

DESCRIPTION

Title of the Invention: LEG MASSAGER

Technical Field

[0001] The present invention relates to a leg massager suitable for use in massaging legs.

Background Art

[0002] Leg massagers capable of massaging human legs have been developed to date. An example of such leg massagers is disclosed in Patent Literature 1.

The leg massager disclosed in Patent Literature 1 comprises: a pair of open-topped tubular members, each having an L-shape as seen in side view, for receiving user's legs inserted from above; an air bag, mounted in each tubular member, for performing pressure massage on the leg received in the tubular member; and a pump for feeding air to the air bag. In this construction, the tubular members are arranged side by side in a horizontal direction within a case body, with at least one of the front face, side faces in the horizontal direction, and rear face of each tubular member supported by the case body as a supported face.

Prior Art Reference

Citation List

[0003] Patent Literature 1: Japanese Unexamined Patent Publication JP-A 2016-89

Summary of Invention

Technical Problem

[0004] The leg massager disclosed in Patent Literature 1 achieves very effective massage treatment over a toe-to-calf range with the facility for user's legs to be inserted in it.

Unfortunately, in keeping with an increasingly wider variety of needs toward leg massage in recent years, in the use of the leg massager disclosed in Patent Literature 1, in addition to the toe-to-calf range massaging function, the capability of massaging user's thigh located above this range has been demanded as a user-requested feature.

[0005] The present invention has been devised in view of the problem as discussed supra, and accordingly its object is to provide a leg massager that, while being basically designed to achieve massage treatment over a toe-to-calf range of user's leg, performs effective massage not only on this below-knee area, but also on an above-knee area such as thigh as a massage target area.

Solution to Problem

[0006] In order to accomplish the above object, the following means is adopted for the implementation of the present invention.

A leg massager pursuant to the present invention comprises a below-knee area massaging mechanism for massaging user's foot and/or calf located below user's knee, and further comprises an above-knee area massaging mechanism, mounted above the

below-knee area massaging mechanism, for massaging user's thigh located above the knee, and a coupling mechanism that couples the above-knee area massaging mechanism to the below-knee area massaging mechanism for rocking motion in a front-rear direction.

[0007] In the present invention, it is preferable that the coupling mechanism couples the below-knee area massaging mechanism and the above-knee area massaging mechanism together in a manner permitting changes in a distance between the below-knee area massaging mechanism and the above-knee area massaging mechanism.

In the present invention, it is preferable that the coupling mechanism comprises a coupling arm that provides connection between the below-knee area massaging mechanism and the above-knee area massaging mechanism, and a lower pivotal portion for rocking the coupling arm in the front-rear direction relatively to the below-knee area massaging mechanism.

[0008] In the present invention, it is preferable that the coupling mechanism comprises an upper pivotal portion for rocking the above-knee area massaging mechanism in the front-rear direction relatively to the coupling arm.

In the present invention, it is preferable that the coupling mechanism comprises a distance adjustment portion that adjusts the distance between the below-knee area massaging mechanism and the above-knee area massaging mechanism.

In the present invention, it is preferable that the coupling

arm comprises an upper arm coupled via the upper pivotal portion to the above-knee area massaging mechanism, and a lower arm coupled via the distance adjustment portion to the below-knee area massaging mechanism, and that the upper arm and the lower arm are coupled to each other via the lower pivotal portion.

[0009] In the present invention, it is preferable that the lower arm is provided with the distance adjustment portion, and that the distance adjustment portion has a slide mechanism via which the lower arm is coupled to the below-knee area massaging mechanism.

In the present invention, it is preferable that the lower arm is provided with the distance adjustment portion, and that the distance adjustment portion has a ratchet mechanism via which the lower arm is coupled to the below-knee area massaging mechanism.

[0010] In the present invention, it is preferable that the above-knee area massaging mechanism comprises a pressing section that performs pressure massage on the thigh, and a support body that supports the pressing section.

In the present invention, it is preferable that the above-knee area massaging mechanism comprises a cuff belt attached to the support body in such a way as to be able to be wrapped around an above-knee massage target area, and an inflatable air bag provided in the cuff belt, the cuff belt and the air bag constituting the pressing section.

In the present invention, it is preferable that the cuff belt has a circularly curved profile conforming to an outside shape of the thigh, and is made of an elastic member that allows the cuff belt to become deformed when receiving the above-knee massage target area.

[0011] In the present invention, it is preferable that the pressing section includes a left-hand pressing section for massaging an above-knee area of user's left leg, and a right-hand pressing section for massaging an above-knee area of user's right leg, and that the support body is designed to support a horizontal row of the left-hand pressing section and the right-hand pressing section.

In the present invention, it is preferable that the below-knee area massaging mechanism comprises: a pair of open-topped tubular members, each having an L-shape as seen in side view, capable of receiving user's below-knee massage target area inserted from above; an air bag, mounted in each of the tubular members, for performing pressure massage on the below-knee massage target area received in the tubular member; and a pump for feeding air to the air bag.

