DESCRIPTION

TITLE OF THE INVENTION:

CHAIR-TYPE MASSAGE APPARATUS EQUIPPED WITH LEG KNEADING DEVICE

Technical field

[0001] The present invention relates to a chair-type massage apparatus equipped with a leg kneading device.

Background Art

[0002] An example of chair-type massage apparatuses equipped with a leg kneading device is disclosed in Patent Literature 1.

This chair-type massage apparatus comprises a seat portion having a backrest at the rear and a leg kneading device at the front. The backrest is provided with a massage mechanism for massaging the back of a user, and the leg kneading device has a built-in lower leg massage mechanism for massaging the lower legs of a user. Moreover, the backrest is designed to be reclinable back and forth, and the leg kneading device is mounted on the front side of the seat portion for rocking movement via a support member.

[0003] In addition to being utilized for massage purposes, such a chair-type massage apparatus is often used merely as a chair. In a chair-type massage apparatus of this type in particular, generally a soft pad is embedded in the seat portion and other regions and the backrest has a reclining feature. The

chair-type massage apparatus is therefore suitable for use also as a sofa.

However, the leg kneading device disclosed in Patent Literature 1 has holding recesses formed on the front side thereof. In this case, a user has to fit his/her lower legs into the holding recesses even when he/she is not going to use the massage function, with a consequent restraint on free movement of the legs. This makes it difficult for a user to take a comfortable position. Furthermore, such a design is causative of impairment of the appearance of the chair.

[0004] In an attempt to avoid such disadvantages, the applicant of the present application has already come up with a technology such as suggested in Patent Literature 2.

In the chair-type massage apparatus based on this technology, there is provided a push-pull mechanism for allowing a leg kneading device to move between a position for use and a position for housing which is located under a seat. The push-pull mechanism comprises a guide rail disposed on both sides of the chair-type massage apparatus, a push-pull rod which is moved in and out along the guide rail, and a carriage plate coupled to the push-pull rod. The leg kneading device is pin-connected to the carriage plate.

[0005] In this construction, with the leg kneading device placed in the position for use, the selection between the front face (massage surface) and the rear face (footrest surface) of

the leg kneading device can be made freely by rotary motion.

Prior Art Reference

Patent Literature

[0006] Patent Literature 1: Japanese Unexamined Patent Publication JP-A 2002-238963

Patent Literature 2: Japanese Unexamined Patent Publication JP-A 2007-75590

Summary of the Invention

Problems to be solved by the Invention

[0007] However, in the case of adopting a guide rail, the guide rail is required to have a gentle curve. This necessitates high precision and great care in machining operation, thus making it difficult to cut down on manufacturing costs.

Furthermore, a curved guide rail is partly subjected to a great sliding resistance, wherefore a correspondingly strong drive is required, but on the other hand there is a need to devise a method of suppressing driving sound and vibration. This leads to extra burdens in terms of structure and weight. After all, the conventional construction is susceptible to improvement.

[0008] As another demands, in the opinion of some users it is desirable to be able to use the leg kneading device while taking a relaxed position with their legs stretched out forward (with their knees straightened out as much as possible), and it is also desirable to be able to adjust the position of the leg kneading device (the distance between the leg kneading device

and the seat) optimally in conformity with user's height at the time of setting the leg kneading device in front of the seat. However, as a prerequisite to fulfillment of such a demand, an increase in complexity of driving structure must be avoided.

[0009] The present invention has been devised in view of the aforestated problems, and accordingly its object is to provide a chair-type massage apparatus that can be made simpler in structure, lighter in weight, and lower in cost than ever before. Another object of the present invention is to provide a chair-type massage apparatus that offers enhanced usability by allowing a user to use a leg kneading device in a relaxed sitting position with his/her legs stretched out forward, as well as to adjust the position of the leg kneading device in accordance with variation in user's height, while preventing an increase in complexity of driving structure as a prerequisite.

Means for solving the Problems

[0010] In order to accomplish the above object, the following technical means is adopted for the implementation of the present invention.

