

SPECIFICATION

TITLE OF INVENTION

LEG MASSAGE MACHINE

Technical Field

[0001]

The present invention relates to a leg massage machine suitable to massage the legs.

Background Art

[0002]

As a massage machine adapted to include: paired left and right massage members disposed so as to sandwich a treatment region such as the leg (in particular, the foot); and a pressing member disposed between the paired left and right massage members, there is one disclosed in Patent Literature 1.

In the massage machine of Patent Literature 1, the paired left and right massage members are driven so as to be mutually approximated/separated, and adapted to perform a kneading massage action by repeating both oppositely pressing the foot from both left and right sides and releasing the pressing.

[0003]

On the other hand, the pressing member provided to

the massage machine of Patent Literature 1 is adapted to perform a finger pressure massage action on the foot sandwiched by the left and right massage members by repeating both pressing a surface (such as the sole) different from regions massaged by the left and right massage members and releasing the pressing.

Citation List

Patent Literatures

[0004]

Patent Literature 1: Japanese Patent No. 3377195

Summary of Invention

Technical Problem

[0005]

In the conventional massage machine disclosed in Patent Literature 1 or the like, the massage action by the paired left and right massage members and the massage action by the pressing member have been ones performed on the foot as a combination of constantly same action patterns. For this reason, the resulting massage feeling has been monotonous.

Also, even when the pressing member presses the foot at the timing when, after the left and right massage members have sandwiched and pressed the foot from both

the left and right sides, attempting to release the sandwiched state, the foot has been released in a direction to separate from the pressing member, and the massage action by the pressing members has not also been sufficiently transferred to the foot. For this reason, the massage action by the pressing member has not been effectively performed.

[0006]

The present invention has been made in consideration of the above situations, and an object thereof is to, in a leg massage machine that performs a massage action by paired left and right massage members and a massage action by a pressing member, enables effective massage treatment by the pressing members.

Solution to Problem

[0007]

In order to accomplish the above object, the present invention has taken the following means.

The leg massage machine according to the present invention is a leg massage machine including: paired left and right massage members disposed so as to sandwich a treatment region; a pressing member disposed between the paired left and right massage members; a first driving mechanism that mutually approximates/separates the

paired left and right massage members; and a second driving mechanism that actuates the pressing member so as to press the pressing member against the treatment region, and configured to be switchable between a synchronous state, which is a state where the first driving mechanism and the second driving mechanism are synchronously actuated, and a non-synchronous state, which is a state where the first driving mechanism is stopped and the second driving mechanism is actuated.

[0008]

Preferably, it is only necessary that in the non-synchronous state, the second driving mechanism is actuated while keeping a state where the paired left and right massage members are approximated to each other.

Preferably, it is only necessary to configure the leg massage machine so that the first driving mechanism includes: a rotary shaft that transmits the rotational driving force of a drive motor; and paired left and right conversion parts that convert the rotational driving force of the rotary shaft into an approximation/separation action of the paired left and right massage members, and the second driving mechanism includes the pressing member that is driven by the rotary shaft provided in the first driving mechanism, each of the conversion parts includes: a tilted boss part whose

central part is penetrated by the rotary shaft and whose outer circumference has a cam groove provided at a tilt with respect to the rotary shaft; an annular fitting part that is provided at the base end of a corresponding one of the massage members and fitted to the outer circumference of the tilted boss part; and a one-way clutch mechanism disposed between the tilted boss part and the rotary shaft, and the rotational driving force of the rotary shaft is transmitted to the tilted boss part via the one-way clutch mechanism.

[0009]

Preferably, it is only necessary to configure the leg massage machine so that when the rotary shaft is normally rotated, the rotational driving force of the rotary shaft is transmitted to the tilted boss part via the one-way clutch mechanism to thereby reach the synchronous state where the first driving mechanism and the second driving mechanism are synchronously actuated, and when the rotary shaft is reversely rotated, the rotational driving force of the rotary shaft is not transmitted to the tilted boss part via the one-way clutch mechanism to thereby reach the non-synchronous state where the first driving mechanism is stopped and the second driving mechanism is actuated.

[0010]

Preferably, it is only necessary to configure the leg massage machine so that the one-way clutch mechanism includes a one-way power transmission part, and the one-way power transmission part transmits the rotational driving force of the rotary shaft to the tilted boss part when the rotary shaft is normally rotated, and when the rotary shaft is reversely rotated, does not transmit the rotational driving force of the rotary shaft to the tilted boss part.

