

SPECIFICATION

Title of Invention

RIDING TYPE EXERCISE MACHINE

[Technical Field]

[0001]

The present invention relates to a riding type exercise machine applying a balance movement to a user sitting on a seat part.

[Background Art]

[0002]

Conventionally, as a riding type exercise machine which swings a seat (a riding portion) in a state of a user seating on a seat and applies a balance movement to the user, there has been disclosed such a machine in Patent Literature 1.

This exercise machine has a structure such that, a pedestal fixed to a lower surface of a seat is supported by a movable frame so as to be swingable back and forth via a pair of left and right coupling links and this movable frame is supported by a base so as to be swingable in the left and right direction, and by driving the coupling links by a swing device, the seat is allowed to rotationally swing about a shaft in a left and right

direction, that is, rotationally swing in the back and forth direction and to rotationally swing about a shaft in the back and forth direction, that is, rotationally swing in the left and right direction.

[Citation List]

[Patent Literature]

[0003]

Patent Literature 1: Japanese Unexamined Patent Publication JP-A2004-344684

[Summary of Invention]

[Technical Problem]

[0004]

However, the riding type exercise apparatus disclosed in Patent Literature 1 has a structure such that, a pair of left and right coupling links are provided and the seat is supported by the movable frame via the coupling links so as to be swingable back and forth, and further the movable frame is supported by the base so as to be swingable in the left and right direction. Therefore, this balance training apparatus has a very complicated configuration, and a cost appears to be inevitably increased. Nevertheless, the balance movement applied to a user is obtained by merely adding the left and right swinging to the back and forth swinging, which is relatively simple and which a user cannot

continue to use for a long time without getting bored in a current situation.

[0005]

Therefore, the present invention has an object to provide a riding type exercise machine capable of applying a complicated balance movement (a movement allowing a user to feel as if riding a horse) with a simple mechanism to a user.

[Solution to problem]

[0006]

In order to accomplish the object mentioned above, the following technical means has been taken in the present invention.

That is, a riding type exercise machine according to the present invention includes: an installation part to be installed on a floor surface; a seat part provided above the installation part and on which a user can ride; and a swing device provided between the installation part and the seat part for applying a reciprocal swing to the seat part, and in this configuration, the swing device includes a first drive mechanism for reciprocally swinging the seat part at least in a left and right direction and a second drive mechanism for reciprocally swinging the seat part at least in a vertical direction.

[0007]

Preferably, the second drive mechanism reciprocally swings the seat part in a back and forth direction.

Preferably, the first drive mechanism and the second drive mechanism are driven by a single drive motor.

Preferably, the first drive mechanism includes a conversion part for converting a rotational drive force of the drive motor to an operation of a reciprocal movement in the left and right direction and transmitting the converted drive force to the seat part.

[0008]

Preferably, the second drive mechanism includes a crank mechanism for converting the rotational drive force of the drive motor to an operation of a reciprocal movement in the vertical direction and transmitting the converted drive force to the seat part.

Preferably, the crank mechanism includes a crank body elongated in the vertical direction, and an upper end portion of the crank body is coupled to the first drive mechanism via a first joint part, and a lower end portion of the crank body is coupled to the second drive mechanism via a second joint part.

[0009]

Preferably, a swinging cycle of the seat part by the first drive mechanism and a swinging cycle of the

seat part by the second drive mechanism are set to non-integer ratio.

Preferably, the seat part is configured for a user to be able to straddle and ride thereon.

Preferably, the seat part is formed as chair-shaped one provided with a seating part on which a user can sit down with one's waist seated thereon.

[0010]

Preferably, the enclosure part is formed so that a protrusion height thereof increases upward from a front side to a rear side.

Preferably, in a front side below the seat part, there is formed a footrest part on which user's feet can be placed.

[Advantageous Effects of Invention]

[0011]

According to the riding type exercise machine of the present invention, it becomes possible to apply a complicated balance movement (an exercise allowing a user to feel as if riding a horse or a movement sitting on a swinging chair) with a simple mechanism to a user.

