kept in a proper pose.

[0035] The exercise main body 302 has a straight shaft with both ends bent downward as shown in Fig. 3A, and grips, etc, attached to the ends of the shaft in order for a user to hold easily.

[0036] The loading part 303 includes a loading device, such as weights, coupled to the exercise main body 302 by a chain, etc., and further includes a load adjustment means, such as gears, between the exercise main body 302 and the weights. The load adjustment means is configured to switch between the downward loading and upward relaxing movements.

(Operation)

[0037] In the above-configured lat pull down apparatus 300 of this embodiment, a user sits and straightens his/her spine by holding the exercise main body while opening the arms. Then, when the user moves the exercise main body 302 to information, his/her muscles are relaxed. Subsequently, when he/she moves the exercise main body 302 downward, the muscles undergo a load. Those movements allow the back muscle, biceps brachii muscle, etc. as shown in Fig. 3B to be exercised. When the user applies a pull force toward the center of his/her body, the output of the muscles is transferred to their ends. This makes it possible to acquire flexible, elastic muscles which are applicable to various competitions, and to expand the movable range of the shoulder joints.

[0038] As a result, ordinary users can benefit from the improvement of stiff necks, stiff shoulder due to age, baseball shoulders, migraine due to stiff necks and palsy due to stiff neck, and athletes can obtain the sharp movement of the waist.

(Forth embodiment: Total hip)

[0039] Next, a description will be given, of a total hip apparatus 400 according to a forth embodiment of the present invention. Fig. 4A is a schematic view of the exercise apparatus according to the forth embodiment of the present invention, and Fig. 4B is a view depicting muscle portions exercised by this exercise apparatus.

[0040] As shown in Fig. 4A, the total hip apparatus 400 of this embodiment is an exercise apparatus for mainly exercising muscles around hip joints and a hip, adducent muscles and abducent muscles. In addition, it mainly includes an exercise main body 401 composed of an arm part on which a leg of a user is to be set and which is provided in such a way that the leg is movable in a circular motion around the base of the leg, and a loading part 402 which is coupled to the exercise main body 401 and which gives a load thereto. The loading part 402 gives a load while moving in a downward circular motion, and is also movable in an upward circular motion.

(Operation)

[0041] In order to perform an exercise by using the total hip apparatus 400 of this embodiment, a user first stands in front of the exercise main body 401, and put, on the exercise main body 401, the cnemis of a leg which is located in the direction opposite to that where the exercise main body 401 extends (the left leg in the example of Fig. 4A). Following this, the user moves the exercise main body 401 in an upward circular motion (or in the relaxing direction). Subsequently, the user pushes the

exercise main body 401 in a downward circular motion (or in the loading direction). With the above relaxing and loading movements, the flexibility, elasticity and interaction of muscles around the waist, which connects the upper and lower bodies, can be improved. This makes it possible to enhance the twisting movement which is important to any kinds of sport including the batting of baseball and a golf swing, and to sharpen the movement of the waist. Furthermore, due to the effect on the hop parts, it can effectively prevent elderly persons from tumbling.

(Fifth embodiment: Leg press)

[0042] Next, a description will be given, of a leg press apparatus 500 according to a fifth embodiment of the present invention. Fig. 5A is a schematic view of the exercise apparatus according to the fifth embodiment of the present invention, and Fig. 5B is a view depicting muscle portions exercised by this exercise apparatus.

[0043] As shown in Fig. 5A, the leg press apparatus 500 of this embodiment is an exercise apparatus for mainly exercising quadriceps muscles, gluteus maximus muscles, hamstring muscles and triceps surae muscles. In addition, it mainly includes an exercise main body 501 composed of a seating 501a on which the hip and leg of a user are to be set and a backrest 501b positioned substantially parallel to the seating and placed at a predetermined angle with respect to a floor, and a loading device 502 placed above the seating 501a of the exercise main body 501, giving an upward load along the seating 501a. The loading part 502 of this embodiment is configured to give an upward load along the seating 501a, and is movable downward along the seating 501a.