Preferably, it is only necessary that the one-way power transmission part includes a snail shell-like boss part whose central part is penetrated by the rotary shaft and that is fixed to the rotary shaft to rotate together and fitted into the tilted boss part in a loosely fitted state, the outer circumference of the snail shell-like boss part is formed with a position restriction part that restricts the position of the massage member, and the position restriction part is formed in a predetermined position with respect to the circumferential direction of the rotary shaft in each of the massage members.

[0011]

Preferably, it is only necessary to configure the leg massage machine so that the one-way clutch mechanism includes a brake part, and the brake part restricts rotation of the tilted boss part in order to restrict

the massage member from moving in a state where the one-way power transmission part prevents the rotational driving force of the rotary shaft from being transmitted.

Advantageous Effects of Invention

[0012]

Using the leg massage machine according to the present invention enables the paired left and right massage members and the pressing members to give effective massage treatment to the foot.

Brief Description of Drawings

[0013]

FIG. 1 is a front appearance perspective view illustrating the leg massage machine according to the present invention.

FIG. 2 is a front view of a horizontal massage mechanism provided to the leg massage machine according to the present invention.

FIG. 3 is a front view of the horizontal massage mechanism in the present invention (in which paired left and right massage members are in an opened state, and a third massage member is illustrated omitted).

FIG. 4 is a front view of the horizontal massage mechanism in the present invention (in which the paired

left and right massage members are in a closed state, and the third massage member is illustrated omitted).

FIG. 5 is an exploded perspective view of the horizontal massage mechanism in the present invention.

FIG. 6 is an exploded perspective view of a one-way clutch mechanism (perspective view from a left rear side).

FIG. 7 is a view illustrating an enlarged one-way power transmission part (perspective view from the left rear side).

FIG. 8 is an exploded perspective view of a brake part (perspective view from a right rear side).

Description of Embodiments

[0014]

In the following, an embodiment of the present invention will be described on the basis of the drawings.

FIGS. 1 to 5 illustrate the embodiment of the leg massage machine according to the present invention.

A leg massage machine 1 of the present embodiment is configured to be able to simultaneously give a kneading massage and a linearly moving pressure massage (finger pressure massage) to both the feet and the calves constituting the legs with both the left and right legs of a user as massage targets (treatment regions).

[0015]

Note that the "calves" in this specification refer to regions below the knees and above the ankles of the human legs, and the "feet" refer to regions below the ankles. Also, directions in the description are appropriately indicated in the drawings, and correspond to a front-back direction, left-right direction, and up-down direction as viewed from a user using the leg massage machine 1.

The leg massage machine 1 of the present embodiment has a casing 2 that is quadrangular in a front view and boot-shaped (L-shaped) in a side view. At the front of the casing 2, paired left and right treatment concave parts 9 opened forward and upward are parallel provided mutually separated leftward and rightward. In the left and right treatment concave parts 9, a lining material having elasticity and flexibility and provided with appropriate breathability is provided.

[0016]

As illustrated in FIG. 2, in the casing 2, a base frame part 2a, and a support frame that has a back frame part rising at the back end part of the base frame part 2a and is L-shaped in the side view are provided. The base frame part 2a is provided with a horizontal massage mechanism 3, and the back frame part is provided with

a vertical massage mechanism 4.

Note that the designations "horizontal" and "vertical" of the horizontal massage mechanism 3 and the vertical massage mechanism 4 are only convenient ones in this specification, but not limit any usage state as the leg massage machine 1.

[0017]

First, the horizontal massage mechanism 3 (foot massage mechanism) will be described.

As illustrated in FIGS. 2 to 5, and the like, the horizontal massage mechanism 3 includes: paired left and right massage members 5, 5 that are parallel provided separated leftward and rightward to the extent that the foot can be inserted; a pressing member 6 disposed between the paired left and right massage members 5, 5, a first driving mechanism 7 that mutually approximates/separates the paired left and right massage member 5, 5; and a second driving mechanism 8 that actuates the pressing member 6.

[0018]

With the paired left and right massage members 5, 5 as one set, two sets in total are provided corresponding to the left and right treatment concave parts 9 of the casing 2. The massage members 5 are formed in a rising plate shape from a raw material having elasticity in a

thickness direction, and the mutually opposites inner surfaces of the massage members 5 are provided with a cushioning material, a cover material, or the like that reduces the contact feeling with the foot.