Advantageous Effects of Invention

[0012] The use of the leg massager of the present invention allows effective massage treatment to be performed not only on a massage target area located below user's knee, such as calf and toe, but also on a massage target area located above the

knee, such as thigh.

Brief Description of Drawings

[0013] [FIG. 1] is a perspective view of a leg massager according to an embodiment of the invention.

[FIG. 2] is a front perspective view showing the internal structure of the leg massager according to the embodiment (air supply mechanism for air bag).

[FIG. 3] is a perspective sectional view of the leg massager according to the embodiment, with an above-knee area massaging mechanism set in an upstanding position relatively to a below-knee area massaging mechanism.

[FIG. 4] is a perspective sectional view of the leg massager according to the embodiment, with the above-knee area massaging mechanism set in a housed position relatively to the below-knee area massaging mechanism.

[FIG. 5] is a perspective sectional view of the leg massager according to the embodiment, with the above-knee area massaging mechanism set in a tilting position relatively to the below-knee area massaging mechanism.

[FIG. 6] is a view showing the above-knee area massaging mechanism set in the housed position as seen from in front.

[FIG. 7] is a view showing the leg massager according to the embodiment now in use, with the above-knee area massaging mechanism set in the housed position relatively to the below-knee area massaging mechanism.

[FIG. 8] is a view showing the leg massager according to the embodiment now in use, with the above-knee area massaging mechanism set in the upstanding position relatively to the below-knee area massaging mechanism.

[FIG. 9] is a view showing the leg massager according to the embodiment now in use, with the above-knee area massaging mechanism set in the tilting position relatively to the below-knee area massaging mechanism.

Description of Embodiments

[0014] The following describes an embodiment of a leg massager 1 pursuant to the present invention with reference to drawings.

In FIGs. 1 to 9, there are shown the structure and workings of the leg massager 1 of the present invention.

As employed in this specification the term "calf" refers to that part of human leg within a range from below the knee to above the ankle, and the term "foot F" refers to that part of below-knee human leg within a range downwardly from the ankle. In addition, the term "thigh H" refers to that part of human leg within a range from above the knee to below the waist.

[0015] Moreover, in the following description, given that a user U is sitting with his/her legs received in the leg massager 1 in actuality, then a direction from left to right of FIG. 6, which corresponds to a direction from right to left of the user, is defined as a horizontal direction, a direction from top to

bottom of FIG. 6, which corresponds to a direction from top to bottom of the user, is defined as a vertical direction, and a paper-piercing direction from in front of FIG. 6 to behind FIG. 6 is defined as a front-rear direction or width direction. The definitions of directions are indicated by arrows in some main drawings.

As shown in FIG. 1, the leg massager 1 comprises: a below-knee area massaging mechanism 2 that performs massage on a massage target area located below the knee of the user U; and an above-knee area massaging mechanism 3 that performs massage on a massage target area located above the knee of the user U, i.e. a thigh H located above the knee of the user U. More specifically, the leg massager 1 has a main body 4 internally provided with the described below-knee area massaging mechanism 2.

[0016] As shown in FIG. 2, the main body 4 of the leg massager 1 is capable of massaging that part of the leg of the user U sitting in a chair or the like which includes the calf, the heel, the top of the foot, or instep. The main body 4 has a built-in air bag 10 that performs pressure massage on the leg of the user U.

In addition, the leg massager 1 has the above-knee area massaging mechanism 3, coupled via a coupling mechanism 5 to the main body 4 so as to wrap around the thigh H of the user U, for performing pressure massage on the thigh H.

[0017] The main body 4 of the leg massager 1 will be described first.

The main body 4 comprises: a pair of open-topped tubular members 6, each having an L-shape as seen in side view, capable of receiving the legs of the user U; an air bag 10, mounted in each tubular member 6, for performing pressure massage on the leg received in the tubular member 6; and a pump 7 (compressor) for feeding pressurized air to the air bag 10.

[0018] As shown in FIGs. 1 and 2, the leg massager 1 has a case body 8 (casing), which is substantially triangular shaped as seen in side view, in which the paired tubular members 6 (massaging sections) are arranged side by side in the horizontal direction. In the leg massager 1 according to this embodiment, the paired tubular members 6 and the case body 8 are formed integrally with each other.

In the leg massager 1 according to this embodiment, the tubular member 6 is situated at the rear of the case body 8. Thus, the leg of the user U is inserted into the tubular member 6 in a direction from behind the upper rear part to the lower front part of the tubular member 6.

[0019] As shown in FIG. 1, the case body 8, which is a casing that receives therein the described tubular members 6, pump 7, etc., surrounds the tubular member 6 except its upper part, part of its side, and part of its rear part. That is, the case body 8 has the shape of a horizontally oriented or vertically oriented

rectangle or a square as seen in front view, and has, like the tubular member 6, a substantially L-shape (boot-like shape) as seen in side view.