That is, the chair-type massage apparatus equipped with a leg kneading device pursuant to the present invention comprises: a seat; a backrest disposed on a rear side of the seat; and a leg kneading device disposed on a front side of the seat. In this construction, under the seat is disposed an advance-retraction mechanism which is connected to the leg

kneading device and includes an advancing and retracting section and a forwardly protruding section. The advancing and retracting section is configured to move, by advance movement, the leg kneading device situated in a housing position formed under the seat to a first use position in front of the seat where the leg kneading device is grounded on a floor and is able to massage the lower legs of a user, and move the leg kneading device situated in the first use position to a second use position in front of the seat where the leg kneading device is floating in the air above the floor and is able to massage the lower legs of a user. Moreover, the advancing and retracting section is also configured to move, by retraction movement, the leg kneading device situated in the second use position downward and backward to return it to the first use position, and move the leg kneading device situated in the first use position downward and backward to return it to the housing position. The forwardly protruding section is configured to move, by advance movement, the leg kneading device situated in the second use position in a floating state forward even further to allow it to reach a third use position where the leg kneading device is able to massage the lower legs of a user, and move, by retraction movement, the leg kneading device situated in the third use position backward to return it to the second use position.

[0011] It is preferable that, when set in the second use position and in the third use position as well, the leg kneading

device stays with its back face opposed to the floor and its bottom face pointing forward, and that, when set in the housing position, the leg kneading device stays with its bottom face pointing forward and kept substantially flush with a vertical of a forward end of the seat, and its front face for massaging lower legs pointing upward.

Moreover, it is advisable that the advance-retraction mechanism has a unitary driving section by which the advancing and retracting section and the forwardly protruding section are driven to operate.

[0012] It is more preferable that the advancing and retracting section of the advance-retraction mechanism comprises: a link member disposed so as to act as a connection between a stationary pivot portion disposed under the seat for free rotation about a horizontal axis and a mobile pivot portion disposed in an upper part of a back face of the leg kneading device for free rotation about a horizontal axis, and in which the mobile pivot portion is retained for free forward-backward rocking movement about the stationary pivot portion; a driving unit for imparting a driving force tending to rock the link member forward and backward; a rolling wheel disposed at a lower end of the back face of the leg kneading device and retained for free movement on the floor; and a rotation restricting portion disposed in the link member, for restricting rotation of the leg kneading device about the mobile pivot portion during forward

rocking movement of the link following the movement of the leg kneading device from the housing position to an area ahead of the seat and from then on.

[0013] Moreover, it is advisable that the driving section of the advance-retraction mechanism includes: a rail portion located under the seat but above the housing position, with its lengthwise direction aligned with a front-rear direction; a forward-backward moving body disposed for free forward-backward movement along the rail portion; and a motor mechanism for imparting a driving force tending to move the forward-backward moving body in the front-rear direction, and that the forward-backward moving body and the link member are coupled to each other via a pivotal point which is spaced a predetermined distance away from the stationary pivot portion in a radial direction on the link member.

[0014] It is preferable that the rail portion is disposed at each of a right side and a left side of a region under the seat, that the forward-backward moving body includes a pair of sliders that engage in the right-hand rail portion and the left-hand rail portion, respectively, and a traverse member acting as a connection between the paired sliders, and that the link member is coupled to a forward end of each slider via the pivotal point.

It is advisable that the traverse member of the forward-backward moving body is formed with a concave part which

is created by curving part of the traverse member downwardly for the purpose of preventing interference with other members.

[0015] It is more preferable that, in the forwardly protruding section of the advance-retraction mechanism, the link member of the advancing and retracting section includes an arm main body having the stationary pivot portion disposed at a base end thereof for free rocking movement and a slide arm retained for free forward-backward sliding movement relative to the arm main body and having the mobile pivot portion at a front end thereof, thereby forming a telescopic structure which is free to telescope in the front-rear direction, and that the pivotal point is disposed at a base end of the slide arm.

[0016] It is advisable that, in the link member, one of the arm main body and the slide arm is made as an outer tubular shaft, and the other is made as an inner shaft which is fitted in the outer tubular shaft interiorly thereof while being free to move slidingly in and out.

Advantageous effect of the Invention

[0017] According to the chair-type massage apparatus pursuant to the present invention, further simplification in structure, weight reduction, and cost reduction can be achieved. In addition to that, in the chair-type massage apparatus pursuant to the present invention, enhancement in usability can be achieved without causing any increase in complexity of driving structure by allowing a user to use the leg kneading device in a relaxed

sitting position with his/her legs stretched out forward, as well as to adjust the position of the leg kneading device in accordance with variation in user's height.

Brief Description of Drawings

[0018][Fig. 1] Figure 1 is a perspective view, with parts omitted, illustrating one embodiment of a chair-type massage apparatus pursuant to the present invention.

