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(71) Applicants:
• **SANYO Electric Co., Ltd.**
Moriguchi-shi
Osaka
570-8677 (JP)
• **Sanyo Consumer Electronics Co., Ltd.**
Tottori-shi
Tottori 680-8634 (JP)

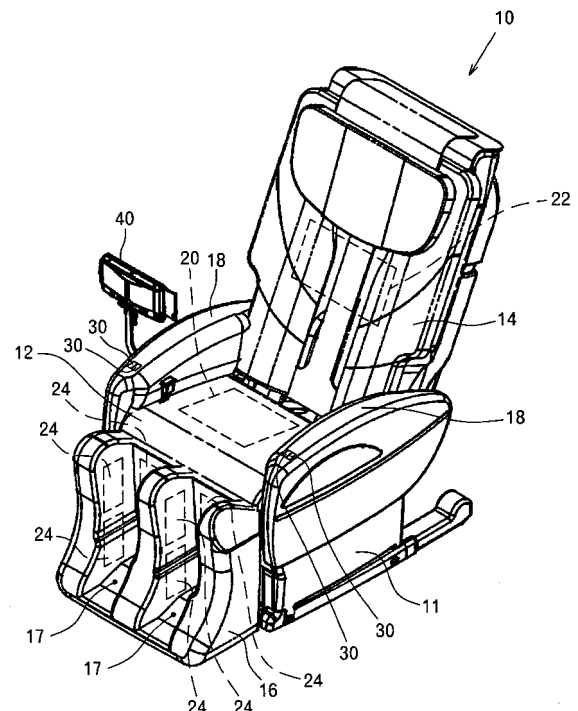
(72) Inventors:
• **Uenishi, Tomoaki**
Tottori-shi
Tottori 680-8634 (JP)
• **Suto, Toshihiro**
Tottori-shi
Tottori 680-8634 (JP)
• **Motomatsu, Kensuke**
Tottori-shi
Tottori 680-8634 (JP)
• **Dohi, Junichi**
Tottori-shi
Tottori 680-8634 (JP)

(74) Representative: **Wagner, Bernhard Peter**
Ter Meer Steinmeister & Partner GbR
Mauerkircherstraße 45
81679 München (DE)

(54) **Chair-Type massage machine**

(57) The invention provides a chair-type massage machine adapted to accurately measure heartbeats or like living body data of the person to be treated. The massage machine has a seat 12, a backrest 14 and a leg unit 16, the seat and/or the backrest having massaging means 20, 22 for massaging an affected part of the person, the leg unit having leg massage means 24 for giving a massage to the legs of the person. The massaging means and the leg massage means are controllable by control means 50. The massage machine comprises living body data detecting means 30, 30 electrically connected to the control means for detecting living body data of the person. The control means is adapted to operate the leg massage means alone without operating the massaging means when the living body data of the person is measured by the living body data detecting means.

FIG. 1



Description

TECHNICAL FIELD

[0001] The present invention relates to massage machines of the chair type which are adapted to accurately measure the data as to the living body of the user to be treated, such as heartbeats.

BACKGROUND OF THE INVENTION

[0002] Chair-type massage machines are proposed which are adapted to measure the data as to the living body of the user to be treated, such as the heart rate and skin temperature (see, for example, JP2005-46382A). Means for detecting living body data comprises electrodes and the like, and is disposed in the vicinity of the forward end of an elbow rest of the chair. The user holds his or her palm or pulp of finger in contact with the data detecting means, whereby the data of living body of the user is detected.

[0003] In order to improve the accuracy of measurement of the living body data by the detecting means, it is necessary for the user to hold the finger pulp or palm pressed against the detecting means with good stability. If the finger pulp or palm comes out of contact with the data detecting means or moves during measurement, satisfactory measurements will not be available or an error is likely to be involved in the measurement.

[0004] According, when the living body data is measured during the operation of kneading or pounding massage means provided in the backrest or seat of the chair-type massage machine, accurate measurements will not be obtained because the upper half of the user's body is moved upward downward, leftward or rightward by the massage means, consequently raising the finger pulp or palm off the data detecting means.

[0005] It is possible to hold all the massage means out of operation during the measurement of the living body data, whereas if the user remains in a standby position as seated during the period of time (about 30 seconds) needed for measuring, the user will generally take this period as a long waiting time.

[0006] An object of the present invention is to provide a chair-type massage machine which, when measuring the living body data of the user, is adapted to perform only such a massage operation that will not greatly influence the upper half of the user's body, for example, to give a massage to the legs, consequently affording living body data measurements with improved accuracy and making it less likely for the user to perceive waiting time.