[0044] In order to perform an exercise by using the leg press apparatus 500 of this embodiment, a user puts his/her leg and back on the seating 501a and, then sits thereon with keeping the back in contact with a backrest 501b. Then, the user carries out the relaxing movement of the muscles by moving the loading part 502 downward along the seating 501a and, then conducts the loading movement of the muscles by moving the loading part 502 upward along the seating 501a.

[0045] By the above movements, the movable range of the hamstring muscles or the hip muscles around the legs and the hip joints can be expanded. Moreover, the flexibility of the hip joints and the anteflexion is enhanced. In addition, it is possible for elderly persons to have the strong muscles of legs and to improve the stiffness of the hamstring muscles. Accordingly, it can be expected that ordinary users are prevented from suffering from backache and muscle strain and they acquire flexible slouch, etc. and flexible joints, and that elderly persons are prevented from falling down. Furthermore, it can be expected that athletes have strong hamstring muscles, are prevented from having muscle strain, have strong legs, and is prevented from suffering from the pain of Achilles' tendon.

(Fifth embodiment: Hip adapter)

[0046] Next, a description will be given, a hip adapter apparatus 600 according to a sixth embodiment of the present invention. Fig. 6A is a schematic view of the exercise apparatus according to the sixth embodiment of the present invention, and Fig. 6B is a view depicting muscle portions exercised by this exercise apparatus.

[0047] As shown in Fig. 6A, the hip adapter apparatus 600 of this embodiment is an exercise apparatus for exercising muscles around hip joints and adducent muscles. In addition, it mainly includes a seat part 601 on which a user is to sit, and a loading part 602 that is provided on the seat part to produce a load in the direction where a user closes his/her legs. The loading part 601 produces a load in the direction where a user closes his/her legs, and is movable in the direction where the user opens the legs.

[0048] In order to perform an exercise by using the hip adapter apparatus 600 of this embodiment, a user first sits on the seat part 601 and puts both legs on the loading part 602. Following this, the user carries out the relaxing movement in the direction where the legs open and, then gives a load in the direction where the legs close.

[0049] By doing a series of the movements consisting of the relaxing and loading movements as described above, the hip adapter apparatus 600 of this embodiment is effectively used to prevent the stiffness of adducent muscles which may cause backache. Since the hip adapter apparatus 600 of this embodiment can act on the adducent muscles directly, a user can work out while acquiring the flexibility and elasticity of the muscles. Hence, the hip adapter apparatus 600 of this embodiment enables ordinary users to prevent troubles due to backache, sensitivity to cold temperatures, period pains and stiffness of hip joints, and further, allows elderly persons to be prevented from falling down. In addition, athletes can use it to strengthen their hip joint and to acquire flexibility of the hip joint.

INDUSTRIAL APPLICABILITY

[0050] As described above, although conventional training methods are to lift up heavy weights for the purpose of increasing the maximum muscle strength, the exercise apparatus of the present invention involves slash back movements at a light load at an appropriate speed to thereby increase the peak of a muscle force even by using the same weights. This is because the relaxing movement using the decreased load and the loading movement using the increased load are switched at an appropriate timing. Thus, the exercise apparatus of the present invention could combine stretch and weight trainings and advance them. Apparatuses of this type have been available to basically provide ballistic workout. However, since involving quick movement, they are not appropriate to especially middle-aged and elderly persons. In contrast, because the exercise apparatus of the

present invention permits a user to change his/her pose with a proper rhythm, the user can work out safely without undergoing any excessive stress.

[0051] The exercise apparatus of the present invention provide users to essential ballistic workout, as well as to rhythmically contract and relax his/her muscles while surrendering him or her to the weights. This enables a user to keep his/her body relaxed without undergoing excessive loads. Thus, it is possible for users to acquire a flexible, elastic body, thereby leading to the decrease in the risk of injury. Moreover, this apparatus can improve the circulation of blood and metabolism of users, which is effective to anti-aging, fat removal and a rehabilitation exercise for sick persons except for those having a locomotor disability.

[0052] A training method using the exercise apparatus of the present invention rhythmically guides the compression and relax of muscles of a user by using light weights. In this case, the blood circulation of distal vein of a user is naturally facilitated. Consequently, the user can feel that his/her body is light, that is, comfortable, even when exerting a force. Furthermore a user can breathe evenly and show the stable circulatory system response, which has an effect on the recovery from fatigue and the removal of fatigue-producing substances. Therefore, the exercise apparatus of the present invention has potential for various applications.