[Fig. 2] Figure 2 is a sectional side view illustrating how a leg kneading device is to be taken in and out, with (A) showing a state where the leg kneading device is situated in a housing position, (B) showing a state where the leg kneading device is in the middle of movement, (C) showing a state where the leg kneading device is situated in a first use position, (D) showing a state where the leg kneading device is situated in a second use position, and (E) showing a state where the leg kneading device is situated in a third use position.

[Fig. 3] Figure 3 is a perspective view, partially broken away, of a condition of taking the leg kneading device in and out (corresponding to Fig. 2(A)).

[Fig. 4] Figure 4 is a perspective view, partially broken away, of a condition of taking the leg kneading device in and out (corresponding to Fig. 2(B)).

[Fig. 5] Figure 5 is a perspective view, partially broken away, of a condition of taking the leg kneading device in and out (corresponding to Fig. 2(C)).

[Fig. 6] Figure 6 is a perspective view, partially broken away, of a condition of taking the leg kneading device in and out (corresponding to Fig. 2(D)).

[Fig. 7] Figure 7 is a perspective view, partially broken away, of a condition of taking the leg kneading device in and out (corresponding to Fig. 2(E)).

[Fig. 8] Figure 8 is a front view showing the interior of the chair-type massage apparatus pursuant to the present invention.

[Fig. 9] Figure 9 is a perspective view showing the exterior of the chair-type massage apparatus pursuant to the present invention.

Modes for Carrying out the Invention

[0019] Hereinafter, an embodiment of the present invention will be described with reference to the drawings.

In Figs. 1 to 9, there is shown one embodiment of a chair-type massage apparatus 1 pursuant to the present invention. It is noted that, in these drawings, except for Fig. 9 which is a general external view, the construction is illustrated with some parts omitted on an as needed basis for convenience in explanation.

The chair-type massage apparatus 1 comprises a seat 2, a backrest 3 disposed on the rear side of the seat 2, and a leg kneading device 5 disposed on the front side of the seat 2, for giving a kneading massage to the lower legs (calves, in particular) of a user sitting on the seat 2.

[0020] As shown in Fig. 1, under the seat 2 is disposed a leg frame 6 for the placement of the chair-type massage apparatus 1 on a floor F. The seat 2 is supported at a predetermined level by the leg frame 6.

Moreover, armrests 7 are disposed on both sides of the seat 2 so as to have sandwiched therebetween the seat 2. The leg frame 6 is hidden from external view by the armrests 7.

[0021] Figs. 2(A) through 2(E) are views for explaining workings of the apparatus, illustrating how the leg kneading device 5 is to be taken in and out in chronological order. In these figures, for the sake of visibility of a region under the seat 2 (the inside of the leg frame 6), the armrest 7, the seat 2, the backrest 3, and so forth are omitted. Moreover, the leg frame 6 is sectioned at its center, and the leg kneading device 5 is indicated by an imaginary line.

In the following description, a direction of from left to right (right to left) of Fig. 2 will be referred to as a front-rear direction of the apparatus in practice, and a direction of from top to bottom (bottom to top) of Fig. 2 will be referred to as a vertical direction of the apparatus in practice. Moreover, a direction of drilling through the paper sheet with Fig. 2 printed on it will be referred to as a horizontal direction or right-left direction or widthwise direction of the apparatus in practice. The definitions of directions conform to the sight of a user sitting on the chair-type massage apparatus 1.

[0022] The seat 2 has an area large enough to support the buttocks of a user from below. The backrest 3 has its lower end pivotally supported on the rear of the seat 2 or the rear of the leg frame 6 for free forward-backward rocking movement. The backrest 3 can be reclined by a reclining mechanism 8 such as a linear actuator mechanism attached to the leg frame 6 interiorly thereof.

Within the backrest 3 is mounted a back massage mechanism (not represented graphically) for producing massage actions such as kneading, tapping, and vibrations for free vertical movement.

[0023] The leg kneading device 5 is substantially quadrilateral in shape when viewed frontally, and takes the form of a rounded-triangular box when viewed laterally. On the front side of the leg kneading device 5 is formed a pair of right-hand and left-hand holding recesses 10 in which the lower legs (right and left legs), respectively, of a user can be fitted.

The inward-facing surface of each holding recess 10 has a built-in lower leg massage device for performing a kneading massage on lower legs. The lower leg massage device may be configured to effect kneading by imparting horizontal rocking motion to a platy member elongated in the direction of length of a leg, or may be configured to effect kneading by using an airbag which is inflated and deflated with the admission and release of air.

