

SPECIFICATION

TITLE OF THE INVENTION: CHAIR AND COMPOSITE CHAIR

TECHNICAL FIELD

[0001]

The present disclosure relates to a chair and a composite chair that ensure reclining operation of reclining a backrest portion even when being installed near a wall of a room. The present application claims priority to Japanese Patent Application No. 2023-203144 filed on November 30, 2023, the entire disclosure of which is hereby incorporated by reference.

BACKGROUND ART

[0002]

Conventionally, there are many chair-type massage machines including a backrest portion capable of reclining in a front-rear direction. Such a chair-type massage machine is disclosed in, for example, Patent Literature 1. Patent Literature 1 discloses a technique concerning a stationary chair-type massage machine capable of reclining operation of a backrest portion.

CITATION LIST

[PATENT LITERATURE]

[0003]

PATENT LITERATURE 1: JP 2012-170554 A

SUMMARY OF THE INVENTION

[0004]

A chair according to an aspect of the present disclosure includes: a seat portion on which a user is able to sit; a backrest portion provided on a rear side of the seat portion; a leg body supporting the seat portion and the backrest portion; a reclining mechanism configured to recline the backrest portion; a slide mechanism configured to slide the backrest portion and the seat portion in a front-rear direction; and an interlocking mechanism configured to interlock the reclining mechanism and the slide mechanism with each other.

BRIEF DESCRIPTION OF DRAWINGS

[0005]

FIG. 1 is a side view schematically illustrating a base position and a reclining position of a chair (a chair-type massage machine) according to the present embodiment.

FIG. 2A is a perspective view illustrating a situation in which a backrest portion is in a non-reclining state and a seat portion is at a rear reference position (a sofa mode).

FIG. 2B is a view illustrating transition from the non-reclining state to a reclining state, and is a perspective view illustrating a situation in which a reclining mechanism moves the backrest portion upward from an accommodated position and a slide mechanism moves the seat portion forward for a shift to a protruding position.

FIG. 2C is a view illustrating the transition from the non-reclining state to the reclining state, and is a perspective view illustrating a situation in which the backrest portion is moved uppermost (a comfortable mode).

FIG. 2D is a perspective view illustrating a situation in which the backrest portion is in the reclining state and the seat portion is moved forward (a lounging mode).

FIG. 3A is a right side view of the state illustrated in FIG. 2A.

FIG. 3B is a right side view of the state illustrated in FIG. 2B.

FIG. 3C is a right side view of the state illustrated in FIG. 2C.

FIG. 3D is a right side view of the state illustrated in FIG. 2D.

FIG. 4 is an exploded perspective view illustrating a configuration of the reclining mechanism and a configuration of the slide mechanism.

FIG. 5A is a perspective view of the reclining mechanism.

FIG. 5B is an exploded perspective view illustrating the reclining mechanism in an enlarged manner.

FIG. 6 is a perspective view of a composite chair including the chair of the present embodiment, a chair substantially equal in shape to the chair, and a coupling unit coupling the chairs to each other.

FIG. 7 is an exploded perspective view of the composite chair illustrated in FIG. 6.

DETAILED DESCRIPTION

[0006]

<Problems to be solved by the present disclosure>

The chair-type massage machine disclosed in Patent Literature 1 eliminates a necessity of a long distance between a wall of a room and a rear surface of a backrest portion, and can be installed in a small space (i.e., a short distance) in a reclinable manner. According to the chair-type massage machine disclosed in Patent Literature 1, for example, the backrest portion can be inclined rearward and adjusted by securing only a distance of approximately 10 to 20 cm between the wall of the room and the rear surface of the backrest portion.

[0007]

However, depending on various situations such as the size of a room, it is occasionally necessary to install a chair-type massage machine in a state in which there is almost no clearance between a rear surface of a backrest portion and a wall of a room. For example, a

distance between the wall of the room and the rear surface of the backrest portion is occasionally several centimeters. In this case, it has been found that the backrest portion of the conventional chair-type massage machine cannot recline.

[0008]

In view of the circumstances described above, hence, an object of the present disclosure is to provide a chair and a composite chair that include a mechanism for reclining a backrest portion and sliding a seat portion forward so that the backrest portion is capable of smoothly reclining with reliability even in a case where a distance between a wall of a room and a rear surface of the backrest portion is short in installing the chair and the composite chair near the wall of the room.

[0009]

<Advantageous effect of the present disclosure>

A chair and a composite chair according to the present disclosure include a mechanism for reclining a backrest portion and sliding a seat portion forward so that the backrest portion is capable of smoothly reclining with reliability even in a case where a distance between a wall of a room and a rear surface of the backrest portion is short in installing the chair and the composite chair near the wall of the room.

[0010]

<Outline of embodiments of the present disclosure>

An outline of below-listed embodiments of the present disclosure is described.

[0011]

In order to achieve the foregoing object, the present disclosure takes the following technical measures.

[0012]

(1) A chair according to the present disclosure includes: a seat portion on which a

user is able to sit; a backrest portion provided on a rear side of the seat portion; a leg body supporting the seat portion and the backrest portion; a reclining mechanism configured to recline the backrest portion; a slide mechanism configured to slide the backrest portion and the seat portion in a front-rear direction; and an interlocking mechanism configured to interlock the reclining mechanism and the slide mechanism with each other.

[0013]

(2) In (1) described above, the leg body may include: a stationary frame to be installed on a floor; and a movable frame on which the seat portion and the backrest portion are mounted, the movable frame being slidable relative to the stationary frame in the front-rear direction, a backrest frame configured to support the backrest portion such that the backrest portion is reclinable and the seat portion may be mounted on the movable frame, and the slide mechanism may allow the movable frame to slide relative to the stationary frame in the front-rear direction.

[0014]

(3) In (2) described above, the interlocking mechanism may be a mechanism configured to interlock reclining operation of reclining the backrest frame by the reclining mechanism with sliding operation of sliding the movable frame in the front-rear direction by the slide mechanism.

[0015]

(4) In (3) described above, the interlocking mechanism may be configured to cause the slide mechanism to slide the movable frame in the front-rear direction, using a driving force output from an elevating mechanism of the reclining mechanism for reclining the backrest portion.

[0016]

(5) In (4) described above, the interlocking mechanism may include: a first shaft

provided on a lower side of the backrest frame; a first guide rail provided on the stationary frame in a state in which the first guide rail is inclined forward so as to extend obliquely from a lower rear end to an upper front end; and a first slider portion attached to the first shaft and configured to move obliquely on the first guide rail.

[0017]

(6) In (5) described above, the interlocking mechanism may be configured to, when the first slider moves on the first guide rail inclined forward so as to extend obliquely upward, generate for the first slider a force component directed forward or rearward, from upward or rearward movement of the backrest frame, transmit the generated force component directed forward or rearward, to the first shaft to which the first slider is attached, and move the movable frame forward or rearward via the backrest frame.

[0018]

(7) In (6) described above, the reclining mechanism may move the backrest portion upward, the reclining mechanism may include: a guide plate provided on the seat portion and having a long groove extending in an up-down direction; and a guide body fitted into the long groove so as to freely roll and configured to be guided along the long groove, and the reclining mechanism may couple the backrest frame and the movable frame to each other.

[0019]

(8) In (7) described above, the reclining mechanism may move the backrest portion upward and tilt the backrest portion, which has been moved upward, rearward, an upper side of the long groove may have a shape curved rearward, the long groove may include: a lower groove portion extending in the up-down direction and inclined rearward; and an upper groove portion connected to an upper side of the lower groove portion and bent rearward of the lower groove portion, the long groove may be provided with a rack gear, at least two or more of the guide bodies may be disposed on an upper side and a lower side of the long groove, one of the

guide bodies may be movable from the lower groove portion to the upper groove portion, and another one of the guide bodies may include a pinion gear meshing with the rack gear, and may be movable on the lower groove portion.

[0020]

(9) In (8) described above, the slide mechanism may include: a second shaft provided on the movable frame; a second guide rail provided on the stationary frame and directed in the front-rear direction; and a second slider portion attached to the second shaft and configured to move on the second guide rail in the front-rear direction.

[0021]

(10) In (9) described above, the slide mechanism may include: a slide bar provided on the movable frame in parallel with the second guide rail, and configured to slide in conjunction with movement of the movable frame in the front-rear direction; and a guide groove provided in the stationary frame and configured to guide the slide bar in the front-rear direction.

[0022]

(11) In (1) described above, armrest portions may be respectively provided on left and right sides of the seat portion, and the armrest portions may be configured to move together with the seat portion in the front-rear direction in conjunction with the reclining operation of reclining the backrest portion.

[0023]

(12) In (11) described above, the armrest portions may be respectively attached to the left and right sides of the movable frame, and move together with the movable frame in the front-rear direction.

[0024]

(13) In any one of (1) to (12) described above, a massage mechanism configured to perform a massage on a treatment target site of the user may be incorporated in one of or each

of the backrest portion and the seat portion.

[0025]

(14) A composite chair according to the present disclosure includes: at least two or more of the chairs according to any one of (1) to (12) described above; and a coupling unit configured to couple two of the chairs to each other in a left-right direction with the coupling unit interposed between the chairs.

[0026]

(15) In (14) described above, the coupling unit may include a side plate member disposed so as to freely slide in the front-rear direction, and the side plate member may be coupled to the movable frame.

[0027]

<Details of embodiments of the present disclosure>

Details of embodiments of the present disclosure are described below with reference to the drawings. It should be noted that at least some of the embodiments described below may be arbitrarily combined with each other.

[0028]

It should be noted that the embodiments described below are examples embodying the present disclosure; therefore, the configuration of the present disclosure is not limited to these specific examples. In the drawings, some components are not illustrated or indicated by, for example, imaginary lines in consideration of viewability.

[0029]

In the following description, directions defined in the drawings are used in describing a chair 1 of the present disclosure. For example, FIGs. 1 to 7 illustrate directions, such as an up-down direction, a front-rear direction, and a left-right direction, of the chair 1. With regard to side views of FIGs. 1 and 3A to 3D, the front and the back of each drawing in the

thickness direction respectively correspond to the “right” and the “left” of the chair 1 although the “up”, the “down”, the “front”, and the “rear” of the chair 1 are as illustrated. These directions correspond to directions seen from a user sitting in the chair 1.

[0030]

The present disclosure describes, as an example of the chair 1, a chair-type massage machine 1 according to the present embodiment including a backrest portion 3 and a seat portion 2 each of which or one of which includes a massage mechanism (not illustrated) for performing a massage on a treatment target site of a user. The massage mechanism may be of a mechanical type or may be a pressing massage machine that utilizes expansion and contraction of an air bag.

[0031]

FIGs. 1 to 5B are views each illustrating an outline of the chair-type massage machine 1 according to the present embodiment.

[0032]

As illustrated in, for example, FIGs. 2A and 3A, the term “sofa mode” refers to a base position of the chair-type massage machine 1 (the chair 1) of the present embodiment in a state which the backrest portion 3 is moved downward, a lower side of the backrest portion 3 is located below the seat portion 2, and the seat portion 2 is located rearward.

[0033]

For example, FIGs. 2B, 2C, 3B, and 3C are views each illustrating a state of the chair-type massage machine 1 of the present embodiment shifting from the sofa mode to reclining operation of reclining the backrest portion 3, by protruding the backrest portion 3 upward and sliding the seat portion 2 forward.

[0034]

As illustrated in, for example, FIGs. 2D and 3D, the term “lounging mode” refers

to a reclining position of the chair-type massage machine 1 of the present embodiment in a state which the backrest portion 3, which has been moved upward, is inclined rearward and the seat portion 2 is further slid forward.

