

DESCRIPTION

Title of Invention: MESSAGE MACHINE

Technical Field

[0001] The present invention relates to a massage machine capable of performing kneading massage over a wide range in user's lower limb, extending from the foot, through the calf, to the thigh, as massage-treatment target parts, and also performing pressing massage over a wide range in user's upper body, extending from the neck, through the shoulder, the back, the waist, and each side of the waist, to the buttocks, etc. as massage-treatment target parts.

Background Art

[0002] Conventional leg massagers include one having a massaging mechanism operative to massage, as a massage-treatment part, that part of user's lower limb, or leg which extends from the foot, i.e. toe-to-heel region to the calf situated between the ankle and the knee (refer to Patent Literature 1, for example).

Meanwhile, conventional massage chair machines include one having a massaging mechanism operative to massage, for example, the back and the waist of a seated user (refer to Patent Literature 2, for example).

Prior Art Reference

Citation List

[0003]

Patent Literature 1: Japanese Unexamined Patent
Publication JP-A 2011-103988

Patent Literature 2: Japanese Unexamined Patent
Publication JP-A 2013-208264

Summary of Invention

Technical Problem

[0004] The construction disclosed in Patent Literature 1 performs effective massage on user's leg, such as the foot, whereas the construction disclosed in Patent Literature 2 performs effective massage on user's back, etc.

The recently increasing variety of user requests for massage treatment include: requests for a massager configured to massage, in addition to the foot, a wide range in the leg, extending from the lower region of the calf, through the entire calf, to the thigh, of a user sitting in a chair or the like; and requests for a massager configured to massage over a wide range in the upper body, extending from the neck, through the shoulder, the back, and the waist, to the buttocks of a user.

[0005] Moreover, the fact that users of varying body shape have different leg lengths and different back sizes has led to requests for a massager capable of adjusting to

the body shape of any user. For example, a user who is not so tall and has a small build has relatively short legs, whereas a user who is tall and has a large build has relatively long legs. This fact has led to user requests for a massager configured for adjustment in accordance with the length of user's leg.

[0006] Moreover, there are user requests for an adjustable massager capable of massaging various parts of user's body such as the neck (nape), the shoulder, and the central area of the back, and also requests for a massager that fulfills the described plurality of demands as one single unit.

In view of the circumstances as discussed supra, an object of the present invention is to provide a massage machine that comprises a position-adjustable massaging mechanism which permits easy changing of massage positions in accordance with the length of user's leg and the size of user's back, and is thus capable of performing, as one single unit, kneading and pressing massage over a wide range in user's leg, extending from the foot, through the calf, to the thigh, or a wide range in user's upper body, extending from the neck, through the shoulder, the back, the waist, and each side of the waist, to the buttocks, etc., as massage-treatment target parts.

Solution to Problem

[0007] In order to fulfill the above object, the present invention provides the following technical means.

A massage machine embodying the present invention comprises: a lower massaging mechanism; and an upper massaging mechanism disposed above the lower massaging mechanism. The lower massaging mechanism comprises: a front-located seat portion, in which a user sits from the front of the massage machine, configured for massage to a "first treatment part" including at least one or more of user's waist and user's buttocks; and openings, each provided to receive a lower region of user's leg, configured for massage to a "second treatment part" corresponding to the lower region of the leg. The upper massaging mechanism is configured to massage at least one or more of a "third treatment part" corresponding to an upper region of the leg, a "fourth treatment part" corresponding to user's back, and a "fifth treatment part" corresponding to user's shoulder and user's neck.

[0008] In the present invention, it is preferable that the upper massaging mechanism is configured for vertical movement relative to the lower massaging mechanism.

In the present invention, it is preferable that the massage machine comprises: a first treatment part-massaging mechanism, located on a front part of the lower massaging mechanism, for performing massage on the "first treatment

part" of the user who has sat in the seat portion from the front; a second treatment part-massaging mechanism, located on a rear part of the lower massaging mechanism, for performing massage on the "second treatment part" of the user, which has been inserted in the opening from the rear of the massage machine; a third treatment part-massaging mechanism, disposed within the upper massaging mechanism, for performing massage on the "third treatment part" of the user; and a vertically moving mechanism that moves the third treatment part-massaging mechanism up and down.

[0009] In the present invention, it is preferable that the third treatment part-massaging mechanism comprises a pair of rear-located massaging members, fashioned for covering the "third treatment part" of the user from the front, for sandwiching and holding the "third treatment part" for squeezing massage to the "third treatment part", and that the massaging members are each mounted so as to extend rearward.

In the present invention, it is preferable that the massaging members each have a base end situated forward of the "third treatment part" of the user.

[0010] In the present invention, it is preferable that the third treatment part-massaging mechanism comprises a converting section that converts a rotational driving force on the rotating shaft into rocking motion of the massaging

members, that the converting section comprises: a boss member attached to the rotating shaft for rotation together with the rotating shaft; and an annular fit portion disposed on the base end of each of the massaging members and fitted onto the boss member, and that the boss member is spherically shaped, and the annular fit portion has an inner periphery shaped as a curved surface conforming to the spherical shape of the boss member.

[0011] In the present invention, it is preferable that the inner periphery of the annular fit portion is fitted with an inwardly projected pin, and that the boss member is provided at its outer periphery with a raceway in which the pin slides, and the raceway is inclined with respect to the rotating shaft.

In the present invention, it is preferable that the upper massaging mechanism comprises a front-located fifth treatment part-massaging mechanism that performs massage on the "fifth treatment part" of the user.

[0012] In the present invention, it is preferable that the fifth treatment part-massaging mechanism comprises a forwardly extended arm member, and that the arm member is disposed at the base end of each of the massaging members, and provided at its tip with a massaging element.

In the present invention, it is preferable that the massage machine is designed so that, with the "second

treatment part" of the user securely held by the second treatment part-massaging mechanism, the upper massaging mechanism can be moved up and down.

Advantageous Effects of Invention

[0013] The present invention provides a massage machine that comprises a position-adjustable massaging mechanism which permits easy changing of massage positions in accordance with the length of user's leg and the size of user's back, and is thus capable of performing, as one single unit, kneading and pressing massage over a wide range in user's leg, extending from the foot, through the calf, to the thigh, or a wide range in user's upper body, extending from the neck, through the shoulder, the back, the waist, and each side of the waist, to the buttocks, etc., as massage-treatment target parts.

Brief Description of Drawings

[0014]

FIG. 1 is a side view of a massage machine embodying the present invention, illustrating the vertical movement of an upper massaging mechanism (a third treatment part-massaging mechanism, a fifth treatment part-massaging mechanism).

FIG. 2 is a side view of the massage machine, illustrating a "first position" with the upper massaging mechanism (the third treatment part-massaging mechanism,

the fifth treatment part-massaging mechanism) adjusted to its lower position by lowering an upper case body.

FIG. 3 is a side view of the massage machine, illustrating a "second position" with the upper massaging mechanism (the third treatment part-massaging mechanism, the fifth treatment part-massaging mechanism) adjusted to its higher position by raising the upper case body.

FIG. 4 is a front perspective view of the massage machine embodying the present invention, illustrating the "first position" with the upper massaging mechanism (the third treatment part-massaging mechanism, the fifth treatment part-massaging mechanism) adjusted to its lower position by lowering the upper case body.

FIG. 5 is a front perspective view of the massage machine embodying the present invention, illustrating the "second position" with the upper massaging mechanism (the third treatment part-massaging mechanism, the fifth treatment part-massaging mechanism) adjusted to its higher position by raising the upper case body.

FIG. 6 is a rear perspective view schematically showing the upper massaging mechanism (the third treatment part-massaging mechanism, the fifth treatment part-massaging mechanism) in the higher position corresponding to the "second position" to which it has been moved by raising the upper case body.

FIG. 7 is a front perspective view schematically showing the internal structure of the massage machine embodying the present invention (in the second position).

FIG. 8 is a rear perspective view schematically showing the configurations of massaging members and their surroundings (such as a converting section) in the third treatment part-massaging mechanism.

FIG. 9 is a rear perspective view schematically showing the configurations of massaging members and their surroundings (such as a converting section) in a second treatment part-massaging mechanism.

Description of Embodiments

[0015] An embodiment of a massage machine 1 pursuant to the present invention will now be described with reference to the drawings.

The following embodiment is given by way of example of carrying out the present invention in practice, and is thus not intended to be limiting of the structural features of the present invention. Moreover, in the drawings, some constituent components are not shown, and imaginary lines, etc. are used to indicate certain components for clarity of illustration.

Directions with respect to the massage machine 1 embodying the present invention, such as a front-rear direction and a right-left, or horizontal direction, are as

shown in the drawings. These directions coincide with those as viewed from a user sitting in a seat portion 5 of the massage machine 1, as well as a user sitting in a chair or the like with the lower limb, or leg L placed in a second receiving recess 7 of the massage machine 1. In what follows, the directions shown in the drawings are used as the basis for describing the massage machine 1 embodying the present invention.

[0016] Moreover, in this embodiment, that part of human body which extends from waist W, through back B and shoulder S, to neck N (nape) is defined as "upper body". The upper part of the human "upper body" is defined as the "shoulder S", the part above the shoulder is defined as the "neck N (nape)", the back side of the upper body is defined as the "back B (back side)", and the part below the back B is defined as the "waist W". Moreover, each side of the waist W is defined as "waist side part D (side of the body)", and, the part below the waist W is defined as "buttocks A".

[0017] The region including at least one or more of the "waist W", the "waist side part D (side of the body)", the "buttocks A", etc. corresponds to a "first treatment part". Moreover, the "back B" corresponds to a "fourth treatment part". The region including at least one or more of the "shoulder S", the "neck N (nape)", etc. corresponds

to a "fifth treatment part".

Moreover, in this embodiment, that part of human body which extends from foot F, through calf C, to thigh T is defined as leg L. That part of the human leg L situated above knee K is defined as the "thigh T", that part of the leg L situated below the knee and above ankle is defined as the "calf C", and that part of the leg L situated below the ankle (including the ankle) and extending from heel H to toe E is defined as the "foot F".

[0018] The lower part of the leg L including at least one or more of the "foot F", the "calf C", etc. corresponds to a "second treatment part". Moreover, the upper part of the leg L including at least one or more of the "knee K", the "thigh T", etc. corresponds to a "third treatment part".

In this embodiment, a lower case body 2 houses a lower massaging mechanism.

The lower massaging mechanism comprises a "second treatment part-massaging mechanism 8" and a "first treatment part-massaging mechanism 55".

[0019] The below-knee region-massaging mechanism 8 performs squeezing massage on the second treatment part such as the calf C and the foot F, and is thus also called "below-knee region-massaging mechanism 8". Moreover, the first treatment part-massaging mechanism 55 performs

acupressure massage-like pressing massage on the first treatment part such as the waist W, the waist side part D (the side of the body), and the buttocks A, and also on the fourth treatment part corresponding to the back B, and is thus also called "seat's massaging mechanism 55".

[0020] In this embodiment, an upper case body 3 houses an upper massaging mechanism.

The upper massaging mechanism comprises a "third treatment part-massaging mechanism 9" and a "fifth treatment part-massaging mechanism 27".

The third treatment part-massaging mechanism 9 performs squeezing massage on the third treatment part such as the thigh T including the knee K, and is thus also called "above-knee region-massaging mechanism 9". Moreover, the fifth treatment part-massaging mechanism 27 performs acupressure massage-like pressing massage on the fourth treatment part corresponding to the back B, and also on the fifth treatment part such as the shoulder S and the neck N (nape), and is thus also called "front massaging mechanism 27".