[Brief Description of Drawings]

[0012]

[Fig. 1] Fig. 1 is a perspective overview of a riding type exercise machine of a first embodiment.

[Fig. 2] Fig. 2 is a front perspective view showing an internal mechanism of the riding type exercise machine of the first embodiment.

[Fig. 3] Fig. 3 is a front view showing the internal mechanism of the riding type exercise machine of the first embodiment.

[Fig. 4] Fig. 4 is a right side view showing the internal mechanism of the riding type exercise machine of the first embodiment (in a state of raising a front end of a seat part).

[Fig. 5] Fig. 5 is a right side view showing the internal mechanism of the riding type exercise machine of the first embodiment (in a state of lowering the front end of the seat part).

[Fig. 6] Fig. 6 is a front sectional view of a first drive mechanism.

[Fig. 7] Fig. 7 is a front sectional view of a second drive mechanism.

[Fig. 8] Fig. 8 is a perspective overview of a riding type exercise machine of a second embodiment.

[Fig. 9] Fig. 9 is an exploded view of the riding type exercise machine of the second embodiment.

[Description of Embodiments]

[0013]

[First Embodiment]

The following describes an embodiment of a riding type exercise machine (balance exercise machine) of the present invention with reference to Figs. 1 to 7.

In the following description, the explanation will be proceeded based on directions shown in Fig. 1. These are coincident with a back and forth direction, a left and right direction, and a vertical direction of the riding type exercise machine 1 as seen from a user straddling the riding type exercise machine 1.

[0014]

Note that, referring to the drawings, in order to facilitate understanding of the riding type exercise machine 1 of the present embodiment, the drawings is illustrated while members constituting the riding type exercise machine 1 are partly cut or omitted.

The riding type exercise machine 1 according to the present invention is shown in Figs. 1 to 7. This riding type exercise machine 1 is horse riding typed one used by a user in a straddling state.

As shown in Fig. 1, the riding type exercise machine 1 of a seating type includes an installation part 2 installed on a floor surface F and a seat part 3 (riding part) supported above this installation part 2 and for a user to straddle and seat thereon.

[0015]

The installation part 2 includes a ring-shaped support leg 4 arranged on the floor surface F and an accommodating body 5 provided so as to stand upward from a center portion of this support leg 4. This accommodating body 5 is a cylindrical body of a substantially elliptical shape in horizontal cross section, and an interior thereof is hollow. This hollow (interior of the accommodating body 5) serves as an accommodating portion for storing a swing device 6 for swinging the seat part 3.

The seat part 3 is arranged above the accommodating body 5. The seat part 3 is formed in an elliptical shape in plan view and its upper surface and outer peripheral surface are covered with a seat material. An operation panel part 8 is provided at a front portion of the seat part 3. This operation panel part 8 is provided with switches for starting, stopping, switching modes, and the like.

[0016]

In addition, at the front portion of the seat part 3, there is provided a grip part 7 for assisting a user to be able to stably seat on the seat part 3. By gripping the grip part 7 by hand, it becomes possible to stably seat on the seat part 3.

The swing device 6 accommodated in the

accommodating body 5 is adapted to apply a pseudo horse riding exercise (balance exercise) to the seat part 3 and also serves as coupling the installation part 2 and the seat part 3, so that a lower side of the swing device 6 is coupled to a side of the installation part 2 and an upper side of the swing device 6 is coupled to the seat part 3.

[0017]

As shown in Figs. 2 to 7, the swing device 6 is configured to perform at least one or more reciprocal swinging operations in the vertical direction, left and right direction, and back and forth direction with respect to the seat part 3.

In the case of the present embodiment, the seat part 3 performs a swinging operation (undulating motion) as undulating in all the directions of the back and forth direction, left and right direction, and vertical direction by the swing device 6.