[0035]

It should be noted that the chair-type massage machine 1 of the present embodiment can be used in a comfortable mode in which the backrest portion 3 is protruded upward and the seat portion 2 is slid forward as illustrated in, for example, FIGs. 2C and 3C.

[0036]

As illustrated in, for example, FIGs. 1 to 3D, the chair-type massage machine 1 of the present embodiment includes the seat portion 2 on which a user is able to sit, the backrest portion 3 that is provided on a rear side of the seat portion 2, armrest portions 4 that are disposed on left and right side surfaces of the seat portion 2, and a leg body 5 that supports the seat portion 2 and the backrest portion 3.

[0037]

The chair-type massage machine 1 also includes reclining mechanisms 6 that move the backrest portion 3 upward and then recline the backrest portion 3 which has been moved upward, a slide mechanism 7 that slides the seat portion 2 (a movable frame 11) in the front-rear direction, and an interlocking mechanism 8 that interlocks the reclining mechanisms 6 and the slide mechanism 7 with each other.

[0038]

In the chair-type massage machine 1 of the present embodiment, the massage mechanism (not illustrated) is incorporated in the backrest portion 3. The massage mechanism performs massage operation on the back of the user who leans against the backrest portion 3.

[0039]

As illustrated in FIGs. 2A to 2D and 3A to 3D, the seat portion 2 has an adequate

width that allows the user to be subjected to a massage to sit on the seat portion 2. The entire seat portion 2 is covered with a sheet or the like. The seat portion 2 has an upper surface that is formed in a flat planar shape and is provided with a cushioning medium for enhancing the comfort of the user sitting on the seat portion 2.

[0040]

The seat portion 2 is supported at a predetermined height from below by the leg body 5 installed on a floor F. The movable frame 11 is provided below the seat portion 2 and is capable of bearing a weight applied from the user. The armrest portions 4 are disposed on the left and right side surfaces of the seat portion 2.

[0041]

The seat portion 2 is slidable in such a manner that the slide mechanism 7 moves the movable frame 11 in the front-rear direction. It should be noted that the armrest portions 4 slide together with the seat portion 2 in the front-rear direction.

[0042]

That backrest portion 3 has an adequate width to support the back of the user from the waist to the shoulder of the user. The entire backrest portion 3 is covered with a casing, a sheet, or the like. The backrest portion 3 has a front surface that is formed in a flat planar shape and is provided with a cushioning medium.

[0043]

The backrest portion 3 of the present embodiment is capable of protruding (extending) upward and inclining rearward, using the reclining mechanisms 6 (described later). In other words, the chair-type massage machine 1 of the present embodiment is designed to perform a massage on the back of the user in a reclined state.

[0044]

A backrest frame 14 is provided inside the backrest portion 3 and is capable of

bearing a weight applied from the back of the user. The backrest frame 14 is movable in the front-rear direction as the movable frame 11 (described later in detail) slides in the front-rear direction.

[0045]

In the present embodiment, the massage mechanism (not illustrated) is provided inside the backrest portion 3 to perform massage operation that involves, for example, kneading, tapping, or vibrating a treatment target site on the back of the user sitting on the seat portion 2.

[0046]

The chair-type massage machine 1 of the present embodiment also includes a footrest portion 9 into which the user is able to insert his/her lower limbs. Inside the footrest portion 9, a foot massage mechanism (not illustrated) is provided for performing a massage on the lower limbs of the user.

[0047]

The footrest portion 9 is capable of protruding forward of the seat portion 2 and retracting below the seat portion 2 (inside the leg body 5) by a forward extension mechanism. In other words, the footrest portion 9 is capable of protruding forward of the seat portion 2 in performing a massage on the lower limbs. In addition, the footrest portion 9 can be stored in the leg body 5, that is, below the seat portion 2 in a case where the user does not need a massage on his/her lower limbs.

[0048]

As illustrated in, for example, FIGs. 4, 5A, and 5B, the leg body 5 is a frame body that has an appearance like a scaffold and is capable of supporting the seat portion 2 such that the seat portion 2 is located at a predetermined height from the floor F. The leg body 5 includes a stationary frame 10 that is installed on the floor F, and the movable frame 11 on which the seat portion 2 and the backrest portion 3 are mounted, and that is capable of moving in the front-rear

direction relative to the stationary frame 10.

[0049]

As illustrated in, for example, FIG. 4, the stationary frame 10 (base frame 10) includes a plurality of rod members, such as metal pipes or angles, that are combined to intersect with each other in the up-down direction, the left-right direction, and the front-rear direction. The stationary frame 10 is stably placed on the floor F, and holds the movable frame 11 such that the movable frame 11 is movable in the front-rear direction. Inside the stationary frame 10 (below the movable frame 11 on which the seat portion 2 is mounted), a space is secured in which the footrest portion 9 can be stored.

[0050]

The stationary frame 10 is installed on and fixed to the floor F. The stationary frame 10 includes a pair of bottom rod members 10a that are provided on a bottom of the stationary frame 10 and extend in the front-rear direction, lateral rod members 10b that connect between the pair of bottom rod members 10a, front upright rod members 10c that are erected from front ends of the bottom rod members 10a, and rear upright rod members 10d that are erected from rear ends of the bottom rod members 10a.

[0051]

The bottom rod members 10a are provided left and right in a pair. The right bottom rod member 10aR is provided with its axial center directed in the front-rear direction. The left bottom rod member 10aL is spaced away from the right bottom rod member 10aR by a predetermined distance in the left-right direction (width direction). The bottom rod members 10a each include a leg member that can be placed on the floor F.

[0052]

The lateral rod members 10b are provided front and rear in a pair. The front lateral rod member 10b is joined to the front end of the right bottom rod member 10aR and the

front end of the left bottom rod member 10aL to connect the right bottom rod member 10aR and the left bottom rod member 10aL. The rear lateral rod member 10b is joined to the rear end of the right bottom rod member 10aR and the rear end of the left bottom rod member 10aL to connect the right bottom rod member 10aR and the left bottom rod member 10aL.

[0053]

The front upright rod members 10c are provided left and right in a pair. The right front upright rod member 10cR is erected from the front end of the right bottom rod member 10aR. The left front upright rod member 10cL is erected from the front end of the left bottom rod member 10aL.

[0054]

The rear upright rod members 10d are provided left and right in a pair. The right rear upright rod member 10dR is erected from the rear end of the right bottom rod member 10aR. The left rear upright rod member 10dL is erected from the rear end of the left bottom rod member 10aL.

[0055]

The right front upright rod member 10cR and the right rear upright rod member 10dR are coupled to each other with an upper rod member 10eR. In the present embodiment, the right upper rod member 10eR is provided horizontally and directed in the front-rear direction so as to connect an upper side of the right front upright rod member 10cR and an upper side of the rear upright rod member 10dR. The right upper rod member 10eR couples the right front upright rod member 10cR and the rear upright rod member 10dR to each other. The right upper rod member 10eR serves as a second guide rail 37 of the slide mechanism 7 (described later).

[0056]

The right upper rod member 10eR and the right bottom rod member 10aR are coupled to each other with a central rod member 10fR. In the present embodiment, the right

central rod member 10fR is provided in a state in which the right central rod member 10fR is inclined forward so as to extend obliquely from a lower rear end to an upper front end.

[0057]

The right central rod member 10fR is provided in a state in which the right central rod member 10fR is inclined like a diagonal brace between a substantially center of the right upper rod member 10eR and a rear side of the bottom rod member 10aR to couple the right upper rod member 10eR and the bottom rod member 10aR to each other. The right central rod member 10fR serves as a first guide rail 19 of the interlocking mechanism 8 (described later).

[0058]

The left front upright rod member 10cL and the left rear upright rod member 10dL are coupled to each other with an upper rod member 10eL. In the present embodiment, the left upper rod member 10eL is provided horizontally and directed in the front-rear direction so as to connect an upper side of the left front upright rod member 10cL and an upper side of the rear upright rod member 10dL. The left upper rod member 10eL couples the left front upright rod member 10cL and the rear upright rod member 10dL to each other. The left upper rod member 10eL serves as a second guide rail 37 of the slide mechanism 7 (described later).

[0059]

The left upper rod member 10eL and the left bottom rod member 10aL are coupled to each other with a central rod member 10fL. In the present embodiment, the left central rod member 10fL is provided in a state in which the left central rod member 10fL is inclined forward so as to extend obliquely from a lower rear end to an upper front end.

[0060]

The left central rod member 10fL is provided in a state in which the left central rod member 10fL is inclined like a diagonal brace between a substantially center of the left upper rod member 10eL and a rear side of the bottom rod member 10aL to couple the left upper rod

member 10eL and the bottom rod member 10aL to each other. The left central rod member 10fL serves as a first guide rail 19 of the interlocking mechanism 8 (described later).

[0061]

The movable frame 11 is slidable relative to the stationary frame 10 in the front-rear direction by the slide mechanism 7. The backrest frame 14 that supports the backrest portion 3 such that the backrest portion 3 is reclinable and the seat portion 2 are mounted on the movable frame 11. That is, the reclining mechanisms 6 couple the movable frame 11 (the seat portion frame 11) and the backrest frame 14 to each other.

[0062]

When the reclining mechanisms 6 operate the backrest frame 14, the interlocking mechanism 8 allows the backrest frame 14 to move in the front-rear direction, and the slide mechanism 7 allows the movable frame 11 coupled to the backrest frame 14 to move in the front-rear direction.

[0063]

That is, the interlocking mechanism 8 simultaneously achieves the reclining operation of reclining the backrest frame 14 by the reclining mechanisms 6 and the sliding operation of sliding the movable frame 11 in the front-rear direction by the slide mechanism 7.

[0064]

The movable frame 11 supports at its front side the seat portion 2, and long grooves 21 (guide plates 22) of the reclining mechanisms 6 are attached to a rear side of the movable frame 11. The movable frame 11 is a member that is obtained by combining rod members, such as metal pipes or angles, in a frame shape.

[0065]

The movable frame 11 includes a seat portion frame body 12 on which the seat portion 2 is mounted, and support frame bodies 13 that support the seat portion frame body 12.

[0066]

The seat portion frame body 12 is a member that is formed by combining rod members in a frame shape in the front-rear direction and the left-right direction. The seat portion 2 is placed on the seat portion frame body 12.

[0067]

In the present embodiment, the seat portion frame body 12 includes a pair of left and right front-rear rod members 12a that are slightly inclined forward so as to extend upward and are directed in the front-rear direction, and a pair of front and rear lateral rod members 12b that connect the pair of left and right front-rear rod members 12a.

[0068]

The front-rear rod members 12a are provided left and right in a pair. The right front-rear rod member 12a is provided with an axial center directed in the front-rear direction. The left front-rear rod member 12a is spaced away from the right front-rear rod member 12a by a predetermined distance in the left-right direction (width direction).

[0069]

The front lateral rod member 12b is provided so as to connect front ends of the pair of left and right front-rear rod members 12a. The rear lateral rod member 12b is provided so as to connect rear ends of the pair of left and right front-rear rod members 12a. A rear end of the rear lateral rod member 12b is connected to the support frame bodies 13 (front upright rod members 13a). The seat portion frame body 12 is formed in a rectangular shape that is slightly longer in the left-right direction as seen in plan view (a substantially quadrilateral shape).

[0070]

Outer rod members 12c are provided outside the pair of left and right front-rear rod members 12a in the left-right direction in parallel with the front-rear rod members 12a as seen in plan view. The outer rod members 12c are provided left and right in a pair and are

directed horizontally in the front-rear direction. The pair of left and right outer rod members 12c serve as slide bars 39 of the slide mechanism 7 (described later).