[0021] Moreover, as to an upper massage position, for example, a position shown in the left-hand view of FIG. 1 and in FIG. 2 is defined as a "first position". The "first position" is a position with the upper massaging mechanism (the above-knee region-massaging mechanism 9, the front

massaging mechanism 27) lying within the upper case body 3 adjusted to its lower position suited to the calf C1 of a user having relatively short legs L1.

A position shown in the right-hand view of FIG. 1 and in FIG. 3 is defined as a "second position". The "second position" is a position with the upper massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27) lying within the upper case body 3 adjusted to its higher position suited to the calf C2 of a user having relatively long legs L2.

[0022] FIGs. 1 to 9 are general views of the massage machine 1 embodying the present invention.

The massage machine 1 embodying the present invention, which is placeable on a floor surface Y, etc., is configured to simultaneously perform squeezing massage on the "second treatment part", i.e. a wide range in each of the right and left legs L, extending from the foot F (sole U, each side of the foot, instep, heel H, etc.) to the calf C, of a user sitting in a chair or the like, and squeezing massage on the "second treatment part" corresponding to the calf C and the "third treatment part" such as the "thigh T", etc. Moreover, the massage machine 1 according to this embodiment is configured to perform acupressure massage-like pressing massage on the sole U, the knee K, etc. concurrently with the squeezing massage.

[0023] Moreover, the massage machine 1 embodying the present invention is configured to perform massage over a wide range in the body of a user sitting in the seat portion 5, extending from the "first treatment part" including the buttocks A, the waist W, and the waist side part D to the "fourth treatment part" corresponding to the back B, as well as to perform massage over a wide range in user's body extending from the "fourth treatment part" to the "fifth treatment part" including the shoulder S and the neck N (nape).

That is, the massage machine 1 embodying the present invention permits changing of massage positions for massage to various body parts (treatment parts) of a user, e.g. the foot F, the calf C, the thigh T, the buttocks A, the waist W, the waist side part D, the back B, and the shoulder S.

[0024] As shown in FIGs. 1 to 9 for example, the massage machine 1 according to this embodiment includes a "leg massage area" and a "seat's massage area".

In the "leg massage area", at the rear side of the lower case body 2 formed with second receiving recesses 7 in each of which the lower part of user's leg L is insertable from behind the massage machine, squeezing massage is performed on the lower part of the leg L corresponding to the "second treatment part" such as the foot F and the calf C, and also, at the rear side of the

upper case body 3 formed with first receiving recesses 4 in each of which the upper part of the leg L, i.e. the thigh T is insertable from behind the massage machine, squeezing massage is performed on the "third treatment part" such as the thigh T and the knee K.

[0025] In the "seat's massage area", at the front side of the lower case body 2, pressing and rubbing massage is performed on the "first treatment part" such as the buttocks A, the waist W, and the waist side part D, as well as on the "fourth treatment part" corresponding to the back B, of the user sitting in the seat portion 5, and also, at the front side of the upper case body 3, pressing and rubbing massage is performed on the "fourth treatment part" corresponding to the back B, as well as on the "fifth treatment part" such as the shoulder S and the neck N (nape).

[0026] The massage machine 1 according to this embodiment comprises: the lower case body 2 configured for user seating; and the upper case body 3 located on the lower case body 2. The upper case body 3 is formed with the first receiving recesses 4 in each of which the thigh T, etc. of the user is insertable from behind the massage machine.

The lower case body 2 is provided at its front side with the seat portion 5 for user seating and a backrest

portion 6 against which the user leans back. The lower case body 2 is provided at its rear side with the second receiving recesses 7 in each of which the leg L (the foot F, the calf C, etc.) of the user is insertable from behind the massage machine.

[0027] The lower case body 2 houses the below-knee region-massaging mechanism 8 (the second treatment part-massaging mechanism 8) for performing squeezing massage on the second treatment part including the foot F, the calf C, etc. of the user. The upper case body 3 houses the above-knee region-massaging mechanism 9 (the third treatment part-massaging mechanism 9) for massaging the treatment part situated above the treatment part to be massaged by the below-knee region-massaging mechanism 8 (such as the upper part of the calf C and the thigh T). The above-knee region-massaging mechanism 9 (the upper massaging mechanism) is moved up and down by a vertically moving mechanism 10.

[0028] Moreover, the massage machine 1 includes a safety stop mechanism (not shown in the drawings) that stops the vertically moving mechanism 10 when the upper case body 3 in upward movement reaches a predetermined position, or when the downward movement of the upper case body 3 is hindered.

As shown in FIGs. 1 to 6 for example, the upper case

body 3 is a member elongated in the front-rear direction as seen in side view, and formed so as to extend rearward. The upper case body 3 has an internal space in which is mounted the above-knee region-massaging mechanism 9. Moreover, the upper case body 3 is supported for up-and-down movement by the vertically moving mechanism 10.

[0029] The upper case body 3 is a member having its left end, midportion in the right-left direction, and right end extended rearward. That is, the upper case body 3 comprises a left-hand extending portion 3L, a right-hand extending portion 3R, and a middle extending portion 3C that are each extended rearward. The three extending portions 3L, 3R, and 3C are spaced apart in the right-left direction, yet connected together at their front (base end) sides. In other words, the upper case body 3 is a forked member as seen in plan view.

[0030] The left-hand extending portion 3L, the right-hand extending portion 3R, and the middle extending portion 3C are each internally provided with a first massaging member 11 of the above-knee region-massaging mechanism 9. That is, there is provided a pair of first massaging members 11 spaced apart in the right-left direction. Moreover, the middle extending portion 3C houses a first drive section 12, etc. of the above-knee region-massaging mechanism 9.

When the upper case body 3 is manually lifted, the left-hand extending portion 3L and the right-hand extending portion 3R of the upper case body 3 serve as grips that can be held with user's hands. The grips 3L and 3R permits changing of the upper massage position.

[0031] The space between the left-hand extending portion 3L and the middle extending portion 3C defines a first receiving recess 4L. Moreover, the space between the middle extending portion 3C and the right-hand extending portion 3R defines a first receiving recess 4R. That is, the first receiving recesses 4L and 4R are formed as a pair of spaced-apart right-hand and left-hand recesses in the upper case body 3.

The first receiving recesses 4 receive the right and left calves C, thighs T, etc., respectively, of the user. The first receiving recesses 4 each have an open rear, an open top, and an open bottom. That is, the first receiving recesses 4 each have a closed front for covering the front region of the knee K, the thigh T, etc.

[0032] While not shown in the drawings, the paired right-hand and left-hand first receiving recesses 4 are each internally provided with a lining material which is elastic, flexible, and adequately breathable. Moreover, the upper case body 3 may be provided at its upper surface (or preferably at the upper surface of the middle extending

portion 3C) with a switch to start and stop the operation of the massage machine 1. Disposing the switch at the upper surface of the upper case body 6 increases the visibility of the switch, thereby allowing the user to always visually recognize the switch.

[0033] For example, the upper case body 3 may be supported by a rockably supporting mechanism (not shown) for rocking motion about a horizontally directed axis in the front-rear direction relative to the lower case body 2. That is, the upper case body 3 may be configured so that the above-knee region-massaging mechanism 9 (the upper massaging mechanism), mounted therein, can be rocked in the front-rear direction along with the rocking motion thereof in the front-rear direction.

As shown in FIGs. 1 to 8 for example, the above-knee region-massaging mechanism 9, accommodated in the upper case body 3, comprises: first massaging members 11 arranged in pairs, with right-hand and left-hand massaging members 11 of each pair spaced apart for holding the "second treatment part" such as the calf C, as well as the "third treatment part" such as the thigh T (the upper part of the leg L), from the sides; a first drive section 12 that produces a rotational driving force; a first rotating shaft 13 which is rotated by the rotational driving force from the first drive section 12; and a first converting section

14 that converts the rotational driving force on the first rotating shaft 13 into rocking motion of the first massaging members 11.

[0034] The above-knee region-massaging mechanism 9 is directly attached to the upper case body 3. More specifically, the above-knee region-massaging mechanism 9 is attached to a support member 15 disposed within the upper case body 3, and supported in an elevated fashion at a location above the vertically moving mechanism 10. The above-knee region-massaging mechanism 9 (the upper massaging mechanism) can move in the vertical direction in response to the up-and-down movement of the upper case body 3 effected by the vertically moving mechanism 10.

[0035] As shown in FIGs. 6 and 7 for example, the first massaging members 11 are each constructed of an elongated plate member, and are located on the rear side of the above-knee region-massaging mechanism 9. The massaging members 11 are arranged in pairs, with the right-hand and left-hand massaging members 11 of each pair are spaced apart for sandwiching the "second treatment part" such as the calf C, as well as the "third treatment part" such as the thigh T. The first massaging members 11 are operative to perform squeezing (pressing) massage on the calf C, the thigh T, etc.

[0036] An outer left-hand first massaging member 11a

is disposed inside the left-hand extending portion 3L. Moreover, an inner left-hand first massaging member 11b is disposed inside the middle extending portion 3C. The inner left-hand first massaging member 11b and the outer left-hand first massaging member 11a are arranged facing each other at a predetermined spacing.

An outer right-hand first massaging member 11c is disposed inside the right-hand extending portion 3R. An inner right-hand first massaging member 11d is disposed inside the middle extending portion 3C. The inner right-hand first massaging member 11d and the outer right-hand first massaging member 11c are arranged facing each other at a predetermined spacing. Moreover, the inner left-hand first massaging member 11b and the inner right-hand first massaging member 11d are arranged with the first drive section 12 lying in between.

[0037] In the "first position" shown in FIG. 2, etc., the first massaging member 11 has its base end situated forward of a knee K1, and its tip projected rearward for operation to massage the upper part of the calf C1, the front part of the knee K1, a thigh T1, etc.

Moreover, in the "second position" shown in FIG. 2, etc., the first massaging member 11 has its base end located above a knee K2, and its tip projected rearward for operation to massage a thigh T2, the upper part of the knee

K2, etc.

[0038] While not shown in the drawings, a pressing member may be disposed on the first rotating shaft 13 at a location between the right-hand and left-hand first massaging members 11 of each pair (at the base ends of the first massaging members). The pressing member is rotatably attached to the first rotating shaft 13, and presses the knee K from the front for acupressure massage-like pressing massage to the knee K.

The pressing member is provided at its outer periphery with a projection directed radially outward. The projection is made of a soft material to avoid applying heavy press force to the knee K. Moreover, the pressing member may be constructed of an eccentrically rotatable roller or projection.

[0039] A set of the first massaging member 11 and the pressing member is provided in correspondence with each of the right-hand and left-hand first receiving recesses 4 of the upper case body 3, that is; two such sets are mounted in total. While the first massaging member 11 performs effective pressing massage on the calf C, the thigh T, etc., the pressing member unitarily performs effective pressing massage on the knee K.

As shown in FIG. 7 for example, the first drive section 12, accommodated inside the middle extending

portion 3C of the upper case body 3, rotates the first rotating shaft 13 to drive the first massaging members 11. The first drive section 12 comprises: a drive motor 16 that produces output of a rotational driving force; and a gear case 17 that transmits the rotational driving force, with deceleration to a predetermined rate, to the first rotating shaft 13.

