

DESCRIPTION

TITLE OF INVENTION

MASSAGER

TECHNICAL FIELD

[0001] The present invention relates to massagers each of which performs pressing massage on the buttocks, the back, and other parts of user's body.

BACKGROUND ART

[0002] Some known massagers, each of which is shaped like a chair with a seat and a backrest (i.e., massage chairs), each have a massage mechanism built in the seat. The massage mechanism includes a plurality of treating elements arranged in a front-rear direction, and massages buttocks of a user sitting in the seat by pressing the treating elements against the buttocks from below (for instance a massager disclosed in Patent Literature 1).

[0003] Specifically, the massager of Patent Literature 1 includes a seat part, a massage mechanism, and a guide rail. The massage mechanism massages buttocks of a user sitting in the sea part. The guide rail guides the massage mechanism in movement in the front-rear direction in the interior of the seat part. The massage mechanism includes two treating elements (i.e., two massaging members) arranged in the front-rear direction under a seat surface

of the seat part, and massages the buttocks of the user by upwardly pressing the treating elements against the buttocks via the seat surface.

[0004] The guide rail extends in the front-rear direction in the interior of the seat part. The massage mechanism presses the treating elements against the buttocks-to-thigh region when guided in movement in the front-rear direction along the guide rail. The massage mechanism is thus capable of massaging not only the buttocks, but also the thigh of the user by moving the treating elements in the front-rear direction.

Prior Art Reference

Citation List

[0005] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2018-134182

SUMMARY OF INVENTION

Technical Problem

[0006] Typical chair-shaped massagers each have a seat part and a backrest part which is inclinable rearward of the seat part. Some of such known massagers are each designed such that the seat part inclines upwardly in synchronism with the backward inclining of the backrest part.

[0007] The massager may fail to provide appropriate and effective massage when, for example, the posture of a

user changes in response to the backward inclining of the backrest part. More specifically, the postural change causes the weighted center of the user to shift, reducing the load applied in the direction of the normal to the seat surface. This results in the treating elements being pressed with insufficient force against a to-be-treated body area of the user.

[0008] An object of the present invention is to provide a performance-enhanced massager capable of applying adequate pressing force to to-be-treated body areas of a user.

Solution to Problem

[0009] To solve the above problem, a massager according to an example embodiment of the present invention adopts the following technical means.

[0010] A massager according to an aspect of the present invention includes a main body to face predetermined treatment area of a user, and a massage mechanism, provided inside a treating surface of the main body which faces the treatment area, to perform pressing massage on the treatment area. The massage mechanism includes a first treating element to massage the treatment area, and a position-changing mechanism to change a treatment-element position of the first treating element in a vertical direction. The position-changing mechanism is

configured to change the treatment-element position between a first state where the first treating element is in a lowered position and a second state where the first treating element is in a raised position.

[0011] The massage mechanism may include the first treating element and a second treating element to massage the treatment area, and the position-changing mechanism to change a vertical position of the first treating element and a vertical position of the second treating element. The first treating element and the second treating element may be arranged in a front-rear direction at a predetermined spacing therebetween. The position-changing mechanism may be configured to change the treatment-element position between the first state where the second treating element is in a raised position and the second state where the first treating element is in the raised position.

[0012] The massage mechanism may include an outer frame, an arm portion provided at an end thereof with the first treating element and pivotally mounted at another end thereof on the outer frame, an eccentric cam pivotally mounted on the outer frame and configured to, when rotated, allow the arm portion to reciprocate at least in the vertical direction, a movable frame pivotally mounted at a supported end thereof on the outer frame, and a link frame extended between a tip of the movable frame and the end of

the arm portion with the first treating element to pivotally couple the movable frame and the arm portion to each other. The position-changing mechanism may be configured to change the treatment-element position by rocking the movable frame about the supported end of the movable frame.

[0013] The massage mechanism may include an outer frame, an arm portion provided at opposite ends thereof with the first treating element and the second treating element, respectively, and pivotally mounted on the outer frame at an intermediate portion thereof between the opposite ends thereof, an eccentric cam pivotally mounted on the outer frame and configured to, when rotated, allow the arm portion to reciprocate at least in the vertical direction, a movable frame pivotally mounted at a supported end thereof on the outer frame, and a link frame extended between a tip of the movable frame and one of the opposite ends of the arm portion with the first treating element to pivotally couple the movable frame and the arm portion to each other. The position-changing mechanism may be configured to change the treatment-element position by rocking the movable frame about the supported end of the movable frame.

[0014] The massager may further include an air-supply device to supply air to the massage mechanism. The

position-changing mechanism may include an air bag to rock the movable frame with a pressure of air supplied from the air-supply device.

[0015] The outer frame may include a base frame to face the movable frame. The air bag may be provided between the movable frame and the base frame, and may be configured to rock the movable frame away from the base frame in the vertical direction with the pressure of the air.

[0016] The massage mechanism may include a driver to drive the massage mechanism, and a casing to house the driver. The air bag may be provided between the movable frame and the casing, and may be configured to rock the movable frame away from the casing in the vertical direction with the pressure of the air.

[0017] The air bag may be provided on each of an upper surface portion of the movable frame and a lower surface portion of the movable frame.

[0018] The main body may include a seat part to face the buttocks of the user, the buttocks being the treatment area. The massage mechanism may be provided inside a seat surface of the seat part, the seat surface being the treating surface.

[0019] The main body may include a seat part to face buttocks of the user, the buttocks being the treatment

area, and a backrest part upstanding at a rear side of the seat part, the backrest part being inclinable in a direction rearward of the seat part. The massage mechanism is configured to, as the backrest part inclines backwardly, change the treatment-element position to the second state.

[0020] The first treating element may be provided forward of the second treating element.

Advantageous Effects of Invention

[0021] The massager according to an example embodiment of the present invention changes the positional relationship between the treating elements on an as-needed basis, and can thus apply adequate pressing force to the treatment area of a user even when the posture of the user changes. This yields a massager that achieves enhanced massage performance.

BRIEF DESCRIPTION OF DRAWINGS

[0022]

FIG. 1 is a perspective view of a massager according to an example embodiment of the present invention.

FIG. 2 is a side view showing an arrangement of a first massage mechanism.

FIG. 3 is a perspective view of a first massage mechanism.

FIG. 4 is a partly disassembled perspective view of a first massage mechanism.

FIG. 5 is a perspective view of an internal structure of a

first massage mechanism.

FIG. 6 is a side view of a first massage mechanism, with a movable frame being in a lower position.

FIG. 7 is a side view of a first massage mechanism, with a movable frame being in a middle position.

FIG. 8 is a side view of a first massage mechanism, with a movable frame being in an upper position.

FIG. 9 is a schematic view of a general configuration of a controller.

DESCRIPTION OF EMBODIMENTS

[0023] Example embodiments of the present invention will now be described with reference to the drawings. The following example embodiments are given by way of example of carrying the present invention into practice, and hence are not intended to be limiting of the structural features of example embodiments of the present invention.

[0024] A massager 1 according to an example embodiment is a chair-shaped massager (i.e., massage chair). The massager 1 massages at least one to-be-treated body area (hereafter called "treatment area") of a user sitting in the massager 1. The at least one treatment area includes user's neck, shoulders, back, waist (i.e., lower back, or hip), buttocks, thighs, and/or lower legs.