In order to realize the movement of the seat part 3 as described above, the swing device 6 of the riding type exercise machine 1 includes: a first drive mechanism 10 for reciprocally swinging the seat part 3 in the back and forth direction and in the left and right direction; and a second drive mechanism 12 for reciprocally moving the seat part 3 in the back and forth direction and in

the vertical direction. The first drive mechanism 10 and the second drive mechanism 12 are accommodated in the accommodating body 5.

[0018]

First, the first drive mechanism 10 is described in detail with reference to the drawings.

As shown in Figs. 2 to 7, the first drive mechanism 10 includes: a drive motor 13 for transmitting a rotational drive force; a first gear box 14 for decelerating the rotational drive force to a predetermined speed; a conversion part 15 for converting the decelerated rotational drive force to a reciprocal swinging operation in the left and right direction mainly and transmitting the reciprocal swinging operation to the seat part 3.

The drive motor 13 is provided on a left side in the accommodating body 5 so as to be oriented to the vertical direction. Rotating drive shafts (a first rotating drive shaft and a second rotating drive shaft) are protruded so as to be oriented upward and downward respectively from an upper end side and lower end side of the drive motor 13 which is a double shaft motor. The first rotating drive shaft oriented upward is coupled to the first gear box 14.

[0019]

A worm gear is attached to a distal end of the first rotating drive shaft and the worm gear is engaged with a worm wheel 16 disposed in the first gear box 14. A first rotating shaft 30 oriented in the left and right direction is inserted through the worm wheel 16. The first rotating shaft 30 is disposed so as to be oriented in the left and right direction as shown in Fig. 6 and it is rotatably supported by a bearing 18 (left side bearing 18) disposed in the first gear box 14 and a right side bearing 18 disposed in a right side of an accommodating part. The right side bearing 18 is attached to an upper portion of a support body 28 (right side support body 28) which is provided so as to be protruded upward from a plate-like base body 27 disposed in a portion of the support leg 4.

[0020]

The conversion part 15 converting the rotational drive force to a reciprocal swing and transmitting the reciprocal swing to the seat part 3 is attached to a substantially central portion in a shaft center direction of the first rotating shaft 30.

As shown in Fig. 2 and Fig. 6, the conversion part 15 includes: a first rotating boss part 17 which is attached to the first rotating shaft 30 and rotating in accordance with a rotation of the first rotating shaft

30; bearings 18 fitted to an outside of the first rotating boss part 17; and a first annular fitting part 19 fitted to an outside of the bearings 18.

[0021]

The first rotating boss part 17 is arranged on the substantially central portion of the first rotating shaft 30 in the shaft center direction and has a substantially circular and endless track (cam surface) inclined with respect to the first rotating shaft 30. In addition, as shown in Figs. 4 and 5, etc., the first rotating boss part 17 is provided so as to be eccentric with respect to the first rotating shaft 30, so that the first rotating shaft 30 passes through a position deviated from the center of the first rotating boss part 17.

[0022]

The bearings 18 (inner races of the bearings 18) are fitted to the cam surface of the first rotating boss part 17 so as to fit the cam surface externally.

Meanwhile, the first annular fitting part 19 is fitted to the outer periphery of outer races of the bearings 18 so as to be externally fitted. This first annular fitting part 19 is a through hole provided in a proximal end side of a seat coupling part 20 and passing through in the left and right direction. Note that, the seat coupling part 20 is a member oriented in the vertical

direction for coupling the conversion part 15 and the seat part 3.

[0023]

As shown in Fig. 6 and the like, the seat coupling part 20 is a solid member having a T character shape in cross section, and the seat part 3 is attached to the upper end portion of the seat coupling part 20. Under the lower end portion of the seat coupling part 20, the first annular fitting part 19 mentioned above is formed and is fitted to the first rotating boss part 17 via the bearings 18. The first annular fitting part 19 is an opening formed in a substantially annular shape in side view under a lower end of the seat coupling part 20. This opening is externally fitted to an outer peripheral surface of the bearings 18 (an outer peripheral surface of the outer race) fitted to the cam surface. Therefore, the first rotating boss part 17 and the first annular fitting part 19 are rotatable relative to each other via the bearings 18.