[0053] The exercise apparatus of the present invention is also possible to enhance the talent of top athletes, but it is more effective to persons who hope to maintain their health or to prevent the decline of their strength and athletic talent. It can be greatly expected that disable persons due to accident or sick or elderly persons are able to recover the body functions or control their health.

[0054] Note that either a motion of expanding, retracting and expanding muscles in this order or a motion of retracting, expanding and retracting muscles in this order can satisfy the expectation for the above effects.

Claims

1. An exercise apparatus for exercising muscles, comprising:

an exercise main body; and
a loading part,
the loading part configured to move in directions where a load is applied to the muscles and where the muscles are relaxed.

2. The exercise apparatus according to claim 1 wherein a latissimus dorsi muscle, rhomboideus muscle, deltoid muscle, biceps brachii muscle and trapezial muscle are mainly exercised,
said exercise apparatus comprising:

a seat part on which a user is to sit;
an exercise part including:

a pair of grip means which a user is to take hold of with both hands that are away from each other by a predetermined distance, the pair of grip means being arranged at a predetermined distance away from one another; and
an arm being positioned parallel to a horizontal surface of the seat part, the arm and the grip means being integrated; and

a loading part which gives a load to the exercise main body, the loading part being coupled to the exercise main body,
the loading part configured to give the exercise part a vertical, downward load with respect to the seat part, and to be movable upward with respect to the seat part.

3. The exercise apparatus according to claim 1 wherein a greater pectoral muscle, triceps brachii muscle and deltoid muscle are mainly exercised,
said exercise apparatus comprising:

a seat part on which a user is to sit;
an exercise main body including an arm part being positioned surrounding the seat part, the exercise main body capable of being held by a user while the user being sitting and stretching both arms upward; and
a loading part which couples the exercise main body to the exercise main body and which gives forward and backward loads to the exercise main body, the loading part being positioned parallel to and behind the exercise main body,
the loading part configured to give the forward load with respect to the loading part and to be movable backward with respect to the loading part.

4. The exercise apparatus according to claim 1 wherein back muscles and a biceps brachii muscle are mainly exercised,
said exercise apparatus comprising:

a seat part on which a user is to sit, the seat part being inclined forward;
an exercise main body including arm parts which a user is to hold while stretching his/her arms, the exercise main body being positioned above the user; and
a loading part which gives the exercise main body a vertical load, the loading part being coupled to the exercise main body through a stripe-shaped body,
the loading part configured to give a vertical, downward load to the exercise main body during

an exercise, and to be movable upward vertically.

5. The exercise apparatus according to claim 1 wherein muscles around a hip joint and hip, an adducent muscle, and abducent muscle are mainly exercised,
an exercise main body including an arm part on which a user is to put a leg and which is adapted to move the leg in a circular motion around a base of the leg; and
a loading part which gives a load to the exercise main body, the loading part being coupled to the exercise main body;
the loading part configured to give the load in a downward circular motion, and to be movable in an upward circular motion.

6. The exercise apparatus according to claim 1 wherein a quadriceps muscle, gluteus maximum muscle, hamstring muscle and triceps surae muscle are mainly exercised,
said exercise apparatus comprising:

an exercise main body including a seating on which a user is to put a hip and legs and a backrest being positioned substantially parallel to the seating, the exercise main body being positioned at a predetermined angle with respect to a horizontal surface of an installation site; and
a loading device which gives a upward load along the seating, the loading device being positioned above the seating of the exercise main body,
the loading part configured to give the upward load along the seating and to be movable downward along the seating.

7. The exercise apparatus according to claim 1 wherein muscles around a hop joint and adducent muscles are mainly exercised,
said exercise apparatus comprising:

a seat part to which a user is to sit; and
a loading part which gives a load to legs of a user in a direction where the legs close, the loading part being provided on the seat part;
the loading part configured to give the load in a direction where the legs close and to be movable in a direction where the legs open.