The back side of the case body 8 is formed with a pair of insertion recesses 9 spaced apart in the horizontal direction. The left-hand and right-hand insertion recesses 9 are each a continuous opening, extending from the lower part of the case body 8 to the upper end of the case body 8, in which is fitted the tubular member 6.

[0020] As shown in FIG. 1, the tubular member 6 is constructed of an L-shaped assembly of a horizontal tubular member 6a horizontally oriented so as to conform to the shape of the toe of the user and a vertical tubular member 6b vertically oriented so as to conform to the shape of the calf of the user U. The tubular member 6 is supported in substantially upstanding condition in the described insertion recess 9 of the case body 8. For example, the tubular member 6 is composed of a flexible cloth so as to be deformable in response to inflation and deflation of the air bag 10, and is formed having a predetermined thickness to bear the weight of the leg of the user U. That is, the horizontal tubular member 6a covers an instep-to-toe range of user's leg, and the vertical tubular member 6b covers a heel-to-calf range of user's leg. Thus, the below-knee massage target area can be massaged widely in the vertical direction.

[0021] There are provided a plurality of air bags 10, mounted

around the outer periphery of the described tubular member 6, for performing pressure massage on the below-knee massage target area. A plurality of the air bags 10 also constitute the below-knee area massaging mechanism 2.

For example, for the below-knee area massaging mechanism 2 of this embodiment, in the tubular member 6, the upper side face of the horizontal tubular member 6a, the opposite side faces of the lower part of the vertical tubular member 6b in the horizontal direction, and the opposite side faces of the upper part of the vertical tubular member 6b in the horizontal direction are each provided with the air bag 10.

[0022] As shown in FIG. 2, the described plurality of air bags 10 are each a bag body capable of storing pressurized air fed from the pump 7.

More specifically, the first air bag 10a is inflated with air fed from the pump 7 to perform pressure massage on the instep and other nearby areas (such as the toe) of user's leg received in the horizontal tubular member 6a. On the other hand, the second air bag 10b and the third air bag 10c are each inflated with air fed from the pump 7 to perform pressure massage on the calf H received in the vertical tubular member 6b.

[0023] The pump 7 (compressor) for feeding pressurized air to the described air bag 10, a solenoid valve 11 that allows selection between a mode of admitting air into the air bag 10 and a mode of discharging air from the air bag 10, and a control

unit for controlling the solenoid valve 11 are also housed inside the case body 8. The pump 7, located centrally of the paired left-hand and right-hand tubular members 6, is connected to the solenoid valve 11 through a hose 12. Via the pump 7, pressurized air is fed to the solenoid valve 11, and from there to each air bag 10. Moreover, the solenoid valve 11 is mounted at the bottom of the main body 4 so as to be connected to the hose 12 directed toward each air bag 10. The solenoid valve 11 is operated under the control of the control unit in a manner to feed air fed from the pump 7 to a predetermined air bag (10a to 10c).

[0024] In the described below-knee area massaging mechanism 2, the bottom part of each of the paired left-hand and right-hand tubular members 6 and 6 may be provided with a massaging member, such as a cylindrical roller (mechanical massaging instrument), for performing pressure massage on the sole of user's foot received in the tubular member 6.

In the leg massager 1 of the present invention, the above-knee area massaging mechanism 3 is mounted above the below-knee area massaging mechanism 2 to perform massage on the thigh H located above the knee of the user U (above-knee massage target area). The leg massager 1 of the present invention is characterized in that the below-knee area massaging mechanism 2 and the above-knee area massaging mechanism 3 are rockable in the front-rear direction, and that these massaging mechanisms are coupled to each other via an adjustable length coupling

mechanism 5.

[0025] The following describes the details of the above-knee area massaging mechanism 3 and the coupling mechanism 5 that constitute a striking feature of the leg massager 1 of the invention.

The above-knee area massaging mechanism 3 is a mechanism for massaging the thigh H, i.e. the above-knee massage target area of the leg of the user U. The above-knee area massaging mechanism 3, which is free to change its position relatively to the described below-knee area massaging mechanism 2, is capable of massaging the thigh H on an as needed basis. Massage treatment for the thigh H by the above-knee area massaging mechanism 3 may be effected either alone or concurrently with massage treatment for the below-knee massage target area.

[0026] More specifically, the above-knee area massaging mechanism 3 comprises: a cuff belt (a cuff belt which wraps around the thigh) 13 that is wrapped around the above-knee massage target area, and an above-knee air bag 14, provided in the cuff belt 13, which is subjected to air inflation and deflation to perform pressure massage on the massage target area (pressing section); and a support body 15 that supports the cuff belt 13 and the above-knee air bag 14. As the cuff belt 13, there are provided a left-hand cuff belt 13L for massaging the above-knee area of the left leg of the user U, and a right-hand cuff belt 13R for massaging the above-knee area of the right leg of the user U.