[0024]

The first annular fitting part 19 is adapted to convert a rotation of the first rotating boss part 17 mainly to a reciprocal swinging movement in the left and right direction.

Meanwhile, as shown in Figs. 2, 5, 6 and the like,

at a front portion of the lower end of the seat coupling part 20, there is disposed a regulation part 21 for regulating the seat coupling part 20 from co-rotating with the rotation of the first rotating shaft 30. The regulation part 21 includes: a hemispherical concave portion formed in the lower surface of the front portion of the seat coupling part 20; and a ball body 22 which is slidably fitted to this concave portion. The ball body 22 is formed at an upper end portion of a crank body 23 to be described later.

[0025]

In this way, as being coupled by a pivotally swingable first joint part (hemispherical concave portion and ball body 22 fitted thereto), a vertically swinging movement generated by the crank body 23 does not disturb a swinging movement generated by the conversion part 15, but both of the swinging movements cooperate and act with each other, resulting in developing a complicated reciprocal movement mixed by the vertical swinging, left and right swinging and back and forth swinging applied to the seat part 3.

[0026]

Next, the second drive mechanism 12 for reciprocally moving the seat part 3 mainly in the back and forth direction and vertical direction is described

in detail.

As shown in Figs. 2, 3, 7 and the like, the second drive mechanism 12 includes: the drive motor 13 for outputting a rotational drive force; a second rotating drive shaft protruded downward from the lower end of the drive motor 13; a second gear box 25 for decelerating the rotational drive force transmitted by the second rotating drive shaft to a predetermined speed; the crank body 23 for converting the decelerated rotational drive force to a reciprocal movement operation in the vertical direction and transmitting the reciprocal movement operation to the seat coupling part 20 and the seat part 3 coupled thereto.

[0027]

A worm gear is attached to a distal end of the second rotating drive shaft protruded downward from the lower end of the drive motor 13 and the distal end thereof is inserted into the second gear box 25 disposed below the drive motor 13. A worm wheel 26 is disposed in the second gear box 25, and the worm wheel 26 is integrally and rotatably provided with a second rotating shaft 31 oriented in the left and right direction. The second rotating shaft 31 rotatably supported via bearings 18 disposed in the second gear box 25.

[0028]

As shown in Fig. 7, a right end portion of the second rotating shaft 31 is protruded rightward from the second gear box 25 and the right end portion is attached to a support body 28 via bearings 18. The rotating drive force of the second rotating shaft 31 is transmitted to the seat coupling part 20 by the crank body 23 to be described later to thereby swing the seat coupling part 20, i.e., the front end portion of the seat part 3 in the vertical direction (crank mechanism).

[0029]

The crank body 23 constituting the crank mechanism is constituted by an elongated plate piece oriented in the vertical direction.

More specifically, in the proximal end portion in the longitudinal direction of the crank body 23 (lower end portion in the vertical direction), the second rotating shaft 31 is disposed so as to pass through the crank body 23. On the distal end in the longitudinal direction of the crank body 23, the ball body 22 is attached in a manner of protruding upward.

[0030]

As shown in Fig. 7, a second rotating boss part 32 is arranged at a substantially central portion of the second rotating shaft 31 so as to rotate integrally with the second rotating shaft 31. This second rotating boss

part 32 is not inclined with respect to the second rotating shaft 31 but it is provided so as to be eccentric with respect to the second rotating shaft 31, and the second rotating shaft 31 is adapted to pass through the second rotating boss part 32 at a position deviated from the center thereof.

The second rotating boss part 32 has a cam surface formed on an outer peripheral surface thereof, and a bearing 18 (an inner race of the bearing 18) is fitted so as to externally fit the cam surface.

[0031]

Meanwhile, a ring-shaped second annular fitting part 33 is fitted to an outer periphery of an outer race of the bearing 18. This second annular fitting part 33 is fitted into a through hole 34 in a loosely fitted state, the through hole 34 being provided in a proximal end side of the crank body 23 and passing through in the left and right direction.