SUMMARY OF THE INVENTION

[0007] To fulfill the above object, the present invention provides a chair-type massage machine comprising a seat for the person to be treated to sit in, a backrest provided at a rear end of the seat and a leg unit provided at

a forward end of the seat for accommodating the legs of the person,

the seat and/or the backrest having massaging means for massaging an affected part of the person, the leg unit having leg massage means for giving a massage to the legs of the person, the massage machine having control means for controlling the massaging means and the leg massage means,

the machine comprising living body data detecting means electrically connected to the control means for detecting living body data of the person,

the control means being adapted to operate the leg massage means alone without operating the massaging means when the living body data of the person is measured by the living body data detecting means.

[0008] The present invention further provides a chair-type massage machine comprising a seat for the person to be treated to sit in and a backrest provided at a rear end of the seat,

the backrest being provided with massage means comprising an air bag for massaging an affected part of the person and/or a kneading ball movable upward and downward along the spine, the massage machine having control means for controlling the massage means,

the machine comprising living body data detecting means electrically connected to the control means for detecting living body data of the person,

the control means being adapted to give a massage only by inflating the air bag or by moving the kneading ball along the spine when the living body data of the person is measured by the living body data detecting means.

[0009] In detecting the living body data when the chair-type massage machine of the present invention is used, the leg massage means only is operated, or a massage is given by inflating the air bag provided in the backrest or by moving the kneading ball in the backrest upward and downward along the spine.

Since these modes of massage are unlikely to tremble or shake the upper half of the user's body, the data detecting portion of the body, such as the finger pulp, remains free of shakes or like influence. This provides living body data with high accuracy.

Further legs are given a massage by the leg massage means during the period of time needed for measuring the living body data, so that the user is unlikely to take this period of time as a waiting time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a perspective view of a chair-type massage machine to which the present invention is applicable; FIG. 2 is a graph showing an example of heartbeat waveform;

FIG. 3 is a control block diagram;

FIG. 4 is a flow chart showing an example of massage course for measuring living body data;

FIG. 5, (a) schematically shows a chair-type massage machine with a backrest inclined rearward greatly, and (b) shows the same, with the backrest inclined rearward to a small extent; and

FIG. 6 is a flow chart showing on-off control of a heater.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] The present invention will be described below in detail with reference to the drawings.

FIG. 1 is a perspective view of a chair-type massage machine 10, to which the present invention is applicable. The massage machine 10 has a seat 12 pivotally movably supported by a base 11 to be placed on the floor for the user to be treated to sit in. A backrest 14 for the back of the user to bear on is supported by the rear end of the seat 12, and a leg unit 16 for accommodating the legs of the user by the front end of the seat 12.

As shown in FIG. 1, the leg unit 16 has recessed portions 17, 17 for inserting the respective legs (the parts below the knees) of the user.

[0012] The seat 12, the backrest 14 and the leg unit 16 can each be inclined with respect to the base 11 by a reclining mechanism (not shown in FIG. 1). The reclining mechanism can be composed of a plurality of actuators or the like for causing the seat 12, backrest 14 and leg unit 16 to incline independently of one another, or a single actuator and a link mechanism in combination therewith for causing the seat 12, backrest 14 and leg unit 16 to incline in cooperation.

[0013] The seat 12 is provided on opposite sides thereof with elbow rests 18, 18 which can be inclined with the seat 12.

[0014] With reference to FIG. 1, the seat 12, backrest 14 and leg unit 16 are provided with seat massage means 20, backrest massage means 22 and leg massage means 24, respectively.

Examples of seat massage means 20 are those of the air bag type, vibration type and roller type.

Examples of the backrest massage means 22 are those of the air bag type, kneading ball type, vibration type and roller type. The massage means of the kneading ball type or roller type can be made movable upward and downward longitudinally of the backrest 14.

[0015] Examples of leg massage means 24 are those of the air bag type, vibration type and roller type. The means of the air bag type is desirable to use in order to reduce vibration or like influence on the upper half of the user's body.

In the case where air bags are used for the leg massage means 24, it is desirable to provide one or a plurality of air bags on each interior side wall of the recessed portion 17 and the bottom wall thereof as seen in FIG. 1 for massaging the calf, ankle and fore part of the foot of the user.

[0016] Living body data detecting means 30 is provided on each of the elbow rests 18, 18 for measuring data as to the living body of the user. The living body data to

be measured by the detecting means 30 is, for example, heartbeats.