[0040] The drive motor 16 is disposed between two pairs of the first massaging members 11 arranged in the horizontal direction, or equivalently located centrally of the above-knee region-massaging mechanism 9. The drive motor 16 is mounted with its output shaft facing forward. The gear case 17 is disposed forward of the drive motor 16. The gear case 17 is fitted with the first rotating shaft 13 passed therethrough in the right-left direction. Moreover, the gear case 17 houses a plurality of gears for transmitting the rotational driving force from the output shaft of the drive motor 16, with deceleration, to the first rotating shaft 13.

[0041] The first rotating shaft 13 is mounted, with its axis directed in the right-left direction, so as to span the region between the left-hand extending portion 3L and the right-hand extending portion 3R within the upper case body 3. That is, the first rotating shaft 13 is rotatably supported by a support member 23L disposed inside

the left-hand extending portion 3L and a support member 23R disposed inside the right-hand extending portion 3R. The first rotating shaft 13 is mounted with its lengthwise intermediate part passed through the gear case 17 of the first drive section 12. The first rotating shaft 13 is rotated by the rotational driving force from the first drive section 12.

[0042] The first converting section 14 comprises: a first rotating boss portion 18 attached to the first rotating shaft 13 for rotation together with the first rotating shaft 13; a first annular fit portion 19 located toward the base end of the first massaging member 11 and fitted onto the first rotating boss portion 18 for rotation relative to the first rotating boss portion 18; and a first restraining portion 20 that restrains the first massaging member 11 from rotating together with the first rotating shaft 13.

The first rotating boss portion 18 is spherically shaped. The first rotating boss portion 18 is provided at its outer periphery with a groove-shaped raceway 24. The raceway 24 is formed so as to extend circumferentially around the outer periphery of the first rotating boss portion 18.

[0043] The raceway 24 receives a pin member 26 for sliding movement. The pin member 26 is attached to the

inside of the first annular fit portion 19. The raceway 24 is inclined with respect to the axis of the first rotating shaft 13. Thus, the first rotating boss portion 18 rotates in inclined relation to the axis of the first rotating shaft 13.

The first rotating boss portions 18 (the raceways 24) of, respectively, the paired first massaging members 11 disposed within the upper case body 3 are inclined in opposite directions (in the form of a V as seen in plan view, for example). The inclination of the first rotating boss portion 18 (the raceway 24) may be suitably changed as required.

[0044] The first annular fit portion 19 has an inner periphery shaped as a curved surface 25 conforming to the spherical shape of the first rotating boss portion 18 (indicated by a dash-single-dot line in FIG. 8). The inner periphery of the first annular fit portion 19 is defined by a plane having the same curvature as that of the outer periphery of the first rotating boss portion 18.

The inner periphery of the first annular fit portion 19 is fitted with the inwardly projected pin member 26. In this embodiment, the first annular fit portion 19 has the form of split bodies, and the pin member 26 is fitted in the interior of the split bodies (indicated by a dash-double-dot line in FIG. 8).

[0045] Upon rotation of the first rotating boss portion 18 accompanying the rotation of the first rotating shaft 13, the pin member 26 slides within the raceway 24, causing the first annular fit portion 19 to slidably move around the first rotating boss portion 18. This enables the rotational driving force on the first rotating shaft 13 to be converted into rocking motion, so that the first massaging member 11 can be rocked in the right-left direction. Thus, the rotation (inclined rotation) of the first rotating boss portion 18 exteriorly fitted with the first annular fit portion 19 causes the first massaging member 11 to rock.

[0046] The first restraining portion 20 is located toward the base end of the first annular fit portion 19. The first restraining portion 20 comprises: a first restraining pin 21 disposed on the first annular fit portion 19 (the base end of the first massaging member 11); and a first restraining slot 22, disposed within the upper case body 3, for receiving the first restraining pin 21 for sliding movement.

 The first restraining pin 21 is a cylindrical column-shaped member. The first restraining pin 21 is formed so as to protrude upward, as well as to protrude downward, from the first annular fit portion 19. The first restraining slot 22 is cylindrically shaped. The first

restraining slot 22 is formed in each of the interior upper part and the interior lower part of the upper case body 3 in correspondence with each of the upward first restraining pin 21 and the downward first restraining pin 21.

[0047] As shown in FIGs. 6 and 7, the first restraining pin 21 rotates about a substantially vertically directed axis within the first restraining slot 22. This restrains the first annular fit portion 19 from accompanying rotation relative to the first rotating boss portion 18.

Various device arrangements may be adopted for the above-knee region-massaging mechanism 9. Moreover, the above-knee region-massaging mechanism 9 may be supported for rocking motion about the axis of the first rotating shaft 13 directed in the right-left direction.

[0048] As shown in FIGs. 1 to 8 for example, disposed forward of the above-knee region-massaging mechanism 9 (the third treatment part-massaging mechanism 9) is the fifth treatment part-massaging mechanism 27 (the front massaging mechanism 27) that performs massage on the "fourth treatment part" corresponding to the back B of the user, and the "fifth treatment part", such as the shoulder S and the neck N (nape), of the user. In other words, the fifth treatment part-massaging mechanism is located on the front side of the upper massaging mechanism.

[0049] The front massaging mechanism 27 comprises: a front arm member 28 extended forwardly from the upper case body 3; and a front massaging element 29 disposed at the tip of the front arm member 28.

 The front arm member 28 is attached to the base end of the inner first massaging member 11. The front arm member 28 protrudes obliquely upwardly in the forward direction through a hole 30 made in the upper case body 3. The front arm member 28 rocks in the right-left direction along with the horizontal rocking motion of the inner first massaging member 11.

[0050] The front massaging element 29, which is spherically shaped, is disposed at the tip of the front arm member 28 so as to protrude obliquely upwardly in the forward direction. The front massaging element 29 rocks in the right-left direction along with the horizontal rocking motion of the front arm member 28.

 In the "first position", the front massaging element 29 is positioned for contact with the back B of the user (the fourth treatment part). Moreover, in the "second position", the front massaging element 29 is positioned for contact with the shoulder S, the neck N, etc. (the fifth treatment part). The front massaging element 29 moves smoothly over the back B, the shoulder S, the neck N, etc.

[0051] In the "seat's massage area", the front

massaging mechanism 27 operates in a manner such that the front arm member 28 rocks together with the inner first massaging member 11, thereby enabling the front massaging element 29 to press and rub the back B, the shoulder S, the neck N, etc. of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned treatment parts.

For example, in order to prevent the application of an excessive degree of press force to the back B, the shoulder S, the neck N, etc., preferably, the front arm member 28 and the front massaging element 29 are capable of relieving loads to moderately reduce the press force for the relief of pain to the back B, the shoulder S, the neck N, etc. That is, the front arm member 28 and the front massaging element 29 may be configured to, when subjected to a load of predetermined level or higher, release the load, and return to their original states by a repulsive force upon the release of the load. This protects the front arm member 28, etc. from damage.

[0052] While the front arm member 28 is attached to the base end of the inner first massaging member 11 in this embodiment, the location of attachment, etc. of the front arm member 28 may be suitably changed as required.

In this embodiment, the above-knee region-massaging mechanism 9 (the third treatment part-massaging mechanism

9) may include a width-adjusting mechanism that adjusts the width of the spacing between the paired first massaging members 11. In this case, while not shown in the drawings, for example, the width-adjusting mechanism is disposed at the base end of the first massaging member 11, and configured to enable the first rotating boss portion 18 to move in the right-left direction on the first rotating shaft 13. The horizontal movement of the rotating boss portion 18 on the first rotating shaft 13 causes the first massaging member 11 to move in the right-left direction. This permits desired adjustment of the width of the spacing between the paired first massaging members 11. The massage machine provided with such a width-adjusting mechanism is capable of adjusting to the shape (size) of the leg L, regardless of whether the calf C or the thigh T is thin or thick. Moreover, with consideration given to variations in foot F shape (size) from user to user, a second massaging member 39 of the below-knee region-massaging mechanism 8 (the second treatment part-massaging mechanism 8), which will hereafter be described, may also be provided with the width-adjusting mechanism.

[0053] As shown in FIGs. 1 to 8 for example, the massage machine 1 according to this embodiment includes the vertically moving mechanism 10 that moves the upper case body 3 and the above-knee region-massaging mechanism 9 (the

upper massaging mechanism) in the vertical direction along the back B of the user. The vertically moving mechanism 10 is located at the rear of the lower case body 2, and moves the upper case body 3 toward and away from the lower case body 2 in the vertical direction.

[0054] More specifically, the vertically moving mechanism 10 comprises: an up-and-down drive section that produces a driving force for moving the above-knee region-massaging mechanism 9, etc. in the vertical direction; an up-and-down shaft 31 mounted with its axis directed in the right-left direction; and up-and-down means 32, located below the upper case body 3, for moving the above-knee region-massaging mechanism 9, etc. in the vertical direction.

The up-and-down drive section (not shown) produces output of a driving force for moving the above-knee region-massaging mechanism 9 (the third treatment part-massaging mechanism 9), etc. in the vertical direction by rotating the up-and-down shaft 31, and transmits the driving force to the up-and-down means 32. For example, the up-and-down drive section comprises: an up-and-down motor that produces output of a driving force (rotational driving force); and a gear case that transmits the rotational driving force, with deceleration to a predetermined rate, to the up-and-down shaft 31. The up-and-down motor has an output shaft

received in the gear case. The gear case is fitted with the up-and-down shaft 31 passed therethrough.

[0055] The up-and-down shaft 31 is mounted, with its axis directed in the right-left direction, so as to span the region between a left-hand slider 34L and a right-hand slider 34R that constitute the up-and-down means 32. The up-and-down shaft 31 is mounted so as to pass through the gear case. The up-and-down shaft 31 receives the rotational driving force transmitted thereto via the gear case from the up-and-down motor.

The up-and-down means 32 is disposed at each of the interior left end and the interior right end of the lower case body 2. The up-and-down means 32 comprises: a vertically-extending continuous guide rail 33 having a concavely curved sectional configuration; a slider 34 that engages the guide rail 33 for vertical movement; a rack gear 35 mounted with its teeth facing forward; and a pinion gear 36 which moves in the vertical direction while rolling on the rack gear 35.

[0056] The guide rail 33 is attached to each interior side of the lower case body 2. The guide rail 33 is a concavely curved member for guiding the slider 34 in vertical movement. The guide rail 33 serves also as a support member that supports the slider 34.

In this embodiment, the guide rail 33 is made shorter

than the slider 34. The guide rail 33 comprises: a left-hand guide rail 33L attached to the interior left end of the lower case body 2; and a right-hand guide rail 33R attached to the interior right end of the lower case body 2.

[0057] The slider 34 is a prismatic member formed so as to extend downward from the lower end of the upper case body 3. In this embodiment, the slider 34 is made longer than the guide rail 33.

The elongated slider 34 is guided in vertical movement along the guide rail 33. The slider 34 comprises: a left-hand slider 34L downstanding from the left lower end of the upper case body 3; and a right-hand slider 34R downstanding from the right lower end of the upper case body 3.

[0058] The rack gear 35 is formed on the front face of the slider 34 so as to be elongated in the vertical direction. That is, the rack gear 35 is a longitudinally-elongated toothed member. Like the slider 34, the rack gear 35 is an elongated member, which is formed on the front face of the slider 34 so as to extend from the top to the bottom of the front face. The rack gear 35 comprises: a rack gear 35L formed on the front face of the left-hand slider 34L; and a rack gear 35b formed on the front face of the right-hand slider 34R.