[0024] As shown in Fig. 1 and 2, the leg kneading device

5 is supported by a mobile frame 30 to secure rigidity in the device 5 as a whole. The mobile frame 30 is constructed by combining a bottom support frame 28 and a back support frame 29 in the form of the letter L when viewed laterally. In such a leg kneading device 5, there is provided a rolling wheel 23 which is located at a corner part between the bottom and the back thereof (the part of juncture between the bottom support frame 28 and the back support frame 29 in the mobile frame 30).

[0025] As shown in Fig. 2, the leg kneading device 5 is designed to be movable between a housing position P formed under the seat 2 (refer to Fig. 2(A)) and a first use position U1 located in front of the seat 2 (refer to Fig. 2(C)) where the leg kneading device 5 is able to massage the lower legs of a user, with the rolling wheel 23 grounded on the floor F, between the first use position U1 and a second use position U2 located in front of the seat 2 (refer to Fig. 2(D)) where the leg kneading device 5 is able to massage the lower legs of a user in a state of floating in the air away from the floor F, and between the second use position U2 and a third use position U3 lying more to the front than does the second use position U2 (refer to Fig. 2(E)).

[0026] The movement of the leg kneading device 5 from the housing position P to the first use position U1, from there to the second use position U2, and from there to the third use position U3 is effected by an advance-retraction mechanism 15 disposed in the chair-type massage apparatus 1.

More specifically, the advance-retraction mechanism 15 is placed under the seat 2 (the inside of the leg frame 6), and the seat 2 (the leg frame 6) and the leg kneading device 5 are coupled to each other via the advance-retraction mechanism 15. The advance-retraction mechanism 15 includes an advancing and retracting section 16 and a forwardly protruding section 17.

[0027] As shown in Figs. 2 through 7, the advancing and retracting section 16 allows the movement of the leg kneading device 5 among the second use position U2, the first use position U1, and the housing position P. That is, with the leg kneading device 5 kept in the housing position P under the seat 2, when the advancing and retracting section 16 of the advance-retraction mechanism 15 effects forward movement, the leg kneading device 5 is moved from the housing position P to the first use position U1. Thence, when the advancing and retracting section 16 effects further forward movement, the leg kneading device 5 kept in the first use position U1 is moved to the second use position U2. After that, when the advancing and retracting section 16 effects backward movement, the leg kneading device 5 is moved from the second use position U2 to the first use position U1, and from there to the housing position P to be put in place.

[0028] On the other hand, the forwardly protruding section 17 allows the movement of the leg kneading device 5 between the second use position U2 and the third use position U3.

That is, with the leg kneading device 5 kept in the second use position U2, when the forwardly protruding section 17 of the advance-retraction mechanism 15 effects forward movement, the leg kneading device 5 is moved from the second use position U2 to the third use position U3. After that, when the forwardly protruding section 17 effects backward movement, the leg kneading device 5 returns to its original position, viz., the second use position U2.

[0029] Figs. 3 to 7 are perspective views, partially broken away, of conditions of taking the leg kneading device 5 in and out. Fig. 3 corresponds to Fig. 2(A), Fig. 4 corresponds to Fig. 2(B), Fig. 5 corresponds to Fig. 2(C), Fig. 6 corresponds to Fig. 2(D), and Fig. 7 corresponds to Fig. 2(E).

The advancing and retracting section 16 of the advance-retraction mechanism 15 is composed of a link member 20, a rotation restricting portion 21, a driving unit 22, and a rolling wheel 23.

[0030] There are provided two link members 20 in the form of a pair of right-hand and left-hand link members 20. The link member 20 is so disposed as to act as the connection between a stationary pivot portion 40 disposed below the seat 2 (disposed inside an upper part of the leg frame 6 in the horizontal direction) and a mobile pivot portion 41 disposed in an upper part of the back face of the leg kneading device 5 (disposed at the upper end of the back support frame 29 of the mobile frame 30). The

stationary pivot portion 40 and the mobile pivot portion 41 serve to hold the link member 20 for free relative rotation about a pivot shaft whose axis is pointing in the horizontal direction. Thus, the link member 20 is so designed that the mobile pivot portion 41 is free to rock in the front-rear direction about the stationary pivot portion 40.

[0031] As to the forward-backward rocking movement of the link member 20, the link member 20 can be rocked forward and backward correspondingly with the range of movement of the leg kneading device 5 between the housing position P and the second use position U2 (a rockably movable region of the link member 20). That is, when the leg kneading device 5 is situated in the housing position P (refer to Fig. 2 (A)), the link member 20 is situated toward the rear of the rockably movable region. On the other hand, when the leg kneading device 5 is situated in the second use position U2 (refer to Fig. 2 (D)), the link member 20 is situated toward the front of the rockably movable region.