[0025] As shown in FIG. 1, the massager 1 includes a base 2, a main body 3, and a massage mechanism 4. The main

body 3 includes a seat part 3A, a backrest part 3B, and a footrest part 3C. The massage mechanism 4 includes a first massage mechanism 4A, a second massage mechanism 4B, and a third massage mechanism 4C.

[0026] As shown in FIG. 2, the massager 1 includes a power supply device 5, an actuator device 6, and an air-supply device 7. The power supply device 5, the actuator device 6, and the air-supply device 7 are disposed in an interior of the base 2. The power supply device 5 is connected via electrical wiring to the individual massage mechanisms 4, the actuator device 6, and the air-supply device 7, and supplies driving electric power to each of the massage mechanisms 4, the actuator device 6, and the air-supply device 7. The air-supply device 7 is connected via an air tube P1 to the first massage mechanism 4A and the third massage mechanism 4C, and supplies the first massage mechanism 4A and the third massage mechanism 4C with air taken from an external area of the massager 1 to actuate the first massage mechanism 4A and the third massage mechanism 4C.

[0027] The power supply device 5, the actuator device 6, and/or the air-supply device 7 may be provided in a place other than the interior of the base 2. For example, the air-supply device 7 may be provided within the seat part 3A. When using a plurality of the air-supply devices

7, one of them may be, as a dedicated air pump for the first massage mechanism 4A, mounted to the first massage mechanism 4A (e.g., the back side of a base frame 32, which will hereafter be described).

[0028] In the present example embodiment, the direction from front to back, or vice versa, of a user sitting with proper posture in the massager 1 (i.e., directions indicated by arrows "X1" and "X2") is defined as the front-rear direction of the massager 1, and the direction from right to left, or v.v., of the user having the proper sitting posture (i.e., directions indicated by arrows "Y1" and "Y2") is defined as the right-left, or lateral direction of the massager 1. Also, the direction from top to bottom, or v.v., of the user having that posture (i.e., directions indicated by arrows "Z1" and "Z2") is defined as the top-bottom, or vertical direction of the massager 1.

[0029] The main body 3 is placed to face one or more specified treatment areas of a user sitting in the massager 1. More specifically, the seat part 3A is disposed above the base 2, and supports, at a seat surface 8 thereof, the buttocks and thighs of the user from below. That is, the seat part 3A is located below a first specified treatment area, including the buttocks and the thighs, of the user sitting in the massager 1 to face the first specified

treatment area thereabove.

[0030] The backrest part 3B is disposed in upstanding condition at the rear side of the seat part 3A, and supports, at a backrest surface 9 thereof, the back and waist of the user from the rear. That is, the backrest part 3B is located behind a second specified treatment area, including the back and the waist, of the user sitting in the massager 1 to face the second specified treatment area forward thereof.

[0031] The backrest part 3B is connected to the actuator device 6. The telescoping motion of the actuator device 6 allows the backrest part 3B to incline rearwardly of the seat part 3A. That is, the backrest part 3B is backwardly-tiltably attached to the base 2.

[0032] The footrest part 3C is rockably provided at the front side of the seat part 3A. The footrest part 3C supports, at its surface which faces upward when the footrest part 3C rocks forwardly and upwardly, the lower legs of the user sitting in the massager 1A from below. That is, the footrest part 3C may be located behind a third specified treatment area, including the lower legs, of the user to face the third specified treatment area forward thereof.

[0033] The seat part 3A is provided at a lower front portion thereof with an opening 3H for retracting the

footrest part 3C (i.e., footrest retracting place 3H). The footrest part 3C is freely tiltable and movable at a variable angle between a retracted position (i.e., a position where the footrest part 3C is housed in the footrest retracting place 3H) and a raised position (i.e., a position to which the footrest part 3C has been moved upwardly forward from the footrest retracting place 3H). At the raised position, the footrest part 3C supports, from below, the lower legs of the user stretched out forward of the seat part 3A.

[0034] The footrest part 3C includes two recesses that receive the right lower leg and the left lower leg, respectively, of the user. The third massage mechanism 4C is disposed in the interior of a portion defining each of these recesses. In the present example embodiment, the third massage mechanism 4C performs pressing massage on the lower leg (i.e., treatment area) using an inflated air bag. The third massage mechanism 4C may alternatively use a platelike treating element to perform pressing massage on the lower leg (i.e., treatment area).

[0035] As shown in FIG. 2, the first massage mechanism 4A is disposed in the interior of the seat part 3A. The first massage mechanism 4A is mounted inside of the seat surface 8 defining a treating surface S movably in the front-rear direction. More specifically, the seat part 3A

includes first guide rails 11 on left and right inner sides thereof, respectively. The first massage mechanism 4A is supported movably along the first guide rails 11. In other words, the first guide rails 11 support the first massage mechanism 4A to allow movement of the first massage mechanism 4A in the front-rear direction in the interior of the seat part 3A.

[0036] Each of the first guide rails 11 includes a rack 12 and a guide slot 13. The rack 12 has a plurality of teeth arranged in the direction in which the first guide rail 11 extends. A pinion 48 meshes with the rack 12. The pinion 48 is mounted to a first support shaft 41 of the first massage mechanism 4A. The guide slot 13 extends along with the rack 12. The first massage mechanism 4A includes a second support shaft 42 which engages in the guide slot 13.

[0037] In the present example embodiment, the first guide rail 11 includes a guide portion 11A for back-and-forth movement (hereafter called "back-forth guide portion 11A") and a guide portion 11B for up-and-down movement (hereafter called "up-down guide portion 11B"). The back-forth guide portion 11A linearly extends in a direction from the front of the seat part 3A toward the rear. The back-forth guide portion 11A gently slopes downwardly and rearwardly. The up-down guide portion 11B extends in

arcuate form downwardly rearward from the rear end of the back-forth guide portion 11A. The up-down guide portion 11B is gently curved downwardly. In other words, in the interior of the seat part 3A, the first guide rail 11 linearly extends in a front-to-rear direction, and subsequently extends in concave form downwardly rearward.

[0038] Thus configured, the first massage mechanism 4A is movable along the seat surface 8 in the front-rear direction in a first range where it is supported by the back-forth guide portion 11A, and also movable toward and away from the seat surface 8 in a second range where it is supported by the up-down guide portion 11B. The structure of the first massage mechanism 4A will hereafter be described in detail.

[0039] As shown in FIG. 1, the second massage mechanism 4B is disposed in the interior of the backrest part 3B. The second massage mechanism 4B is mounted in the interior of the backrest surface 9 defining a treating surface S movably in the vertical direction. More specifically, the backrest part 3B includes second guide rails 14 on left and right inner sides thereof, respectively. Similar to the first guide rail 11, each of the second guide rails 14 includes a rack and a guide slot, and supports the second massage mechanism 4B for vertical movement using the rack and the guide slot.

[0040] In the present example embodiment, the second massage mechanism 4B includes two treating arms 15 arranged in the lateral direction. These right-hand and left-hand treating arms 15 each have a treating element at an end thereof. The second massage mechanism 4B massages the neck, the shoulders, the back, the waist, etc., of the user via the treating elements. More specifically, the second massage mechanism 4B performs kneading massage, or grasping massage, or also tapping massage. To attain kneading massage, the second massage mechanism 4B presses the treating elements of the right-hand and left-hand treating arms 15 against the treatment area, including the neck, the shoulders, the back, and the waist, of the user. To attain grasping massage, the second massage mechanism 4B moves the right-hand and left-hand treating arms 15 toward and away from each other in the lateral direction along the treatment area, including the neck, the shoulders, the back, and the waist, of the user so as to sandwich and hold (i.e., squeeze) the treatment area. To attain tapping massage, the second massage mechanism 4B hits the right-hand and left-hand treating arms 15 on the treatment area, including the neck, the shoulders, the back, and the waist, of the user at short time intervals.