[0071]

Support plates 15 that support the armrest portions 4 are provided on the front ends of the pair of left and right front-rear rod members 12a. The armrest portions 4 are attached to the support plates 15 and are thus fixed to the movable frame 11. The armrest portions 4 move together with the movable frame 11 in the front-rear direction.

[0072]

The support frame bodies 13 are provided on rear sides of left and right side surfaces of the seat portion frame body 12. The reclining mechanisms 6 including the guide plates 22 having the long grooves 21 are attached to the support frame bodies 13. The reclining mechanisms 6 are attached to inner sides of the support frame bodies 13 (inside the leg body 5) in the left-right direction.

[0073]

The support frame bodies 13 are each a rectangular frame body that is formed by combining rod members in a frame shape in the front-rear direction and the left-right direction. The support frame bodies 13 are provided along the backrest frame 14 (described later) in the up-down direction.

[0074]

The support frame bodies 13 each include a front upright rod member 13a that extends in the up-down direction and is attached to the rear side of the seat portion frame body 12 (the rear end of the rear lateral rod member 12b), a rear upright rod member 13b that is disposed rearward of the front upright rod member 13a, and a bottom rod member 13c that connects the front upright rod member 13a and the rear upright rod member 13b. The support frame bodies 13 are disposed left and right in a pair.

[0075]

An upper end of the rear upright rod member 13b is bent rearward at a height of approximately one-fourth of the entire rear upright rod member 13b from the top of the rear upright rod member 13b, so that the rear upright rod member 13b is formed in a substantially “L” shape. The bent upper end of the rear upright rod member 13b is connected to an upper end of the front upright rod member 13a. The bottom rod member 13c is provided orthogonal to the front upright rod member 13a and the rear upright rod member 13b so as to connect a lower side of the front upright rod member 13a and a lower side of the rear upright rod member 13b, and couples the front upright rod member 13a and the rear upright rod member 13b to each other.

[0076]

Support plates 16 that support the armrest portions 4 are provided below bent portions of the front upright rod members 13a and on upper sides of rear ends of the front-rear rod members 12a. The armrest portions 4 are attached to the support plates 16 and are thus fixed to the movable frame 11. The armrest portions 4 move together with the movable frame 11 in the front-rear direction.

[0077]

In addition, plate members 17 are provided on upper rear sides of the rear upright rod members 13b. The plate members 17 are each a member that protrudes rearward. In the present embodiment, the plate members 17 are each formed in a substantially triangular shape. Second shafts 36 of the slide mechanism 7 (described later) are provided on rear ends of the plate members 17 so as to pass through the plate members 17.

[0078]

The backrest frame 14 is obtained by combining a plurality of rod members, such as metal pipes or angles, in a substantially rectangular shape as seen in plan view. The backrest frame 14 is a frame body that is capable of adequately supporting the back of the user via a

cushioning medium.

[0079]

The backrest frame 14 includes a pair of left and right upright rod members 14a that extend in the up-down direction, and a pair of upper and lower lateral rod members 14b that connect upper ends and lower ends of the pair of left and right upright rod members 14a. The backrest frame 14 is formed in a rectangular shape that is longer in the up-down direction as seen in front view (a substantially quadrilateral shape).

[0080]

Auxiliary rod members 14c are provided on lower front sides of the pair of left and right upright rod members 14a in parallel with the upright rod members 14a. The auxiliary rod members 14c are provided so as to overhang outward in the left-right direction. The auxiliary rod member 14c provided on the left upright rod member 14a overhangs leftward, and the auxiliary rod member 14c provided on the right upright rod member 14a overhangs rightward.

[0081]

That is, a distance (width) between the pair of left and right auxiliary rod members 14c is wider than a distance (width) between the pair of left and right upright rod members 14a. The reclining mechanisms 6 (described later) are attached to outer sides of the pair of left and right upright rod members 14a in the left-right direction.

[0082]

In addition, rear rod members 14d are provided on a lower side of the backrest frame 14. The rear rod members 14d are members that couple lower rear sides of the auxiliary rod members 14c and lower rear sides of the upright rod members 14a to each other, and are provided so as to overhang rearward. First shafts 18 of the interlocking mechanism 8 are provided on the rear rod members 14d.

[0083]

As illustrated in, for example, FIGs. 1 to 5B, the chair-type massage machine 1 (the chair 1) of the present embodiment has a feature in that it includes the interlocking mechanism 8 that interlocks the reclining operation of protruding the backrest portion 3 upward and then tilting the backrest portion 3 rearward by the reclining mechanisms 6 with the sliding operation of moving the seat portion 2 (the movable frame 11) forward by the slide mechanism 7.

[0084]

In describing the feature of the chair-type massage machine 1 of the present embodiment, the interlocking mechanism 8, the reclining mechanisms 6, and the slide mechanism 7 are specifically described in this order.

[0085]

The interlocking mechanism 8 which is the feature of the chair-type massage machine 1 of the present embodiment is described.

[0086]

As illustrated in FIGs. 2A to 5B, the interlocking mechanism 8 of the present embodiment is a mechanism that interlocks the reclining operation of reclining the backrest frame 14 by the reclining mechanisms 6 with the sliding operation of sliding the movable frame 11 in the front-rear direction by the slide mechanism 7.

[0087]

The interlocking mechanism 8 of the present embodiment causes the slide mechanism 7 to slide the movable frame 11 in the front-rear direction, using driving forces output from an elevating mechanism 28 (described later in detail) of the reclining mechanisms 6 for reclining the backrest portion 3.

[0088]

The interlocking mechanism 8 of the present embodiment is capable of interlocking the operation of moving the backrest portion 3 (the backrest frame 14) upward and then inclining the backrest portion 3 (the backrest frame 14) rearward to recline the backrest portion 3 (the backrest frame 14) by the reclining mechanisms 6 with the operation of sliding the seat portion 2 (the movable frame 11) forward by the slide mechanism 7.

[0089]

The interlocking mechanism 8 of the present embodiment is also capable of interlocking accommodating operation of raising the backrest portion 3 (the backrest frame 14), which has been inclined rearward, forward and then moving the lower side of the backrest portion 3 (the backrest frame 14) into the leg body 5 (the stationary frame 10) by the reclining mechanisms 6 with sliding operation of moving the seat portion 2 (the movable frame 11) rearward by the slide mechanism 7.

[0090]

The interlocking mechanism 8 includes the first shafts 18 that are provided on the lower side of the backrest frame 14, the first guide rails 19 that are provided on the stationary frame 10 in a state in which the first guide rails 19 are inclined forward so as to extend obliquely from lower rear ends to upper front ends, and first slider portions 20 that are attached to the first shafts 18 and move obliquely on the first guide rails 19.

[0091]

As illustrated in FIGs. 4 to 5B, the first shafts 18 are provided on the lower side of the backrest frame 14. The first slider portions 20 are disposed on the first shafts 18. The first shafts 18 are rod-shaped members that protrude outward in the width direction from side surfaces of the rear rod members 14d of the backrest frame 14.

[0092]

The first shafts 18 are provided left and right in a pair and are each a columnar or

cylindrical rod member. In other words, the first shafts 18 include a left shaft that protrudes leftward from the side surface of the left rear rod member 14d, and a right shaft that protrudes rightward from the side surface of the right rear rod member 14d.

[0093]

The first slider portions 20, into which the first guide rails 19 are fitted such that the first slider portions 20 freely move in the up-down direction, are attached to the first shafts 18.

[0094]

As illustrated in, for example, FIGs. 2A to 4, the first guide rails 19 have upper ends that are joined to middles of the upper rod members 10e in the front-rear direction, and lower ends that are joined to the rear sides of the bottom rod members 10a. In other words, the first guide rails 19 are provided like diagonal braces between the upper rod members 10e and the bottom rod members 10a of the stationary frame 10 in the state in which the first guide rails 19 are inclined forward from the lower rear ends to the upper front ends.

[0095]

The first guide rails 19 (inclined rails 19) are the central rod members 10f that are provided on the stationary frame 10 and are inclined obliquely forward. The right central rod member 10fR is the right first guide rail 19. The left central rod member 10fL is the left first guide rail 19.

[0096]

That is, the first guide rails 19 are provided left and right in a pair. The first guide rails 19 are fitted into the first slider portions 20 that move in an axial center direction.

[0097]

The first slider portions 20 move on the first guide rails 19 between the lower rear ends and the upper front ends to thereby move the movable frame 11 in the front-rear direction.

The first slider portions 20 (inclined slider portions 20) are provided left and right in a pair.

[0098]

Quadrangular through holes are formed in lower sides of the first slider portions 20 so as to pass through the first slider portions 20 in the front-rear direction. The first guide rails 19 are inserted through the through holes such that the first slider portions 20 freely slide. In other words, the first slider portions 20 are provided so as to surround the upper, lower, and side surfaces of the first guide rails 19 and are disposed so as to freely slide.

[0099]

In addition, cylindrical through holes are formed in upper sides of the first slider portions 20 so as to pass through the first slider portions 20 in the left-right direction. The first shafts 18 are inserted through the through holes so as to freely rotate. For example, the backrest frame 14 moves upward and the movable frame 11 moves forward as the first slider portions 20 move on the first guide rails 19 from the lower rear ends to the upper front ends (move obliquely upward).

[0100]

In reclining the backrest portion 3, foreign matter may be caught between the backrest portion 3, which has been inclined rearward, and rear case bodies 43 (the armrest portions 4) for any reason in some rare cases. In reclining the backrest portion 3, foreign matter may also be caught between the upper end of the backrest portion 3, which has been inclined rearward, and a wall W.

[0101]

The chair-type massage machine 1 of the present embodiment includes a contact sensor (not illustrated) that is provided on a rear surface of the backrest portion 3. For example, contact sensors are provided on an upper end, a lower left side, and a lower right side of the rear surface of the backrest portion 3. Contact sensors may be provided on the entire rear surface of

the backrest portion 3.

[0102]

In reclining the backrest portion 3, if foreign matter is present between the backrest portion 3 and the rear case bodies 43 (the armrest portions 4), the contact sensors on the lower left side and lower right side of the rear surface of the backrest portion 3 detect the foreign matter and immediately stop reclining the backrest portion 3 or immediately raise the backrest portion 3 forward to thereby prevent the foreign matter from being caught between the backrest portion 3 and the rear case bodies 43 (the armrest portions 4), based on a result of the detection.

[0103]

In reclining the backrest portion 3, if foreign matter is caught between the upper end of the backrest portion 3 and the wall W or if the upper end of the backrest portion 3 slightly comes into contact with the wall W, the contact sensor on the upper end of the rear surface of the backrest portion 3 detects the contact and immediately stops reclining the backrest portion 3 or immediately raises the backrest portion 3 forward, based on a result of the detection.

[0104]

Next, the movement of the movable frame 11 in the front-rear direction by the interlocking mechanism 8 is described.

[0105]

When the first slider portions 20 move on the first guide rails 19 inclined forward, the interlocking mechanism 8 generates for the first slider portions 20 a force component (an x-directional component) directed forward or rearward, from upward or downward movement (z-directional movement) of the backrest frame 14, and further transmits the generated force component directed forward or rearward, to the first shafts 18 to which the first slider portions 20 are attached, to thereby move the movable frame 11 forward or rearward via the backrest frame 14.

[0106]

The first guide rails 19 of the interlocking mechanism 8 are provided on the stationary frame 10 in the state in which the first guide rails 19 are inclined forward so as to extend obliquely from the lower rear ends to the upper front ends. The first slider portions 20 are provided on the lower side (the rear rod members 14d) of the backrest frame 14 with the first shafts 18.