That is, the second annular fitting part 33 is formed in a substantially annular shape in side view in the lower end of the crank body 23, and in a substantially central portion, there is provided a ring-shaped opening slightly larger than the size of the second rotating boss part 32. This opening externally fit the outer peripheral surface (outer peripheral surface of the outer

race) of the bearing 18 externally fitted to the cam surface of the second rotating boss part 32. Therefore, the second rotating boss part 32 and the second annular fitting part 33 are relatively rotatable via the bearing 18. The second annular fitting part 33 is configured to be coupled to the proximal end side of the crank body 23 by a shaft body 35 located in a lower side of the second annular fitting part 33 in a state of being loosely fitted to the through hole 34 (a second joint part, to be described in detail later).

[0032]

Meanwhile, on the upper end portion of the crank body 23, there is provided a shaft core body 36 oriented upward, and the ball body 22 is attached to the distal end (upper end) of the shaft core body 36. The ball body 22 is slidably fitted to the hemispherical concave portion formed in the front end portion of the lower end of the seat coupling part 20.

By this configuration, in the case where the second rotating shaft 31 rotates, the second rotating boss part 32 eccentrically attached thereto rotates, and accordingly the crank body 23 reciprocally swings in the vertical direction and back and forth direction. This vertical movement is transmitted to the seat coupling part 20 via the ball body 22, and the rotation of the

rotating boss part rotating together with the second rotating shaft 31 is converted to a reciprocal swinging movement of the front end of the seat part 3 in the vertical and left and right directions.

[0033]

Note that, in the case where the crank body 23 reciprocally swings vertically, in order to make this swinging movement smooth, the lower end portion of the crank body 23 is adapted to swing in the left and right direction with respect to the second annular fitting part 33. That is, the second annular fitting part 33 is fitted into the through hole 34 provided in the proximal side of the crank body 23 in the loosely fitted state. Moreover, the lower end portion of the crank body 23 and the second annular fitting part 33 are coupled by the shaft body 35 oriented in the back and forth direction (a second joint portion). Since this second joint portion is provided, the lower end portion of the crank body 23 is swingable in the left and right direction about the shaft body 35 oriented in the back and forth direction, and, via this shaft body 35, the crank body 23 is swingable in the left and right direction with respect to the second annular fitting part 33.

[0034]

Therefore, the rotation of the second rotating boss

part 32 rotating together with the second rotating shaft 31 is smoothly converted to the reciprocal swinging movement of the front end of the seat part 3 in the vertical and back and forth directions, and therefore the swinging movement of the seat part 3 in the left and right direction is never disturbed.

In other words, this crank body 23 can be said to be a coupling member for smoothly coupling the first drive mechanism 10 and the second drive mechanism 12. At the time of interlocking the first drive mechanism 10 and the second drive mechanism 12 by the ball joint mechanism (first joint portion) disposed on the upper end of the crank body 23 and the swing mechanism (second joint portion) rotating about the shaft body 35 on the lower end thereof, the crank body 23 functions to smoothly couple the swinging movement developed by both of the mechanisms 10 and 12.

[0035]

An operation aspect of the riding type exercise machine 1 having such a configuration as mentioned above is as follows.

First, a user M sits on the seat part 3 in a posture of straddling the seat part 3 and turns on a start switch using an operation panel part 8.

Then, the drive motor 13 which is a double shaft

motor provided in the swing device 6 rotates to thereby rotationally drive the first rotating drive shaft and the second rotating drive shaft. The rotational drive force transmitted to the first rotational drive force is transmitted to the first drive mechanism 10, and the drive force is converted to the reciprocal swinging movement of the seat part 3 mainly in the left and right direction by the actions of the first rotating boss part 17 and the first annular fitting part 19.