[0041] The second massage mechanism 4B may be configured to perform one or more of the three massage

treatments, namely kneading massage, grasping massage, and tapping massage if the one or more of the three massage treatments are enough to properly massage the neck-to-waist region of user's body.

[0042] The second massage mechanism 4B may be made similar in arrangement to the first massage mechanism 4A. In this case, the second massage mechanism 4B is mounted with its treating arms 15 (equivalent to treating arms 22 of the first massage mechanism 4A) opposed to the inner side of the backrest surface 9 defining the treating surface S.

[0043] Moreover, the first guide rail 11 and the second guide rail 14 may be connected to each other. The connected guide rails allow the first massage mechanism 4A to move from the seat part 3A to the backrest part 3B, that is; the first massage mechanism 4A can serve also as the second massage mechanism 4B. The structure of the first massage mechanism 4A lying as the second massage mechanism 4B in the backrest part 3B can equally be understood if "a vertical direction with respect to the seat surface 8" is taken as "a front-rear direction with respect to the backrest part 3B", and "a front-rear direction with respect to the seat surface 8" is taken as "a vertical direction with respect to the backrest part 3B".

[0044] Likewise, the first guide rail 11 may be

extended further into the footrest part 3C. The extended first guide rail 11 allows the first massage mechanism 4A to move from the seat part 3A to the footrest part 3C. The structure of the first massage mechanism 4A lying in the footrest part 3C can equally be understood if the vertical direction with respect to the seat surface 8 is taken as "a front-rear direction with respect to the footrest part 3C", and the front-rear direction with respect to the seat surface 8 is taken as "a vertical direction with respect to the footrest part 3C".

[0045] As shown in FIGS. 3 to 5, the first massage mechanism 4A includes an outer frame 20, a drive mechanism 21, at least one treating arm 22, a movable frame 23, at least one link frame 24, at least one movement assist member 25, and a position-changing mechanism 26. In the present example embodiment, the first massage mechanism 4A includes two treating arms 22 arranged in the lateral direction, and massages the buttocks, the thighs, etc. of the user using these right-hand and left-hand treating arms 22.

[0046] As shown in FIG. 2, the first massage mechanism 4A of the present example embodiment, when supported on the back-forth guide portions 11A of the first guide rails 11 in the interior of the seat part 3A, has the treating arms 22 opposed to the inner side of the seat surface 8 defining

the treating surface S.

[0047] The outer frame 20 includes two (i.e., right-hand and left-hand) side frames 31 and a base frame 32. Each side frame 31 is substantially flat-shaped. The right-hand and left-hand side frames 31 are spaced from each other at a distance in the lateral direction (refer to FIG. 4).

[0048] The base frame 32 includes two lower frames 33 and a lower plate 34. The lower frames 33, each in the form of a pipe, or tubular member of rectangular cross section, are spaced from each other at a distance in the front-rear direction. Each lower frame 33 extends between respective lower edges of the right-hand and left-hand side frames 31 to join the side frames 31 to each other. The lower plate 34, which is a rectangular plate elongated in the lateral direction, extends along respective upper sides of the lower frames 33. The lower plate 34 is secured to the upper sides of the two lower frames 33.

[0049] As shown in FIG. 5, the drive mechanism 21 includes a casing 40, a first support shaft 41, a second support shaft 42, a first drive motor 43, a second drive motor 44, a first power transmission mechanism 45, a second power transmission mechanism 46, and a cam 47.

[0050] The first drive motor 43, the second drive motor 44, the first power transmission mechanism 45, and

the second power transmission mechanism 46 are collectively housed in the casing 40. The casing 40 is disposed between respective upper edges of the right-hand and left-hand side frames 31. At a location below the casing 40, the base frame 32 connects the right-hand and left-hand side frames 31 together.

[0051] The first support shaft 41 is disposed at a rear portion of the casing 40. The first support shaft 41 extends in the lateral direction at the rear portion of the casing 40. A right axial end of the first support shaft 41 is passed through an upper rear portion of the right-hand side frame 31, and protruded outward beyond the outer side of the right-hand side frame 31. A left axial end of the first support shaft 41 is passed through an upper rear portion of the left-hand side frame 31, and protruded outward beyond the outer side of the left-hand side frame 31. The first support shaft 41 is provided at left and right ends thereof with respective pinions 48. The pinions 48 mesh with the racks 12 of the first guide rails 11, respectively. That is, the first support shaft 41 is supported in meshing engagement with the racks 12 of the first guide rails 11.

[0052] The second support shaft 42 is disposed at the front portion of the casing 40. The second support shaft 42 extends in the lateral direction at the front portion of

the casing 40. The right axial end of the second support shaft 42 is passed through an upper front portion of the right-hand side frame 31, and protruded outward beyond the outer side of the right-hand side frame 31. The left axial end of the second support shaft 42 is passed through an upper front portion of the left-hand side frame 31, and protruded outward beyond the outer side of the left-hand side frame 31. The right and left axial ends of the second support shaft 42 are each engaged in the guide slot 13 of the first guide rail 11. That is, the second support shaft 42 is supported in engagement with the guide slots 13 of the first guide rails 11.

[0053] The first drive motor 43 produces a rotational driving force when driven by electric power supplied from the power supply device 5. A rotating shaft of the first drive motor 43 is connected via the first power transmission mechanism 45 to the first support shaft 41. The first power transmission mechanism 45 transfers the rotational driving force exerted by the first drive motor 43 to the first support shaft 41. Accordingly, the pinions 48 on axial ends of the first support shaft 41 are rotated to cause the first massage mechanism 4A to move along the first guide rails 11. That is, the first drive motor 43 serves as a driver to drive the first massage mechanism 4A.

[0054] The drive mechanism 21 switches the direction

of rotation of the rotating shaft of the first drive motor 43 between the normal direction and the reverse direction on an as-needed basis. Thus, the drive mechanism 21 can change the direction of movement of the first massage mechanism 4A by changing the rotational direction of the first drive motor 43. This enables positional adjustment of the first massage mechanism 4A in the front-rear direction according to the location of the treatment area of the user.

[0055] The second drive motor 44 produces rotational driving force when driven by electric power supplied from the power supply device 5. The rotating shaft of the second drive motor 44 is connected via the second power transmission mechanism 46 to the second support shaft 42. The second power transmission mechanism 46 transfers the rotational driving force exerted by the second drive motor 44 to the second support shaft 42. Accordingly, the cam 47 coupled to the second support shaft 42 is rotated to actuate the treating arm 22. That is, the second drive motor 44 serves as a driver to actuate the treating arm 22.

[0056] The drive mechanism 21 switches the direction of rotation of the rotating shaft of the second drive motor 44 between the normal direction and the reverse direction on an as-needed basis. Thus, the drive mechanism 21 can change the direction of rotation of the cam 47 (i.e., the

direction of actuation of the treating arm 22) by changing the rotational direction of the second drive motor 44. This enables application of massage treatment of different patterns to the treatment area.