[0107]

The first slider portions 20 are fitted into the first guide rails 19 so as to be freely slide. The backrest frame 14 is coupled to the stationary frame 10 (the first guide rails 19) with the first shafts 18 and the first slider portions 20.

[0108]

When the reclining mechanisms 6 move the backrest frame 14 upward, the first slider portions 20 attached to the first shafts 18 move obliquely upward on the first guide rails 19 from the lower rear ends to the upper front ends.

[0109]

When the first slider portions 20 move forward and obliquely upward on the first guide rails 19, the upward movement component (the z-directional component) of the backrest frame 14 is resolved into the forward movement component (the x-directional component) of the movable frame 11.

[0110]

In other words, when the backrest frame 14 moves upward, the first slider portions 20 (the inclined slider portion 20) obliquely move upward on the first guide rails 19 (the inclined rails 19) from the lower rear ends to the upper front ends. The backrest frame 14 moves upward and also moves forward in conjunction with the movement of the first slider portions 20.

[0111]

The movable frame 11 slides forward as the backrest frame 14 moves forward, in such a manner that the interlocking mechanism 8 uses the driving forces from the reclining mechanisms 6. The interlocking mechanism 8 thus generates a component for moving the movable frame 11 forward.

[0112]

The interlocking mechanism 8 of the present embodiment is configured to, in the reclining operation of reclining the backrest portion 3, slide the movable frame 11 (the movable frame 11 on which the backrest portion 3, the seat portion 2, and the armrest portions 4 are disposed) in the front-rear direction.

[0113]

That is, the interlocking mechanism 8 having the configuration described above in detail achieves the following characteristic operation in a case where the chair-type massage machine 1 is installed (needs to be installed) in the state in which there is almost no clearance between the rear surface of the backrest portion 3 and the wall W of the room depending on situations, such as the size of the room, for example, in a case where a distance between the wall W of the room and the rear surface of the backrest portion 3 is only several centimeters.

[0114]

As illustrated in, for example, FIGs. 2A to 2C and 3A to 3C, the chair-type massage machine 1 is shifted from the sofa mode to another mode (operation of reclining the backrest portion 3). A procedure of the operation of reclining the backrest portion 3 is illustrated in the order of FIG. 2A, FIG. 2B, FIG. 2C, and FIG. 2D (perspective views) or in the order of FIG. 3A, FIG. 3B, FIG. 3C, and FIG. 3D (side views).

[0115]

The reclining mechanisms 6 protrude the backrest portion 3 upward from the leg body 5. The upper side of the backrest portion 3 moves upward along the wall W.

[0116]

The interlocking mechanism 8 causes the slide mechanism 7 to move the movable frame 11 forward in conjunction with the operation of the backrest portion 3 by the reclining mechanisms 6.

[0117]

The seat portion 2 and the armrest portions 4 slide forward from the base position corresponding to a position (i) in FIG. 3A to a position (iii) in FIG. 3C via a position (ii) in FIG. 3B. When the backrest portion 3 which has been moved uppermost is stopped, the chair-type massage machine 1 can be used in the comfortable mode as illustrated in, for example, FIGs. 2C and 3C.

[0118]

As illustrated in, for example, FIGs. 2D and 3D, the reclining mechanisms 6 recline the backrest portion 3, which has been moved upward, rearward.

[0119]

The interlocking mechanism 8 causes the slide mechanism 7 to move the movable frame 11 forward in conjunction with the operation of the backrest portion 3 by the reclining mechanisms 6.

[0120]

The upper side of the backrest portion 3 moves downward along the wall W while the lower side of the backrest portion 3 moves forward. The backrest portion 3 reclines rearward.

[0121]

When the movable frame 11 further moves forward, the reclining backrest portion 3 moves forward and, at the same time, the seat portion 2 further slides forward. The seat portion 2 and the armrest portions 4 slide forward from the position (iii) in FIG. 3C to a position

(iv) in FIG. 3D.

[0122]

In other words, the backrest portion 3 is inclined rearward by the reclining mechanisms 6 and is moved forward by the interlocking mechanism 8. At the same time, the seat portion 2 is further slid forward by the slide mechanism 7 in conjunction with the operation of the backrest portion 3 by the interlocking mechanism 8. The chair-type massage machine 1 is used in the lounging mode as illustrated in, for example, FIGs. 2D and 3D.

[0123]

As illustrated in, for example, FIGs. 2C, 2D, 3C, and 3D, on the other hand, the chair-type massage machine 1 is shifted from the lounging mode to another mode (accommodating operation). A procedure of the accommodating operation is illustrated in the reverse order of FIG. 2D, FIG. 2C, FIG. 2B, and FIG. 2A or in the reverse order of FIG. 3D, FIG. 3C, FIG. 3B, and FIG. 3A.

[0124]

The reclining mechanisms 6 raise the backrest portion 3, which has been inclined rearward, forward. The upper side of the backrest portion 3 moves upward along the wall W. The backrest portion 3 is in the protruding state.

[0125]

The slide mechanism 7 moves the movable frame 11 rearward in conjunction with the operation of the backrest portion 3 by the interlocking mechanism 8. Since the movable frame 11 moves rearward, the seat portion 2 slides rearward.

[0126]

As illustrated in, for example, FIGs. 2C and 3C, even when the backrest portion 3, which has been raised forward, is stopped, the chair-type massage machine 1 can be used in the comfortable mode.

[0127]

When the reclining mechanisms 6 move the backrest portion 3, which has been raised, downward, the lower side of the backrest portion 3 is accommodated in the leg body 5. The slide mechanism 7 further moves the movable frame 11 rearward in conjunction with the operation of the backrest portion 3 by the interlocking mechanism 8.

[0128]

The seat portion 2 further slides rearward in conjunction with the operation of the backrest portion 3, and returns to the base position. The chair-type massage machine 1 is used in the sofa mode as illustrated in, for example, FIGs. 2D and 3D.

[0129]

The interlocking mechanism 8 of the present embodiment allows the movable frame 11 to move in the front-rear direction to thereby recline the backrest portion 3 without contact with the wall W even at a narrow clearance (achieve so-called zero wall reclining) and slide the seat portion 2 and the armrest portions 4 in the front-rear direction.

[0130]

The interlocking mechanism 8 provided as described above allows the chair-type massage machine 1 to be shifted from the sofa mode (the base position) to the comfortable mode (the backrest portion 3 is at the protruding position) and then to the lounging mode (the reclining position).

[0131]

The reclining mechanisms 6 are configured to shift the sofa mode (the base position) in which the lower side of the backrest portion 3 is accommodated in the leg body 5 to the comfortable mode by moving the backrest portion 3 upward while moving the backrest portion 3 forward and then to the lounging mode by performing the reclining operation of inclining the backrest portion 3, which has been moved upward, rearward. The reclining

mechanisms 6 are provided left and right in a pair.

[0132]

It should be noted that the exploded views of, for example, FIGs. 4 and 5B illustrate the reclining mechanisms 6 located outside the movable frame 11 (the leg body 5) in the left-right direction in view of viewability. In the actual chair-type massage machine 1, however, the reclining mechanisms 6 are attached to the inner sides of the support frame bodies 13 of the movable frame 11 in the left-right direction as illustrated in FIG. 5A. That is, the support frame bodies 13 are disposed outside in the left-right direction, and the reclining mechanisms 6 are disposed on the inner sides of the support frame bodies 13.

[0133]

As illustrated in, for example, FIGs. 4, 5A, and 5B, the reclining mechanisms 6 each include the guide plate 22 that is provided on the seat portion 2 and has the long groove 21 extending in the up-down direction, and a guide body 23 that is fitted into the long groove 21 so as to freely roll and is guided along the long groove 21.

[0134]

The guide plates 22 are each a rectangular strip plate. In the present embodiment, an upper end of each guide plate 22 is bent rearward at a height of approximately one-fourth of the entire guide plate 22 from the top of the guide plate 22 along the shape of the corresponding long groove 21 (described later). The guide plates 22 are each formed in a substantially “L” shape as seen in plan view. The guide plates 22 are members that are disposed left and right in a pair. The guide plates 22 are disposed outside the backrest frame 14.

[0135]

The long grooves 21 are formed in the guide plates 22 attached to the support frame bodies 13 of the movable frame 11. Upper sides of the long grooves 21 are curved rearward in order to perform the reclining operation of inclining the backrest portion 3 rearward.

In the present embodiment, an upper end of each long groove 21 is bent rearward at a height of approximately one-fourth of the entire long groove 21 from the top of the long groove 21, so that the long groove 21 is formed in a substantially “L” shape as seen in plan view.

[0136]

Each long groove 21 has a width into which the corresponding guide body 23 can be fitted. That is, the guide bodies 23 are disposed so as to freely roll along the long grooves 21 in the up-down direction. The long grooves 21 each include a lower groove portion 21a that extends in the up-down direction, and an upper groove portion 21b that is connected to an upper side of the lower groove portion 21a and is bent rearward of the lower groove portion 21a.

[0137]

The lower groove portions 21a are each a linear groove that is inclined rearward as seen in side view. That is, the guide bodies 23 move upward and obliquely rearward along the lower groove portions 21a. A length of each lower groove portion 21a ranges from a lower end of the corresponding long groove 21 to a position at a height of approximately three quarters of the entire long groove 21 from the top of the long groove 21. Rack gears 31 of the elevating mechanism 28 are provided on the lower groove portions 21a.

[0138]

The upper groove portions 21b are each a groove that communicates with the corresponding lower groove portion 21a and is further bent rearward. The upper groove portions 21b are each a linear groove that is further inclined rearward of the corresponding upper groove portion 21b as seen in side view.

[0139]

It can be said that an upper end of each upper groove portion 21b is an “obliquely upper rear end” that is located rearward of an upper end of the corresponding lower groove portion 21a. The guide bodies 23 move upward and obliquely rearward along the upper groove

portions 21b. A length of each upper groove portion 21 is in a range of approximately one-fourth of the entire long groove 21 from the top of the long groove 21.

[0140]

The lower groove portions 21a are regions for moving the backrest frame 14 upward from the sofa mode (the base position). The upper groove portions 21b are regions for inclining the backrest frame 14, which has been moved upward, rearward (shifting to the lounging mode).

[0141]

The guide plates 22 having the long grooves 21 are attached to the support frame bodies 13 of the movable frame 11 such that a portion from the lower end to the bent position of each guide plate 22 extends in the up-down direction and a portion from the bent position to the upper end of the guide plate 22 is inclined.

[0142]

The guide bodies 23 (rotating bodies 23) are fitted into the long grooves 21. The guide bodies 23 are guided in the direction in which the long grooves 21 are formed, with the guide bodies 23 fitted into the long grooves 21 to thereby guide the backrest portion 3 in the up-down direction and the front-rear direction.

[0143]

At least two or more guide bodies 23 are disposed on an upper side and a lower side of each long groove 21. The guide bodies 23 of the present embodiment include lower guide bodies 23a that are disposed on the lower sides of the long grooves 21, and upper guide bodies 23b that are disposed above and spaced away from the lower guide bodies 23a. In other words, the two guide bodies 23, that is, the upper and lower guide bodies 23 are movably fitted into each long groove 21 to move the backrest portion 3 upward or downward or incline the backrest portion 3.

[0144]

The lower guide bodies 23a are provided left and right in a pair. The lower guide bodies 23a are fitted into the long grooves 21 and therefore have outside diameters that are substantially equal to the opening widths of the long grooves 21. The lower guide bodies 23a are each a cylindrical body having a through hole that is formed at a center and into which a rotary drive shaft 30 is fitted. In other words, the lower guide bodies 23a are attached to two ends of the rotary drive shaft 30 having an axial center directed in the left-right direction.