The inner periphery of the left-hand cuff belt 13L is provided with a left-hand above-knee air bag 14L for massaging the left thigh H of the user U, and the inner periphery of the right-hand cuff belt 13R is provided with a right-hand above-knee air bag 14R for massaging the right thigh H of the user U. The support body 15 is designed to support a horizontal row of the paired left-hand and right-hand cuff belts 13L and 13R, as well as the above-knee air bags 14L and 14R. That is, the left-hand and right-hand above-knee air bags 14L and 14R constitute a pressing section that performs pressure massage on the above-knee massage target area.

[0027] The cuff belt 13, which is formed by rolling a long, thickly made sheet of synthetic resin, etc. into hollow cylindrical form, is mounted so that a cavity defined by the hollow of the cylinder points in the front-rear direction. The cavity of the cuff belt 13 in roll form has an inside diameter which is greater than the outside diameter of the thigh H. That is, the described cuff belt 13 has a circularly curved profile conforming to the outside shape of the thigh H for smooth insertion of the thigh H.

[0028] Moreover, for example, the described cuff belt 13 is made of elastically deformable synthetic resin to attain stretchability that permits an increase in size of the round cavity for smooth insertion of the thigh H. More specifically, when viewed from in front, the right-hand cuff belt 13R (the

left-hand cuff belt 13L), which is secured, at its first end, i.e. one end, to the right end (the left end) of the support body 15, extends arcuately in a clockwise direction (a counterclockwise direction) so as to go around the thigh H, or equivalently extends circumferentially about the thigh H, with its distal end, i.e. the other end located on the inner side of the one end.

[0029] The above-knee air bag 14, which is constructed of a bag member that receives therein compressed air, undergoes inflation and deflation repeatedly under the supply of air to perform massage on the massage target area. Moreover, the above-knee air bag 14 is mounted inside the described cuff belt 13 (at the inner periphery of the roll).

Any number of the above-knee air bag 14 may be used with any arrangement. For example, a single above-knee air bag 14 is disposed so as to extend over substantially the entire inner periphery of the cuff belt 13, or, a plurality of above-knee air bags 14 are disposed at different positions of the inner periphery, such as the left side, the top, and the right side of the inner periphery.

[0030] Moreover, although not shown in the drawings, each above-knee air bag 14 is connected with a hose 12, which is similar to the described hose 12 of the below-knee area massaging mechanism 2, to receive compressed air fed from the pump 7 (compressor) via the solenoid valve 11.

The support body 15 is a member designed to support a horizontal row of the described left-hand and right-hand cuff belts 13L and 13R. For example, a synthetic resin which is harder than the material constituting the cuff belt 13 is used to form the support body 15. The support body 15 is a horizontally oriented strip member that is longer at the side extending in the horizontal direction than at the side extending in the front-rear direction. That is, the support body 15 has dimensions large enough to cover the horizontal row of the cuff belts 13L and 13R from end to end.

[0031] The lower surface of the support body 15 is provided with the described cuff belts 13 in roll form. More specifically, each cuff belt 13 is mounted in suspended fashion, with the uppermost part of the roll form kept in contact with the lower surface of the support body 15.

The coupling mechanism 5, which provides coupling between the below-knee area massaging mechanism 2 and the above-knee area massaging mechanism 3, is rockable in the front-rear direction, and serves to change the distance between these mechanisms. In other words, the coupling mechanism 5 couples the above-knee area massaging mechanism 3 to the below-knee area massaging mechanism 2, which is placed on for example a floor for use, in a manner permitting changes in position in the front-rear direction and/or in the vertical direction.

[0032] The leg massager 1 of the present invention employs

such a coupling mechanism 5 capable of positional changes in the front-rear direction and/or in the vertical direction on the following grounds.

That is, in corresponding relation to the length of the coupling mechanism 5, the above-knee area massaging mechanism 3 for massaging the above-knee massage target area such as the thigh H extends upwardly above the level of the below-knee area massaging mechanism 2 placed on for example a floor to perform massage on the front part of user's leg received in it. If the coupling mechanism 5 is non-length and tilt-adjustable, the above-knee area massaging mechanism 3 will be situated in a position spaced away from the floor by a distance corresponding to the length of the coupling mechanism 5, with consequent limitations to the level (position) of the thigh H to be massaged.

[0033] However, the position, or level of the thigh H of the user U sitting in for example a chair varies greatly depending on the body shape of the user U. That is, the height adjustability of the above-knee area massaging mechanism 3 is essential to perform adequate massage on such a massage target area as the thigh H that varies greatly in position depending on user's gender, race, or body shape.

Meanwhile, the user U sitting in for example a chair changes his/her posture at will. For example, when it is desired to enjoy massage in a relaxed state of mind, some users U prefer to have massage while sitting on the front edge of the seat of

a chair to assume a reclining position, whereas some other users U prefer to have massage while sitting back in the seat to assume an upright position. That is, the desired position of the above-knee area massaging mechanism 3 varies from user to user. It is thus preferable that the described coupling mechanism 5 is made freely adjustable in length and tilt.