[0057] A circular plate cam is used for the cam 47. The cam 47 is pivotally mounted on the outer frame 20. More specifically, the cam 47 is situated between the casing 40 and the side frame 31, and coupled to and supported on the second support shaft 42 at its off-center point, i.e., that point thereof which is offset radially from the center of a circle defining the periphery of the cam 47. Thus, on rotation of the second support shaft 42, the cam 47 eccentrically rotates about the second support shaft 42 to cause the treating arm 22 to move in a circle in conformity to the eccentric track of the outer periphery of the cam 47. This allows the treating elements, namely a first treating element 51 and a second treating element 52, to reciprocate in the vertical direction and in the front-rear direction as well.

[0058] In the present example embodiment, the right-hand cam 47 and the left-hand cam 47 are coupled to and supported on the common second support shaft 42. Thus, on rotation of the second support shaft 42, each cam 47 rotates together with the second support shaft 42. Moreover, the right-hand and left-hand cams 47 are equal in

the direction of eccentricity (i.e., lifting direction). Thus, rotating these cams 47 allows the right-hand and left-hand treating arms 22 to constantly synchronously reciprocate in the same direction.

[0059] The right-hand and left-hand cams 47 may be such that they differ in eccentricity direction from each other (e.g., 180-degree difference) when viewed in an axial direction of the second support shaft 42, or such that they are rotatable independently of each other. Such an arrangement allows the reciprocating movement of the right-hand treating arm 22 and the reciprocating movement of the left-hand treating arm 22 to be timed not to coincide with each other.

[0060] As shown in FIGS. 3 to 8, each of the treating arms 22 includes the first treating element 51, the second treating element 52, and an arm portion 53. Each of the first and second treating elements 51 and 52 includes a pair of thick-walled wheels that are arranged right and left and are mounted on each of front and rear ends of the arm portion 53 to have a common axis extending in the lateral direction. That is, the first and second treating elements 51 and 52 mounted to the arm portion 53 are spaced from each other at a distance in the front-rear direction. The first treating element 51 is located toward the front of the first massage mechanism 4A. The second treating

element 52 is located rearward of the first treating element 51. In other words, the first treating element 51 is located forward of the second treating element 52. To perform pressing massage on the treatment area such as the buttocks and thighs of the user, the first massage mechanism 4A presses either one or both of the first and second treating elements 51 and 52 against the treatment area.

[0061] The second treating element 52 may be omitted from the treating arm 22. In this case, the first massage mechanism 4A performs pressing massage on the treatment area using the first treating element 51 alone. Moreover, each of the first and second treating elements 51 and 52 may not have the form of wheels as mentioned above, and may have any other form that can perform suitable pressing massage on the treatment area. For example, the first and second treating elements 51 and 52 may be made in a spherical form, or a shell-like form, or a plate form, or also the form of a ball formed with a plurality of concavities and convexities. The first treating element 51 and/or the second treating element 52 may include either a single component or a set of two or more components arranged in the lateral direction.

[0062] The first treating element 51 and the second treating element 52 are located toward the front and toward

the rear, respectively, in the illustrated example.

Alternatively, the second treating element 52 and the first treating element 51 may be located toward the front and toward the rear, respectively. In this case, as a second bag 69 is inflated, the rear first treating element 51 comes in a projected position with respect to the seat surface 8, and as a first bag 68 is inflated, the rear first treating element 51 comes in a retracted position with respect to the seat surface 8 (and the front second treating element 52 is raised at this time).

[0063] A V-shaped or boomerang-shaped platelike member is used for the arm portion 53. The arm portion 53 is pivotally mounted on the outer frame 20 at an intermediate portion thereof between opposite ends 54 and 55 (i.e., front and rear ends) thereof. More specifically, the arm portion 53 is provided between the casing 40 and the side frame 31, and coupled to and supported on the cam 47 at the intermediate portion thereof.

[0064] Two arm portions 53 are disposed on the left side and the right side of the casing 40, respectively, with the casing 40 sandwiched therebetween. That is, the first massage mechanism 4A includes two treating arms 22 spaced from each other at a distance in the lateral direction, and massages the treatment area using these two treating arms 22.

[0065] As shown in FIGS. 6 to 8, the arm portion 53 includes the first end 54, the second end 55, and a cam-receiving hole 56. The first end 54 and the second end 55 of the arm portion 53 extend in different directions toward the corresponding radially outer sides of the cam-receiving hole 56. When the treating arm 22 lies in a first state which will hereafter be described, the first end 54 of the arm portion 53 is located as an end of a forwardly upward extended portion of the treating arm 22, whereas the second end 55 of the arm portion 53 is located as an end of a rearwardly upward extended portion of the treating arm 22.

[0066] The first treating element 51 is disposed at the first end 54 of the arm portion 53. The second treating element 52 is disposed at the second end 55 of the arm portion 53. That is, the arm portion 53 is provided at the end 54 with the first treating element 51, and provided at the end 55 with the second treating element 52.

[0067] The cam-receiving hole 56 is a circular hole having an outer periphery shaped in conformance with the outer periphery of the cam 47. The cam-receiving hole 56 is formed at the intermediate portion of the arm portion 53 between the first end 54 and the second end 55. The cam 47 is rotatably inserted and fitted in the cam-receiving hole 56. Rotating the cam 47 within the cam-receiving hole 56 allows the arm portion 53 to move in a circle in conformity

to the eccentric track of the outer periphery of the cam 47. The circular motion of the arm portion 53 causes the first treating element 51 and the second treating element 52 to reciprocate in the vertical direction and in the front-rear direction inside of the seat surface 8. Thus, the cam 47 allows, when rotated, the arm portion 53 to reciprocate at least in the vertical direction for massaging the treatment area.

[0068] The movable frame 23 is a platelike member supported rockably about the first support shaft 41 acting as a fulcrum. The movable frame 23 includes a support plate 61 and at least one coupling arm 62. The support plate 61 is located in a space defined by and between the casing 40 and the base frame 32. The support plate 61 includes upper and lower flat portions, namely an upper surface portion 63 and a lower surface portion 64. The support plate 61 (i.e., the movable frame 23) is disposed between the casing 40 and the base frame 32, with the upper surface portion 63 facing the lower surface of the casing 40, and with the lower surface portion 64 facing the upper surface of the lower plate 34 of the base frame 32. The upper surface portion 63 and the lower surface portion 64 of the movable frame 23 may also be taken as a front side portion 63 and a back side portion 64, respectively, of the movable frame 23, or more specifically the support plate

61.

[0069] The movable frame 23 includes two coupling arms 62 arranged at the rear portion of the support plate 61. The two coupling arms 62 are spaced from each other at a distance in the lateral direction. The coupling arms 62 extend upwardly rearward from the right rear edge and the left rear edge of the support plate 61, respectively. Between the casing 40 and the side frame 31, a supported end 65 of each coupling arm 62 is coupled to the first support shaft 41. That is, the movable frame 23 is pivotally mounted on the outer frame 20 at the supported ends 65 of the coupling arms 62.

[0070] This arrangement allows the movable frame 23 to rockingly move in the vertical direction between a lower position (refer to FIG. 6) and an upper position (refer to FIG. 8). When the movable frame 23 is in the lower position, the lower surface portion 64 of the support plate 61 is closely adjacent in face-to-face relation to the upper surface of the lower plate 34. When the movable frame 23 is in the upper position, the upper surface portion 63 of the support plate 61 is closely adjacent in face-to-face relation to the lower surface of the casing 40. In FIG. 7, the movable frame 23 is illustrated as being in a middle position, which is a transitional position between the lower position and the upper position,

to which it has been rockingly moved from the upper or lower position.