[0059] The pinion gear 36 is located forward of the slider 34, and has a meshing engagement with the rack gear 35 disposed on the slider 34. A pinion gear 36L is attached to the left end of the up-and-down shaft 31, and meshes with the rack gear 35L. Moreover, the pinion gear 36L is rotatably fitted in a cavity made in the front side of the left-hand guide rail 33L.

 A pinion gear 36R is attached to the right end of the up-and-down shaft 31, and meshes with the rack gear 35R. Moreover, the pinion gear 36R is rotatably fitted in a cavity made in the front side of the right-hand guide rail 33R.

[0060] In order to prevent the slider 34, the pinion gear 36, etc. from coming off from the guide rail 33, there is provided a cover member 37 that externally covers the guide rail 33. Note that the structure of the vertically moving mechanism 10 is not limited to that as exemplified in this embodiment.

 Moreover, the vertically moving mechanism 10 includes: a shaft angle detector (not shown) that detects the angle of rotation of the up-and-down shaft 31; a position detector (not shown) that detects the upper or lower limit position for the vertical movement of the upper case body 3 (the above-knee region-massaging mechanism 9); and a stopper (not shown) that stops the upward or downward

movement of the upper case body 3 on the basis of the result of detection by the shaft angle detector and/or the position detector.

[0061] The shaft angle detector may be attached to the up-and-down shaft 31. For example, a rotary encoder may be adopted for use as the shaft angle detector.

When the angle of rotation of the up-and-down shaft 31 reaches a predetermined value during the vertical movement of the upper case body 3, the shaft angle detector detects the position of the upper case body 3. Then, the stopper stops the rotation of the up-and-down shaft 31 on the basis of the detection result, thereby causing the upper case body 3 to stop its vertical movement in a predetermined position.

[0062] For example, the position detector may be attached to the guide rail 33. For example, a limit switch may be adopted for use as the position detector.

When the pinion gear 36 running on the rack gear 35 reaches the uppermost or lowermost reachable position, the position of the upper case body 3 is detected by the position detector. Then, the stopper stops the rotation of the up-and-down shaft 31 on the basis of the detection result, thereby causing the upper case body 3 to stop its upward or downward movement.

[0063] The following describes the operation of the

vertically moving mechanism 10.

Upon input of the rotational driving force from the up-and-down motor to the gear case, the rotational driving force is transmitted to the up-and-down shaft 31 within the gear case. As the up-and-down shaft 31 is rotated by the transmitted rotational driving force, the pinion gear 36L attached to the left end of the up-and-down shaft 31 and the pinion gear 36R attached to the right end of the up-and-down shaft 31 run on the rack gear 35L and the rack gear 35R, respectively. That is, the pinion gear 36 and the rack gear 35 permit conversion of the rotational driving force on the up-and-down shaft 31 into vertical movement.

[0064] The left-hand slider 34L is guided in upward or downward movement by the left-hand guide rail 33L, and the right-hand slider 34R is guided in upward or downward movement by the right-hand guide rail 33R. For example, the upward movement of the left-hand and right-hand sliders 34L and 34R causes the upper case body 3 (the above-knee region-massaging mechanism 9) to move upward. Moreover, the downward movement of the left-hand and right-hand sliders 34L and 34R causes the upper case body 3 to move downward.

When the pinion gear 36 reaches the lowermost end of the rack gear 35, the position detector detects the

lowermost position. On the basis of the result of detection by the position detector, the stopper stops the downward movement of the upper case body 3 (the above-knee region-massaging mechanism 9) which is moving close to the lower case body 2. This enables transition to the "first position" shown in the left-hand view of FIG. 1, FIGS. 2 and 4, etc.

[0065] Then, for example, when the pinion gear 36 reaches an intermediate point on the rack gear 35 in the vertical direction, the shaft angle detector detects that the predetermined position is reached. On the basis of the result of detection by the position detector, the stopper stops the vertical movement of the upper case body 3 (the above-knee region-massaging mechanism 9).

Moreover, when the pinion gear 36 reaches the uppermost end of the rack gear 35, the position detector detects the uppermost position. On the basis of the result of detection by the position detector, the stopper stops the upward movement of the upper case body 3 (the above-knee region-massaging mechanism 9) which is moving away from the lower case body 2. This enables transition to the "second position" shown in the right-hand view of FIG. 1, FIGS. 3 and 5, etc.

[0066] Thus constructed and operated, the vertically moving mechanism 10 supports the upper case body 3 (the

above-knee region-massaging mechanism 9) for vertical movement.

Moreover, the massage machine 1 according to this embodiment may be provided with a safety stop mechanism (not shown) that immediately stops the vertically moving mechanism 10 when the vertical movement of the upper case body 3 is hindered (for example, the occurrence of a load such as to interfere with the downward movement of the upper case body 3).

[0067] The safety stop mechanism detects hindrance to the vertical movement of the upper case body 3, and stops the vertically moving mechanism 10 on the basis of the detection result. For example, a limit switch may be adopted for use as the detecting section of the safety stop mechanism. Moreover, the safety stop mechanism may include a device that, when an unexpected shock is applied, absorbs the shock for protection of the limit switch from damage.

Specific examples of the "hindrance to the vertical movement of the upper case body 3" include: the application of an external load exceeding a predetermined level (upwardly-pressing load) such as ingress of a foreign object in between the upper case body 3 under downward movement and the lower case body 2 (e.g. a hand of a person other than the user (such as child's hand) being caught in between the upper and lower case bodies); and hindrance to

the operation of the upper case body 3 during its upward movement (e.g. a load such as to interfere with the upward movement of the upper case body 3).

[0068] Moreover, the safety stop mechanism may be configured to detect the distance between the upper case body 3 under downward movement and the lower case body 2. That is, the safety stop mechanism is preferably configured to figure out the distance between the upper case body 3 and the lower case body 2. The safety stop mechanism may also be configured to stop the rockably supporting mechanism when the operation of the upper case body 3 is hindered during its rocking motion.

The described safety stop mechanism prevents an accident such as catching of child's hand, and thereby avoids the application of a load to the upper case body 3 and the above-knee region-massaging mechanism 9 (the upper massaging mechanism).

[0069] Now, the vertical movement of the upper case body 3 (the above-knee region-massaging mechanism 9, the front massaging mechanism 27, etc.) constituting the massage machine 1 embodying the present invention, expressed differently, the "first position" and the "second position", will be described with reference to the drawings.

The configurations of the lower case body 2, the

below-knee region-massaging mechanism 8 (the second treatment part-massaging mechanism 8), the seat's massaging mechanism 55 (the first treatment part-massaging mechanism 55), etc. will be described later.

[0070] First, the condition of the upper case body 3 in the "first position" will be described with reference to the left-hand view of FIG. 1, FIGs. 2 and 4, etc. The "first position", in which the upper case body 3 assumes a lower position, is suited to the leg L1 of a user of relatively small build, for example.

For example, in the "first position" shown in the left-hand view of FIG. 1, FIGs. 2 and 4, etc., the upper case body 3 is situated immediately above the lower case body 2, with its main body substantially horizontally oriented and its tip projected rearward.

[0071] The upper case body 3 is formed with the first receiving recesses 4 each having an open rear, an open top, and an open bottom. Moreover, the lower case body 2 is formed with the second receiving recesses 7 each having an open rear. The user places the calves C1 of the legs L1 in their respective first receiving recesses 4 of the upper case body 3, and also places the feet F1 in their respective second receiving recesses 7 of the lower case body 2.

[0072] More specifically, as shown in FIG. 2, the calf

C1 is covered, from the front, with the upper case body 3, and is sandwiched between the first massaging members 11 of the above-knee region-massaging mechanism 9. In the "first position", the first massaging members 11 are operative to hold and press the calf C1 received in the first receiving recess 4 from the lateral sides for calf pressing massage.

The location of user's calf C1 to be pressed by the first massaging member 11 in the lengthwise direction varies depending on the size of the calf C1. Moreover, the above-knee region-massaging mechanism 9 is held in place (stationary condition) by the vertically moving mechanism 10.

[0073] Meanwhile, the foot F1 is sandwiched between the second massaging members 39 of the below-knee region-massaging mechanism 8. In the "first position", the second massaging members 39 are operative to hold and press the foot F1, i.e. the toe E-to-heel H region received in the second receiving recess 7 from the lateral sides for foot pressing massage.

In the "first position" with the upper case body 3 held in a lowered state, when the user sits in the seat portion 5 and leans back against the backrest portion 6, the front massaging mechanism 27 operates in a manner such that the front massaging element 29 presses and rubs the back B in a rear to front direction for acupressure

massage-like pressing and rubbing massage to the back B.

[0074] Moreover, the seat's massaging mechanism 55 operates in a manner such that a rear massaging element 61 of a rear massaging portion 56 presses and rubs the back B, the waist W, etc. in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned treatment parts, that a side massaging element 64 of a side massaging portion 57 presses the waist side part D (the side of the body), etc. in an outside to inside direction for "pressing massage" to the part D, etc., and that a lower massaging element 67 of a lower massaging portion 58 presses and rubs the buttocks A, etc. in a bottom to top direction for acupressure massage-like pressing and rubbing massage to the buttocks A, etc.

[0075] Next, the condition of the upper case body 3 in the "second position" will be described with reference to the right-hand view of FIG. 1 and FIG. 3. The "second position", in which the upper case body 3 assumes a higher position, is suited to the leg L2 of a user of relatively large build, for example.

For example, in the "second position" shown in the right-hand view of FIG. 1 and FIG. 3, the upper case body 3 remains upward in the position to which it has been moved by a predetermined distance (height) away from the lower case body 2 by the vertically moving mechanism 10. The

upper case body 3 in the upward position is substantially horizontally oriented and has its tip projected rearward. At this time, the first receiving recesses 4 of the upper case body 3 each have an open rear, an open top, and an open bottom. The user places the thighs T2 of the legs L2 in their respective first receiving recesses 4 of the upper case body 3, and also places the feet F2, as well as the calves C2, in their respective second receiving recesses 7 of the lower case body 2.

[0076] More specifically, as shown in FIG. 3, the thigh T2 is covered, from the front, with the upper case body 3, and is sandwiched between the first massaging members 11 of the above-knee region-massaging mechanism 9. In the "second position", the first massaging members 11 are operative to hold and press the thigh T2 received in the first receiving recess 4 from the lateral sides for thigh pressing massage.

The location of user's thigh T2 to be pressed by the first massaging member 11 in the lengthwise direction varies depending on the size of the thigh T2. Moreover, the above-knee region-massaging mechanism 9 is held in place (stationary condition) by the vertically moving mechanism 10.

[0077] Meanwhile, the foot F2 and the calf C2 are sandwiched between the second massaging members 39 of the

below-knee region-massaging mechanism 8. In the "second position", the second massaging members 39 are operative to hold and press the foot F2, i.e. the toe E-to-heel H region, and the calf C2 received in the second receiving recess 7 from the lateral sides for pressing massage to the aforementioned treatment parts.

In the "second position" with the upper case body 3 held in a raised state, when the user sits in the seat portion 5 and leans back against the backrest portion 6, the front massaging mechanism 27 operates in a manner such that the front massaging element 29 presses and rubs the shoulder S, the neck N (nape), etc. in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned treatment parts (refer to FIG. 6).