The first driving mechanism 7 of the horizontal massage mechanism 3 is one that reciprocates the paired left and right massage members 5,5 between a sandwiching position (see FIG. 4) and a releasing position (FIG. 3) with respect to the foot to be inserted between them, and thereby gives a kneading massage action to the foot. The first driving mechanism 7 is adapted to simultaneously drive the two sets of massage members 5, 5.

[0019]

The first driving mechanism 7 includes: one rotary shaft 10 provided in a direction (left-right direction) to penetrate between the massage members 5, 5; a drive motor 11 (electric motor) that rotationally drives the rotary shaft 10; and conversion parts for converting the rotational driving force of the rotary shaft 10 into the massage action by the massage members 5.

The drive motor 11 is one capable of switching between normal rotation driving and reverse rotation driving, and transmits the rotational driving force thereof to the rotary shaft 10 via a deceleration part

incorporating a worm gear and a worm wheel meshing with the worm gear.

[0020]

Each of the conversion parts is disposed in a part where the rotary shaft 10 penetrates a corresponding one of the massage members 5, and includes a tilted boss part 13 whose central part is penetrated by the rotary shaft 10 and whose outer circumference has a cam groove provided at a tilt with respect to the rotary shaft 10.

The present embodiment is adapted to dispose a one-way clutch mechanism 14 between the tilted boss part 13 and the rotary shaft 10. For this reason, when the drive motor 11 performs the normal rotation driving to normally rotate the rotary shaft 10, the rotational driving force of the rotary shaft 10 is transmitted to the tilted boss part 13 and thereby the rotary shaft 10 and the tilted boss part 13 are integrally rotated in the same direction. On the other hand, when the drive motor 11 performs the reverse rotation driving to reversely rotate the rotary shaft 10, the tilted boss part 13 comes into an idling state with respect to the rotary shaft 10, and the rotational driving force of the rotary shaft 10 is not transmitted to the tilted boss part 13.

[0021]

In addition, the details of the one-way clutch mechanism 14 will be described later.

The outer circumference of the tilted boss part 13 is fitted, via a bearing, with an annular fitting part 15 provided at the base end of the massage member 5, and the massage member 5 is adapted to keep a relatively rotatable state to the rotary shaft 10.

Also, the conversion part has a structure adapted to engage a restrictive protrusion 16 protruding downward from the massage member 5 with a horizontally long hole 17 that is provided in the base frame part 2a of the support frame, or the like, and long in the left-right direction. The massage member 5 is adapted not to be rotated (driven rotation) together with the tilted boss part 13 in such a manner that the restrictive protrusion 16 and the horizontally long hole 17 engage together and the restrictive protrusion 16 slides in the horizontally long hole 17. That is, when the rotary shaft 10 is rotated, the tilted boss part 13 is adapted to make a left-right direction swing corresponding to a tilting component around the rotary shaft 10, and only a swing component at this time is adapted to be transmitted to the massage member 5.

[0022]

Tilt directions in which the tilted boss parts 13

are tilted with respect to the rotary shaft 10 are set to be relatively opposite directions between the massage members 5, 5. For this reason, a swing action where the paired left and right massage members 5, 5 are mutually approximated and then separated is performed. When the paired left and right massage members 5, 5 are mutually approximated, an action of sandwiching the foot disposed between the massage members 5, 5 and giving a pressure massage from left and right sides is performed.

[0023]

When the paired left and right massage members 5, 5 are mutually separated, the foot disposed between the massage members 5, 5 is released. By continuously rotating the rotary shaft 10, while alternately repeating the above-described sandwiching action and releasing action, the massage members 5, 5 make a wavy swing under the condition of being restricted within a predetermined angle range.

The above-described action is one performed when the rotary shaft 10 is normally rotated. That is, when normally rotating the rotary shaft 10, the rotational driving force of the rotary shaft 10 is transmitted to the tilted boss part 13 via the one-way clutch mechanism 14, and the rotary shaft 10 and the tilted boss part 13 are integrally rotated in the same direction to swingably

drive the massage member 5.

[0024]

On the other hand, when reversely rotating the rotary shaft 10, the one-way clutch mechanism 14 brings the tilted boss part 13 into the idling state with respect to the rotary shaft 10, and the rotational driving force of the rotary shaft 10 is not transmitted to the tilted boss part 13. For this reason, the massage member 5 stop while keeping the state of sandwiching the foot or the state of releasing the foot; however, a corresponding one of the pressing members 6 described below is driven.