[0032] As to the function of the rotation restricting portion 21, when the link member 20 is rocked forward to change the leg kneading device 5 from the state of being kept in the housing position P to the state of protruding forward beyond the seat 2 (refer to Fig. 2(C)), from then on, in the rocking region of the link member 20 (refer to Figs. 2(D) and 2(E)), the leg kneading device 5 is restrained against rotation about

the mobile pivot portion 41 by the rotation restricting portion 21.

More specifically, in the link members 20, there is disposed a pair of oppositely arranged right-hand and left-hand abutment stopper pins 44, of which each is so formed as to protrude horizontally inwardly from a location near the mobile pivot portion 41 (protrude toward the opposed link member 20 placed in parallel face-to-face relation).

[0033] That is, the abutment stopper pin 44 is configured to be kept in a noncontact state during the rocking movement of the link member 20 within the moving range of Fig. 2(A) to Fig. 2(C), while engaged with the mobile frame 30 (the back support frame 29) for supporting the leg kneading device 5 during the rocking movement of the link member 20 within the moving range of Fig. 2(C) to Fig. 2(E).

The driving unit 22, which imparts a driving force tending to rock the link member 20 forward and backward, is composed of a rail portion 47, a forward-backward moving body 48, and a motor mechanism 49.

[0034] As shown in Fig. 1 and Fig. 8, the rail portion 47 is disposed below the seat 2 (disposed inside an upper part of the leg frame 6) but above the housing position P, with its lengthwise direction aligned with the front-rear direction. Moreover, there are provided two rail portions 47 in the form of a pair of right-hand and left-hand rail portions 47. The

rail portions 47 are parallelly arranged at a predetermined spacing to secure an open area immediately above the housing position P.

In the illustrated example, a grooved strip member with cross section like the letter U is mounted in such a way that the opening of the groove is oriented horizontally inwardly (two rail portions 47 are arranged face to face with each other). In this way, the opened inner surface of the groove constitutes a rail surface.

[0035] The forward-backward moving body 48, which is retained for free forward-backward movement along the rail portion 47, is moved in the front-rear direction in the location below the seat 2 (inside the upper part of the leg frame 6)) but above the housing position P.

As has already been described, in this embodiment, since the paired right-hand and left-hand rail portions 47 are arranged at a predetermined spacing, it follows that the forward-backward moving body 48 is configured to have right-hand and left-hand sliders 50 that engage in the right-hand and left-hand rail portions 47, respectively, and a traverse member 51 acting as the connection between the sliders 50.

[0036] The slider 50 is made in the form of a square pipe, the lengthwise direction of which is aligned with the front-rear direction, so as to be fitted in the rail portion 47 for smooth sliding movement without causing a backlash.

Moreover, the traverse member 51 is widened and elongated in the front-rear direction at its ends, namely the right and left ends 51a, to increase the strength of connection with the right-hand and left-hand sliders 50, and is constricted at its midportion in the horizontal direction to achieve weight reduction.

[0037] The forward-backward moving body 48 thereby constructed is, at its right end-sided part and its left end-sided part (at the forward end of each slider 50), coupled to each of a one end-sided part of the right-hand link member 20 and a one end-sided part of the left-hand link member 20 (that part of each link member 20 which is spaced a predetermined distance away from the stationary pivot portion 40 in a radial direction) via a pivotal point 53.

The motor mechanism 49, which imparts a driving force tending to move the forward-backward moving body 48 in the front-rear direction, is composed of a feed screw shaft 55 placed in parallel with the rail portion 47, an electric motor 56 for rotatably driving the feed screw shaft 55, and a nut portion 57 threadedly fitted to the feed screw shaft 55 exteriorly thereof. The nut portion 57 is attached to the upper side of the traverse member 51 of the forward-backward moving body 48 via a bracket 58.

[0038] The electric motor 56 is connected with a reduction gear 59. Since the reduction gear 59 produces an output in a

direction at right angles to the electric motor 56 when viewed planarly after receiving an input from the motor, it follows that the electric motor 56 is horizontally oriented with respect to the feed screw shaft 55. This makes it possible to achieve a space-saving arrangement of the motor mechanism 49 in the front-rear direction.