[0078] Moreover, the seat's massaging mechanism 55 operates in a manner such that the rear massaging element 61 of the rear massaging portion 56 presses and rubs the back B, the waist W, etc. in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned treatment parts, that the side massaging element 64 of the side massaging portion 57 presses the waist side part D (the side of the body), etc. in an outside to inside direction for "pressing massage" to the part D, etc., and that the lower massaging element 67 of

the lower massaging portion 58 presses and rubs the buttocks A, etc. in a bottom to top direction for acupressure massage-like pressing and rubbing massage to the buttocks A, etc..

[0079] Thus, moving the upper case body 3 upward and downward enables the above-knee region-massaging mechanism 9 to move to a desired position (corresponding to the "first position" or the "second position", for example). This permits easy changing of the upper massage position.

For massage positions, the "first position" and the "second position" are cited by way of example and without limitation.

[0080] That is, for example, when the massage machine 1 embodying the present invention is set in the "first position" shown in the left-hand view of FIG. 1, FIG. 2, etc., in the "leg massage area", massage can be performed on the right and left thighs T1 of the user of relatively small build (having relatively short legs) received in the right-hand and left-hand first receiving recesses 4, respectively, as well as on the right and left foot F1-to-calf C1 regions of the user received in the right-hand and left-hand second receiving recesses 7, respectively.

Moreover, when the massage machine 1 is set in the "first position" shown in FIG. 4, in the "seat's massage area", massage can be performed on the back B-to-buttocks A

region of the user sitting in the seat portion 5 while leaning back against the backrest portion 6.

[0081] Moreover, for example, when the massage machine 1 embodying the present invention is set in the "second position" shown in the right-hand view of FIG. 1, FIG. 3, etc., massage can be performed on the right and left thighs T2 of the user of relatively large build (having relatively long legs) received in the right-hand and left-hand first receiving recesses 4, respectively, as well as on the right and left foot F2-to-calf C2 regions of the user received in the right-hand and left-hand second receiving recesses 7, respectively.

Moreover, when the massage machine 1 is set in the "second position" shown in FIGs. 5 and 6, etc., in the "seat's massage area", massage can be performed on the part ranging from the shoulder S or the neck N (nape), through the back B, to the buttocks A of the user sitting in the seat portion 5 while leaning back against the backrest portion 6.

[0082] When the upper case body 3 (the above-knee region-massaging mechanism 9) is moved upward, the foot F received in the second receiving recess 7 of the lower case body 2 is likely to be lifted. It is thus preferable to provide an arrangement in which the foot F is securely held by the paired second massaging members 39. This

arrangement prevents the foot F from being lifted.

That is, the massage machine is preferably designed so that, with the "second treatment part" of the user securely held by the below-knee region-massaging mechanism 8, the above-knee region-massaging mechanism 9 can be moved up and down.

[0083] Thus, due to user's foot being sandwiched and held between the second massaging members 39, an inconvenience such as the lifting of the leg L2 is effectively prevented even when the first massaging member 11 moves from the position corresponding to the "first position" to the position corresponding to the "second position".

Moreover, for the upward and downward movement of the upper case body 3, the vertically moving mechanism 10 may include an arrangement that enables the upper case body 3 to automatically move up and down (detailed later). This arrangement provides facility for the massage machine to adjust to the length of the leg L of any user, regardless of whether the leg L (the below-knee region, in particular) is short or long, and also facility for the massage machine to adjust to the body shape of any user, regardless of whether the user has a large build or a small build. Moreover, this arrangement permits easy adjustment of the massage machine for massage to any desired part.

[0084] Moreover, for example, the massage machine may employ an arrangement that enables the upper case body 3 to move up and down between the "first position" and the "second position" repeatedly for continuous massage to the calf C-to-thigh T region, or the shoulder S- or the neck (nape)-to-back B region. This arrangement makes the massage machine operative to massage, in addition to the foot F, the calf C-to-thigh T region, or the shoulder S- or the neck (nape)-to-back B region.

[0085] Moreover, when the first massaging member 11 is lowered (changing from the "second position" to the "first position") with the foot F of the user sandwiched between the second massaging members 39, a massaging element 46 of a press massaging member 43 performs effective acupressure point-pressing massage on the sole U.

For cases where the acupressure point on the sole U is subjected to an excessive degree of press force, for example, it is very desirable that the massaging element 46 of the press massaging member 43 can be moved downward for retraction along with the movement of the first massaging member 11 from the "second position" to the "first position" (lowering movement).

[0086] The configurations of the lower case body 2 and the below-knee region-massaging mechanism 8 will be described below with reference to the drawings.

As shown in FIGs. 1 to 5 for example, as viewed from the front, the lower case body 2 is a housing of rectangular shape which is longer at the side in the horizontal direction than at the side in the vertical direction, or a housing of square shape. The lower case body 2 is placeable on the floor surface Y. The lower case body 2 is provided at its sides with handhold portions 68 which can be held with user's hands. The lower case body 2 is provided at its interior bottom with a control section 69 that controls the massage machine 1 according to this embodiment. The control section 69 controls the upper massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27), the vertically moving mechanism 10, the lower massaging mechanism (the below-knee region-massaging mechanism 8, the seat's massaging mechanism 55), a heater 54, etc.

[0087] Moreover, the lower case body 2 is formed with a pair of spaced-apart right-hand and left-hand second receiving recesses 7 (openings).

The second receiving recesses 7 are each formed in the rear side of the lower case body 2 so as to open into the rear-to-upper part of the rear side. That is, the paired right-hand and left-hand second receiving recesses 7 are shaped as vertically elongated openings for receiving the right and left legs L (the calf C-to-foot F regions,

i.e. the second treatment parts), respectively (in this embodiment, the second receiving recesses 7 each receive the leg L insertable from behind the massage machine). The second receiving recess 7 is internally provided with a lining material (not shown).

[0088] Support members 38a and 38b support, within the lower case body 2, the below-knee region-massaging mechanism 8 at a location spaced above and away from the bottom surface of the massage machine. The support members 38a are attached one to each interior end of the lower case body 2 in the right-left direction, and rotatably support the right and left ends of a second rotating shaft 40 provided in the below-knee region-massaging mechanism 8. The support member 38b is attached to the interior midportion of the lower case body 2, and supports a gear case 48 of a second drive section 41 fitted with the second rotating shaft 40 passed therethrough.

[0089] As shown in FIGs. 1 to 9 for example, in the "leg massage area", the below-knee region-massaging mechanism 8 holds and kneads the "second treatment part", i.e. the lower region of the leg L (such as the calf C and the foot F) of the user for "kneading massage" to the aforementioned parts.

The below-knee region-massaging mechanism 8 comprises: the paired right-hand and left-hand second

massaging members 39, spaced apart in the right-left direction so as to sandwich the "second treatment part", for performing kneading massage on the "second treatment part"; the second rotating shaft 40 mounted with its axis horizontally directed, and mounted so as to pass through the base-end sides of the second massaging members 39 in the right-left direction; the second drive section 41 that rotatably drives the second rotating shaft 40; and a second converting section 42, located toward the base end of the second massaging member 39, for converting a rotational driving force on the second rotating shaft 40 into rocking motion of the second massaging member 39.

[0090] Moreover, the massage machine 1 includes the press massaging member 43 that performs acupressure massage-like vibratory and pressing massage on the sole U such as the arc of the foot.

The second massaging member 39 comprises: a horizontal massaging member 44 extended forwardly from the base-end side of the second massaging member (forwardly extending portion); and a vertical massaging member 45 extended upwardly from the base-end side (upwardly extending portion).

[0091] In this embodiment, the second massaging member 39 is a substantially L-shaped (boot-shaped) member formed so as to extend along the lower region of the leg L, i.e.

the calf C-to-foot F region, as seen in side view. The second massaging member 39 is disposed inside the second receiving recess 7.

Within the lower case body 2, there is provided a pair of right-hand and left-hand horizontal massaging members 44, each mounted so as to extend forwardly and substantially horizontally from the base-end side of the second massaging member 39. The horizontal massaging members 44 are fashioned for covering the foot F from the sides. The front-end side and the rear-end side of the horizontal massaging member 44 cover the toe E and the heel H, respectively. The horizontal massaging members 44 are operative to press the foot F received in the second receiving recess 7 both from the lateral side and from the medial side for foot squeezing massage.

[0092] Within the lower case body 2, there is provided a pair of right-hand and left-hand vertical massaging members 45, each mounted so as to rise upwardly and substantially vertically from the base-end side of the second massaging member 39. The vertical massaging members 45 are fashioned for covering the calf C from the sides. The vertical massaging members 45 are operative to press the calf C received in the second receiving recess 7 both from the lateral side and from the medial side for calf squeezing massage.

[0093] In this embodiment, the second massaging member 39 is provided at its base end (bend) with the second converting section 42 that converts a rotational driving force on the second rotating shaft 40 into rocking motion of the second massaging member 39. That is, in this embodiment, the horizontal massaging member 44 and the vertical massaging member 45 are coupled to each other via the second converting section 42 lying between them.

The second massaging member 39 comprises: an inner second massaging member 39a for pressing the leg L outward; and an outer second massaging member 39b, opposed to the inner second massaging member 39a, for pressing the leg L inward.

[0094] The inner second massaging member 39a comprises: a horizontal massaging member 44a, positioned for contact with the medial side (big toe-side part) of the foot F, for pressing the medial side of the foot F outward; and a vertical massaging member 45a, positioned for contact with the medial side of the calf C, for pressing the medial side of the calf C outward.

The outer second massaging member 39b comprises: a horizontal massaging member 44b, positioned for contact with the lateral side (little toe-side part) of the foot F, for pressing the lateral side of the foot F inward; and a vertical massaging member 45b, positioned for contact with

the lateral side of the calf C, for pressing the lateral side of the calf C inward.

[0095] With a repeat of the alternation of the approaching-separating movement of the paired horizontal massaging members 44a and 44b and the approaching-separating movement of the paired vertical massaging members 45a and 45b, the paired second massaging members 39a and 39b hold and knead the leg L, i.e. the foot F-to-calf C region (the second treatment part) for "kneading massage" to the leg L. Moreover, the press massaging member 43 acts in conjunction with the horizontal massaging member 44a, and the massaging element 46 is thus pressed against the sole U at regular intervals for pressing massage to the sole U.

[0096] As shown in FIG. 7, there is provided a single second rotating shaft 40 mounted with its axis horizontally directed. The second rotating shaft 40 is mounted so as to pass through the base-end sides of the paired right-hand and left-hand second massaging members 39 in the right-left direction. The second rotating shaft 40 is supported, via a bearing (not shown), by the support members 38a and 38b.

The second rotating shaft 40 is located between the "seat's massage area" and the "leg massage area" as seen in side view. That is, the area situated forward of the second rotating shaft 40 is the "seat's massage area", and,

the area situated rearward of the second rotating shaft 40 is the "seat's massage area".

[0097] The horizontal massaging member 44 includes the press massaging member 43 operative to perform pressing massage on the sole U such as the arc of the foot. The press massaging member 43 is an arm-shaped member extended from one side to the other side for massage to the sole U of the foot F received in the second receiving recess 7.

 The press massaging member 43 is provided at its tip with the spherical massaging element 46. The massaging element 46 is operative to perform, for example, thumb pressure massage-like sharp pressure massage on the sole U.

[0098] Along with the operation of the horizontal massaging member 44 to hold the foot F laterally for foot squeezing massage, the press massaging member 43 repeats a series of the following actions: bringing the massaging element 46 near to the sole U; pressing the massaging element 46 upward against the sole U; and moving the massaging element 46 away from the sole U.