Meanwhile, as illustrated in FIGS. 2 and 5, the pressing part 6 for giving a pressure massage to the sole includes: a rotating rotor 20 provided rotatably integrally with the rotary shaft 10 provided in the first driving mechanism 7; and multiple protrusions mutually dispersively arranged in a circumferential direction and an axial direction at predetermined intervals on the outer circumferential surface of the rotating rotor 20.

[0025]

The second driving mechanism 8 for driving the pressing member 6 is one that gives a massage action to the foot inserted between the paired left and right massage members 5, 5 in such a manner as to press the sole (the back of the toes, the arch, the heel) of it

upward by rotating the rotating rotor 20 integrally with the rotary shaft 10.

When the rotating rotor 20 is rotated by the rotation of the rotary shaft 10, depending on the rotational direction of the rotary shaft 10, it can be selected whether, while pressing the sole of the foot, the multiple protrusions moves from the back side to the front side or reversely from the front side to the back side.

[0026]

In the present embodiment, the pressing member 6 for giving the pressure massage to the sole is one having a further complicated configuration.

The pressing member 6 in the present embodiment is one that includes: a first massage member 20 for massaging the central part of the sole of a user; a second massage member 21 for massaging the back part of the sole of the user; and a third massage member 22 for massaging the front part of the sole of the user, and by driving the first massage member 20 to the third massage member 22 in conjunction with one another, gives the massage action to the sole.

[0027]

The first massage member 20 is the above-described rotating rotor 20 that gives the pressure massage to the

central part of the sole.

An arm-like first connecting piece 23 formed extending backward from the first massage member 20 (rotating rotor) is disposed, and the first connecting piece 23 is configured so that the base end part thereof is rotatably attached to the rotary shaft 10 in an eccentric state, the fore end part thereof is provided with the second massage member 21, and the rotary shaft 10 performs a rotary motion to thereby allow the second massage member 21 connected to the first connecting piece 23 to perform a swing motion.

[0028]

In addition, an arm-like second connecting piece 24 formed extending forward from the first massage member 20 (rotating rotor) is disposed, and the second connecting piece 24 is configured so that the base end part thereof is rotatably attached to the rotary shaft 10 in an eccentric state, the fore end part thereof is provided with the third massage member 22, and the rotary shaft 10 performs the rotary motion to thereby allow the third massage member 22 connected to the second connecting piece 24 to make a slide swing in the front-back direction.

[0029]

The second massage member 21 and the third massage

member 22 are formed with multiple protrusions 25 in an upward protruding manner, and the protrusions make the massage to the sole effective.

The above-described first connecting piece 23 and second connecting piece 24 are integrally formed so that the base end parts of the respective connecting pieces are in the same position.

As described above, the leg massage machine 1 of the present embodiment is one in which between the tilted boss part 13 and the rotary shaft 10, the one-way clutch mechanism 14 is disposed.

[0030]

The one-way clutch mechanism 14 is configured to include a one-way power transmission part 40 and a brake part 50.

As illustrated in FIGS. 6 and 7, the one-way power transmission part 40 is provided on the width direction inner side of the tilted boss part 13, and as illustrated in FIGS. 6 and 8, the brake part 50 is provided on the width direction outer side of the tilted boss part 13.

[0031]

As illustrated in FIGS. 6 and 7, the one-way power transmission part 40 has a snail shell-like boss part 42 fitted into the tilted boss part 13 in a loosely fitted state. The snail shell-like boss part 42 is adapted to

be fixed to the rotary shaft 10 and rotate together with the rotary shaft 10 penetrating the central part thereof.

The outer circumference of the snail shell-like boss part 42 is formed with a cam groove 42 that is spiral in the side view. In detail, the cam groove 43 is one whose radius is the maximum at an angle of 0 degrees and becomes shorter as the cam groove 43 is spirally traced in the counterclockwise direction. Accordingly, the radius is the shortest immediately before a position (an angle of 360 degrees) reached after just one rotation. Because of this, in the position at an angle of 360 degrees (in other words, at an angle of 0 degrees), a sheer cliff part 44 (position restriction part) is formed. The cam groove 43 exhibits a form like a snail shell shape in the side view. The cliff part 44 is one formed in the predetermined position with respect to the circumferential direction of the rotary shaft 10 in each message member 5.