FIG. 1A

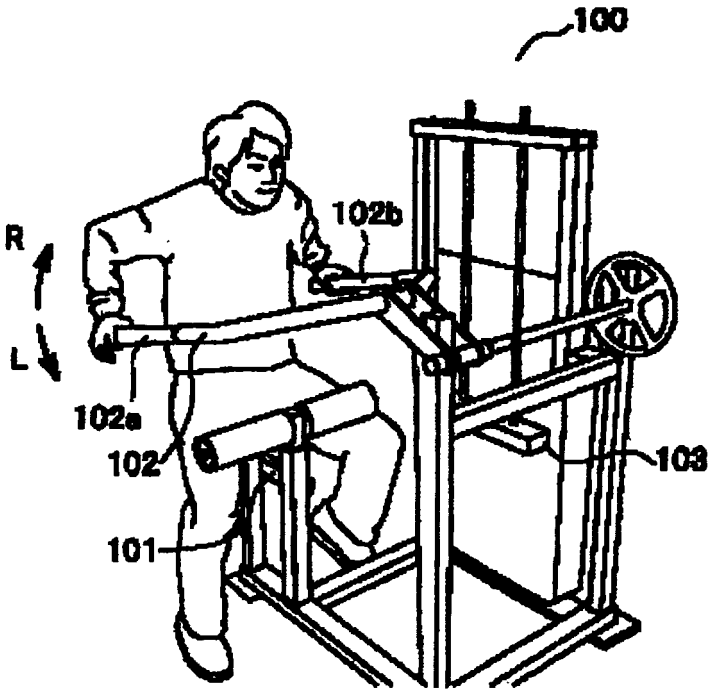


FIG. 1B

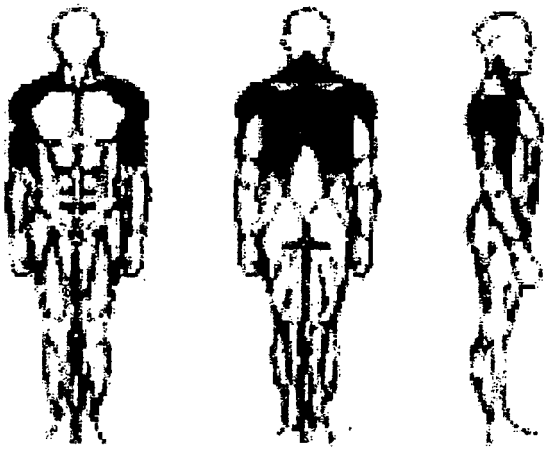


FIG. 2A

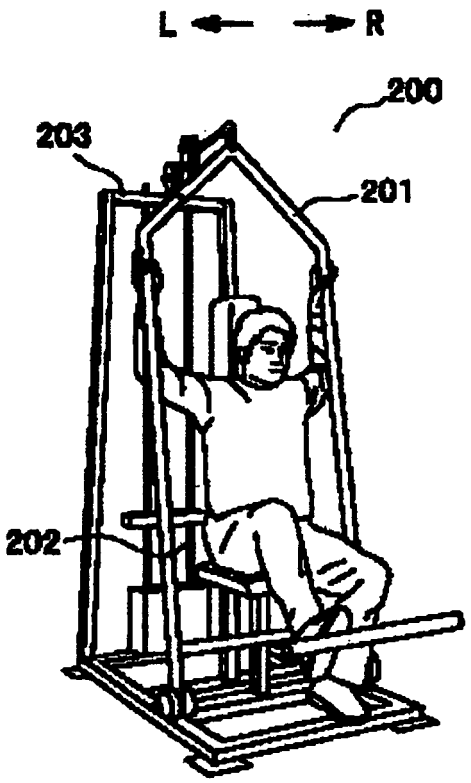


FIG. 2B

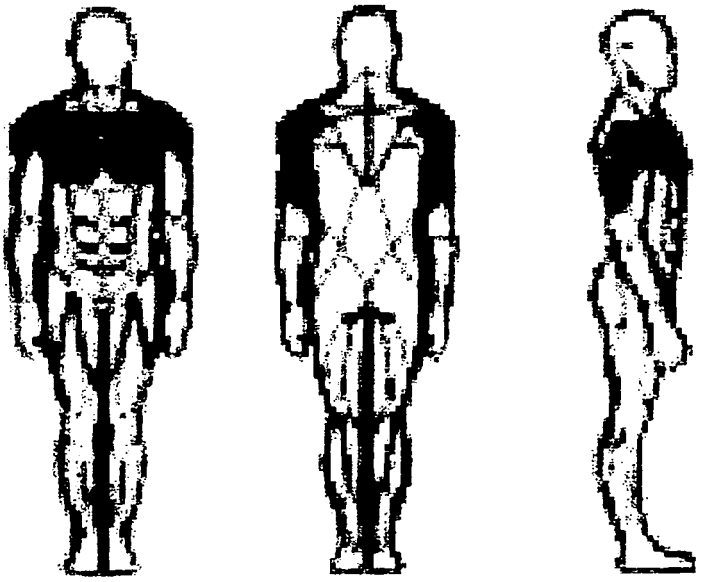


FIG. 3A

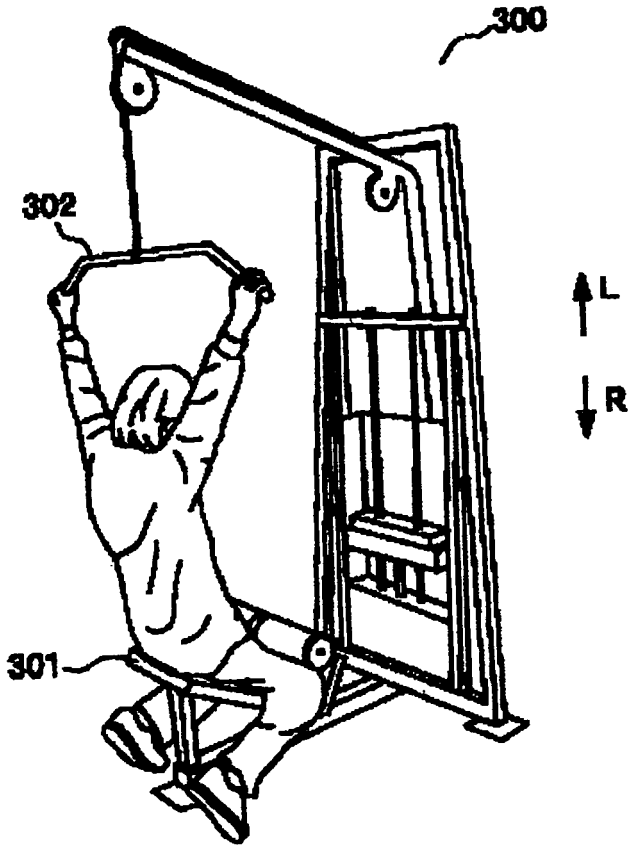


FIG. 3B

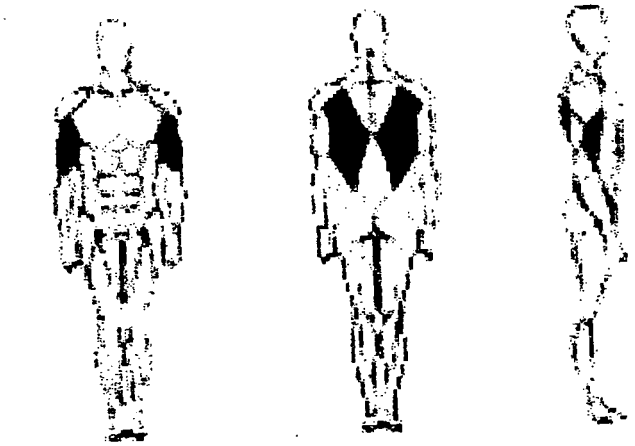


FIG. 4A

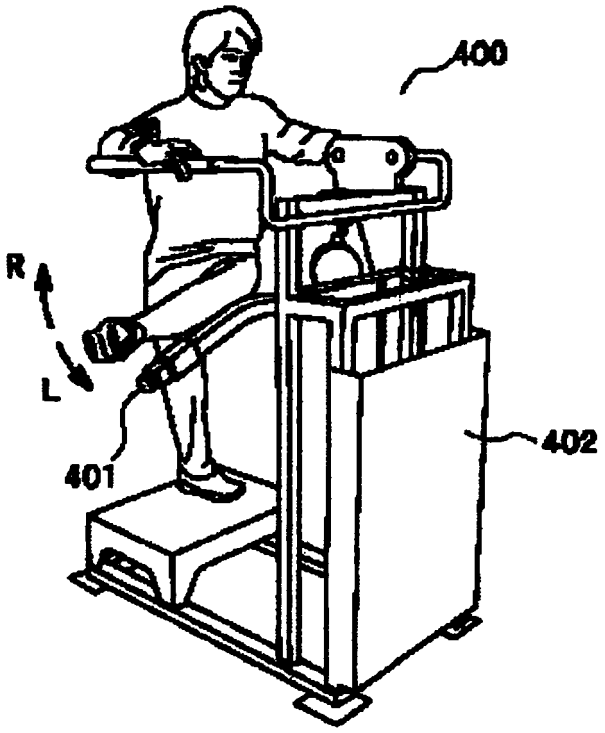


FIG. 4B

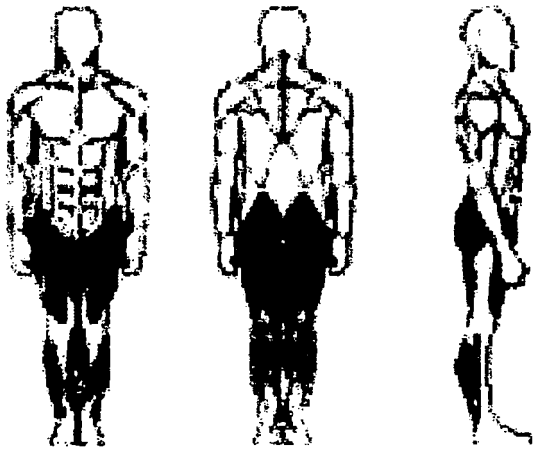


FIG. 5A

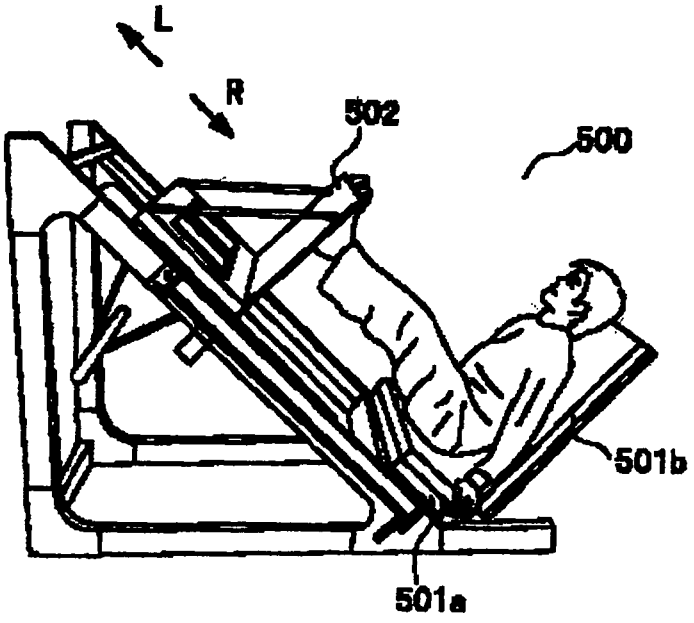


FIG. 5B

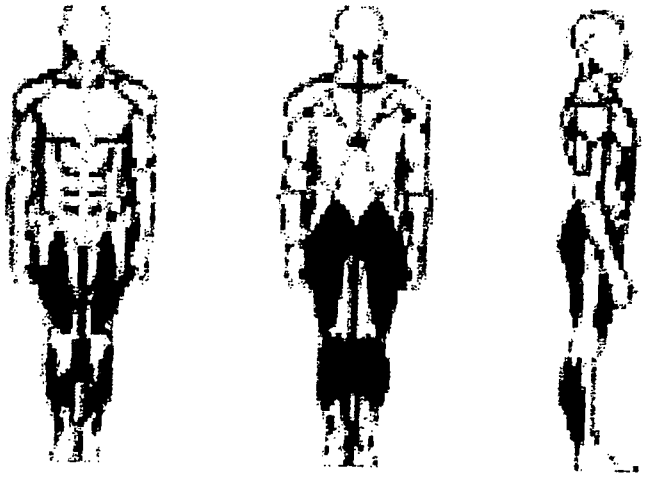


FIG. 6A