[0071] As shown in FIG. 3, FIG. 4, and FIGS. 6 to 8, a V-shaped platelike member is used for the at least one link frame 24. The at least one link frame 24 pivotally couples the movable frame 23 and the arm portion 53 of the corresponding treating arm 22 to each other. More specifically, the link frame 24 is extended in the vertical direction between a corresponding tip 66 of the movable frame 23 and the first end 54 (i.e., the end with the first treating element 51 thereon) of the corresponding arm portion 53. The link frame 24 is pivotally coupled at the upper end thereof to the first end 54 of the arm portion 53, and is pivotally coupled at the lower end thereof to the tip 66 of the movable frame 23.

[0072] Thus, as the movable frame 23 is rocked into the lower position, the at least one link frame 24 lowers the first end 54 of the corresponding arm portion 53 to cause the arm portion 53 to rotate forward at predetermined degrees about the corresponding cam 47. This allows the first treating element 51 to move downward, and the second treating element 52 to protrude upward, bringing about the first state where the first treating element 51 is in its lowered position and the second treating element 52 is in its raised position. In other words, in the first state,

the treating arm 22 is held with its first and second treating elements 51 and 52 arranged substantially parallel to each other along the inner side of the seat surface 8 (refer to FIG. 6).

[0073] On the other hand, as the movable frame 23 is rocked into the upper position, the at least one link frame 24 forces the first end 54 of the corresponding arm portion 53 upward to cause the arm portion 53 to rotate backward at predetermined degrees (e.g., 47 degrees) about the corresponding cam 47. This brings about the second state where the corresponding treating arm 22 has the first treating element 51 projected upward beyond the second treating element 52 (i.e., projected toward the seat surface 8 in the vertical direction) (refer to FIG. 8).

[0074] More specifically, a line passing through both the center of the first treating element 51 and the center of the second treating element 52 in the corresponding treating arm 22 lying in the first state is defined as a reference line L1. When the movable frame 23 is rocked from the lower position to the upper position, the first treating element 51 moves upward to above the reference line L1, whereas the second treating element 52 moves downward to below the reference line L1.

[0075] The at least one movement assist member 25 biases the movable frame 23 in a direction to rotate to the

lower position. As shown in FIG. 5, in the present example embodiment, a torsion spring is used for the movement assist member 25. The at least one movement assist member 25 is situated between the supported end 65 of the corresponding coupling arm 62 and the casing 40, and applies an elastic force to bias the movable frame 23 in the direction to rotate downward. Thus, the movable frame 23 is retained in the lower position when the massager 1 is out of operation (i.e., at standstill). That is, the at least one movement assist member 25 helps keep the corresponding treating arm 22 in the first state (refer to FIG. 6).

[0076] As shown in FIGS. 6 to 8, the position-changing mechanism 26 includes an air bag 67. The air bag 67 is connected via the air tube P1 to the air-supply device 7 (refer to FIG. 2), and is inflated by air supplied from the air-supply device 7. In the present example embodiment, the position-changing mechanism 26 includes two air bags 67. The air bags 67 are disposed on the upper surface portion 63 and the lower surface portion 64 of the support plate 61, respectively. The air bags 67 include a first air bag 68 and a second air bag 69.

[0077] The first air bag 68 is disposed on the upper surface portion 63 of the support plate 61. The second air bag 69 is disposed on the lower surface portion 64 of the

support plate 61. That is, the first air bag 68 is situated between the upper surface portion 63 of the support plate 61 and the lower surface of the casing 40, and the second air bag 69 is situated between the lower surface portion 64 of the support plate 61 and the upper surface of the lower plate 34.

[0078] With the movable frame 23 held in the lower position (refer to FIG. 6), the air-supply device 7 supplies air to the second air bag 69. The second air bag 69 inflated with air forces the movable frame 23 upward away from the base frame 32 (or the lower plate 34) with the pressure of the air. After reaching the middle position (refer to FIG. 7), the movable frame 23 is rocked into the upper position (refer to FIG. 8). This brings about the second state where the corresponding treating arm 22 is retained with the first treating element 51 projected upward beyond the second treating element 52. In other words, in the second state, the first treating element 51 is in its raised position, whereas the second treating element 52 is in its lowered position.

[0079] To rock the movable frame 23 upward as above described, the inflated first air bag 68 needs to be deflated, whereas the second air bag 69 needs to be inflated (refer to FIG. 7).

[0080] On the other hand, with the movable frame 23

held in the upper position (refer to FIG. 8), the air-supply device 7 supplies air to the first air bag 68. The first air bag 68 inflated with air forces the movable frame 23 downward away from the casing 40 with the pressure of the air. After reaching the middle position (refer to FIG. 7), the movable frame 23 is rocked into the lower position (refer to FIG. 6). This brings about the first state where the corresponding treating arm 22 is retained with its first and second treating elements 51 and 52 arranged substantially parallel to each other along the inner side of the seat surface 8.

[0081] To rock the movable frame 23 downward as above described, the inflated second air bag 69 needs to be deflated, whereas the first air bag 68 needs to be inflated.

[0082] With the pressure of air supplied from the air-supply device 7, the air bag 67 changes the positional relationship between the first treating element 51 and the second treating element 52 (i.e., treating-element position) in the vertical direction by rocking the movable frame 23 about the supported end 65 of the corresponding coupling arm 62 in the vertical direction. This enables application of massage treatment with varying pressing forces to the treatment area.

[0083] The first air bag 68 and the second air bag 69

are each in a deflated condition when the massager 1 is out of operation. During this time, the movable frame 23 is retained in the lower position under its own weight and the elastic force of the at least one movement assist member 25, while given freedom of upward rocking motion against its own weight and the elastic force. That is, within the range of predetermined angles of rotation, the at least one treating arm 22 is free to rotate about the corresponding cam 47 in accordance with the condition of contact with the treatment area.

[0084] As shown in FIG. 9, the massager 1 includes a control unit 70. The control unit 70 includes a main-body controller C1 and a massage controller C2. The main-body controller C1 includes a backrest drive controller 71, a backrest angle detector 72, and a footrest drive controller 73. The massage controller C2 includes a first massage controller 74, a second massage controller 75, and a third massage controller 76.

[0085] The backrest drive controller 71 controls the inclining motion of the backrest part 3B. The backrest angle detector 72 detects, based on drive information indicating a driving status of the backrest part 3B, whether or not the backrest part 3B tilts to an angle greater than or equal to a predetermined angle. The footrest drive controller 73 controls operation to change

the angle of the footrest part 3C.

[0086] The first massage controller 74 controls the massaging operation of the first massage mechanism 4A in the seat part 3A. The second massage controller 75 controls the massaging operation of the second massage mechanism 4B in the backrest part 3B. The third massage controller 76 controls the massaging operation of the third massage mechanism 4C in the footrest part 3C.

[0087] In the present example embodiment, the first massage controller 74 has a treating-element position-changing function to change the rotational position of the at least one treating arm 22 (i.e., the treating-element position, or specifically the positions of the first and second treating elements 51 and 52) based on the information detected by the backrest angle detector 72.

[0088] Specifically, for example, when the backrest angle detector 72 detects that the backrest part 3B is inclined backwardly at an angle greater than or equal to the predetermined angle (e.g., an angle of 30 degrees with respect to the backrest part 3B in its fully erected position) in response to a change in the tilt angle of the backrest part 3B effected by an operating unit, then the first massage controller 74 inflates the second air bag 69, and rocks the movable frame 23 into the upper position using the inflated air bag 69. This causes the at least

one link frame 24 to force the first end 54 of the corresponding arm portion 53 upward, and consequently the corresponding treating arm 22 changes its position to a position with the first treating element 51 projected toward the seat surface 8 beyond the second treating element 52. In this condition, rotating the cam 47 allows the corresponding treating arm 22 to move up and down, with the first treating element 51 being firmly pressed against the buttocks, the thigh, etc. of the user.