[0032]

For example, by adjusting the positions of the cliff parts 44 corresponding to the message members 5 for sandwiching the right foot, and the positions of the cliff parts 44 corresponding to the message members 5 for sandwiching the left foot to the same position with respect to the circumferential direction of the rotary

shaft 10, when sandwiching and pressing the right foot, the left foot can also be sandwiched and pressed in the same manner. That is, the massage members 5 corresponding to the right foot and the massage members 5 corresponding to the left foot can be swung at the same phase. Incidentally, by mutually displacing the positions of the cliff parts 44 corresponding to the massage members 5 for sandwiching the right foot and the positions of the cliff parts 44 corresponding to the massage members 5 for sandwiching the left foot by 90 degrees or 180 degrees with respect to the circumferential direction of the rotary shaft 10, for example, when pressing the right foot (left foot), the left foot (right foot) can be brought into a relaxed state or a released state. That is, the massage members 5 corresponding to the right foot and the massage members 5 corresponding to the left foot can be swung at different phases.

[0033]

On the cam groove 43 of the snail shell-like boss part 42, the lower end bottom part of a positioning piece 45 slides. The positioning piece 45 exhibits a prismatic shape, whose longer direction is adapted to face in the radial direction of the snail shell-like boss part 42. On the other hand, the upper end part of the positioning

piece 45 is on the width direction inner side of the tilted boss part 13 (side facing the snail shell-like boss part 42), fitted into a groove part 46 that is provided on the radially outer side and faces in the radial direction, and adapted to be slidable in the groove part 46 in the radial direction.

[0034]

Assembling the members in a decomposed state illustrated in FIG. 7 results in a configuration in which the snail shell-like boss part 42 is fitted, in a loosely fitted state, into a cylindrical concave part 47 formed on the radial direction inner side of the tilted boss part 13, the positioning piece 45 slides on the cam groove 43 of the snail shell-like boss part 42, and the upper end part of the positioning piece 45 is fitted into the groove part 46 of the tilted boss part 13.

In this configuration, when the rotary shaft 10 is rotated in the normal rotation direction (when seeing the snail shell-like boss part 42 from the direction of FIG. 7, a direction in which the snail shell-like boss part 42 rotates clockwise), the cliff part 44 formed on the snail shell-like boss part 42 abuts on the side surface of the lower end part of the positioning piece 45, and the snail shell-like boss part 42 and the positioning piece 45 rotate together. In other words,

together with the normal rotation of the rotary shaft 10, the positioning piece 45 also rotates in the normal rotation direction.

[0035]

At this time, since the upper end part of the positioning piece 45 is configured to be fitted into the groove part 46 of the tilted boss part 13, together with the normal rotation of the rotary shaft 10, the tilted boss part 13 also rotates in the normal rotation direction, and therefore the resulting rotational driving force swingably drives the massage member 5.

On the other hand, when the rotary shaft 10 is rotated in the reverse rotation direction (when seeing the snail shell-like boss part 42 from the direction of FIG. 7, a direction in which the snail shell-like boss part 42 rotates counterclockwise), the positioning piece 45 slides on the cam groove 43 of the snail shell-like boss part 42 without engaging with the cliff part 44 formed on the snail shell-like boss part 42. When the positioning piece 45 reaches the cliff part 44, that is, reaches an angle of 360 degrees from an angle of 0 degrees of the snail shell-like boss part 42, the positioning piece 45 moves while falling down the cliff part 44.

[0036]

As is clear from this, when the rotary shaft 10 is

rotated in the reverse rotation direction, the cliff part 44 does not abut on the side surface of the lower end part of the positioning piece 45, and the positioning piece 45 only slides on the cam groove 43 of the snail shell-like boss part 42 to prevent the snail shell-like boss part 42 and the positioning piece 45 from rotating together. For this reason, when the rotary shaft 10 is reversely rotated, the resulting rotational driving force is not transmitted to the positioning piece 45, and the tilted boss part 13 comes into a non-rotating state. As a result, the massage member 5 is in a stopped state without performing the swing motion.

[0037]

The above-described one-way power transmission part 40 switches between the swung state and the stopped state of the massage member 5.