It is noted that, as shown in Fig. 8, the traverse member 51 of the forward-backward moving body 48 is altered in shape at its part crossing the feed screw shaft 55 of the motor mechanism 49 thereby to form a concave part 51b. The concave part 51b is created by curving part of the traverse member 51 in the direction of suspended installation (the horizontal direction) downwardly for the purpose of preventing interference with the feed screw shaft 55.

[0039] In the traverse member 51 of the forward-backward moving body 48, aside from the concave part 51b formed in the part crossing the feed screw shaft 55 of the motor mechanism 49, there is provided a second concave part 51c which is likewise created by curving part of the traverse member 51 in the direction of suspended installation (the horizontal direction) downwardly. The second concave part 51c is provided for the purpose of preventing interference with the reclining mechanism 8 (refer to Fig. 1) for bringing the backrest 3 into a reclined state with respect to the seat 2.

[0040] Incidentally, in this embodiment, the aforestated

link member 20 has a telescopic configuration and thus constitutes the forwardly protruding section 17 of the advance-retraction mechanism 15.

That is, the link member 20 is constructed of a combination of an arm main body 60 and a slide arm 61. The slide arm 61 is made as an outer tubular shaft, whereas the arm main body 60 is made as an inner shaft (a solid shaft or a hollow shaft, either will do) which is fitted in the slide arm 61 (outer tubular shaft) interiorly thereof while being free to move slidingly in and out. It is possible to configure the arm main body 60 as an outer tubular shaft and correspondingly configure the slide arm 61 as an inner shaft.

[0041] At the base end of the arm main body 60 which is an inner shaft is disposed the stationary pivot portion 40. At the front end of the slide arm 61 is disposed the mobile pivot portion 41. Moreover, at the side of the base end of the slide arm 61 is disposed the pivotal point 53 acting as the connection between the link member 20 and the forward-backward moving body 48.

Now, the workings of the chair-type massage apparatus 1 having the structure described heretofore and, in particular, the operation of the advance-retraction mechanism 15 will be described.

[0042] To begin with, as shown in Fig. 2(A) and Fig. 3, let it be assumed that the leg kneading device 5 is placed in

the housing position P under the seat 2. In the leg kneading device 5 in this state, the bottom face points frontward and the front face (the face formed with the holding recesses 10, 10 in which the lower legs of a user are inserted) points upward. Moreover, the aforesaid bottom face is substantially flush with the forward end of the seat 2.

Upon actuation of the electric motor 56 of the driving unit 22, the forward-backward moving body 48 is moved forward, and correspondingly the link member 20 is caused to rock about the stationary pivot portion 40 so that the mobile pivot portion 41 moves ahead. In consequence, as shown in Fig. 2(B) and Fig. 4, the leg kneading device 5 receives transmission of a force of forward movement at its upper rear part, wherefore the rolling wheel 23 is rolled over the floor F and thereby the leg kneading device 5 can be moved forward smoothly to reach the first use position U1 shown in Fig. 2 (C).

[0043] As the link member 20 is rocked forward even further, in the rotation restricting portion 21, the abutment stopper pin 44, which was in a completely interference-free state, becomes engaged with the mobile frame 30 (the back support frame 29), thereby arresting the rotation of the leg kneading device 5 about the mobile pivot portion 41 (the leg kneading device 5 is held down for unitary rocking movement with the link member 20). Henceforth, as the link member 20 is rocked forward, the leg kneading device 5 is moved toward the second use position U2

shown in Fig. 2 (D) and Fig. 6, with the rolling wheel 23 floating in the air above the floor F.

[0044] In the leg kneading device 5 situated in the second use position U2, the back face is opposed to the floor F and the bottom face is pointing forward. Moreover, the front face for massaging lower legs is kept nearly level so as to be substantially flush with the top face of the seat 2, or pointing upward while being continuous with the top face of the seat 2, with its front downwardly inclined gently.

A user is able to enjoy a pleasant massage treatment just by setting the massage mechanism for lower legs in motion while inserting his/her legs into the holding recesses 10, 10, respectively, of the leg kneading device 5. Moreover, at this time, the leg kneading device 5 as a whole is in a raised state while protruding forward. In this case, a user is able to take a relaxed sitting position with his/her legs stretched out forward and also does not have to bend his/her knees excessively, with a consequent enhancement in usability.

[0045] It is noted that, when it is desired to move the leg kneading device 5 forward even further, the electric motor 56 of the driving unit 22 is actuated continuously to move the forward-backward moving body 48 ahead furthermore.