[0089] The degree of inclination of the backrest part 3B may be detected by a position sensor for detecting the rotational position of the support shaft disposed at the supported end of the backrest part 3B. In addition, the above-described treating-element position-adjusting function (i.e., the treating-element position-changing function) may exercise angle control on the treating arm 22 in response to a change in the tilt angle of the backrest part 3B effected by the operating unit, or in accordance with a load placed on the seat part 3A instead of exercising the angle control on the basis of the degree of inclination of backrest part 3B.

[0090] For the load-based angle control as described just above, a load placed on the seat part 3A may be detected by a pressure-sensing element, or a pressure sensor mounted to the seat surface 8 and/or the first and

second treating elements 51 and 52. The above-described load may alternatively be detected on the basis of the revolutions per minute (RPM for short) of the second drive motor 44 and/or the torque-current relation in the motor 44, or on the basis of the RPM of a drive motor for inclining the backrest part 3B and/or the torque-current relation in the motor. In addition, the above-described treating-element position-adjusting function may be on-off switchable according to the operation of the operating unit, the position of the first massage mechanism 4A on the first guide rails 11, and the operating condition of the first massage mechanism 4A, for instance.

[0091]

<Modifications>

In the above-described example embodiment, the first massage mechanism 4A is configured such that one treating element located toward the front of the seat part 3A (i.e., the first treating element 51) protrudes toward the seat surface 8 beyond the other treating element (i.e., the second treating element 52) in the vertical direction upon the backward inclining of the backrest part 3B. In an alternative example embodiment, the first massage mechanism 4A, as long as it ensures the application of adequate pressing force to the treatment area, may be placed with the front side at the back (i.e., back to front). In the

first massage mechanism 4A supported in such a reversed position on the first guide rails 11, one treating element located toward the rear of the seat part 3A (i.e., the first treating element 51) protrudes toward the seat surface 8 beyond the other treating element (i.e., the second treating element 52) in the vertical direction upon the backward inclining of the backrest part 3B.

[0092] In the above-described example embodiment, the position-changing mechanism 26 uses two air bags 67, namely the first air bag 68 and the second air bag 69, to impart vertical (i.e., up-and-down) rocking motion to the movable frame 23. In an alternative example embodiment, the position-changing mechanism 26 may include one air bag 67 only.

[0093] In this regard, specifically, for example, the position-changing mechanism 26 includes one air bag 67 (i.e., the second air bag 69) disposed on the back side of the movable frame 23. With the movable frame 23 held in the lower position, inflating the air bag 67 allows the movable frame 23 to rock upward, causing the arm portion 53 to rotate backward. This brings about the second state where the treating arm 22 is retained with the first treating element 51 projected upward beyond the second treating element 52.

[0094] While in this condition, deflating the air bag

67 allows the movable frame 23 to rock downward under its own weight and the elastic force of the at least one movement assist member 25, causing the corresponding arm portion 53 to rotate forward. This brings about the first state where the corresponding treating arm 22 is retained with its first and second treating elements 51 and 52 arranged substantially parallel to each other along the inner side of the seat surface 8. Such arrangements produce advantageous effects similar to those produced by the above-described embodiment.

[0095] In the above-described embodiment, the air bag 67 rocks the movable frame 23. Alternatively, an actuator or motor may be used instead to rock the movable frame 23.

[0096] In the above-described embodiment, the two treating arms 22 (i.e., the right-hand and left-hand treating arms 22) are simultaneously operated by the one common position-changing mechanism 26 to simultaneously change both the vertical positional relationship between the first and second treating elements 51 and 52 of one treating arm 22 and the vertical positional relationship between the first and second treating elements 51 and 52 of the other treating arm 22. In an alternative example embodiment, the first massage mechanism 4A may include two mutually independent position-changing mechanisms 26. In this case, the right-hand and left-hand treating arms 22

are operated independently of each other by the respective position-changing mechanisms 26.

[0097] In this alternative example embodiment, specifically, for example, the first massage mechanism 4A includes two (i.e., right-hand and left-hand) movable frames 23 that are rockable independently of each other, two (i.e., right-hand and left-hand) link frames 24, and four air bags 67. The right-hand and left-hand link frames 24 each couple the corresponding movable frame 23 to the arm portion 53 of the corresponding treating arm 22. Two of the four air bags 67 are disposed on upper and lower sides of the support plate 61 of the right-hand moving frame 23, respectively, and the other two of the four air bags 67 are disposed on upper and lower sides of the support plate 61 of the left-hand moving frame 23, respectively. This arrangement allows the right-hand treating arm 22 and the left-hand treating arm 22 each to have corresponding air bags 67 to be inflated to individually change the corresponding vertical positional relationship between the first treating element 51 and the second treating element 52. This enables application of massage treatment of a wider variety of patterns to the treatment area.

[0098] In the above-described example embodiment, the movable frame 23 is pivotally mounted on the first support

shaft 41 passed through the rear portion of the casing 40. That is, the rock support shaft of the movable frame 23 serves also as the axis of rotation of the pinion 48. In an alternative example embodiment, the movable frame 23 may be pivotally mounted on another support shaft that is disposed at the rear portion of the casing 40 independently of the first support shaft 41. This arrangement also produces advantageous effects similar to those produced by the above-described embodiment.

[0099] According to an example embodiment, a massager 1 includes a main body 3 to face a predetermined treatment area of a user, and a massage mechanism 4, provided inside a treating surface S of the main body 3 which faces the treatment area, to perform pressing massage on the treatment area. The direction in which the treating surface S and the treatment area are opposed to each other is defined as a first direction. The lateral direction of the treatment area is defined as a second direction. The direction perpendicular to each of the first direction and the second direction is defined as a third direction. The massage mechanism 4 includes a first treating element 51 and a second treating element 52 arranged at a predetermined spacing therebetween in the third direction, and a position-changing mechanism 26 to change a treating-element position, i.e., the position of the first treating

element 51 and the position of the second treating element 52, in the first direction. The position-changing mechanism 26 is configured to change the treatment-element position between the first state and the second state. In the first state, the first treating element 51 and the second treating element 52 are arranged along the inner side of the treating surface S. In the second state, the first treating element 51 protrudes toward the treating surface S beyond the second treating element 52 in the first direction.

[0100] When the first treating element 51 and the second treating element are positioned in the first state, the massager 1 performs pressing massage on the treatment area using two treating elements (i.e., the first and second treating elements 51 and 52). On the other hand, when the first and second treating elements 51 and 52 are positioned in the second state, the massager 1 performs pressing massage on the treatment area using the first treating element 51 protruding toward the treating surface S beyond the second treating element 52. Thus, for example, even when the posture of the user changes in response to the backward inclining of the backrest part 3B, the massager 1 can apply an adequate pressing force to the treatment area. This yields the massager 1 that achieves enhanced massage performance.