[0034] Thus, the leg massager 1 of the present invention employs the coupling mechanism 5 which is adjustable in length and rocking angle to give massage treatment to any user with adaptability to widely varying conditions, including user's age, as well as to allow the user to change his/her posture freely during massage treatment.

The following describes the details of the structure of the coupling mechanism 5.

As shown in FIGs. 3 to 5, the coupling mechanism 5 comprises: a coupling arm 16 that provides coupling between the below-knee area massaging mechanism 2 and the above-knee area massaging mechanism 3; an upper pivotal portion 17 for rocking the above-knee area massaging mechanism 3 in the front-rear direction relatively to the coupling arm 16; a lower pivotal portion 18 for rocking the coupling arm 16 in the front-rear direction relatively to the below-knee area massaging mechanism 2; and a distance adjustment portion 19 that adjusts the distance between the below-knee area massaging mechanism 2 and the above-knee area massaging mechanism 3. That is, in the coupling mechanism

5 of this embodiment, two pivotal portions (17 and 18) and a single distance adjustment portion (19) allow adjustment of the length and tilt of the coupling mechanism 5 in itself.

[0035] In this embodiment, the coupling mechanism 5 is exemplified by the arrangement in which the upper pivotal portion 17 is located at the upper end of the coupling arm 16, the distance adjustment portion 19 is located at the lower end of the coupling arm 16, and the lower pivotal portion 18 is located at an intermediate point on the coupling arm 16 in the vertical direction. Alternatively, in the leg massager 1 of the present invention, the coupling mechanism 5 may be implemented by an arrangement in which the upper pivotal portion 17 is located at the upper end of the coupling arm 16, the lower pivotal portion 18 is located at the lower end of the coupling arm 16, and the distance adjustment portion 19 is located at an intermediate point on the coupling arm 16 in the vertical direction. In another alternative, the coupling mechanism 5 may be implemented by an arrangement in which the distance adjustment portion 19 is located at the upper end of the coupling arm 16, the lower pivotal portion 18 is located at the lower end of the coupling arm 16, and the upper pivotal portion 17 is located at an intermediate point on the coupling arm 16 in the vertical direction.

[0036] The following describes the details of the coupling arm 16, the upper pivotal portion 17, the lower pivotal portion 18, and the distance adjustment portion 19 that constitute the

coupling mechanism 5.

The coupling arm 16 is an elongated member, mounted between the above-knee area massaging mechanism 3 and the below-knee area massaging mechanism 2, for providing connection between the above-knee area massaging mechanism 3 and the below-knee area massaging mechanism 2. Moreover, the coupling arm 16 is constructed of a combination of vertically arranged upper and lower arms 20 and 21.

[0037] The upper arm 20 is an elongated rodlike member acting as the connection between the upper pivotal portion 17 and the lower pivotal portion 18. The upper arm 20 is thicker at the upper and lower ends than at the other intermediate part in the vertical direction. The thicker upper end is provided with the described upper pivotal portion 17, and, the lower end, which is made thicker than the intermediate part just like the upper end, is provided with the lower pivotal portion 18.

On the other hand, the lower arm 21, while being made an elongated rodlike member just like the upper arm 20, has a length as short as about one-half to two-thirds the length of the upper arm 20. The upper end of the lower arm 21 is coupled via the lower pivotal portion 18 to the upper arm 20. Moreover, the front face of the lower arm 21 is provided with a slider 22 of the distance adjustment portion 19 that will hereafter be described. That is, the lower arm 21 is coupled via the distance adjustment portion 19 to the below-knee area massaging mechanism

2.

[0038] The upper pivotal portion 17 is attached to an intermediate point on the described support body 15 of the above-knee areamassagingmechanism3 in the horizontal direction, and thus the upper pivotal portion 17 and the support body 15 are connected to each other in substantially the shape of T when viewed from in front. Via the upper pivotal portion 17, the upper end of the upper arm 20 and the support body 15 are coupled to each other for free rocking motion (rotational movement) about a horizontally-directed axis. The upper pivotal portion 17 is formed having a horizontal width, or thickness equal to about one-third to one-half the outside diameter of the described cuff belt 13 in consideration of user friendliness to avoid that the presence of the upper pivotal portion 17 in between the right and left thighs H will arouse user U discomfort or constitute an obstruction to the use of the massager.

[0039] Moreover, the lower pivotal portion 18 is a member via which the lower end of the upper arm 20 and the upper end of the lower arm 21 are coupled to each other for free rocking motion (rotational movement) about a horizontally-directed axis. Like the upper pivotal portion 17, the lower pivotal portion 18 is constructed of a member formed having a relatively small horizontal width, such as a hinge member adopted for use as the upper pivotal portion 17.