 As shown in FIGs. 7 and 9 for example, the second drive section 41 produces output of a rotational driving force for rotating the second rotating shaft 40. The rotational driving force on the second rotating shaft 40 is converted into rocking motion by the second converting section 42, thereby enabling the second massaging member 39

comprising the horizontal massaging member 44 and the vertical massaging member 45 to perform massage.

[0099] The second drive section 41 comprises: a drive motor 47 that produces a rotational driving force; and the gear case 48 that transmits the rotational driving force, with deceleration to a predetermined rate, to the rotating shaft 40. The second drive section 41 is supported by the support member 38b.

The drive motor 47 is located substantially centrally of the interior of the lower case body 2. That is, the drive motor 47 is located between the inner second massaging member 39a disposed on the right and the inner second massaging member 39a disposed on the left (located substantially centrally of the interior of the lower case body 2). In this embodiment, there is provided a single drive motor 47. Below the drive motor 47 is disposed the gear case 48.

[0100] The gear case 48, in which the output shaft of the drive motor 47 is received, accommodates a plurality of gears. Moreover, the gear case 48 is fitted with the second rotating shaft 40 passed therethrough in the right-left direction. That is, after being inputted to the gear case 48, the rotational driving force of the drive motor 47 is subjected to deceleration to a predetermined rate, and then transmitted to the second rotating shaft 40.

The second converting section 42 converts the rotational driving force on the second rotating shaft 40 into rocking motion (approaching-separating movement) of the second massaging member 39. In this embodiment, the second converting section 42 is disposed at the bend (base end) of the substantially L-shaped (boot-shaped) second massaging member 39.

[0101] The second converting section 42 comprises: a second rotating boss portion 49 attached to the second rotating shaft 40 for unitary rotation with the second rotating shaft 40; a second annular fit portion 50 located toward the base end of the second massaging member 39 and fitted onto the second rotating boss portion 49; and a second restraining portion 51 that restrains the second massaging member 39 from rotating together with the second rotating shaft 40.

The second rotating boss portion 49 is provided at its outer periphery with a cam surface 52. In this embodiment, the cam surface 52 is inclined with respect to the second rotating shaft 40. That is, the second rotating boss portion 49 rotates in inclined relation to the axis of the second rotating shaft 40.

[0102] The second rotating boss portions 49 (the cam surfaces 52) of, respectively, the paired second massaging members 39a and 39b disposed within the lower case body 2

are inclined in opposite directions (in the form of a V as viewed from the front, for example). The inclination of the second rotating boss portion 49 (the cam surface 52) may be suitably changed as required.

The second annular fit portion 50 is formed on the base-end side of the second massaging member 39, and fitted onto the second rotating boss portion 49 for relative rotation. In this embodiment, the second annular fit portion 50 is fitted, via a bearing 70, onto the second rotating boss portion 49. The inclined rotation of the second rotating boss portion 49 externally fitted with the second annular fit portion 50 causes the second massaging member 39 to rock.

[0103] The second restraining portion 51 restrains the second annular fit portion 50 from accompanying rotation relative to the second rotating boss portion 49. The second restraining portion 51 is located forward of the second annular fit portion 50. The second restraining portion 51 comprises: a restraining pin 53 protruding forwardly from the second annular fit portion 50; and a second restraining slot, disposed within the lower case body 2, for receiving the second restraining pin 53 for sliding movement in the right-left direction.

[0104] Thus constructed, the second converting section 42 converts the rotational driving force on the second

rotating shaft 40 into rocking motion of the second massaging member 39. This enables the paired right-hand and left-hand horizontal massaging members 44 to apply squeezing massage to the foot F, and also causes the paired right-hand and left-hand vertical massaging members 45 to fall toward each other to apply squeezing massage to the calf C. At this time, along with the operation of the horizontal massaging member 44, the press massaging member 43 is rocked so as to apply upward pressure to the sole U for acupressure massage-like pressing massage to the sole U.

[0105] Moreover, the massage machine 1 according to this embodiment includes a heater 54 that warms the interior of the lower case body 2 to permit hyperthermic massage to the leg L (the second treatment part). Examples of the heater 54 include a hyperthermic heater (e.g. a positive temperature coefficient (PTC) heater) that warms air inside the lower case body 2. The air warmed by the hyperthermic heater is diffused within the lower case body 2, thereby warming the area around the second massaging member 39. This permits hyperthermic massage to the foot F, etc.

[0106] In this embodiment, the "seat's massage area", which serves as an area for user seating, is provided on the front side of the lower case body 2 (i.e. situated

forward of the "leg massage area"). That is, the lower case body 2 is provided at its front side with the seat portion 5. The seat portion 5 has a substantially flat surface dimensioned to be wide enough for user seating.

At the rear of the seat portion 5 is disposed the backrest portion 6. The backrest portion 6 is dimensioned to be wide enough for user leaning. Moreover, the backrest portion 6 is rearwardly inclined. That is, in this embodiment, the lower case body 2 is shaped like a chair comprising the seat portion 5 and the backrest portion 6.

[0107] The lower case body 2 accommodates: the seat's massaging mechanism 55 that performs massage on the fourth treatment part, such as the back B, of the user, and the first treatment part, such as the waist W, the waist side part D (the side of the body), and the buttocks A, of the user; and the second drive section 41 that drives the seat's massaging mechanism 55. In this embodiment, the second drive section 41 drives both the seat's massaging mechanism 55 and the below-knee region-massaging mechanism 8.

[0108] The seat's massaging mechanism 55 (the first treatment part-massaging mechanism 55) performs pressing and rubbing massage on one or more of the back B, the waist W, the waist side part D (the side of the body), and the buttocks A of the user in the "seat's massage area".

In this embodiment, the seat's massaging mechanism 55 comprises: the rear massaging portion 56 that presses the back B, the waist W, etc. in a rear to front direction for massage to the aforementioned parts; the side massaging portion 57 that presses the waist side part D in an outside to inside direction for waist side part massage; and the lower massaging portion 58 that presses the buttocks A in a bottom to top direction for buttocks massage.

[0109] The rear massaging portion 56 protrudes forwardly through a hole 59 made in the upper part of the backrest portion 6. The rear massaging portion 56 comprises: a rear arm member 60 attached to the edge of the second massaging member 39; and the rear massaging element 61 disposed at the tip of the rear arm member 60.

As shown in FIGs. 7 and 9 for example, in this embodiment, the rear arm member 60 is attached to the inner second massaging member 39a. More specifically, the rear arm member 60 is attached to the inner vertical massaging member 45a so as to protrude obliquely upwardly in the forward direction.

[0110] The rear arm member 60 protrudes forwardly through the hole 59 made in the upper part of the backrest portion 6. The rear arm member 60 rocks in the right-left direction along with the horizontal rocking motion of the inner vertical massaging member 45a.

The rear massaging element 61, which is spherically shaped, is disposed at the tip of the rear arm member 60 so as to protrude obliquely upwardly in the forward direction. The rear massaging element 61 rocks in the right-left direction along with the horizontal rocking motion of the rear arm member 60. The rear massaging element 61 is positioned for contact with the back B, the waist W, etc. of the user leaning on the backrest portion 6. The rear massaging element 61 moves smoothly over the back B, the waist W, etc.

[0111] At the backrest portion 6 corresponding to the "seat's massage area", the rear massaging portion 56 operates in a manner such that the rear arm member 60 rocks together with the inner vertical massaging member 45a (the inner second massaging member 39a), thereby enabling the rear massaging element 61 to press and rub the back B, the waist W, etc. of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned parts.

In order to prevent the application of an excessive degree of press force to the back B, the waist W, etc., preferably, for example, the rear arm member 60 and the rear massaging element 61 relieve loads to moderately reduce the press force for the relief of pain to the back B, the waist W, etc. That is, the rear arm member 60 and

the rear massaging element 61 may be configured to, when subjected to a load of predetermined level or higher, release the load, and to return to their original states by a repulsive force upon the release of the load. This protects the rear arm member 60, etc. from damage.

[0112] While the rear arm member 60 is attached to the upper part of the front edge of the inner vertical massaging member 45a in this embodiment, the location of attachment, etc. of the rear arm member 60 may be suitably changed as required.

The side massaging portion 57 protrudes forwardly through a hole 62 made in the side part of the seat portion 5. The side massaging portion 57 comprises: a side arm member 63 attached to the edge of the second massaging member 39; and the side massaging element 64 disposed at the tip of the side arm member 63.

[0113] In this embodiment, the side arm member 63 is attached to the outer second massaging member 39b. More specifically, the side arm member 63 is attached to the upper-end side of the outer horizontal massaging member 44b so as to protrude obliquely upwardly in the forward direction. The side arm member 63 rocks in the right-left direction along with the horizontal rocking motion of the outer horizontal massaging member 44b.

[0114] The side massaging element 64 protrudes toward

the front at the tip of the side arm member 63. The side massaging element 64 is rectangularly shaped as seen in side view. Moreover, the side massaging element 64 is positioned for contact with the waist side part D (the side of the body) of the user leaning on the backrest portion 6. The side massaging element 64 moves smoothly over the waist side part D.

The spacing between the paired right-hand and left-hand side massaging portions 57 is substantially equal to the width of the waist W of the user. That is, the user sitting in the seat portion 5 leans back against the backrest portion 6, with the waist part lying between the paired right-hand and left-hand side massaging portions 57.

[0115] At the backrest portion 6 corresponding to the "seat's massage area", the side massaging portion 57 operates in a manner such that the side arm member 63 rocks together with the outer horizontal massaging member 44b (the outer second massaging member 39b), thereby enabling the rectangular side massaging element 64 to press the waist side part D of the user in an outside to inside direction for "pressing massage" to the waist side part D. The side massaging element 64 may be provided with an air bag which is alternately inflated and deflated repeatedly.

[0116] While the side arm member 63 is attached to the upper-end side of the outer horizontal massaging member 44b

in this embodiment, the location of attachment, etc. of the side arm member 63 may be suitably changed as required.

The lower massaging portion 58 protrudes upwardly through a hole 65 made in the front part of the seat portion 5. The lower massaging portion 58 comprises: a lower arm member 66 attached to the edge of the second massaging member 39; and the lower massaging element 67 disposed at the tip of the lower arm member 66.

[0117] As shown in FIGs. 7 and 9 for example, in this embodiment, the lower arm member 66 is attached to the inner second massaging member 39a. More specifically, the lower arm member 66 is attached to the tip of the inner horizontal massaging member 44a, and mounted in an upwardly and obliquely forwardly projected position.

The lower arm member 66 protrudes upwardly through the hole 65 made in the front part of the seat portion 5. The lower arm member 66 rocks in the right-left direction along with the horizontal rocking motion of the inner horizontal massaging member 44a.

[0118] The lower massaging element 67, which is spherically shaped, is disposed at the tip of the lower arm member 66, and mounted in an upwardly and obliquely forwardly projected position. The lower massaging element 67 rocks in the right-left direction along with the horizontal rocking motion of the lower arm member 66. The

lower massaging element 67 is positioned for contact with the buttocks A, etc. of the user sitting in the seat portion 5. The lower massaging element 67 moves smoothly over the buttocks A, etc.