Incidentally, when the massage member 5 is in the stopped state, in other words, when the rotary shaft 10 is reversely rotated, and the lower end part of the positioning piece 45 is in a state of sliding on the cam groove 43 of the snail shell-like boss part 42, and when exerting a load on the massage member 5, the lower end part of the positioning piece 45 comes into a state of freely moving counterclockwise on the cam groove 43 of the snail shell-like boss part 42 via the tilted boss

part 13, and the message member 5 unintentionally moves.
[0038]

For example, even if in a state where the message members 5, 5 are approximated (in a state where the message members 5, 5 sandwich the foot), the rotary shaft 10 is switched from the normal rotation to the reverse rotation to stop the message members 5, a reactive force from the sandwiched foot exerts a load on the message members 5, and the message members 5 moves in a direction to be mutually separated.

In order to prevent such inconvenience, the one-way clutch mechanism 14 is provided with the brake part 50 for preventing the tilted boss part 13 from rotating in the reverse rotation direction.
[0039]

As illustrated in FIG. 8, the brake part 50 includes: a brake inner part 51 that is attached to the width direction outer side of the tilted boss part 13 using an attachment ring 55; and a brake outer part 52 that is attached surrounding the outer circumferential part of the brake inner part 51 and fixed to the casing (fixed side). The brake outer part 52 is an annular (cylindrical) member, and the brake inner part 51 is fitted into the inner space of the brake outer part 52 in a loosely fitted manner.

[0040]

The brake inner part 51 is an annular member, and on the outer circumferential surface thereof, multiple (in the present embodiment, eight) triangular convex parts 53 exhibiting a right triangular shape in the side view are formed along the outer circumferential direction of the brake inner part 51. Near the apex of each of the triangular convex parts 53, a distance to (clearance with) the inner circumferential surface of the brake outer part 52 is very narrow, but near a valley part of the triangular convex part 53, a distance to (clearance with) the inner circumferential surface of the brake outer part 52 are adapted to be wide.

[0041]

In addition, between the brake inner part 51 and the brake outer part 52, in other words, at a valley part of each of the triangular convex parts 53, a clearance member 54 adapted to be movable within the valley part is disposed. The clearance member 54 is a member exhibiting a spherical shape or a columnar shape, and the size (diameter) thereof is made larger than the clearance between the apex of the triangular convex part 53 and the inner circumferential surface of the brake outer part 52.

[0042]

In the brake part 50 having the above-described configuration, when the rotary shaft 10 is rotated in the normal rotation direction (when seeing the brake inner part 51 from the direction of FIG. 8, a direction in which the brake inner part 51 rotates counterclockwise), the clearance members 54 are positioned in the valley parts formed between adjacent ones of the triangular convex parts 53 to reach a state where there is no means for connecting between the brake inner part 51 and the brake outer part 52. As a result, the brake inner part 51 and the brake outer part 52 are in an unconnected state, and an action as the brake part 50 is not exerted. For this reason, the mass member 5 is surely swingably driven without preventing the rotation of the tilted boss part 13.

[0043]

In contrast, when the rotary shaft 10 is rotated in the reverse rotation direction (when seeing the brake inner part 51 from the direction of FIG. 8, a direction in which the brake inner part 51 rotates clockwise), the clearance members 54 rise along the slopes of the triangular convex parts 53 to reach the vicinities of the apexes of the triangular convex parts 53. The clearance members 54 having reached the vicinities of the apexes of the triangular convex parts 53 bite into

the clearances between the triangular convex parts 53 (in other words, the brake inner part 51) and the brake outer part 52 to allow the brake inner part 51 and the brake outer part 52 to integrally rotate.

[0044]

In this state, the brake inner part 51 is in a state of being connected to the brake outer part 52 connecting to the fixed side (e.g., the casing), and therefore the brake inner part 51 is in the non-rotating state. As a result, the rotation of the tilted boss part 13 connected to the brake inner part 51 is prevented, and the massage member 5 is suppressed from moving at the position.

Such an action of the brake parts 50 enables the reactive force from the sandwiched foot to surely suppress the massage members 5 from moving in the separated direction even if the rotating shaft 10 is switched from the normal rotation to the reverse rotation to stop the massage members 5 in a state where the massage members 5, 5 are approximated (in a state of sandwiching the foot).

[0045]

In addition, the leg massage machine 1 includes the vertical massage mechanism 4 (calves massage mechanism).

As the vertical massage mechanism 4, various mechanisms can be adopted; however, in the present

embodiment, as illustrated in FIG. 1, the vertical massage mechanism 4 is one including: a massage member 30 for pressing obliquely outer and inner sides of the front of the calf; a pressing member 31 for massaging the calf from the back side; and a lifting/lowering drive part 32 for integrally moving up and down the massage member 30 and the pressing member 31.