[0036]

That is, the rotational drive force transmitted from the drive motor 13 is transmitted to the first rotating shaft 30 via the first gear box 14, and the first rotating shaft 30 rotates the first rotating boss part 17. This rotational drive force is transmitted to the first annular fitting part 19, and a movement mainly in the left and right direction is taken out together with the action of the regulation part 21 to thereby reciprocally swing the seat coupling part 20, i.e., seat part 3 in the left and right direction.

[0037]

Likewise, the rotational drive force transmitted to the second rotational drive force is transmitted to the second drive mechanism 12, and the drive force is converted to the reciprocal swinging movement of the seat

part 3 mainly in the vertical direction and back and forth direction by the actions of the second rotating boss part 32, the second annular fitting part 33 and the crank body 23 coupled thereto.

That is, the rotational drive force transmitted from the drive motor 13 is transmitted to the second rotating shaft 31 via the second gear box 25, and the second rotating shaft 31 rotates the second rotating boss part 32. This rotational drive force is taken out as an eccentric movement in the back and forth direction and in the vertical direction by the second annular fitting part 33, and the crank body 23 reciprocally moves mainly in the vertical direction. Thus, the front end of the seat part 3 moves upward or downward.

[0038]

For example, Fig. 4 shows a state of the crank body 23 being pushed upward and the front end of the seat part 3 being moved upward. From this state, a state of the second rotating boss being substantially half-rotated is shown in Fig. 5. Fig. 5 shows a state of the crank body 23 being pushed downward and the front end of the seat part 3 being moved downward.

In this way, the seat part 3 accordingly performs a combined movement of the swinging movements generated by the first drive mechanism 10 and the second drive

mechanism 12. In the case of the present embodiment, since a rotation number of the first rotating shaft 30 and a rotation number of the second rotating shaft 31 are different from each other by a non-integer ratio (i.e., a gear number (gear number = 40) of the worm wheel 16 of the first rotating shaft 30 and a gear number (gear number = 58) of the worm wheel 26 of the second rotating shaft 31 are different from each other by a non-integer ratio), the movement of the seat part 3 in the left and right direction relative to the movements thereof in the back and forth direction and in the vertical direction is not a simple integer multiple, and the seat part 3 takes a very complicated movement (a movement locus becomes complicated). Therefore, it becomes possible to apply a complicated balance movement to a user (an exercise allowing a user to have a feeling as if riding on a horse).

[0039]

Note that the non-integer ratio mentioned here refers to a ratio between the rotation number of the first rotating shaft 30 and the rotation number of the second rotating shaft 31 being not an integer ratio such as "1:8" or "2:3", but being a ratio containing decimals such as "1:9.23" or "2:3.15".

Such a back and forth swinging and an undulation

swinging in the left and right direction (pseudo horse riding exercise) results in positively disrupting a balance of a user sitting on the seat part 3, so that muscles of parts of a user's body can be strengthened and a sense of balance can be strengthened, and eventually it becomes possible to increase health promotion such as diet.

[Second Embodiment]

Next, a riding type exercise machine 1 of a second embodiment is described with reference to Figs. 8 and 9.

[0040]

As shown in Figs. 8 and 9, the riding type exercise machine 1 of the second embodiment is seating typed one (chair type) for use in a state of a user seating.

Specifically, whereas the seat part 3 provided in the riding type exercise machine 1 of the first embodiment has a horseback shape imitating a horseback (i.e., having a shape such that the center in the left and right direction is rising upward in a convex shape and the center in the back and forth direction is gently recessed downward), the seat part 3 of the riding type exercise machine 1 of the second embodiment has a chair-typed shape such that the center is recessed downward so that a user can sit down with one's waist seated thereon.

[0041]

That is, in the center of the seat part 3 of the second embodiment, there is provided a seating part 37 on which a positioning user can sit down with one's waist seated thereon. This seating part 37 is to be a barrel shaped portion (a quadrangular shape with rounded corners) when viewed from above and it is formed of a seat or the like having a cushioning property so as to be able to protect buttocks.