[0145]

The lower guide bodies 23a are provided with pinion gears 32 of the elevating mechanism 28. The pinion gears 32 mesh with the rack gears 31 on the lower groove portions 21a. The lower guide bodies 23a are movable along the lower groove portions 21a.

[0146]

The upper guide bodies 23b are provided left and right in a pair. The upper guide bodies 23b are fitted into the long grooves 21 and therefore have outside diameters that are equal to the opening widths of the long grooves 21. The upper guide bodies 23b are each a cylindrical body having a through hole that is formed at a center and into which a third shaft 24 is fitted. Each of the upper guide bodies 23b is movable from a middle of the corresponding lower groove portion 21a in the up-down direction to the corresponding upper groove portion 21b.

[0147]

Each lower guide body 23a and each upper guide body 23b are interposed between an outer case member 25a and an inner case member 25b in the left-right direction. This configuration enables the guide bodies 23 to move relative to the long grooves 21 in the up-down direction, and inhibits the guide bodies 23 from coming out of the long grooves 21 (from being separated from the long grooves 21 in the left-right direction).

[0148]

As illustrated in FIG. 5B, the upper guide bodies 23b are attached to the third shafts 24 disposed on the backrest frame 14. The third shafts 24 are rod-shaped members that protrude outward in the width direction from side surfaces of the auxiliary rod members 14c of the backrest frame 14. The third shafts 24 are each a rod member that has a diameter smaller than the opening width of the corresponding long groove 21.

[0149]

The third shafts 24 are provided left and right in a pair. In other words, the third shafts 24 include a left shaft that protrudes leftward from the side surface of the left auxiliary rod member 14c, and a right shaft that protrudes rightward from the side surface of the right auxiliary rod member 14c.

[0150]

The upper guide bodies 23b are respectively attached to the left and right third shafts 24 so as to freely rotate. The upper guide bodies 23b are respectively fitted into the left and right long grooves 21 so as to freely move in the up-down direction.

[0151]

In the present embodiment, each guide plate 22 is stored in a case body 25. The case body 25 is laterally divided into two, that is, includes the outer case member 25a and the inner case member 25b.

[0152]

The outer case members 25a have long grooves 26 that are equal in shape to the long grooves 21. Similarly to the long grooves 21, the long grooves 26 of the outer case members 25a each include a lower groove portion 26a that extends in the up-down direction, and an upper groove portion 26b that is connected to an upper side of the lower groove portion 26a and is bent rearward of the lower groove portion 26a.

[0153]

Each lower groove portion 26a is a straight portion of the corresponding long groove 26 in a range from a lower end of the long groove 26 to a position at a height of approximately three quarters of the entire long groove 26 from the top of the long groove 26. Each upper groove portion 26b is a bent portion that is bent rearward from an upper end of the corresponding lower groove portion 26a in a range of approximately one-fourth of the entire long groove 26 from the top of the long groove 26.

[0154]

The inner case members 25b have long grooves 27 that are equal in shape to the long grooves 21. Similarly to the long grooves 21, the long grooves 27 of the inner case members 25b each include a lower groove portion 27a that extends in the up-down direction, and an upper groove portion 27b that is connected to an upper side of the lower groove portion 27a and is bent rearward of the lower groove portion 27a.

[0155]

Each lower groove portion 27a is a straight portion of the corresponding long groove 27 in a range from a lower end of the long groove 27 to a position at a height of approximately three quarters of the entire long groove 27 from the top of the long groove 27. Each upper groove portion 27b is a bent portion that is bent rearward from an upper end of the corresponding lower groove portion 27a in a range of approximately one-fourth of the entire long groove 27 from the top of the long groove 27.

[0156]

The reclining mechanisms 6 each include the elevating mechanism 28 that moves the backrest frame 14 upward and downward for performing the reclining operation.

[0157]

The elevating mechanism 28 includes drivers 29 that output driving forces for moving the backrest frame 14 upward and rearward, the rotary drive shaft 30 that is disposed on

the backrest frame 14, to which the lower guide bodies 23a are attached, and that rotates by the output driving forces, the rack gears 31 that are provided along the long grooves 21, and the pinion gears 32 that are provided on the lower guide bodies 23a and are rotationally driven by the rotation of the rotary drive shaft 30 in a state in which the pinion gears 32 mesh with the rack gears 31, thereby moving the backrest frame 14 upward along the long groove 21.

[0158]

The drivers 29 and the rotary drive shaft 30 of the elevating mechanism 28 are disposed on the backrest frame 14.

[0159]

The drivers 29 each include a drive motor 33 that generates a rotational driving force, and a gear case 34 that reduces the rotational driving force. The drive motor 33 is disposed with its output shaft directed downward. The gear case 34 is disposed below the drive motor 33, and the output shaft is inserted into the gear case 34. The rotational driving force output from the drive motor 33 is transmitted to the rotary drive shaft 30 via the gear case 34.

[0160]

The rotary drive shaft 30 is disposed on a lower side of the backrest frame 14 with its axial center directed in the left-right direction. The rotary drive shaft 30 has a length that is longer than a length from a left end to a right end of the backrest frame 14.

[0161]

That is, the rotary drive shaft 30 is disposed so as to freely rotate about an axis directed in the left-right direction, and is rotationally driven with the rotational driving forces output from the drive motors 33. The lower guide bodies 23a are disposed on left and right ends of the rotary drive shaft 30 so as to freely rotate. The left and right lower guide bodies 23a are respectively fitted into the left and right long grooves 21 so as to freely move in the up-down direction.

[0162]

The rack gears 31 are provided on the guide plates 22 so as to extend in the up-down direction along the lower groove portions 21a. The rack gears 31 are provided left and right in a pair. The rack gears 31 are meshable with the pinion gears 32, and are attached with their tooth tips directed to the lower groove portions 21a.

[0163]

That is, the rack gears 31 are attached to the guide plates 22 so as to extend along the open edges on the front sides of the lower groove portions 21a. The pinion gears 32 mesh with the rack gears 31 from the front.

[0164]

The pinion gears 32 are provided on the lower guide bodies 23a. The pinion gears 32 are provided left and right in a pair. In the present embodiment, the lower guide bodies 23a are provided with the pinion gears 32 interposed therebetween in the left-right direction. The pinion gears 32 are attached to the ends of the rotary drive shaft 30 so as to be rotatable integrally.

[0165]

That is, the pinion gears 32 are in a state in which the pinion gears 32 mesh with the rack gears 31. The pinion gears 32 are rotationally driven by the drive motors 33 located on lower left side of the backrest frame 14. The pinion gears 32 (the lower guide bodies 23a), which have been rotationally driven, move on the rack gears 31 along the lower groove portions 21a.

[0166]

When the rotary drive shaft 30 is rotationally driven with the rotational driving forces output from the drive motors 33, the lower guide bodies 23a integrally attached to the rotary drive shaft 30 also rotate. The pinion gears 32 provided on the lower guide bodies 23a

then move in the up-down direction in the state in which the pinion gears 32 mesh with the rack gears 31. The pinion gears 32 travel on the rack gears 31, so that the backrest frame 14 moves upward and rearward relative to the stationary frame 10.

[0167]

As illustrated in FIG. 5B, the guide plates 22 are each provided with a limit switch 35 that detects a limit when the reclining backrest frame 14 moves upward and inclines rearward, and a limit switch 35 that detects a limit when the backrest frame 14 moves downward.

[0168]

The limit switches 35 are respectively provided on a lower end of the lower groove portion 21a and a rear end of the upper groove portion 21b. The lower limit switch 35 detects the limit when the backrest frame 14 moves downward. The upper limit switch 35 detects the limit when the reclining backrest frame 14 inclines rearward.

[0169]

When ones of the lower limit switches 35 and the upper limit switches 35 each detect the limit and transmit a stop signal, the drivers 29 stop. That is, the chair-type massage machine 1 can be shifted to any one of the positions corresponding to “sofa mode”, “comfortable mode”, and “reclining mode” in such a manner that the limit switches 35 detect the position of the backrest frame 14.

[0170]

Next, the slide mechanism 7 of the chair-type massage machine 1 of the present embodiment is described.

[0171]

The slide mechanism 7 is provided on the movable frame 11 to slide the movable frame 11 in the front-rear direction.

[0172]

Specifically, in the reclining operation of reclining the backrest portion 3, the interlocking mechanism 8 converts the driving forces from the reclining mechanisms 6 into a force directed forward, and applies this force to the movable frame 11, so that the slide mechanism 7 slides the movable frame 11, on which the seat portion 2 is mounted, in the front-rear direction. As the movable frame 11 slides, the backrest portion 3 moves forward.

[0173]

The slide mechanism 7 includes the second shafts 36 that are provided on rear sides of the support frame bodies 13 of the movable frame 11, the second guide rails 37 that are provided on the stationary frame 10 and are directed in the front-rear direction, and second slider portions 38 that are attached to the second shafts 36 and move on the second guide rails 37 in the front-rear direction.

[0174]

The second shafts 36 on which the second slider portions 38 are disposed are provided on the movable frame 11. The second shafts 36 are provided on the support frame bodies 13 of the movable frame 11. The second shafts 36 are rod-shaped members that protrude outward in the width direction from side surfaces of the plate members 17 provided on the rear upright rod members 13b of the support frame bodies 13.

[0175]

The second shafts 36 are provided left and right in a pair and are each a columnar or cylindrical member. In other words, the second shafts 36 include a left shaft that protrudes leftward from the side surface of the left plate member 17, and a right shaft that protrudes rightward from the side surface of the right plate member 17.

[0176]

The second slider portions 38, into which the second guide rails 37 are fitted such that the second slider portions 38 freely move in the front-rear direction, are attached to the

second shafts 36.

[0177]

As illustrated in, for example, FIGs. 2A to 4, the second guide rails 37 guide the movable frame 11 in the front-rear direction. The second guide rails 37 are provided horizontally in the front-rear direction. The second guide rails 37 (horizontal rails 37) are provided left and right in a pair.

[0178]

The second guide rails 37 each have a front end that is joined to a front end of the corresponding front upright rod member 10c of the stationary frame 10, and a rear end that is joined to an upper side of the corresponding rear upright rod member 10d. The second guide rails 37 are the upper rod members 10e of the stationary frame 10.

[0179]

The upper rod member 10eR is the right second guide rail 37. The upper rod member 10eL is the left second guide rail 37. The second guide rails 37 are fitted into the second slider portions 38 such that the second slider portions 38 freely move in the front-rear direction.

[0180]

The second slider portions 38 move on the second guide rails 37 in the front-rear direction to slide the movable frame 11 horizontally in the front-rear direction. The second slider portions 38 (horizontal slider portion 38) are provided left and right in a pair.

[0181]

Quadrangular through holes are formed in lower sides of the second slider portions 38 so as to pass through the second slider portions 38 in the front-rear direction. The second guide rails 37 are inserted through the through holes such that the second slider portions 38 freely slide. In other words, the second slider portions 38 are provided so as to surround the

upper, lower, and side surfaces of the second guide rails 37 and are disposed so as to freely slide.

[0182]

In addition, cylindrical through holes are formed in upper sides of the second slider portions 38 so as to pass through the second slider portions 38 in the left-right direction. The second shafts 36 are inserted through the through holes so as to freely rotate. For example, when the second slider portions 38 move on the second guide rails 37 from the rear ends toward the front ends, the movable frame 11 moves forward.

[0183]

The slide mechanism 7 also includes the slide bars 39 that are provided on the movable frame 11 in parallel with the second guide rails 37 as seen in plan view and slide as the movable frame 11 moves forward and rearward, and guide grooves 40 that are provided in the stationary frame 10 and guide the slide bars 39 in the front-rear direction.