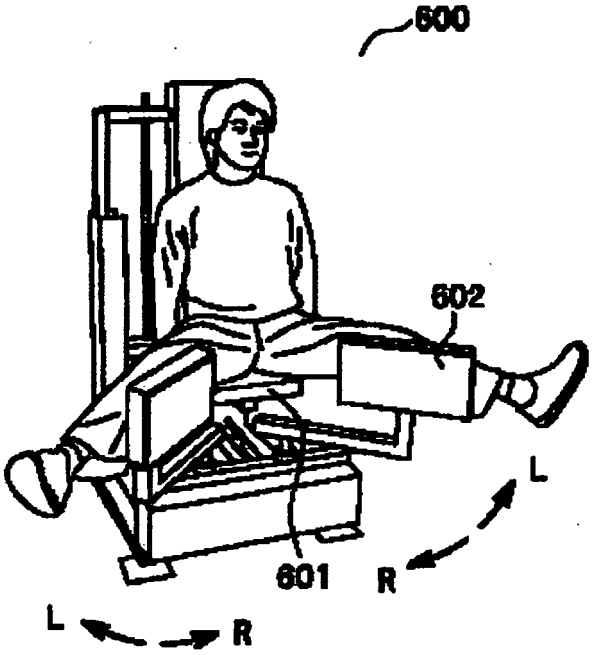
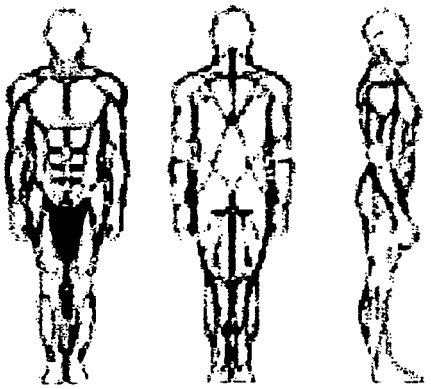


FIG. 6B



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/311962

A. CLASSIFICATION OF SUBJECT MATTER
A63B23/035(2006.01)i, *A63B21/08*(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A63B21/00-21/28, A63B23/00-23/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 7-30034 Y2 (Tsubakimoto Emerson Co.), 12 July, 1995 (12.07.95), Full text; all drawings (Family: none)	1 2-7
Y	JP 2004-267376 A (Matsushita Electric Industrial Co., Ltd.), 30 September, 2004 (30.09.04), Par. No. [0061]; Fig. 7 (Family: none)	2
Y	JP 2004-201944 A (Sakai Iryo Kabushiki Kaisha), 22 July, 2004 (22.07.04), Par. No. [0033]; Fig. 1 (Family: none)	3

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

* Special categories of cited documents:
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 July, 2006 (18.07.06)	25 July, 2006 (25.07.06)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/311962

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2896341 B2 (Seno Kabushiki Kaisha), 31 May, 1999 (31.05.99), Par. No. [0016]; all drawings (Family: none)	4
Y	JP 7-19480 Y2 (Seno Kabushiki Kaisha), 10 May, 1995 (10.05.95), Column 5, line 17 to column 6, line 5; all drawings (Family: none)	5
Y	JP 59-139279 A (Nautilus Sports/Medical Industries), 10 August, 1984 (10.08.84), Full text; all drawings & US 4511137 A & GB 2133709 A & DE 3401980 A & FR 2539632 A & SE 8400291 A & BR 8400249 A	6
Y	JP 2006-122499 A (Seno Kabushiki Kaisha), 18 May, 2006 (18.05.06), Par. No. [0050]; Fig. 11 (Family: none)	7

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