Thence, as shown in Fig. 2(E) and Fig. 7, the arm main body 60 becomes substantially parallel to the rail portion 47. Therefore the advancing power of the forward-backward moving

body 48 is transmitted through the pivotal point 53 to the slide arm 61, thus causing the slide arm 61 to move forward while sliding along the arm main body 60. By the movement of the slide arm 61, the leg kneading device 5 pivotally supported at the front end of the slide arm 61 moves ahead in conjunction with the slide arm 61 while floating in the air above the floor F, and eventually reaches the third use position U3 where it is capable of massaging the lower legs of a user.

[0046] It goes without saying that the forward movement of the leg kneading device 5 from the second use position U2 to the third use position U3 is effected optionally depending on a user's preference.

Meanwhile, with the leg kneading device 5 placed in the second use position U2, as the electric motor 56 of the driving unit 22 is driven to run in reverse, the forward-backward moving body 48 is moved backward, and correspondingly the link member 20 is caused to rock about the stationary pivot portion 40 so that the mobile pivot portion 41 moves backward. In this way, the leg kneading device 5 is moved from the second use position U2 to the first use position U1, and from there to the housing position P. It is noted that, in the case where the leg kneading device 5 has already been advanced to the third use position U3, the withdrawal of the slide arm 61 relative to the arm main body 60 is effected before the start of the backward rocking movement of the link member 20. Thus, the leg kneading device

5 is returned from the third use position U3 to the second use position U2.

[0047] Seeing a transition from the state shown in Fig. 2(C) (Fig. 5) to the state shown Fig. 2(B) (Fig. 4), as the link member 20 is rocked backward, the leg kneading device 5 as a whole is moved downward, with its forward-protruding part retracted backward and its upper front part sunk down. As shown in Fig. 2(B) and Fig. 4, after the upper back part of the leg kneading device 5 goes down until the upper front part thereof is located below the level of the bottom of the seat 2, the leg kneading device 5 starts to retract backward in the region under the seat 2. At this time, the rolling wheel 23 is rolled over the floor F, wherefore the leg kneading device 5 can be moved smoothly.

[0048] Eventually, as shown in Fig. 2(A) and Fig. 3, the leg kneading device 5 is brought back to the state of staying in the housing position P. The retracting operation of the advance-retraction mechanism 15 is accomplished by the sequence of operating steps thus far described.

When set in the housing position P, the leg kneading device 5 stays with its bottom face pointing forward and inhibited from protruding beyond the forward end of the seat 2. Accordingly, a user sitting on the chair-type massage apparatus 1 is able to keep a comfortable position even if he/she is not going to have a massage. Moreover, the chair-type massage apparatus 1

in itself is simple in design and looks lucid.

[0049] It is preferable to dispose a sensor such a limit switch on the top face of the seat 2, in the holding recess 10 of the leg kneading device 5, or in other regions. In this case, the apparatus can be so designed that, even if the advance-retraction mechanism 15 is being actuated to effect the aforestated retracting operation when the presence of a user is detected by the sensor, or during the time the massage mechanism or the lower leg massage mechanism is in action, the performance of retraction is ignored. By adopting such a structure, it is possible to prevent inconveniences such for example as occurrence of a hurt to the lower legs of a user without fail.

[0050] It should be understood that the chair-type massage apparatus 1 pursuant to the present invention is not limited to the embodiment as set forth hereinabove.

Industrial Applicability

[0051] The present invention is applicable to a leg kneading device which is mounted in a chair-type massage apparatus, and is also applicable to a sofa, a seat of a vehicle, and so forth.

Explanation of reference numerals and symbols

[0052]

1	Chair-type massage apparatus
2	Seat
3	Backrest
5	Leg kneading device
15	Advance-retraction mechanism

16	Advancing and retracting section
17	Forwardly protruding section
20	Link member
21	Rotation restricting portion
22	Driving unit
23	Rolling wheel
40	Stationary pivot portion
41	Mobile pivot portion
47	Rail portion
48	Forward-backward moving body
49	Motor mechanism
50	Slider
51	Traverse member
51b	Concave part
53	Pivotal point
55	Feed screw shaft
56	Electric motor
57	Nut portion
60	Arm main body
61	Slide arm
F	Floor
P	Housing position
U1	First use position
U2	Second use position
U3	Third use position