An upper portion of the seat part is provided with an enclosure part 38 which surrounds the seating part 37 and protrudes upward. This enclosure part 38 is a backrest which is formed such that a protruding height increases upward from the front side toward the rear side, and as compared with the front side where a user passes when sitting thereon, the rear side where a user reclines is made higher. By adopting such a configuration, it is configured to facilitate buttocks of a user to be entered into the seating part 37 while preventing the buttocks from falling down from the seating part.

[0042]

Further, below the front side of the seat part, there is formed a footrest part 39 for putting on user's feet. This footrest part 39 is a curved rod-shaped member bridged so as to connect between two points of

both sides of a left front side and a right front side of the accommodating body 5, and the user's feet can be placed and supported on the upper side thereof. By providing the enclosure part 38 and the footrest part 39 as described above, even in the case of the riding type exercise machine 1 of the second embodiment in which the seat part 3 cannot be tightened with knees to hold a posture (cannot straddle and ride on the seat part) as is possible in the first embodiment, since the buttocks can be fixed by the enclosure part 38 and a movement of the feet can be stopped by the footrest part 39, the posture during an exercise can be easily maintained and it becomes possible to perform an exercise in a safe environment.

[0043]

As shown in Fig. 9, since a swing device mounted on the riding type exercise machine 1 of the second embodiment has substantially the same configuration as the swing device 6 of the first embodiment, a detailed explanation thereof is omitted (in Fig. 9, the same members as in the first embodiment are denoted by the same numerals as in the first embodiment). The riding type exercise machine 1 of the second embodiment also includes the first drive mechanism 10 for reciprocally swinging the seat part 3 at least in the left and right

direction and a second drive mechanism 12 for reciprocally swinging the seat part 3 at least in the vertical direction and in the back and forth direction.
[0044]

Note that, it should be understood that the embodiments disclosed this time are examples in all respects but not restrictive. In particular, in the embodiments disclosed this time, items that are not explicitly disclosed such as operating conditions, operating procedures, various parameters, dimensions, weights, volumes of components, and the like are not deviated from the ranges normally practiced by those skilled in the art, and those of ordinary skill in the art adopt values that can be easily perceived.

[0045]

For example, as a further modified example of the riding type exercise machine 1 according to the present embodiment, the following configurations are conceivable.

Referring to Fig. 8 and the like, the seat part 3 of the second embodiment has a front portion of the upper surface of the seating part 37 slightly moved downward. Due to this inclination, since a user puts a force on abdominal muscles and the like in an effort to avoid slipping forward, it becomes possible to perform a more

effective balance exercise (loading exercise to a body).

[0046]

However, for some users, it is conceivable that a forward inclination of the seating part 37 gives an uneasy feeling or a user actually slips down to the front side. On the contrary, some of other users may want to make the forward inclination of the seating part 37 larger to apply a load to a body even stronger.

In response to such a demand, it is preferable to provide inclination adjusting means adapted to adjust the forward inclination of the upper surface of the seating part 37 in the riding type exercise machine 1 according to the present embodiment.

[0047]

As the inclination adjusting means, various aspects are conceivable, for example, a backrest cushion (cushion member) is conceivable.

As described above, there is provided the enclosure part 38 surrounding the seating part 37 and protruding upward along an edge of the seating part 37 from the left and right sides to the rear side of the seating part 37. This enclosure part 38 is formed such that the protruding height increases upward from the front side toward the rear side (i.e., in an arc shape having an upward convex). The cushion member separated from the enclosure part 38

is disposed along the enclosure part 38.

[0048]

The cushion member has a shape as along the enclosure part 38 (particularly the enclosure part 38 corresponding to a back of a user), and the lower end is substantially horizontal and the upper end is an arc shape like "a waxing moon at a time of moonrise". Normally, the cushion member is leaned against the enclosure part 38 corresponding to the rear portion of the seating part 37, so that a user can lean against the enclosure part 38 with a soft feeling.