[0119] At the seat portion 5 corresponding to the "seat's massage area", the lower massaging portion 58 operates in a manner such that the lower arm member 66 rocks together with the inner horizontal massaging member 44a (the inner second massaging member 39a), thereby enabling the lower massaging element 67 to press and rub the buttocks A, etc. of the user in a bottom to top direction for acupressure massage-like pressing and rubbing massage to the buttocks A, etc.

In order to prevent the application of an excessive degree of press force to the buttocks A, etc., preferably, for example, the lower arm member 66 and the lower massaging element 67 relieve loads to moderately reduce the press force for the relief of pain to the buttocks A, etc. That is, the lower arm member 66 and the lower massaging element 67 may be configured to, when subjected to a load of predetermined level or higher, release the load, and to return to their original states by a repulsive force upon the release of the load. This protects the lower arm member 66, etc. from damage.

[0120] While the lower arm member 66 is attached to

the front edge (tip side) of the inner horizontal massaging member 44a in this embodiment, the location of attachment, etc. of the lower arm member 66 may be suitably changed as required.

[Operation Mode 1]

The following describes a first example of the mode of operating the massage machine 1 embodying the present invention (for massage to the foot F, the calf C, the thigh T, etc.). That is, the modes of operating the below-knee region-massaging mechanism 8 of the lower massaging mechanism, the above-knee region-massaging mechanism 9 of the upper massaging mechanism, and the vertically moving mechanism 10 will be described.

[0121] After sitting in a common chair or seat, the user inserts, from behind the massage machine 1 set in front of the chair, the leg L into the opening in the "leg massage area" of the massage machine 1. More specifically, the lower region of the leg L (the calf C and the foot F) is inserted into the second receiving recess 7 of the lower case body 2 from behind the massage machine, and, the upper region of the leg L (the knee K and the thigh T) is inserted into the first receiving recess 4 of the upper case body 3 from behind the massage machine.

[0122] Next, the user sets the vertically moving mechanism 10 in motion by operating the switch of the

massage machine 1. As shown in FIG. 2, for example, for the user having a relatively small build, the upper case body 3 is moved downward to attain the "first position". That is, the vertically moving mechanism 10 guides the left-hand slider 34L and the right-hand slider 34R in downward movement via the left-hand guide rail 33L and the right-hand guide rail 33R, respectively, for lowering the upper case body 3 to attain the "first position". Thus, the position of the upper case body 3 is adjusted to suit the leg L1 (e.g. the thigh T1) of the user of relatively small build.

[0123] On the other hand, as shown in FIG. 3, for example, for the user having a relatively large build, the upper case body 3 is moved upward to attain the "second position". That is, the vertically moving mechanism 10 guides the left-hand slider 34L and the right-hand slider 34R in upward movement via the left-hand guide rail 33L and the right-hand guide rail 33R, respectively, for raising the upper case body 3 to attain the "second position". Thus, the position of the upper case body 3 is adjusted to suit the leg L2 (e.g. the thigh T2) of the user of relatively large build.

[0124] Then, the user sets the above-knee region-massaging mechanism 9 and the below-knee region-massaging mechanism 8 in motion by operating the switch of the

massage machine 1.

In the above-knee region-massaging mechanism 9 (the third treatment part-massaging mechanism 9), the drive motor 16 of the first drive section 12 inputs a rotational driving force into the gear case 17. The gear case 17 transmits the rotational driving force, with deceleration to a predetermined rate, to the first rotating shaft 13.

[0125] Upon rotation of the first rotating shaft 13, the first converting section 14 converts the rotational driving force into rocking motion of the first massaging member 11. That is, the rotation of the first rotating shaft 13 causes the first rotating boss portion 18 to rotate. The pin member 26 of the first annular fit portion 19 having the curved surface 25 slides in the raceway 24 formed in the spherical first rotating boss portion 18, thereby enabling the first massaging member 11 to rock in the right-left direction.

[0126] The paired first massaging members 11 are moved toward each other for holding and pressing the third treatment part such as the thigh T from the sides. That is, after the base ends of, respectively, the paired first massaging members 11 move toward each other, the tips (the rear ends) thereof move toward each other.

The first massaging members 11 press the thigh T from the front lateral sides (the knee K-side regions) to the

rear lateral sides (the leg joint-side regions) thereof for thigh pressing massage. Moreover, the pressing member (projection) rotatably attached to the first rotating shaft 13 rotates while pressing the knee K from the front for acupressure massage-like pressing massage to the knee K.

[0127] In the below-knee region-massaging mechanism 8 (the second treatment part-massaging mechanism 8), the drive motor 47 of the second drive section 41 inputs a rotational driving force into the gear case 48. The gear case 48 transmits the rotational driving force, with deceleration to a predetermined rate, to the second rotating shaft 40.

Upon rotation of the second rotating shaft 40, the second converting section 42 converts the rotational driving force into rocking motion of the second massaging member 39 (the approaching-separating movement of the horizontal massaging members 44 and the approaching-separating movement of the vertical massaging members 45).

[0128] With the rotation of the second rotating shaft 40, the paired horizontal massaging members 44a and 44b move toward each other from their front ends to their rear ends, thereby holding and pressing the toe E-to-heel H region (the foot F) from the sides, whereas the paired vertical massaging members 45a and 45b move toward each other from their lower ends to their upper ends, thereby

holding and pressing the calf C from the sides.

Thus, a series of the following massaging actions is repeated: the paired horizontal massaging members 44a and 44b move toward and away from each other for pressing and holding the foot F, or specifically the toe E, the instep, and the heel H successively in the order named; the paired vertical massaging members 45a and 45b move toward and away from each other for pressing and holding the calf C from below upward; and the paired first massaging members 11 move toward and away from each other for pressing the thigh T from the front lateral sides (the knee K-side regions) to the rear lateral sides (the leg joint-side regions) thereof. This helps promote blood flow in the leg L from the foot F, through the calf C, to the thigh T.

[0129] That is, the massage machine 1 embodying the present invention relaxes the muscles of the entire leg L, etc., thereby allowing the user to experience effective massage treatment for easing stiffness in the leg L and promoting blood circulation, for example.

[Operation Mode 2]

The following describes a second example of the mode of operating the massage machine 1 embodying the present invention (for massage to the buttocks A, the waist W, the shoulder S, etc.). That is, the modes of operating the seat's massaging mechanism 55 of the lower massaging

mechanism, the front massaging mechanism 27 of the upper massaging mechanism, and the vertically moving mechanism 10 will be described.

[0130] The user sets the vertically moving mechanism 10 in motion by operating the switch of the massage machine 1. As shown in FIG. 4, for example, when the user has a relatively small build, or when it is desired to massage the fourth treatment part such as the back B intensively, the upper case body 3 is moved downward to attain the "first position".

That is, the vertically moving mechanism 10 guides the left-hand slider 34L and the right-hand slider 34R in downward movement via the left-hand guide rail 33L and the right-hand guide rail 33R, respectively, for lowering the upper case body 3 to attain the "first position". Thus, the upper case body 3 is set in a position corresponding to the back B of the user.

[0131] On the other hand, as shown in the drawings, e.g. FIGs. 5 and 6, for example, when the user has a relatively large build, or when it is desired to massage the fifth treatment part such as the shoulder S and the neck N (nape) intensively, the upper case body 3 is moved upward to attain the "second position".

That is, the vertically moving mechanism 10 guides the left-hand slider 34L and the right-hand slider 34R in

upward movement via the left-hand guide rail 33L and the right-hand guide rail 33R, respectively, for raising the upper case body 3 to attain the "second position". Thus, the upper case body 3 is set in a position corresponding to the shoulder S and the neck N of the user.

[0132] After sitting in the seat portion 5 in the "seat's massage area", the user tilts the back B and leans back against the backrest portion 6. Then, the user sets the seat's massaging mechanism 55 and the front massaging mechanism 27 in motion by operating the switch of the massage machine 1.

In the front massaging mechanism 27 (the fifth treatment part-massaging mechanism 27), the drive motor 16 of the first drive section 12 inputs a rotational driving force into the gear case 17. The gear case 17 transmits the rotational driving force, with deceleration to a predetermined rate, to the first rotating shaft 13.

[0133] Upon rotation of the first rotating shaft 13, the first converting section 14 converts the rotational driving force into rocking motion of the first massaging member 11. That is, the rotation of the first rotating shaft 13 causes the first rotating boss portion 18 to rotate. The pin member 26 of the first annular fit portion 19 having the curved surface 25 slides in the raceway 24 formed in the spherical first rotating boss portion 18,

thereby enabling the first massaging member 11 to rock in the right-left direction.

[0134] The front massaging mechanism 27 disposed at the base end of the first massaging member 11 rocks substantially horizontally. That is, the left-hand front arm member 28 and the right-hand front arm member 28 rock in the right-left direction. The paired right-hand and left-hand front massaging elements 29 move toward and away from each other in substantially the horizontal direction.

At this time, when the upper case body 3 is in its lower position (the "first position"), the paired right-hand and left-hand front massaging elements 29 press and rub the fourth treatment part, such as the back B, of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the fourth treatment part (refer to FIG. 4).

[0135] On the other hand, when the upper case body 3 is in its higher position (the "second position"), the paired right-hand and left-hand front massaging elements 29 press and rub the fifth treatment part, such as the shoulder S and the neck N, of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the fifth treatment part (refer to FIG. 6).

In the seat's massaging mechanism 55 (the first treatment part-massaging mechanism 55), the drive motor 47

of the second drive section 41 inputs a rotational driving force into the gear case 48. The gear case 48 transmits the rotational driving force, with deceleration to a predetermined rate, to the second rotating shaft 40.

[0136] Upon rotation of the second rotating shaft 40, the second converting section 42 converts the rotational driving force into rocking motion of the second massaging member 39 (the approaching-separating movement of the horizontal massaging members 44 and the approaching-separating movement of the vertical massaging members 45). The rotation of the second rotating shaft 40 causes the paired vertical massaging members 45a and 45b to repeat their mutual approaching-separating movement.

At this time, the rear massaging portion 56 provided in the inner vertical massaging member 45a (the inner second massaging member 39a) rocks substantially horizontally. That is, the left-hand rear arm member 60 and the right-hand rear arm member 60 rock in the right-left direction.

[0137] The paired right-hand and left-hand rear massaging elements 61 repeat their mutual approaching-separating movement in substantially the horizontal direction. The paired right-hand and left-hand rear massaging elements 61 press and rub the back B, the waist W, etc. in a rear to front direction for acupressure

massage-like pressing and rubbing massage to the aforementioned parts (refer to FIG. 4).

On the other hand, the side massaging portion 57 provided in the outer vertical massaging member 45b (the outer second massaging member 39b) rocks substantially horizontally. That is, the left-hand side arm member 63 and the right-hand side arm member 63 rock in the right-left direction.

[0138] The paired right-hand and left-hand side massaging elements 64 repeat their mutual approaching-separating movement in substantially the horizontal direction. The paired right-hand and left-hand side massaging elements 64 press the waist side part D (the side of the body), etc. in an outside to inside direction for "pressing massage" to the aforementioned part (refer to FIG. 4).

Moreover, the rotation of the second rotating shaft 40 causes the paired horizontal massaging members 44a and 44b to repeat their mutual approaching-separating movement. At this time, the lower massaging portion 58 provided in the inner horizontal massaging member 44a (the inner second massaging member 39a) rocks substantially horizontally. That is, the left-hand lower arm member 66 and the right-hand lower arm member 66 rock in the right-left direction.