CLAIMS

1. A chair-type massage apparatus comprising:

a seat;

a backrest disposed on a rear side of the seat; and

a leg kneading device disposed on a front side of the seat,

wherein, under the seat is disposed an advance-retraction mechanism which is connected to the leg kneading device and includes an advancing and retracting section and a forwardly protruding section,

the advancing and retracting section being configured to move, by advance movement, the leg kneading device situated in a housing position formed under the seat to a first use position in front of the seat where the leg kneading device is grounded on a floor and is able to massage lower legs of a user by rolling a rolling wheel provided in a corner part between a bottom and a back of the leg kneading device over the floor, and move the leg kneading device situated in the first use position to a second use position in front of the seat where the leg kneading device is floating in the air above the floor and is able to massage the lower legs of a user, with the rolling wheel floating in the air above the floor,

the advancing and retracting section being also configured to move, by retraction movement, the leg kneading device situated in the second use position downward and backward to return it

to the first use position, and move the leg kneading device situated in the first use position downward and backward to return it to the housing position,

the forwardly protruding section being configured to move, by advance movement, the leg kneading device situated in the second use position in a floating state forward even further to allow it to reach a third use position where the leg kneading device is able to massage the lower legs of a user, and move, by retraction movement, the leg kneading device situated in the third use position backward to return it to the second use position.

2. The chair-type massage apparatus equipped with the leg kneading device according to Claim 1,

wherein, when set in the second use position and in the third use position as well, the leg kneading device stays with its back face opposed to the floor and its bottom face pointing forward,

and wherein, when set in the housing position, the leg kneading device stays with its bottom face pointing forward and kept substantially flush with a vertical of a forward end of the seat, and its front face for massaging lower legs pointing upward.

3. The chair-type massage apparatus equipped with the leg

kneading device according to Claim 1 or 2,

wherein the advance-retraction mechanism has a unitary driving section by which the advancing and retracting section and the forwardly protruding section are driven to operate.

4. The chair-type massage apparatus equipped with the leg kneading device according to one of Claims 1 to 3,

wherein the advancing and retracting section of the advance-retraction mechanism comprises:

a link member disposed so as to act as a connection between a stationary pivot portion disposed under the seat for free rotation about a horizontal axis and a mobile pivot portion disposed in an upper part of a back face of the leg kneading device for free rotation about a horizontal axis, and in which the mobile pivot portion is retained for free forward-backward rocking movement about the stationary pivot portion;

a driving unit for imparting a driving force tending to rock the link member forward and backward;

a rolling wheel disposed at a lower end of the back face of the leg kneading device and retained for free movement on the floor; and

a rotation restricting portion disposed in the link member, for restricting rotation of the leg kneading device about the mobile pivot portion during forward rocking movement of the link following the movement of the leg kneading device from the housing

position to an area ahead of the seat and from then on.

5. The chair-type massage apparatus equipped with the leg kneading device according to Claim 4,

wherein the driving section of the advance-retraction mechanism includes: a rail portion located under the seat but above the housing position, with its lengthwise direction aligned with a front-rear direction; a forward-backward moving body disposed for free forward-backward movement along the rail portion; and a motor mechanism for imparting a driving force tending to move the forward-backward moving body in the front-rear direction,

and wherein the forward-backward moving body and the link member are coupled to each other via a pivotal point which is spaced a predetermined distance away from the stationary pivot portion in a radial direction on the link member.

6. The chair-type massage apparatus equipped with the leg kneading device according to Claim 5,

wherein the rail portion is disposed at each of a right side and a left side of a region under the seat,

and wherein the forward-backward moving body includes a pair of sliders that engage in the right-hand rail portion and the left-hand rail portion, respectively, and a traverse member acting as a connection between the paired sliders, and the

link member is coupled to a forward end of each slider via the pivotal point.

7. The chair-type massage apparatus equipped with the leg kneading device according to Claim 6,

wherein the traverse member of the forward-backward moving body is formed with a concave part which is created by curving part of the traverse member downwardly for the purpose of preventing interference with other members.

8. The chair-type massage apparatus equipped with the leg kneading device according to one of Claims 4 to 7,

wherein, in the forwardly protruding section of the advance-retraction mechanism, the link member of the advancing and retracting section includes an arm main body having the stationary pivot portion disposed at a base end thereof for free rocking movement and a slide arm retained for free forward-backward sliding movement relative to the arm main body and having the mobile pivot portion at a front end thereof, thereby forming a telescopic structure which is free to telescope in the front-rear direction,

and wherein the pivotal point is disposed at a base end of the slide arm.

9. The chair-type massage apparatus equipped with the leg

kneading device according to Claim 8,

wherein, in the link member, one of the arm main body and the slide arm is made as an outer tubular shaft, and the other is made as an inner shaft which is fitted in the outer tubular shaft interiorly thereof while being free to move slidingly in and out.