The distance adjustment portion 19 provides coupling

between the lower arm 21 and the below-knee area massaging mechanism 2 in a manner permitting adjustment of the length of the coupling arm 16, expressed differently, a relative distance between the above-knee area massaging mechanism 3 and the below-knee area massaging mechanism 2.

[0040] More specifically, on a base stand 23 bearing the below-knee area massaging mechanism 2, there is provided a rail installation plate 24 in upstanding condition. The rail installation plate 24 is mounted so that its plate surface points in the horizontal direction. The rail installation plate 24 is wider at the rear than at the front in the horizontal direction, and, the front part and the rear part in the rail installation plate 24 are arranged adjacent each other, with a stepped portion 25 lying in between. Moreover, the widened rear part of the rail installation plate 24 has a flat, vertically extending back face, along which the slider 22 is guided in vertical sliding movement. That is, the back face of the rail installation plate 24 constitutes a guide rail for guiding the slider 22.

[0041] Meanwhile, the front face of the lower arm 21 is provided with the described slider 22 which slides along the guide rail. That is, the slider 22 is composed of a pair of rearwardly protruding left-hand and right-hand guide pieces 26 and 26. The paired left-hand and right-hand guide pieces 26 and 26 are arranged at a spacing which is slightly larger in horizontal width than the back face of the described rail

installation plate 24 to permit vertical movement of the rail installation plate 24.

[0042] Moreover, the forward ends of, respectively, the paired left-hand and right-hand guide pieces 26 and 26 are bent inwardly in the width direction so as to be closer to each other as compared to their rear ends. With the back end-side part of the bend caught in the stepped portion 25 of the rail installation plate 24, the lower arm 21 is restrained from becoming detached from the rail installation plate 24 in a rear to front direction.

That is, in the thereby constructed distance adjustment portion 19, in seeking to bring the slider 22 into contact with the rail installation plate 24 from behind, the back face of the rail installation plate 24 is fitted into a space between the paired left-hand and right-hand guide pieces 26 to restrain horizontal relative movement of the rail installation plate 24 and the slider 22. Note that, with the back face of the rail installation plate 24 fitted in between the paired left-hand and right-hand guide pieces 26, vertical relative movement of the rail installation plate 24 and the slider 22 is permitted. Thus, in the described distance adjustment portion 19, the slider 22 is guided in vertical sliding movement along the back face of the rail installation plate 24 while being restrained against horizontal movement.

[0043] The described stepped portion 25 of the rail

installation plate 24 is formed so as to extend linearly in the vertical direction in a range from the lower end to an intermediate point (a point located somewhat below the upper end) in the vertical direction, and yet, a part from there upward, i.e. the upper end part of the stepped portion 25 is curved frontward to restrain the lower arm against further upward movement. That is, the frontwardly curved stepped portion 25 serves as positioning means 27 for positioning the slider 22 at the upper limit of the guide rail for engagement with the back face of the rail installation plate 24.

[0044] The leg massager 1, employing the described coupling mechanism 5, achieves changes in the positional relationship between the above-knee area massaging mechanism 3 and the below-knee area massaging mechanism 2 in the following manner.

For example, when rocked frontward about the lower pivotal portion 18 relatively to the lower arm 21, the upper arm 20 is oriented with its length extending in the front-rear direction, causing the above-knee area massaging mechanism 3 to move to a location above and forward of the below-knee area massaging mechanism 2 as shown in FIG. 4. In the position shown in FIG. 4 defined as a housed position, the above-knee area massaging mechanism 3 is situated above and forward of the below-knee area massaging mechanism 2 so as not to interfere with the massaging operation of the below-knee area massaging mechanism 2. This feature affords high utility in performing massage by operating

the below-knee area massaging mechanism 2 alone.

[0045] Meanwhile, by rocking the upper pivotal portion 17 and the lower pivotal portion 18 in a manner to align the lower arm 21 and the upper arm 20 in the vertical direction, while telescopically extending the distance adjustment portion 19 in the vertical direction, as shown in FIG. 5, the above-knee area massaging mechanism 3 is spaced farther away from the below-knee area massaging mechanism 2 than in the condition shown in FIG. 3. In the position shown in FIG. 5 defined as a tilting position, a sufficiently long distance is left between the below-knee area massaging mechanism 2 and the above-knee area massaging mechanism 3. This feature affords high utility in performing massage on the above-knee massage target area of the user U of large build, as well as in performing massage on the above-knee massage target area of the user U sitting with his/her flexed knees straightened.

[0046] It is advisable to adopt the following procedure to perform massage on the above-knee massage target area of the user U in addition to his/her below-knee massage target area by operating the described leg massager 1.