[0184]

The slide bars 39 guide the movable frame 11 in the front-rear direction. The slide bars 39 are provided left and right in a pair.

[0185]

The slide bars 39 are the outer rod members 12c of the seat portion frame body 12 of the movable frame 11. The slide bars 39 are provided outside the front-rear rod members 12a in the left-right direction and on the movable frame 11 in parallel with the second guide rails 37.

[0186]

The slide bars 39 have front ends that are joined to the front ends of the front-rear rod members 12a, and rear ends that are joined to the rear ends of the front-rear rod members 12a. The slide bars 39 are provided horizontally in the front-rear direction. The slide bars 39 are inserted into the guide grooves 40 so as to freely slide. The slide bars 39 move along the guide grooves 40 in the front-rear direction, so that the movable frame 11 slides in the front-rear

direction.

[0187]

The guide grooves 40 guide the slide bars 39 in the front-rear direction. The guide grooves 40 are attached to upper sides of the front upright rod members 10c. The guide grooves 40 are provided left and right in a pair.

[0188]

Quadrangular through holes are formed in lower sides of the guide grooves 40 so as to pass through the guide grooves 40 in the front-rear direction. The slide bars 39 are inserted through the through holes so as to freely slide. That is, the guide grooves 40 are equal in structure to the second slider portions 38.

[0189]

The guide grooves 40 are provided so as to surround the upper, lower, and side surfaces of the slide bars 39 and are disposed such that the slide bars 39 freely slide. For example, when the slide bars 39 move on the guide grooves 40 from the rear ends toward the front ends, the movable frame 11 moves forward.

[0190]

As illustrated in, for example, FIGs. 1 to 3D, the armrest portions 4 are respectively provided on the left and right side surfaces of the seat portion 2. The armrest portions 4 are configured to move together with the seat portion 2 in the front-rear direction in conjunction with the reclining operation of reclining the backrest portion 3.

[0191]

The armrest portions 4 are each a plate-shaped member that is disposed so as to be erected in the up-down direction. The armrest portions 4 allow the user who sits on the seat portion 2 to rest his/her arms on the armrest portions 4. It should be noted that upper surfaces of the armrest portions 4 may be formed substantially horizontally such that the user can easily rest

his/her arms on the armrest portions 4.

[0192]

Specifically, the armrest portions 4 are respectively attached to the left and right sides of the movable frame 11, and move together with the movable frame 11 in the front-rear direction. Front sides of the armrest portions 4 are attached to the support plates 15. The support plates 15 are provided on the front ends of the front-rear rod members 12a of the seat portion frame body 12 of the movable frame 11.

[0193]

Rear sides of the armrest portions 4 are attached to the support plates 16. The support plates 16 are provided on the upper sides of the rear ends of the front-rear rod members 12a of the seat portion frame body 12 of the movable frame 11. The support plates 16 are also provided in front of the front upright rod members 13a and below the bent portions.

[0194]

Lower pull-out members 41 are disposed on lower sides of the armrest portions 4. The lower pull-out members 41 are each a rod member that extends in the front-rear direction, and follow the movement of the armrest portions 4 in the front-rear direction. Roller bodies 42 are provided on lower front sides of the armrest portions 4.

[0195]

The roller bodies 42 are wheels that are disposed on front ends of the lower pull-out members 41 and are rollable in the front-rear direction. The roller bodies 42 roll as the armrest portions 4 move in the front-rear direction. The roller bodies 42 smoothly move the armrest portions 4 in the front-rear direction.

[0196]

The armrest portions 4 are fixed to the movable frame 11 via the support plates 15 and the support plates 16. When the seat portion 2 (the movable frame 11) slides in the front-

rear direction, the armrest portions 4 also move in the front-rear direction.

[0197]

Furthermore, the armrest portions 4 move together with the seat portion 2 in the front-rear direction in conjunction with the reclining operation of moving the lower side of the backrest portion 3 forward and inclining the upper side of the backrest portion 3 rearward.

[0198]

The armrest portions 4 each include a stationary case body 43 (the rear case body 43) that is fixed to the leg body and a blindfold member 44 that is movable in the front-rear direction.

[0199]

The armrest portions 4 are each movable in the front-rear direction. When the armrest portion 4 moves forward, a space within the rear case body 43 is opened, through which some devices such as the interlocking mechanism 8 become visible.

[0200]

On the other hand, when the armrest portion 4 moves rearward, the opened space is closed. The rearward movement of the armrest portion 4 may cause an unpreferable situation in which foreign matter enters the opened space.

[0201]

In view of this, according to the present embodiment, the blindfold member 44 is provided in the rear case body 43. The blindfold member 44 prevents foreign matter from entering the space that is opened when the armrest portion 4 moves forward and is closed when the armrest portion 4 moves rearward. In addition, the blindfold member 44 covers the space opened when the armrest portion 4 moves forward, and prevents the interior of the armrest portion 4 from becoming visible to thereby improve the appearance of the chair-type massage machine 1.

[0202]

The blindfold member 44 has such a structure that a plurality of plates overlapping each other gradually slide like a sliding door. The opened space is covered with a plurality of plate members sliding in the front-rear direction. In the present embodiment, the blindfold member 44 has a slide structure, like a sliding door, including three plate members.

[0203]

The blindfold member 44 includes a front slide plate member 44a, an intermediate slide plate member 44b, and a rear slide plate member 44c. The rear slide plate member 44c is larger than the intermediate slide plate member 44b and the front slide plate member 44a. In other words, the rear slide plate member 44c is sized to cover the two plate members.

[0204]

The intermediate slide plate member 44b is larger than the front slide plate member 44a. In other words, the intermediate slide plate member 44b is sized to cover the front slide plate member 44a. That is, the front slide plate member 44a is the smallest among the three plate members.

[0205]

A slide piece 45a is provided on a lower side of the front slide plate member 44a. The slide piece 45a is fitted into a front-rear rail 46 so as to freely slide in the front-rear direction.

[0206]

A slide piece 45b is provided on a lower side of the intermediate slide plate member 44b. The slide piece 45b is fitted into the front-rear rail 46 so as to freely slide in the front-rear direction. The slide piece 45b is provided outside the slide piece 45a in the left-right direction so as to arranged beside the slide piece 45a at the time of storage.

[0207]

A slide piece 45c is provided on a lower side of the rear slide plate member 44c.

The slide piece 45c is fitted into the front-rear rail 46 so as to freely slide in the front-rear direction. The slide piece 45c is provided outside the slide piece 45b in the left-right direction so as to arranged beside the slide piece 45b at the time of storage.

[0208]

The front-rear rail 46 is provided on a lower side (the corresponding bottom rod member 10a) of the stationary frame 10. The front-rear rail 46 includes three rails into which the slide piece 45a, the slide piece 45b, and the slide piece 45c are respectively fitted so as to freely slide in the front-rear direction.

[0209]

The front slide plate member 44a is capable of sliding away from and toward the intermediate slide plate member 44b, and the intermediate slide plate member 44b is capable of sliding away from and retracting toward the rear slide plate member 44c. The blindfold member 44 thus has a configuration like a sliding door.

[0210]

According to the blindfold member 44 of the present embodiment, the slide plate members 44a to 44c guided along the front-rear rail 46 in the front-rear direction close the space opened in the rear case body 43. The blindfold member 44 thus prevents, for example, the user's hand from entering the space. In addition, the blindfold member 44 is expected to improve the appearance of the chair-type massage machine 1 by preventing the interior of the armrest portion 4 from becoming visible.

[0211]

The rear case bodies 43 (the armrest portions 4) each include expansion and contraction mechanisms 47 that are disposed to support the three blindfold members 44 such that the three blindfold members 44 are movable in the front-rear direction. The expansion and

contraction mechanisms 47 each have an accordion shape. The expansion and contraction mechanisms 47 are provided left and right in a pair. Each rear case body 43 includes two expansion and contraction mechanisms 47, that is, an upper expansion and contraction mechanism 47 and a lower expansion and contraction mechanism 47.

[0212]

The expansion and contraction mechanisms 47 each have such an accordion shape that a rhombus is elongated vertically in the sofa mode (at the time of storage) and is elongated horizontally when the sofa mode is shifted to the lounging mode.

[0213]

The expansion and contraction mechanisms 47 each include a plurality of arm members 48 that are disposed in a crisscross shape, support members 49 that support the arm members 48 such that the arm members 48 freely turn, and coupling members 50 that couple the plurality of arm members 48 to each other. Each expansion and contraction mechanism 47 is capable of expanding and contracting in the front-rear direction in such a manner that the plurality of arm members 48 disposed in the crisscross shape are brought close to or separated from each other.

[0214]

Distal ends of the arm members 48 are coupled to each other with the coupling members 50 such that the arm members 48 freely turn on the coupling members 50. The arm members 48 include long arm members 48 and short arm members 48. Short arm members 48a, long arm members 48b, long arm members 48c, and short arm members 48d are disposed in this order from a front side of each expansion and contraction mechanism 47.

[0215]

A support member 49a is provided on the front slide plate member 44a of each blindfold member 44. A support member 49b is provided on the intermediate slide plate member

44b. A support member 49c is provided on the rear slide plate member 44c. A support member 49d is provided on each rear case body 43.

[0216]

Front ends of the two short arm members 48a are supported by the support member 49a provided on the front slide plate member 44a such that the two short arm members 48a freely turn on the support member 49a. Rear ends of the two short arm members 48a are supported by distal ends of the long arm members 48b with the coupling members 50a such that the short arm members 48a freely turn on the coupling members 50a.

[0217]

Middles of the two long arm members 48b in the longitudinal direction are disposed in the crisscross shape, and are supported by the support member 49b provided on the intermediate slide plate member 44b such that the long arm members 48b freely turn on the support member 49b. Rear ends of the two long arm members 48b are supported by distal ends of the long arm members 48c with the coupling members 50b such that the long arm members 48b freely turn on the coupling members 50b.

[0218]

Middles of the two long arm members 48c in the longitudinal direction are disposed in the crisscross shape, and are supported by the support member 49c provided on the rear slide plate member 44c such that the long arm members 48c freely turn on the support member 49c. Rear ends of the two long arm members 48c are supported by distal ends of the short arm members 48d disposed on the rear sides with the coupling members 50c such that the long arm members 48c freely turn on the coupling members 50c.

[0219]

Rear ends of the two short arm members 48d disposed on the rear sides are supported by the support member 49d provided on the rear case body 43 such that the two short

arm members 48d freely turn on the support member 49d.

[0220]

As illustrated in, for example, FIGs. 2A to 3D and 5A, the front slide plate members 44a of the present embodiment include cutout portions 51 that avoid contact with the first shafts 18. The cutout portions 51 are provided left and right in a pair. An opening width of each cutout portion 51 is larger than an outside diameter of the corresponding first shaft 18. The cutout portions 51 are provided rearward of the long grooves 21 of the reclining mechanisms 6 in parallel.

[0221]

For example, when the guide bodies 23 move upward and obliquely rearward along the long grooves 21, the first slider portions 20 move on the first guide rails 19 from the lower rear ends to the upper front ends. At this time, the first shafts 18 move upward within the cutout portions 51 as in the guide bodies 23 moving along the long grooves 21.

[0222]

[Operating modes]

Next, operating modes of the chair-type massage machine 1 (the chair 1) of the present disclosure are described with reference to the drawings.

[0223]

[Sofa mode]

As illustrated in, for example, FIGs. 2A, 3A, and 4, the reclining mechanisms 6 cause the lower side of the backrest portion 3 to be accommodated in the leg body 5. The lower guide bodies 23a are located on the lower ends of the lower groove portions 21a. The slide mechanism 7 causes the seat portion 2 to be brought in the state moved rearward. This state corresponds to the sofa mode (base position) of the chair-type massage machine 1 (the chair 1).