By pulling the lower end of the cushion frontward and folding it so as to be stacked to the rear side on the upper surface of the seating part 37, the rear side on the upper surface of the seating part 37 is accordingly raised by a thickness of the cushion member, and therefore the forward inclination of the seating part 37 becomes larger.

[0049]

Remaining in this state, the lower end of the cushion member is further pulled out to the front side and the cushion member is stacked on the front side on the upper surface of the seating part 37. Then, the front side of the seating part 37 (corresponding to under a thigh of a seating user) is accordingly raised by the

thickness of the cushion member, so that the forward inclination of the eating part 37 is mitigated to thereby prevent a user from slipping down to the front side.

[Reference Signs List]

[0050]

- 1 ... Riding type exercise machine
- 2 ... installation part
- 3 ... Seat part
- 4 ... Support leg
- 5 ... Accommodating body
- 7 ... Grip part
- 8 ... Operation panel part
- 10 ... First drive mechanism
- 12 ... Second drive mechanism
- 13 ... Drive motor
- 14 ... First gear box
- 15 ... Conversion part
- 16 ... Worm wheel of first gear box
- 17 ... First rotating boss part
- 18 ... Bearing
- 19 ... First annular fitting part
- 20 ... Seat coupling part
- 21 ... Regulation part
- 22 ... Ball body
- 23 ... Crank body

25 ... Second gear box
26 ... Worm wheel of second gear box
27 ... Base body
28 ... Support body
30 ... First rotating shaft
31 ... Second rotating shaft
32 ... Second rotating boss part
33 ... Second annular fitting part
34 ... Through hole
35 ... Shaft body
36 ... Shaft core body
37 ... Seating part
38 ... Enclosure part
39 ... Footrest part
M ... User
F ... Floor surface

CLAIMS

1. A riding type exercise machine comprising: an installation part to be installed on a floor surface; a seat part provided above the installation part and on which a user can ride; and a swing device provided between the installation part and the seat part for applying a reciprocal swing to the seat part, wherein

the swing device comprises a first drive mechanism for reciprocally swinging the seat part at least in a left and right direction and a second drive mechanism for reciprocally swinging the seat part at least in a vertical direction.

2. The riding type exercise machine according to claim 1, wherein the second drive mechanism reciprocally swings the seat part in a back and forth direction.

3. The riding type exercise machine according to claim 2, wherein the first drive mechanism and the second drive mechanism are driven by a single drive motor.

4. The riding type exercise machine according to claim 3, wherein the first drive mechanism includes a conversion part for converting a rotational drive force

of the drive motor to an operation of a reciprocal movement in the left and right direction and transmitting the converted drive force to the seat part.

5. The riding type exercise machine according to claim 3, wherein the second drive mechanism includes a crank mechanism for converting the rotational drive force of the drive motor to an operation of a reciprocal movement in the vertical direction and transmitting the converted drive force to the seat part.

6. The riding type exercise machine according to claim 5, wherein the crank mechanism includes a crank body elongated in the vertical direction, an upper end portion of the crank body is coupled to the first drive mechanism via a first joint part, and a lower end portion of the crank body is coupled to the second drive mechanism via a second joint part.

7. The riding type exercise machine according to any one of claims 1 to 6, wherein a swinging cycle of the seat part by the first drive mechanism and a swinging cycle of the seat part by the second drive mechanism are set to non-integer ratio.

8. The riding type exercise machine according to claim 1, wherein the seat part is configured for a user to be able to straddle and ride thereon.

9. The riding type exercise machine according to claim 1, wherein the seat part is formed as chair-shaped one provided with a seating part on which a user can sit down with one's waist seated thereon, and above the seat part, there is provided an enclosure part surrounding the seating part and protruded upward.

10. The riding type exercise machine according to claim 9, wherein the enclosure part is formed so that a protrusion height thereof increases upward from a front side to a rear side.

11. The riding type exercise machine according to claim 9, in a front side below the seat part, there is formed a footrest part on which user's feet can be placed.