First of all, as shown in FIG. 7, to operate the below-knee area massaging mechanism 2 alone while maintaining the above-knee area massaging mechanism 3 at rest, the lower pivotal portion 18 is rocked to cause the upper and lower arms to be spaced approximately 90° apart. At this time, when the leg massager 1 is viewed from the left, in the coupling arm 16, the upper

arm 20 is rocked about the lower pivotal portion 18 into a position so that it protrudes frontward from the upper end of the lower arm 21. With the upper arm 20 oriented with its length extending in the front-rear direction, the above-knee area massaging mechanism 3 can be located above and forward of the below-knee area massaging mechanism 2. That is, it never occurs that the forwardly and upwardly rocked above-knee area massaging mechanism 3 is brought into contact with the leg of the user U indicated by a phantom line in the drawing. Thus, the above-knee area massaging mechanism 3, being placed in the housed position, will not constitute an obstruction to the massaging operation of the below-knee area massaging mechanism 2.

[0047] Attention is now directed to performing massage on the above-knee massage target area (thigh H) of the user U sitting in a chair, for example. In this case, the above-knee area massaging mechanism 3 is placed in an upstanding position, and the angle formed by the below-knee region and the above-knee region of each leg of the sitting user U is assumed to be approximately 90 degrees.

As the first step to attain the upstanding position as shown in FIG. 8, the lower pivotal portion 18 is rocked to cause the upper and lower arms to be spaced approximately 180° apart. This allows the upper pivotal portion 17 to come to a location above the lower pivotal portion 18, whereupon the lower arm 21 and the upper arm 20 are aligned in the vertical direction.

Consequently, the above-knee area massaging mechanism 3 is moved upward from the housed position shown in FIG. 7.

[0048] Moreover, in the condition shown in FIG. 8, the upper pivotal portion 17 is rocked into a position so that the cavity of the cuff belt 13 points in the front-rear direction. This makes it possible to perform massage on the above-knee massage target area of the user U sitting with his/her thigh H received in the cavity by operating the above-knee area massaging mechanism 3.

More specifically, in response to the supply of air compressed by the described pump 7 (compressor) to the air bag 10 and the above-knee air bag 14 through the hose 12, as well as the discharge of air present in the air bag via the solenoid valve 11, the air bag 10 and the above-knee air bag 14 located between the cuff belt 13 and the massage target area are inflated and deflated repeatedly to enable massage on the above-knee massage target area, as well as the below-knee massage target area (thigh H and the foot F).

[0049] In the condition shown in FIG. 8, the slider 22 of the lower arm 21 is located at an intermediate point of the vertically oriented guide rail, and is thus free to move upward and downward along the guide rail. That is, the distance adjustment portion 19 stands ready to increase or decrease the distance between the massaging mechanisms.

Thus, in performing massage on the above-knee massage

target area of the user of large build, by moving the slider 22 upward from the position shown in FIG. 8 along the guide rail, it is possible to increase the length of the coupling arm 16, and thereby lift the above-knee area massaging mechanism 3 to a higher level enough to perform massage on the thigh H of the user U of large build. On the other hand, in performing massage on the above-knee massage target area of the user U of small build, by moving the slider 22 downward from the position shown in FIG. 8 along the guide rail, it is possible to lower the above-knee area massaging mechanism 3, and thereby perform massage on the thigh H of the user U of small build.

[0050] Lastly, to provide massage to the user sitting with his/her flexed knees straightened to avoid a feeling of tightness for example, as shown in FIG. 9, the leg massager 1 is inclined to the horizontal to attain a tilting position.

That is, with the rocking angle of the lower pivotal portion 18 maintained at approximately 180 degrees, the slider 22 is moved to the upper end of the guide rail to increase the distance between the massaging mechanisms to the fullest extent permitted by the distance adjustment portion 19. In addition, the toe-side part (forward end) of the leg massager 1 is lifted backward with respect to the heel-side part (rear end) of it. Consequently, the length of the coupling arm 16 is increased, and the angle of inclination to the horizontal is decreased (to a θ -degree level as shown in FIG. 9). Thus, the leg massager 1 provides

massage to the user sitting with his/her knees straight.

[0051] That is, the described leg massager 1 performs effective massage on the below-knee massage target area of user's leg such as the calf and the toe by operating the below-knee area massaging mechanism 2, and additionally performs effective massage on the above-knee massage target area such as the thigh H.

Moreover, the use of the adjustable length-tilt coupling mechanism 5 enables massage on the thigh H of the user sitting with his/her knees straight, as well as on the thigh H of the user sitting with his/her knees flexed, which results in a great improvement in the convenience of the leg massager 1.

[0052] It should be understood that the embodiment as set forth hereinabove is considered in all respects as illustrative only and not restrictive, and that the scope of the present invention is indicated by the appended claims rather than the foregoing description, and all changes that come within the meaning of and the range of equivalency of the claims are intended to be embraced therein.

For example, although the distance adjustment portion is exemplified by the assembly of the guide rail and the slider (slide mechanism) in the described embodiment, another system having distance adjustment capability, such for example as a ratchet mechanism, may be adopted for use as the distance

adjustment portion. In this case, the lower pivotal portion may be disposed at the upper end of the ratchet mechanism.