[0224]

The drivers 29 of the elevating mechanism 28 are driven. The drive motors 33 are driven to output rotational driving forces. The rotational driving forces are transmitted to the rotary drive shaft 30 via the gear cases 34. The rotary drive shaft 30 rotates by the rotational driving forces.

[0225]

[Shift from sofa mode to comfortable mode]

As illustrated in, for example, FIGs. 2B, 3B, 4, 5A, and 5B, the pinion gears 32 attached to the rotary drive shaft 30 roll upward while meshing with the rack gears 31. In other words, the lower guide bodies 23a and the upper guide bodies 23b move upward along the lower groove portions 21a.

[0226]

The reclining mechanisms 6 move the backrest frame 14 (the backrest portion 3) upward. The interlocking mechanism 8 uses the driving forces from the reclining mechanisms 6 for driving the slide mechanism 7. When the slide mechanism 7 is driven, the movable frame 11 (the seat portion 2 and the armrest portions 4) slides forward from the position (i) in FIG. 3A to the position (ii) in FIG. 3B.

[0227]

Since the long grooves 21 (the guide plates 22) of the reclining mechanisms 6 are attached to the movable frame 11 that is movable in the front-rear direction, the slide mechanism 7 is interlocked with the reclining mechanisms 6 by the interlocking mechanism 8. In other words, the movable frame 11 and the backrest frame 14 are interlocked with each other by the interlocking mechanism 8, and are thus movable in the front-rear direction.

[0228]

In the interlocking mechanism 8, the first slider portions 20 (the inclined slider portions 20) coupled to the backrest frame 14 with the first shafts 18 move forward and

obliquely upward along the first guide rails 19 (the inclined rails 19) provided on the stationary frame 10 in the state in which the first guide rails 19 (the inclined rails 19) extend obliquely forward from the lower rear ends to the upper front ends (in the form of a diagonal brace), as the backrest portion 3 moves upward.

[0229]

When the first slider portions 20 move forward and obliquely upward on the first guide rails 19, the upward movement component (the z-directional component) of the backrest frame 14 is resolved into the forward movement component (the x-directional component) of the movable frame 11. The movable frame 11 including the seat portion 2 and the armrest portions 4 thus moves forward.

[0230]

The movable frame 11 is guided straight forward by the second slider portions 38 (the horizontal slider portions 38) moving on the second guide rails 37 (the horizontal rails 37) and the slide bars 39 moving along the guide grooves 40. The seat portion 2 slides forward as the backrest portion 3 moves forward.

[0231]

[Comfortable mode]

As illustrated in, for example, FIGs. 2C, 3C, 4, 5A, and 5B, the pinion gears 32 attached to the rotary drive shaft 30 roll upward while meshing with the rack gears 31. The lower guide bodies 23a move upward along the lower groove portions 21a. The upper guide bodies 23b move upward along the lower groove portions 21a and reach the upper ends of the lower groove portions 21a.

[0232]

The reclining mechanisms 6 further move the backrest frame 14 (the backrest portion 3) upward. The interlocking mechanism 8 resolves the driving forces from the reclining

mechanisms 6 to be used for driving the slide mechanism 7.

[0233]

In the interlocking mechanism 8, the first slider portions 20 (the inclined slider portions 20) coupled to the backrest frame 14 with the first shafts 18 further move forward and obliquely upward along the first guide rails 19 (the inclined rails 19) provided on the stationary frame 10, as the backrest portion 3 further moves upward.

[0234]

That is, the upward movement component (the z-directional component) of the backrest frame 14 is resolved into the forward movement component (the x-directional component) of the movable frame 11, and is used for driving the slide mechanism 7.

[0235]

When the slide mechanism 7 is driven, the movable frame 11 is guided straight forward by the second slider portions 38 (the horizontal slider portions 38) moving on the second guide rails 37 (the horizontal rails 37) and the slide bars 39 moving along the guide grooves 40. In addition, the interlocking mechanism 8 moves the backrest frame 14 (the backrest portion 3) forward.

[0236]

The movable frame 11 including the seat portion 2 and the armrest portions 4 slides forward from the position (ii) in FIG. 3B to the position (iii) in FIG. 3C.

[0237]

When the reclining mechanisms 6 move the upper guide bodies 23b to the boundaries between the lower groove portions 21a and the upper groove portions 21b, the backrest portion 3 moves uppermost, and the slide mechanism 7 moves the seat portion 2 forward. The chair-type massage machine 1 can be used in the comfortable mode in which the backrest portion 3 protrudes uppermost.

[0238]

[Lounging mode]

As illustrated in, for example, FIGs. 2D, 3D, 4, 5A, and 5B, the pinion gears 32 attached to the rotary drive shaft 30 roll upward while meshing with the rack gears 31 and reach the upper ends of the rack gears 31. The lower guide bodies 23a further move upward along the lower groove portions 21a. The upper guide bodies 23b move upward along the upper groove portions 21b and reach the upper ends of the upper groove portions 21b.

[0239]

The reclining mechanisms 6 perform the reclining operation of inclining the backrest frame 14 (the backrest portion 3) rearward. The interlocking mechanism 8 resolves the driving forces from the reclining mechanisms 6 to be used for driving the slide mechanism 7.

[0240]

In the interlocking mechanism 8, the first slider portions 20 (the inclined slider portions 20) coupled to the backrest frame 14 with the first shafts 18 further move forward and obliquely upward along the first guide rails 19 (the inclined rails 19) provided on the stationary frame 10, and reach the upper ends of the first guide rails 19 as the backrest portion 3 inclines rearward.

[0241]

That is, the upward movement component (the z-directional component) of the backrest frame 14 is resolved into the forward movement component (the x-directional component) of the movable frame 11, and is used for driving the slide mechanism 7.

[0242]

When the slide mechanism 7 is driven, the movable frame 11 is further guided straight forward by the second slider portions 38 (the horizontal slider portions 38) moving on the second guide rails 37 (the horizontal rails 37) and the slide bars 39 moving along the guide

grooves 40. In addition, the interlocking mechanism 8 further moves the backrest frame 14 (the backrest portion 3) forward.

[0243]

The movable frame 11 including the seat portion 2 and the armrest portions 4 slides forward from the position (iii) in FIG. 3C to the position (iv) in FIG. 3D.

[0244]

When the reclining mechanisms 6 move the upper guide bodies 23b to the upper ends (obliquely upper rear ends) of the upper groove portions 21b, the backrest portion 3 inclines rearward, that is, reclines, and the slide mechanism 7 further moves the seat portion 2 forward as compared with the comfortable mode, so that the chair-type massage machine 1 is in the state of the lounging mode (the reclining position).

[0245]

The reclining operation of reclining the backrest portion 3 in the case where the chair-type massage machine 1 is installed near the wall W is described in detail again since the reclining operation in this situation is the important point and is characteristic operation in the present disclosure.

[0246]

The chair-type massage machine 1 of the present embodiment is capable of performing the reclining operation of reclining the backrest portion 3 even in a case where, depending on various situations such as the size of a room, it is occasionally necessary to install the chair-type massage machine 1 in the state in which there is almost no clearance between the rear surface of the backrest portion 3 and the wall W of the room (see, for example, FIG. 1).

[0247]

In the chair-type massage machine 1 of the present embodiment, the backrest frame 14 is mounted to the movable frame 11, and the interlocking mechanism 8 interlocks the

reclining mechanisms 6 and the slide mechanism 7 with each other.

[0248]

Since the chair-type massage machine 1 has the configuration described above, in reclining the backrest portion 3, the interlocking mechanism 8 uses the driving forces from the reclining mechanisms 6 for the slide mechanism 7, so that the movable frame 11 slides forward. When the movable frame 11 slides forward, the backrest frame 14 moves forward while reclining.

[0249]

As described above, in performing the reclining operation of reclining the backrest portion 3, the interlocking mechanism 8 performs the interlocking operation of moving the backrest portion 3 forward in conjunction with the sliding operation of sliding the seat portion 2 forward. As a result, the backrest portion 3 moves downward without contact with the wall W of the room. Therefore, for example, even in a case where a distance between the wall W of the room and the rear surface of the backrest portion 3 is only several centimeters in installing the chair-type massage machine 1, it is possible to smoothly recline the backrest portion 3 (achieve so-called zero wall reclining).

[0250]

According to the chair-type massage machine 1 (the chair 1) of the present disclosure described above in detail, at the time of the reclining operation of reclining the backrest portion 3 by the reclining mechanisms 6, the interlocking mechanism 8 smoothly interlocks the sliding operation of sliding the seat portion 2 in the front-rear direction by the slide mechanism 7. Therefore, in installing the chair-type massage machine 1 (the chair 1) near the wall of the room, even in a case where there is almost no clearance between the wall W of the room and the rear surface of the backrest portion 3, the backrest portion 3 is capable of smoothly reclining.

[0251]

The chair-type massage machine 1 of the present embodiment and at least one chair equal in shape to the chair-type massage machine 1 can be coupled to each other with a coupling unit 52.

[0252]

FIG. 6 is a perspective view of a composite chair 54 including the chair-type massage machine 1 of the present embodiment, a chair 53 that is equal in shape to the chair-type massage machine 1, and the coupling unit 52 that couples the chair-type massage machine 1 and the chair 53 to each other. FIG. 7 is an exploded view of the composite chair 54 including the chair-type massage machine 1 of the present embodiment, the chair 53 that is equal in shape to the chair-type massage machine 1, and the coupling unit 52 that couples the chair-type massage machine 1 and the chair 53 to each other.

[0253]

Using the chair-type massage machine 1 (the chair 1) of the present embodiment described in detail above, the composite chair 54 can be obtained in such a manner that the coupling unit 52 is interposed between adjacent two of the chair-type massage machines 1 or chairs 53, equal in shape to each other, to thereby couple at least two or more of the chair-type massage machines 1 or chairs 53 to each other in the left-right direction.

[0254]

As illustrated in FIGs. 6 and 7, in the composite chair 54 of the present embodiment, the chair-type massage machine 1 is disposed on the right side of the coupling unit 52, and the chair 53 is disposed on the left side of the coupling unit 52.

[0255]

The coupling unit 52 of the present embodiment has an appearance of a substantially chair shape. Furthermore, the coupling unit 52 includes a hollow housing. A width

of the coupling unit 52 is approximately one-third of a width of the chair-type massage machine

1. It should be noted that the shape and dimensions of the coupling unit 52 can be set arbitrarily.

[0256]

The coupling unit 52 of the present embodiment includes a horizontal portion 55 that is aligned with the seat portion 2 upon coupling and an upright portion 56 that is aligned with the backrest portion 3 upon coupling.

[0257]

An upper surface of the horizontal portion 55 of the coupling unit 52 is flush with the upper surface of the seat portion 2. In other words, a height of the horizontal portion 55 from the floor F is equal to a height of the seat portion 2 from the floor F. In addition, a front vertical plane of the horizontal portion 55 is flush with a front vertical plane of the chair-type massage machine 1 in the sofa mode (the bottom surface of the footrest 9 that is stored).

[0258]

The horizontal portion 55 has recesses 55a located slightly below the upper surface. In sliding the coupling unit 52 rearward, protrusions 58a of side plate members 58 are fitted into the recesses 55a, so that the side plate members 58 are stored smoothly.

[0259]

On lower left and right sides of the horizontal portion 55, coupling portions 57 are provided so as to be coupled to the chair-type massage machine 1 or the chair 53 equal in shape to the chair-type massage machine 1. In the present embodiment, the coupling portions 57 include pins 57a that are provided on the lower left and right sides of the horizontal portion 55, and holes 57b that are formed in the bottom rod members 10a of the stationary frame 10 and into which the pins 57a are fitted. The coupling portions 57 can be easily fitted upon coupling of the chair-type massage machine 1 or the like, and are not easily separated after the coupling.