[0101] The first massage mechanism 4A includes an outer frame 20, an arm portion 53, a cam 47, a movable frame 23, and a link frame 24. The arm portion 53 is provided at one end 54 thereof with the first treating element 51, and provided at another end 55 thereof with the second treating element 52. The arm portion 53 is pivotally mounted on the outer frame 20 at an intermediate portion between the ends 54 and 55. The cam 47 is pivotally mounted on the outer frame 20, and is configured to, when rotated, allow the arm portion 53 to reciprocate at least in the first direction. The movable frame 23 is pivotally mounted at a supported end 65 thereof on the outer frame 20. The link frame 24 is extended between a tip 66 of the movable frame 23 and the end 54 of the arm portion 53 with the first treatment element 51 to pivotally couple the movable frame 23 and the arm portion 53 to each other. The position-changing mechanism 26 is configured to change the treatment-element position by rocking the movable frame 23 about the supported end 65 of the movable frame 23.

[0102] The link frame 24 and the tip 66 of the movable frame 23 may be pivotally connected via a pin as illustrated, or alternatively they may be pivotally connected via a ball-joint such as to allow the second support shaft 42 to be coupled to the cam 47 inclined with

respect to the second support shaft 42. Such an arrangement allows the treating arm 22 to rock while moving in conformity to the eccentric track of the outer periphery of the inclined cam 47. Consequently, the first treating element 51 and the second treating element 52 rock in the lateral direction while reciprocating in the front-rear direction and in the vertical direction (i.e., the massager 1 is configured to perform kneading massage using the first treating element 51 and the second treating element 52).

[0103] In the massager 1, in synchronism with the rocking motion of the movable frame 23 about the supported end 65 thereof, the link frame 24 moves the end 54 of the arm portion 53 with the first treating element 51 in a predetermined direction. This allows the first treating element 51 and the second treating element 52 to be positioned in either the first state or the second state. Thus, during its operation, the massager 1 can smoothly change the positional relationship between the first treating element 51 and the second treating element 52 according to the posture of the user. This enables the application of adequate pressing force to the treatment area. The massager 1 therefore achieves even greater massage performance.

[0104] The massager 1 includes an air-supply device 7 to supply air to the massage mechanism 4. The position-

changing mechanism 26 includes an air bag 67 to rock the movable frame 23 with a pressure of air supplied from the air-supply device 7.

[0105] The massager 1 employs the air bag 67 to rock the movable frame 23. The air bag 67 can absorb, with its elasticity, the load that the treating arm 22 receives from the treatment area during the operation of the massager 1. This allows the user to feel more favorable massage effect. The massager 1 therefore achieves even greater massage performance.

[0106] The outer frame 20 includes a base frame 32 placed face-to-face with the movable frame 23. The air bag 67 is provided between the movable frame 23 and the base frame 32, and is configured to rock the movable frame 23 away from the base frame 32 in the first direction with the pressure of the air.

[0107] The massager 1 rocks the movable frame 23 in a direction away from the base frame 32 using the pressure resulting from the inflation of the air bag 67 (i.e., the pressure of air). Thus, during its operation, the massager 1 can stably change the positional relationship between the first treating element 51 and the second treating element 52. This enables the application of adequate pressing force to the treatment area. The massager 1 therefore achieves even greater massage performance.

[0108] The massage mechanism 4 includes a driver 44 to drive the massage mechanism 4, and a casing 40 to house the driver 44. The air bag 67 is provided between the movable frame 23 and the casing 40, and is configured to rock the movable frame 23 away from the casing 40 in the first direction with the pressure of the air.

[0109] The massager 1 rocks the movable frame 23 in a direction away from the casing 40 using the pressure caused by the inflation of the air bag 67 (i.e., the pressure of air). Thus, during its operation, the massager 1 can stably change the positional relationship between the first treating element 51 and the second treating element 52. This enables the application of adequate pressing force to the treatment area. The massager 1 therefore achieves even greater massage performance.

[0110] The movable frame 23 includes an upper surface portion 63 and a lower surface portion 64 facing each other in the first direction. The air bag 67 is provided on each of the upper surface portion 63 and the lower surface portion 64.

[0111] The massager 1 rocks the movable frame 23 by pressing the upper surface portion 63 and the lower surface portion 64 of the movable frame 23 using the pressure caused by the inflation of the air bag 67. This enables more stable changing of the positional relationship between

the first treating element 51 and the second treating element 52. The massager 1 therefore achieves even greater massage performance.

[0112] The massager 1 according to an example embodiment includes an outer frame 20, an arm portion 53 and an eccentric cam 47, and is configured such that the arm portion 53 is provided at opposite ends thereof with the first treating element 51 and the second treating element 52, respectively, and is pivotally mounted on the outer frame 42 at an intermediate portion thereof between the opposite ends thereof via the eccentric cam 47 configured to, when rotated, allow the arm portion 53 to reciprocate at least in the vertical direction. Additionally, the massager 1 includes a movable frame 23 and a link frame 24 and is configured such that the movable frame 23 is pivotally mounted at a supported end thereof on the outer frames 20, and the link frame 24 pivotally couples a tip of the movable frame 23 to a front portion of the arm portion 53 to each other. Further, the massager 1 includes a first air bag 68 and a second air bag 69 and is configured such that the first air bag 68 is provided on an upper surface portion of the movable frame 23 (i.e., between the movable frame 23 and a casing 40), and the second air bag 69 is provided on a lower surface portion of the movable frame 23 (i.e., between the movable frame 23

and a base frame 32).

[0113] In this arrangement, the second air bag 69 (the air bag 67 on the lower surface portion), when inflated, forces the movable frame 23 upward relative to the base frame 32. The rising (i.e., upward) movement of the movable frame 23 causes the first treating element 51 positioned in the upwardly projected position by the eccentric motion of the cam 47 to move further upward via the link frame 24 (i.e., into the second state). That is, the eccentricity of the cam 47 and the second air bag 69 doubly act to further raise the first treating element 51.

[0114] On the other hand, the first air bag 68 (the air bag 67 on the upper surface portion), when inflated, forces the movable frame 23 downward relative to the casing 40. The downward movement of the movable frame 23 causes the first treating element 51 in the upwardly projected position by the eccentric motion of the cam 47 to descend (move reversely) via the link frame 24 (i.e., into the first state).

[0115] The air bags 68 and 69 and the cam 47 with eccentricity enable fine adjustment of the extent of projecting movement of the first treating element 51, and thus enable fine adjustment of the positional relationship between the first treating element 51 and the second treating element 52. This ensures that the degree of

pressing force applied to the treatment area is ideally suited for user's feelings. More specifically, of the two air bags 67 (i.e., the first air bag 68 and the second air bag 69), one allows the first treating element 51 to move in one direction when inflated, and the other allows the first treating element 51 to move in the other direction when inflated, that is; the first air bag 68 and the second air bag 69 move the first treating element 51 in opposite directions.

[0116] When the user sits on the seat surface 8 of the massager with the first air bag 68 and the second air bag 69 held in an air-free, or non-inflated condition, the movable frame 23 spontaneously moves, and also the arm portion 53 inclines in conformity to user's figure, under the force that the first treating element 51 and the second treating element 52 receive from the user. This results in the first treating element 51 and the second treating element 52 being positioned for user contact in conformity to the contour of user's body (i.e., freewheeling condition).

[0117] While in the freewheeling condition, inflating the second air bag 69 forces the movable frame 23 upward relative to the base frame 23. The rising (i.e., upward) movement of the movable frame 23 allows the first treating element 51 to rise via the link frame 24 to be forcibly

pressed against user's body. On the other hand, while in the freewheeling condition, inflating the first air bag 68 forces the movable frame 23 downward relative to the casing 40. The downward movement of the movable frame 23 allows the first treating element 51 to descend via the link frame 24, and the second treating element 52 to rise to be forcibly pressed against user's body.