[0053] Moreover, although the below-knee area massaging mechanism 2 is exemplified by a pneumatic massaging mechanism in the embodiment, the use of a mechanical massaging mechanism for the below-knee area massaging mechanism 2 is acceptable. In another alternative, the below-knee area massaging mechanism 2 may be implemented by a combination of a pneumatic mechanism and a mechanical mechanism.

Reference Signs List

- [0054] 1 Leg massager
 - 2 Below-knee area massaging mechanism
 - 3 Above-knee area massaging mechanism
 - 4 Main body
 - 5 Coupling mechanism
 - 6 Tubular member
 - 6a Horizontal tubular member
 - 6b Vertical tubular member
 - 7 Pump (Compressor)
 - 8 Case body (Casing)
 - 9 Insertion recess
 - 10 Air bag
 - 10a First air bag
 - 10b Second air bag
 - 10c Third air bag

11	Solenoid valve
12	Hose
13	Cuff belt
13L	Left-hand cuff belt
13R	Right-hand cuff belt
14	Above-knee air bag
14L	Left-hand above-knee air bag
14R	Right-hand above-knee air bag
15	Support body
16	Coupling arm
17	Upper pivotal portion
18	Lower pivotal portion
19	Distance adjustment portion
20	Upper arm
21	lower arm
22	Slider
23	Base stand
24	Rail installation plate
25	Stepped portion
26	Guide piece
F	Foot
H	Thigh
U	User

CLAIMS

1. A leg massager comprising a below-knee area massaging mechanism for massaging user's foot and/or calf located below user's knee, and further comprising:

an above-knee area massaging mechanism, mounted above the below-knee area massaging mechanism, for massaging user's thigh located above the knee; and

a coupling mechanism that couples the above-knee area massaging mechanism to the below-knee area massaging mechanism for rocking motion in a front-rear direction.

2. The leg massager according to claim 1,

wherein the coupling mechanism couples the below-knee area massaging mechanism and the above-knee area massaging mechanism together in a manner permitting changes in a distance between the below-knee area massaging mechanism and the above-knee area massaging mechanism.

3. The leg massager according to claim 2,

wherein the coupling mechanism comprises:

a coupling arm that provides connection between the below-knee area massaging mechanism and the above-knee area massaging mechanism; and

a lower pivotal portion for rocking the coupling arm in

the front-rear direction relatively to the below-knee area massaging mechanism.

4. The leg massager according to claim 3,
wherein the coupling mechanism comprises an upper pivotal portion for rocking the above-knee area massaging mechanism in the front-rear direction relatively to the coupling arm.

5. The leg massager according to claim 4,
wherein the coupling mechanism comprises a distance adjustment portion that adjusts the distance between the below-knee area massaging mechanism and the above-knee area massaging mechanism.

6. The leg massager according to claim 5,
wherein the coupling arm comprises an upper arm coupled via the upper pivotal portion to the above-knee area massaging mechanism, and a lower arm coupled via the distance adjustment portion to the below-knee area massaging mechanism,
and wherein the upper arm and the lower arm are coupled to each other via the lower pivotal portion.

7. The leg massager according to claim 6,
wherein the lower arm is provided with the distance adjustment portion,

and wherein the distance adjustment portion has a slide mechanism via which the lower arm is coupled to the below-knee area massaging mechanism.

8. The leg massager according to claim 6,
wherein the lower arm is provided with the distance adjustment portion,

and wherein the distance adjustment portion has a ratchet mechanism via which the lower arm is coupled to the below-knee area massaging mechanism.

9. The leg massager according to any one of claims 1 to 8,
wherein the above-knee area massaging mechanism comprises:

a pressing section that performs pressure massage on the thigh; and

a support body that supports the pressing section.

10. The leg massager according to claim 9,
wherein the above-knee area massaging mechanism comprises a cuff belt attached to the support body in such a way as to be able to be wrapped around an above-knee massage target area, and an inflatable air bag provided in the cuff belt, the cuff belt and the air bag constituting the pressing section.

11. The leg massager according to claim 10,
wherein the cuff belt has a circularly curved profile conforming to an outside shape of the thigh, and is made of an elastic member that allows the cuff belt to become deformed when receiving the above-knee massage target area.

12. The leg massager according to claim 11,
wherein the pressing section includes a left-hand pressing section for massaging an above-knee area of user's left leg, and a right-hand pressing section for massaging an above-knee area of user's right leg,
and wherein the support body is designed to support a horizontal row of the left-hand pressing section and the right-hand pressing section.

13. The leg massager according to claim 1,
wherein the below-knee area massaging mechanism comprises:

a pair of open-topped tubular members, each having an L-shape as seen in side view, capable of receiving user's below-knee massage target area inserted from above;

an air bag, mounted in each of the tubular members, for performing pressure massage on the below-knee massage target area received in the tubular member; and

a pump for feeding air to the air bag.