[0260]

The side plate members 58 are disposed on the left and right side surfaces of the horizontal portion 55 so as to freely slide in the front-rear direction. The side plate members 58 are coupled to the side surfaces of the movable frame 11 instead of the armrest portions 4. The side plate members 58 move together with the seat portion 2 as the movable frame 11 slides in the front-rear direction.

[0261]

For example, in the case of the chair-type massage machine 1 disposed right, the right side plate member 58 is disposed instead of the left armrest portion 4. The side plate members 58 are disposed on front sides of the rear case bodies 43. A distance of the side plate members 58 sliding forward is equal to a distance of the armrest portions 4 sliding forward.

[0262]

Specifically, the side plate members 58 are provided so as to be supported by the support plate 15 provided on the front end of the right movable frame 11 (the front-rear rod member 12a) and the support plate 16 provided on the rear end of the right movable frame 11 (the front-rear rod member 12a).

[0263]

Upper surfaces of the side plate members 58 are flush with the upper surface of the seat portion 2. In other words, a height of each side plate member 58 from the floor F is equal to the height of the seat portion 2 from the floor F. In addition, front vertical planes of the side plate members 58 are flush with the front vertical plane of the chair-type massage machine 1 in the sofa mode (the bottom surface of the footrest 9 that is stored).

[0264]

Since the side plate members 58 are accommodated in the horizontal portion 55, the protrusions 58a are located slightly below the upper surfaces. In sliding the side plate members 58 rearward, the protrusions 58a are fitted into the recesses 55a in the horizontal

portion 55, so that the side plate members 58 are stored smoothly.

[0265]

Cutout portions 58b are provided on the lower sides of the side plate members 58 so as to avoid contact with the coupling portions 57 in sliding the side plate members 58 rearward. The cutout portions 58b extend rearward from middles of the side plate members 58 in the front-rear direction.

[0266]

In the case of the chair 53 disposed left, the left side plate member 58 is disposed instead of a right armrest portion of the chair 53. The left side plate member 58 disposed on the chair 53 is fixed to a frame of the chair 53 and therefore does not slide in the front-rear direction.

[0267]

The upright portion 56 of the coupling unit 52 is flush with the front surface of the backrest portion 3. A height of the upright portion 56 is almost equal to a height of the backrest portion 3 of the chair-type massage machine 1 in the sofa mode.

[0268]

The upright portion 56 of the coupling unit 52 may be configured to be raised upward. A hinge 59 is provided at a joint between the horizontal portion 55 and the upright portion 56. When the upright portion 56 is tilted forward and laid on the horizontal portion 55, the coupling unit 52 serves as an armrest. When the upright portion 56 is raised rearward so as to be flush with the front surface of the backrest 3, a laterally oblong sofa shape is obtained.

[0269]

In addition, a compartment for holding small articles may be provided inside the coupling unit 52. The coupling unit 52 may have a strength to a degree that the user is able to sit, and may be provided with a cushioning medium on which the user is able to sit.

[0270]

As described above, the use of the coupling unit 52 allows a plurality of the chair-type massage machines 1 of the present embodiment, and the like to be coupled to each other.

[0271]

For example, as illustrated in FIGs. 6 and 7, one chair-type massage machine 1 of the present embodiment and one chair 53 equal in shape to the chair-type massage machine 1 may be prepared, and the chair-type massage machine 1 and the chair 53 may be coupled to each other with the coupling unit 52 interposed therebetween.

[0272]

Alternatively, for example, two chair-type massage machines 1 of the present embodiment may be prepared, and the chair-type massage machines 1 may be coupled to each other with the coupling unit 52 interposed therebetween.

[0273]

In addition, two coupling units 52 may be used. For example, three chair-type massage machines 1 of the present embodiment may be prepared, and the chair-type massage machines 1 may be coupled to each other with each coupling unit 52 interposed between adjacent two of the three chair-type massage machines 1.

[0274]

Alternatively, two chair-type massage machines 1 of the present embodiment and one chair 53 equal in shape to the chair-type massage machines 1 may be prepared, and the chair 53 may be coupled to the chair-type massage machines 1 with the coupling units 52 respectively interposed between the chair 53 and the chair-type massage machines 1.

[0275]

As described above, the use of the coupling units 52 enables coupling of at least two or more chair-type massage machines 1 of the present embodiment, chairs 53, and the like in the left-right direction and achieves the composite chair 54 having a desired size (a chair 54 in

the form of a laterally oblong sofa).

[0276]

It should be understood that embodiments disclosed herein are illustrative and are not restrictive in all respects. In particular, as matters that are not explicitly described in the embodiments disclosed herein, such as activating conditions or operating conditions, and dimensions, weights, and the like of constituents, matters are adopted that can be easily conceived by a person skilled in the art without departing from the scope of ordinary implementations by a person skilled in the art. Although not illustrated in the drawings, for example, with regard to the massage mechanism incorporated in the chair-type massage machine 1, a length of a kneading arm, an inclination angle of a kneading arm to a rotary drive shaft, a distance between left and right kneading arms, and the like can be changed as appropriate in view of a treatment range.

REFERENCE SIGNS LIST

[0277]

- 1 chair-type massage machine (chair)
- 2 seat portion
- 3 backrest portion
- 4 armrest portion
- 5 leg body
- 6 reclining mechanism
- 7 slide mechanism
- 8 interlocking mechanism
- 10 stationary frame (base frame)
- 10eR right upper rod member (second guide rail)

- 10eL left upper rod member (second guide rail)
- 10fR right central rod member (first guide rail)
- 10fL left central rod member (first guide rail)
- 11 movable frame
- 12 seat portion frame body
- 13 support frame body
- 14 backrest frame
- 14c auxiliary rod member
- 14d rear rod member
- 18 first shaft
- 19 first guide rail (inclined rail)
- 20 first slider portion (inclined slider portion)
- 21 long groove
- 21a lower groove portion
- 21b upper groove portion
- 22 guide plate
- 23 guide body
- 23a lower guide body
- 23b upper guide body
- 24 third shaft
- 28 elevating mechanism
- 29 driver
- 30 rotary drive shaft
- 31 rack gear
- 32 pinion gear

- 33 drive motor
- 36 second shaft
- 37 second guide rail
- 38 second slider portion
- 39 slide bar
- 40 guide groove
- 43 stationary case body (rear case body)
- 44 blindfold member
- 44a front slide plate member
- 44b intermediate slide plate member
- 44c rear slide plate member
- 47 expansion and contraction mechanism
- 48 arm member
- 49 support member
- 50 coupling member
- 52 coupling unit
- 53 chair
- 54 composite chair
- 55 horizontal portion
- 56 upright portion
- 58 side plate member
- F floor
- W wall

CLAIMS

- [Claim 1] A chair comprising:
- a seat portion on which a user is able to sit;
 - a backrest portion provided on a rear side of the seat portion;
 - a leg body supporting the seat portion and the backrest portion;
 - a reclining mechanism configured to recline the backrest portion;
 - a slide mechanism configured to slide the backrest portion and the seat portion in a front-rear direction; and
 - an interlocking mechanism configured to interlock the reclining mechanism and the slide mechanism with each other.
- [Claim 2] The chair according to claim 1, wherein
- the leg body includes:
 - a stationary frame to be installed on a floor; and
 - a movable frame on which the seat portion and the backrest portion are mounted, the movable frame being slidable relative to the stationary frame in the front-rear direction,
 - a backrest frame configured to support the backrest portion such that the backrest portion is reclinable and the seat portion are mounted on the movable frame, and
 - the slide mechanism allows the movable frame to slide relative to the stationary frame in the front-rear direction.
- [Claim 3] The chair according to claim 2, wherein
- the interlocking mechanism is a mechanism configured to interlock reclining operation of reclining the backrest frame by the reclining mechanism with sliding operation of

sliding the movable frame in the front-rear direction by the slide mechanism.

[Claim 4] The chair according to claim 3, wherein
the interlocking mechanism is configured to cause the slide mechanism to slide the movable frame in the front-rear direction, using a driving force output from an elevating mechanism of the reclining mechanism for reclining the backrest portion.

[Claim 5] The chair according to claim 4, wherein
the interlocking mechanism includes:
a first shaft provided on a lower side of the backrest frame;
a first guide rail provided on the stationary frame in a state in which the first guide rail is inclined forward so as to extend obliquely from a lower rear end to an upper front end; and
a first slider portion attached to the first shaft and configured to move obliquely on the first guide rail.

[Claim 6] The chair according to claim 5, wherein
the interlocking mechanism is configured to, when the first slider moves on the first guide rail inclined forward so as to extend obliquely upward, generate for the first slider a force component directed forward or rearward, from upward or rearward movement of the backrest frame, transmit the generated force component directed forward or rearward, to the first shaft to which the first slider is attached, and move the movable frame forward or rearward via the backrest frame.

[Claim 7] The chair according to claim 6, wherein
the reclining mechanism moves the backrest portion upward,

the reclining mechanism includes:

a guide plate provided on the seat portion and having a long groove extending in an up-down direction; and

a guide body fitted into the long groove so as to freely roll and configured to be guided along the long groove, and

the reclining mechanism couples the backrest frame and the movable frame to each other.

[Claim 8] The chair according to claim 7, wherein

the reclining mechanism moves the backrest portion upward and tilts the backrest portion, which has been moved upward, rearward,

an upper side of the long groove has a shape curved rearward,

the long groove includes:

a lower groove portion extending in the up-down direction and inclined rearward; and

an upper groove portion connected to an upper side of the lower groove portion and bent rearward of the lower groove portion,

the long groove is provided with a rack gear,

at least two or more of the guide bodies are disposed on an upper side and a lower side of the long groove,

one of the guide bodies is movable from the lower groove portion to the upper groove portion, and

another one of the guide bodies includes a pinion gear meshing with the rack gear, and is movable on the lower groove portion.

[Claim 9] The chair according to claim 8, wherein
the slide mechanism includes:
a second shaft provided on the movable frame;
a second guide rail provided on the stationary frame and directed in the front-rear direction; and
a second slider portion attached to the second shaft and configured to move on the second guide rail in the front-rear direction.

[Claim 10] The chair according to claim 9, wherein
the slide mechanism includes:
a slide bar provided on the movable frame in parallel with the second guide rail, and configured to slide in conjunction with movement of the movable frame in the front-rear direction; and
a guide groove provided in the stationary frame and configured to guide the slide bar in the front-rear direction.

[Claim 11] The chair according to claim 1, wherein
armrest portions are respectively provided on left and right sides of the seat portion, and
the armrest portions are configured to move together with the seat portion in the front-rear direction in conjunction with the reclining operation of reclining the backrest portion.

[Claim 12] The chair according to claim 11, wherein
the armrest portions are respectively attached to the left and right sides of the movable frame, and move together with the movable frame in the front-rear direction.

[Claim 13] The chair according to any one of claims 1 to 12, wherein
a massage mechanism configured to perform a massage on a treatment target site
of the user is incorporated in one of or each of the backrest portion and the seat portion.

[Claim 14] A composite chair comprising:
at least two or more of the chairs according to any one of claims 1 to 13; and
a coupling unit configured to couple two of the chairs to each other in a left-right
direction with the coupling unit interposed between the chairs.

[Claim 15] The composite chair according to claim 14, wherein
the coupling unit includes a side plate member disposed so as to freely slide in the
front-rear direction, and
the side plate member is coupled to the movable frame.