[0118] The main body 3 includes a seat part 3A to face buttocks, i.e., the treatment area, of the user. The massage mechanism 4 is provided inside a seat surface 8, i.e., the treating surface S, of the seat part 3A.

[0119] Even when a shift in the weighted center of the user reduces the load applied in the direction of the normal to the seat surface 8, the massager 1 can apply pressing force properly to the treatment area, including the buttocks of the user, using the first treating element 51 and the second treating element 52 provided inside the seat surface 8. The massager 1 therefore achieves even greater massage performance.

[0120] The main body 3 includes a backrest part 3B upstanding at a rear side of the seat part 3A. The first treating element 51 is provided forward of the second treating element 52.

[0121] Even when the weighted center of the user shifts toward the rear side of the seat part 3A, by

positioning the first and second treating elements 51 and 52 in accordance with the second state, the massager 1 can apply pressing force properly to the treatment area, including the buttocks of the user, using the first treating element 51 lying forward of the second treating element 52. The massager 1 therefore achieves even greater massage performance.

[0122] The backrest part 3B is inclinable in a direction rearward of the seat part 3A. The massage mechanism 4 is configured, as the backrest part 3B inclines backwardly, change the treatment-element position to the second state.

[0123] The massager 1 positions the first treating element 51 and the second treating element 52 into the second state in synchronism with the backward inclining motion of the backrest part 3B. This enables the application of adequate pressing force to the treatment area according to changes in the posture of the user. The massager 1 therefore achieves even greater massage performance.

[0124] While particular embodiments of the present invention have been shown and described, the embodiments disclosed herein should be considered in all respects as illustrative and not restrictive of the scope of the invention. The scope of the invention is not to be

restricted by the body of the specification but to be shown as the scope of the appended claims, and all changes which come within the meaning and the range of equivalent of the claims are therefore intended to be embraced therein.

[0125] For example, as a modified form of the massager according to the embodiment thus far described, as shown in FIGS. 1 and 2, an air bag 81 may be disposed at the inner-surface side of each of right-hand and left-hand armrests 80 (i.e., arm resting parts). In this case, the waist of the user can be held between the inflated air bags 81 during the operation of the first treating element 51 and the second treating element 52. This allows the massager to perform massage treatment, while stably holding user's body, using the first treating element 51 and the second treating element 52 (in the second state, in particular). More specifically, the massager achieves effective massage treatment by bringing the first treating element 51 to the upwardly projected position using the inflated second air bag 69, as well as by bringing the first treating element 51 to the retracted position using the inflated first air bag 68.

[0126] Likewise, the massager achieves effective massage treatment by bringing the first treating element 51 to the upwardly projected position using the inflated second air bag 69 disposed inside the seat part 3A, as well

as by bringing the first treating element 51 to the retracted position using the inflated first air bag 68, with the treating elements of the treating arms 15 of the built-in second massage mechanism 4B of the backrest part 3B kept pressed against the shoulders or the waist of the user.

REFERENCE SIGNS LIST

[0127]

1	Massager
2	Base
3	Main body
3A	Seat part
3B	Backrest part
4	Massage mechanism
4A	First massage mechanism
4B	Second massage mechanism
7	Air-supply device
8	Seat surface
9	Backrest surface
20	Outer frame
23	Movable frame
24	Link frame
26	Position-changing mechanism
32	Base frame
40	Casing

44	Driver
47	Cam
51	First treating element
52	Second treating element
53	Arm portion
63	Upper surface portion of movable frame
64	Lower surface portion of moving frame
65	Supported end of movable frame
67	Air bag
S	Treating surface

CLAIMS

1. A massager, comprising;
a main body to face a predetermined treatment area of a user; and
a massage mechanism, provided inside a treating surface of the main body which faces the predetermined treatment area, to perform pressing massage on the treatment area; wherein
the massage mechanism includes
a first treating element to massage the treatment area, and
a position-changing mechanism to change a treatment-element position of the first treating element in a vertical direction; and
the position-changing mechanism is configured to change the treatment-element position between a first state where the first treating element is in a lowered position and a second state where the first treating element is in a raised position.
2. The massager according to claim 1, wherein
the massage mechanism includes
the first treating element and a second treating element to massage the treatment area, the first

treating element and the second treating element being arranged in a front-rear direction at a predetermined spacing therebetween, and

the position-changing mechanism to change a vertical position of the first treating element and a vertical position of the second treating element; and

the position-changing mechanism is configured to change the treatment-element position between the first state where the second treating element is in a raised position and the second state where the first treating element is in the raised position.

3. The massager according to claim 1, wherein

the massage mechanism includes

an outer frame,

an arm portion provided at an end thereof with the first treating element and pivotally mounted at another end thereof on the outer frame,

an eccentric cam pivotally mounted on the outer frame and configured to, when rotated, allow the arm portion to reciprocate at least in the vertical direction,

a movable frame pivotally mounted at a supported end thereof on the outer frame, and

a link frame extended between a tip of the movable frame and the end of the arm portion with the first

treating element to pivotally couple the movable frame and the arm portion to each other, and

the position-changing mechanism is configured to change the treatment-element position by rocking the movable frame about the supported end of the movable frame.

4. The massager according to claim 2, wherein:

the message mechanism includes

an outer frame,

an arm portion provided at opposite ends thereof with the first treating element and the second treating element, respectively, and pivotally mounted on the outer frame at an intermediate portion thereof between the opposite ends thereof,

an eccentric cam pivotally mounted on the outer frame and configured to, when rotated, allow the arm portion to reciprocate at least in the vertical direction,

a movable frame pivotally mounted at a supported end thereof on the outer frame, and

a link frame extended between a tip of the movable frame and one of the opposite ends of the arm portion with the first treating element to pivotally couple the movable frame and the arm portion to each other; and

the position-changing mechanism is configured to change the treatment-element position by rocking the

movable frame about the supported end of the movable frame.

5. The massager according to claim 3 or 4, further comprising:

an air-supply device to supply air to the massage mechanism, wherein the position-changing mechanism includes an air bag to rock the movable frame with a pressure of air supplied from the air-supply device.

6. The massager according to claim 5, wherein

the outer frame includes a base frame placed face-to-face with the movable frame, and

the air bag is provided between the movable frame and the base frame, and is configured to rock the movable frame away from the base frame in the vertical direction with the pressure of the air.

7. The massager according to claim 5, wherein

the massage mechanism includes a driver to drive the massage mechanism, and a casing to house the driver, and

the air bag is provided between the movable frame and the casing, and is configured to rock the movable frame away from the casing in the vertical direction with the pressure of the air.

8. The massager according to claim 5, wherein
the air bag is provided on each of an upper surface
portion of the movable frame and a lower surface portion of
the movable frame.

9. The massager according to claim 1 or 2, wherein
the main body includes a seat part to face buttocks
of the user, the buttocks being the treatment area, and
the massage mechanism is provided inside a seat
surface of the seat part, the seat surface being the
treating surface.

10. The massager according to claim 1 or 2, wherein
the main body includes
a seat part to face buttocks of the user, the
buttocks being the treatment area, and
a backrest part upstanding at a rear side of
the seat part, the backrest part being inclinable in a
direction rearward of the seat part, and
the massage mechanism is configured to, as the
backrest part inclines backwardly, change the treatment-
element position to the second state.

11. The massager according to claim 2, wherein
the first treating element is provided forward of the

second treating element.