[0046]

With the massage member 30 and the pressing member 31 as one set, two sets in total are provided corresponding to the left and right treatment concave parts 9 of the casing 2. The massage member 30 and the pressing member 31 integrally move up and down, and thereby the front and back of the calf are effectively given a pressure massage.

Next, operation modes of the leg massage machine 1 (in particular, the horizontal massage mechanism 3) according to the present embodiment will be described.

[0047]

First, in the leg massage machine 1, when an operation control switch 33 is in an off state, the pairs of left and right massage members 5 of the horizontal massage mechanism 3 are in the released state. Also, the massage members 30 and the pressing members 31 of the vertical massage mechanism 4 are stopped at the lowermost

positions.

First, a user inserts the left and right calves between the pairs of massage members 5 of the vertical massage mechanism 4, and also inserts the left and right feet between the pairs of left and right massage members 5 of the horizontal massage mechanism 3.

[0048]

When the operation control switch 33 is turned on in this state, the drive motor 11 is actuated, and the vertical massage mechanism 4 allows the massage members 30 to press the side surfaces of the calves, and also the pressing members 31 to press the back surfaces of the calves. In addition, a pressure massage is given such that positions of such forward and backward pressing move upward or downward.

Also, in the horizontal massage mechanism 3, the actuation of the drive motor 11 allows the rotary shaft 10 to start the normal rotation. In the case of the normal rotation of the rotary shaft 10, the one-way clutch mechanism 14 comes into a power transmission state, and the rotational driving force of the rotary shaft 10 is transmitted to the tilted boss part 13 to allow the rotary shaft 10 and the tilted boss part 13 to integrally rotate in the same direction.

[0049]

As a result, in the first driving mechanism 7, the paired left and right massage members 5, 5 swing left and right via the conversion parts to repeat the released state and the sandwiched state, and the kneading massage is given to the foot from both left and right sides. Also, at the same time, the second driving mechanism 8 drives the pressing member 6 (the first massage member 20 to the third massage member 22) to give the pressure massage to the sole of the foot.

[0050]

In such a state, the rotary shaft 10 is reversely rotated by an automatic operation mode program or manually. In particular, a state where the massage members 5 are approximated is detected by a sensor (a rotation sensor, a proximity sensor, or a limit switch) or the like, and at the timing when the foot comes into the sandwiched state, the rotary shaft 10 is switched from the normal rotation driving to the reverse rotation driving.

As a result, the one-way clutch mechanisms 14 (in particular, the one-way power transmission parts 40) come into a power non-transmission state to prevent the rotational driving force of the rotary shaft 10 from being transmitted to the tilted boss parts 13, and the paired left and right massage members 5, 5 are stopped while

keeping the state of sandwiching the foot. However, the second driving mechanism 8 drives the pressing member 6 (the first massage member 20 to the third massage member 22), and the pressure massage to the sole of the foot is continued without change.

[0051]

At this time, by the action of the brake parts 50 provided in the one-way clutch mechanisms 14, the massage members 5, 5 can be kept in a state of being approximated (in a state of sandwiching the foot), and by the reactive force from the sandwiched foot, the massage members 5 can be surely suppressed from moving in the separated direction.

By reversely rotating the rotary shaft 10 to use the action (power non-transmission action) of the one-way clutch mechanisms 14 in this manner, the paired left and right massage members 5, 5 can keep the sandwiching state. While keeping the sandwiching state, by driving the pressing member 6, i.e., the first massage member 20 to the third massage member 22 in conjunction with one another, the foot sandwiched between the paired left and right massage members 5, 5 can be surely and sufficiently given the pressing by the pressing member 6 without being released upward by the pressing by the pressing member 6.

[0052]

That is, using the leg massage machine 1 makes it possible for the paired left and right massage members 5, 5 and the pressing member 6 to give effective massage treatment to the foot.

Meanwhile, it should be considered that the embodiment disclosed this time is only an exemplification in all aspects but not a limited one. The scope of the present invention is not the description above but given by the claims, and intended to include meanings equivalent to the claims and all modifications within the claims.

[0053]

For example, the vertical massage mechanism 4 and the horizontal massage mechanism 3 may be adapted to be constantly synchronously actuated or any one of them may be adapted to be independently actuated. It is only necessary to be able to appropriately select any of them depending on user's desire.