[0139] The paired right-hand and left-hand lower

massaging elements 67 repeat their mutual approaching-separating movement in substantially the horizontal direction. The paired right-hand and left-hand lower massaging elements 67 press and rub the buttocks A, etc. in a bottom to top direction for acupressure massage-like pressing and rubbing massage to the buttocks A, etc. (refer to FIG. 4).

Thus, a series of the following massaging actions is repeated: with the approaching-separating movement of the paired vertical massaging members 45a and 45b, the rear massaging element 61 of the rear massaging portion 56 presses and rubs the back B, the waist W, etc. of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned parts, and also the side massaging element 64 of the side massaging portion 57 presses the waist side part D of the user in an outside to inside direction for "pressing massage" to the part D; with the approaching-separating movement of the paired horizontal massaging members 44a and 44b, the lower massaging element 67 of the lower massaging portion 58 presses and rubs the buttocks A, etc. of the user in a bottom to top direction for acupressure massage-like pressing and rubbing massage to the buttocks A, etc.; and, with the approaching-separating movement of the paired first massaging members 11, the front massaging element 29

of the front massaging mechanism 27 presses and rubs the back B, the shoulder S, the neck N, etc. of the user in a rear to front direction for acupressure massage-like pressing and rubbing massage to the aforementioned parts. This helps relax the muscles of the back B, the waist side part D (the side of the body), the buttocks A, etc., and thereby allows the user to experience effective massage treatment for easing stiffness in the body and promoting blood circulation, for example.

[0140] The massage machine 1 embodying the present invention comprises the position-adjustable upper massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27) which permits easy changing of massage positions in accordance with the length of user's leg and the size of user's back B, and is thus capable of performing, as one single unit, kneading massage and pressing massage on a wide range in the leg L extending from the foot F, through the calf C, to the thigh T, or a wide range in the upper body extending from the neck (nape), through the shoulder S, the back B, the waist W, and each side of the waist D, to the buttocks A, etc. as massage-treatment target parts.

[0141] It should be understood that the embodiment as disclosed herein is considered in all respects as illustrative only and not restrictive.

In particular, for such matters as not explicitly specified in the disclosure of the embodiment, e.g. working conditions, operating conditions, and the dimensions, weights, etc. of the structural components, those that do not depart from the practical range which is normally complied with by persons skilled in the art and that conform to matters of common knowledge among the skilled persons are adopted herein.

[0142] For example, the length of the first massaging member 11 provided in the massage machine 1, the angle of inclination of each of the paired right-hand and left-hand first massaging members 11 (the raceway 24 of the first rotating boss portion 18) with respect to the first rotating shaft 13, and the spacing between the paired right-hand and left-hand first massaging members 11 may be suitably changed as required in accordance with the range of massage treatment.

Moreover, while the front massaging element 29 is attached to the first massaging member 11 via the front arm member 28, attaching the front massaging element 29 directly to the first massaging member 11 is satisfactory. Note that the numbers, shapes, etc. of the front massaging element 29 and the front arm member 28 are not limited to those as exemplified in this embodiment.

[0143] That is, the configuration of the upper

massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27) is not limited to that as exemplified in this embodiment.

Moreover, the length of the second massaging member 39, the angle of inclination of each of the paired right-hand and left-hand second massaging members 39 with respect to the second rotating shaft 40, the spacing between the paired right-hand and left-hand second massaging members 39, etc. may be suitably changed as required in accordance with the range of massage treatment.

[0144] Moreover, while the rear massaging element 61, the side massaging element 64, and the lower massaging element 67 are attached to the second massaging member 39 via the rear arm member 60, the side arm member 63, and the lower arm member 66, respectively, attaching these massaging elements directly to the second massaging member 39 is satisfactory. Note that the numbers, shapes, etc. of, respectively, the massaging elements 61, 64, and 67 and the arm members 60, 63, and 66 are not limited to those as exemplified in this embodiment.

[0145] While, in this embodiment, the second massaging member 39 is formed by joining the horizontal massaging member 44 and the vertical massaging member 45 into one integral member of substantially L-shape (boot-like shape) as seen in side view, it is satisfactory to form the

massaging member 39 by separately and independently disposing the horizontal massaging member 44 and the vertical massaging member 45 in a substantially L-shaped arrangement as seen in side view.

[0146] That is, the configurations of the upper massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27), the vertically moving mechanism 10, the lower massaging mechanism (the below-knee region-massaging mechanism 8, the seat's massaging mechanism 55), etc. are not limited to those as exemplified in this embodiment. For example, for the basic device configurations of the below-knee region-massaging mechanism 8, etc., reference may be had to the constructions disclosed in Japanese Unexamined Patent Publication JP-A 2019-180468 and Japanese Unexamined Patent Publication JP-A 2019-000159, for example.

[0147] Moreover, the massage machine 1 may be covered with a stretchable bag-like body. That is, the upper massaging mechanism (the above-knee region-massaging mechanism 9, the front massaging mechanism 27), the vertically moving mechanism 10, the lower massaging mechanism (the below-knee region-massaging mechanism 8, the seat's massaging mechanism 55), etc. may be covered as a whole with a stretchable bag-like body.

Reference Signs List

[0148]

- 1 Massage machine
- 2 Lower case body
- 3 Upper case body
- 3L Left-hand extending portion (Grip)
- 3R Right-hand extending portion (Grip)
- 3C Middle extending portion
- 4 First receiving recess
- 4L First receiving recess (disposed on the left)
- 4R First receiving recess (disposed on the right)
- 5 Seat portion
- 6 Backrest portion
- 7 Second receiving recess (Opening)
- 8 Below-knee region-massaging mechanism (Second
treatment part-massaging mechanism)
- 9 Above-knee region-massaging mechanism (Third
treatment part-massaging mechanism)
- 10 Vertically moving mechanism
- 11 First massaging member
- 11a Outer left-hand first massaging member
- 11b Inner left-hand first massaging member
- 11c Outer right-hand first massaging member
- 11d Inner right-hand first massaging member
- 12 First drive section
- 13 First rotating shaft

- 14 First converting section
- 15 Support member 15 (in the upper case body)
- 16 Drive motor
- 17 Gear case
- 18 First rotating boss portion
- 19 First annular fit portion
- 20 First restraining portion
- 21 First restraining pin
- 22 First restraining slot
- 23L Support member (Left-hand extending portion)
- 23R Support member (Right-hand extending portion)
- 24 Raceway
- 25 Curved surface
- 26 Pin member
- 27 Front massaging mechanism (Fifth treatment part-massaging mechanism)
- 28 Front arm member
- 29 Front massaging element
- 30 Hole (in the upper case body)
- 31 Up-and-down shaft
- 32 Up-and-down means
- 33 Guide rail
- 33L Left-hand guide rail
- 33R Right-hand guide rail
- 34 Slider

34L	Left-hand slider
34R	Right-hand slider
35	Rack gear
35L	Rack gear
35R	Rack gear
36	Pinion gear
36L	Pinion gear
36R	Pinion gear
37	Cover member
38a	Support member
38b	Support member
39	Second massaging member
39a	Inner second massaging member
39b	Outer second massaging member
40	Second rotating shaft
41	Second drive section
42	Second converting section
43	Press massaging member
44	Horizontal massaging member
44a	Inner horizontal massaging member
44b	Outer horizontal massaging member
45	Vertical massaging member
45a	Inner vertical massaging member
45b	Outer vertical massaging member
46	Massaging element

- 47 Drive motor
- 48 Gear case
- 49 Second rotating boss portion
- 50 Second annular fit portion
- 51 Second restraining portion
- 52 Cam surface
- 53 Second restraining pin
- 54 Heater
- 55 Seat's massaging mechanism (First treatment part-massaging mechanism)
- 56 Rear massaging portion
- 57 Side massaging portion
- 58 Lower massaging portion
- 59 Hole (in the upper part of the backrest portion)
- 60 Rear arm member
- 61 Rear massaging element
- 62 Hole (in the side part of the seat portion)
- 63 Side arm member
- 64 Side massaging element
- 65 Hole (in the front part of the seat portion)
- 66 Lower arm member
- 67 Lower massaging element
- 68 Control section
- 69 Handhold portion
- 70 Bearing

S	Shoulder
N	Neck (Nape)
B	Back
W	Waist
D	Waist side part (the side of the body)
A	Buttocks
L	Leg
T	Thigh
K	Knee
C	Calf
F	Foot
H	Heel
U	Sole
E	Toe
Y	Floor surface

CLAIMS

1. A message machine, comprising:
 - a lower massaging mechanism; and
 - an upper massaging mechanism disposed above the lower massaging mechanism,
 - the lower massaging mechanism comprising:
 - a front-located seat portion, in which a user sits from front of the message machine, configured for message to a "first treatment part" including at least one or more of user's waist and user's buttocks; and
 - openings, each provided to receive a lower region of user's leg, configured for message to a "second treatment part" corresponding to the lower region of the leg,
 - the upper massaging mechanism being configured to message at least one or more of a "third treatment part" corresponding to an upper region of the leg, a "fourth treatment part" corresponding to user's back, and a "fifth treatment part" corresponding to user's shoulder and user's neck.
2. The message machine according to claim 1, wherein
 - the upper massaging mechanism is configured for vertical movement relative to the lower massaging mechanism.

3. The message machine according to claim 2, comprising:

a first treatment part-massaging mechanism, located on a front part of the lower massaging mechanism, for performing massage on the "first treatment part" of the user who has sat in the seat portion from the front;

a second treatment part-massaging mechanism, located on a rear part of the lower massaging mechanism, for performing massage on the "second treatment part" of the user, which has been inserted in the opening from the rear of the message machine;

a third treatment part-massaging mechanism, disposed within the upper massaging mechanism, for performing massage on the "third treatment part" of the user; and

a vertically moving mechanism that moves the third treatment part-massaging mechanism up and down.

4. The message machine according to claim 3, wherein

the third treatment part-massaging mechanism comprises a pair of rear-located massaging members, fashioned for covering the "third treatment part" of the user from the front, for sandwiching and holding the "third treatment part" for squeezing massage to the "third treatment part", and

the massaging members are each mounted so as to

extend rearward.

5. The massage machine according to claim 4, wherein the massaging members each have a base end situated forward of the "third treatment part" of the user.

6. The massage machine according to claim 3, wherein the third treatment part-massaging mechanism comprises a converting section that converts a rotational driving force on the rotating shaft into rocking motion of the massaging members,

the converting section comprises:

a boss member attached to the rotating shaft for rotation together with the rotating shaft; and

an annular fit portion disposed on the base end of each of the massaging members and fitted onto the boss member,

the boss member is spherically shaped, and

the annular fit portion has an inner periphery shaped as a curved surface conforming to the spherical shape of the boss member.

7. The massage machine according to claim 6, wherein the inner periphery of the annular fit portion is fitted with an inwardly projected pin,

the boss member is provided at its outer periphery with a raceway in which the pin slides, and

the raceway is inclined with respect to the rotating shaft.

8. The message machine according to claim 1, wherein the upper massaging mechanism comprises a front-located fifth treatment part-massaging mechanism that performs massage on the "fifth treatment part" of the user.

9. The message machine according to claim 8, wherein the fifth treatment part-massaging mechanism comprises a forwardly extended arm member, and the arm member is disposed at the base end of each of the massaging members, and provided at its tip with a massaging element.

10. The message machine according to any one of claims 3 to 9, wherein, with the "second treatment part" of the user securely held by the second treatment part-massaging mechanism, the upper massaging mechanism can be moved up and down.