Reference Signs List

[0054]

1: Leg massage machine

2: Casing

2a: Base frame part

3: Horizontal massage mechanism
4: Vertical massage mechanism
5: Massage member
6: Pressing member
7: First driving mechanism
8: Second driving mechanism
9: Treatment concave part
10: Rotary shaft
11: Drive motor
13: Tilted boss part
14: One-way clutch mechanism
15: Annular fitting part
16: Restrictive protrusion
17: Horizontally long hole
20: First massage member (rotating rotor)
21: Second massage member
22: Third massage member
23: First connecting piece
24: Second connecting piece
25: Protrusion
30: Massage member (vertical massage mechanism)
31: Pressing member (vertical massage mechanism)
32: Lifting/lowering drive part
33: Operation control switch
40: One-way power transmission part

42: Snail shell-like boss part
43: Cam groove
44: Cliff part
45: Positioning piece
46: Groove part (tilted boss part)
50: Brake part
51: Brake inner part
52: Brake outer part
53: Triangular convex part
54: Clearance member
55: Attachment ring

CLAIMS

1. A leg massage machine comprising:

paired left and right massage members disposed so as to sandwich a treatment region;

a pressing member disposed between the paired left and right massage members;

a first driving mechanism that mutually approaching and separating movement of the paired left and right massage members; and

a second driving mechanism that actuates the pressing member so as to press the pressing member against the treatment region,

the leg massage machine being configured to be switchable between a synchronous state and a non-synchronous state, the synchronous state being a state where the first driving mechanism and the second driving mechanism are synchronously actuated, the non-synchronous state being a state where the first driving mechanism is stopped and the second driving mechanism is actuated.

2. The leg massage machine according to claim 1, wherein

in the non-synchronous state, the second driving

mechanism is actuated while keeping a state where the paired left and right massage members are approximated to each other.

3. The leg massage machine according to claim 2 wherein

the first driving mechanism comprises: a rotary shaft that transmits a rotational driving force of a drive motor; and paired left and right conversion parts that convert a rotational driving force of the rotary shaft into an approximation/separation action of the paired left and right massage members, and

the second driving mechanism comprises the pressing member that is driven by the rotary shaft provided in the first driving mechanism,

each of the conversion parts comprises: a tilted boss part whose central part is penetrated by the rotary shaft and whose outer circumference has a cam groove provided at a tilt with respect to the rotary shaft; an annular fitting part that is provided at a base end of a corresponding one of the massage members and fitted to the outer circumference of the tilted boss part; and a one-way clutch mechanism disposed between the tilted boss part and the rotary shaft, and

the rotational driving force of the rotary shaft

is transmitted to the tilted boss part via the one-way clutch mechanism.

4. The leg massage machine according to claim 3, wherein

when the rotary shaft is normally rotated, the rotational driving force of the rotary shaft is transmitted to the tilted boss part via the one-way clutch mechanism to thereby reach the synchronous state where the first driving mechanism and the second driving mechanism are synchronously actuated, and

when the rotary shaft is reversely rotated, the rotational driving force of the rotary shaft is not transmitted to the tilted boss part via the one-way clutch mechanism to thereby reach the non-synchronous state where the first driving mechanism is stopped and the second driving mechanism is actuated.

5. The leg massage machine according to claim 4, wherein

the one-way clutch mechanism has a one-way power transmission part, and

the one-way power transmission part transmits the rotational driving force of the rotary shaft to the tilted boss part when the rotary shaft is normally rotated, and

when the rotary shaft is reversely rotated, the one-way power transmission part does not transmit the rotational driving force of the rotary shaft to the tilted boss part.

6. The leg massage machine according to claim 5, wherein

the one-way power transmission part comprises a snail shell-like boss part whose central part is penetrated by the rotary shaft and that is fixed to the rotary shaft to rotate together and fitted into the tilted boss part in a loosely fitted state,

an outer circumference of the snail shell-like boss part is formed with a position restriction part that restricts a position of the massage member, and

the position restriction part is formed in a predetermined position with respect to a circumferential direction of the rotary shaft in each of the massage members.

7. The leg massage machine according to claim 5 or 6, wherein

the one-way clutch mechanism comprises a brake part, and

the brake part restricts rotation of the tilted boss part in order to restrict the massage member from moving

in a state where the one-way power transmission part prevents the rotational driving force of the rotary shaft from being transmitted.