Each of the data detecting means 30 for use in measuring heartbeats as living body data can be, for example, a pair of electrodes. The electrodes are provided on the upper wall of front end of the elbow rest 18. The electrodes are so positioned as to come into contact with the forefinger and the middle finger or with the palm of the hand when the user as seated in the seat 12 places his or her arm (the part forward from the elbow) on the elbow rest 18 with the palm facing down.

The data detecting means 30 thus positioned enables the user to come into contact with the data detecting means 30 unconsciously in a natural state without feeling tired during the measurement.

The data detecting means 30 are used for detecting the electric potential of the hands, and the potential difference is measured by a control means 50 whereby the heartbeats of the user can be measured.

[0017] FIG. 2 shows an example of heartbeat waveform detected by the data detecting means 30. With reference to the drawing, the intervals (CVRR) between projections (R-waves) of the heartbeat waveform are detected to measure fluctuations of heartbeats of the user. The R-R interval (CVRR) is detected by a fluctuation detecting circuit 32 (see FIG. 3) electrically connected to the data detecting means 30 via the control circuit 50.

The smaller the interval (CVRR) detected by the fluctuation detecting circuit 32, the higher the degree of vigilance of the user, this indicating stress imposed on the user. The greater the interval (CVRR), the less the stress placed on the user, and this indicates that the user is relaxed.

[0018] In the case where the body temperature of the user is to be measured or detected as living body data, a temperature sensor is usable as the data detecting means 30. When measuring or detecting the pulse, a photosensor is used as the data detecting means 30.

[0019] With reference to FIG. 1, the chair-type massage machine is operated by a controller 40 provided on one of the elbow rests 18.

The controller 40 has a power supply switch, and a plurality of manual buttons for selecting massage courses, massage points, intensity of massage, etc. The controller 40 further has a display for showing massage data such as the selected massage course, the operating state, position and strength of the massage means 20, 22, 24, the time elapsed and the living body data detected by the means 30.

[0020] For an improved massage effect, heaters 60 (to be described after) can be provided on the seat 12, backrest 14 and/or leg unit 16 at suitable portions so as to massage the affected part with heating for warming the affected part.

[0021] FIG. 3 is a block diagram of a control system of the chair-type massage machine 10 of the present invention. The control means 50 is used in any of the modes of control of the massage machine 10. The control means

50 comprises a microprocessor or the like and has memories (not shown) for storing various control programs, massage programs, etc.

[0022] As shown in FIG. 3, electrically connected to the control means 50 are the controller 40, living body data detecting means 30, fluctuation detecting circuit 32, massage means 20, 22, 24, reclining mechanism 28 and heaters 60. These means operate according to operating commands from the controller 40 and programs stored in advance in the control means 50.

[0023] In the case where the seat massage means 20, backrest massage means 22 and leg massage means 24 are driven by a motor (e.g., roller type or kneading ball type), these means are connected to the control means 50 via a motor drive circuit. Alternatively when the massage means is of the air bag type, an air pump and a valve are electrically connected to the control means 50 for controlling the inflation and contraction of the air bag.

[0024] Further when the reclining mechanism 28 is driven by a motor, the mechanism is connected to the control means 50 by way of a motor drive circuit. Based on commands from the control means 50, the reclining mechanism 28 inclines the seat 12, backrest 14 and leg unit 16 to a desired angle.

[0025] The heaters 60 are on-off controlled by the manipulation of the controller 40 by the user or according to the massage course program.

[0026] The massage course including the detection of living body data and to be given by the chair-type massage machine 10 of the foregoing construction will be described below with reference to the flow chart of FIG. 4. In order to hold pulps of the fingers or the palm of the user in satisfactory contact with the data detecting means 30 when living body data is to be detected, the chair-type massage machine of the present invention is adapted to give the user a massage that is designed to reduce the trembling, shaking or movement of the upper half of the user's body to the greatest possible extent.

As the massage to be given by the present embodiment for diminishing the movement of the upper half of the body, described below is an example of massage to be applied to the legs by the leg massage means 24 during the detection of living body data.

With the present embodiment, heartbeats are taken as an example of living body data, and heartbeats are measured in the beginning and at the end of the massage course, whereas the living body data is not limited to heartbeats. The measuring timing is not limited to the following example either.

[0027] First, the user is seated in the seat 12, turns on the power supply of the massage machine 10 by manipulating the controller 40 (step 1) and pushes a manual button for the desired one of massage courses including the measurement of living body data (step 2). The user then places his or her hands on the respective elbow rests 18, 18. When the hands are placed on the elbow rests 18, 18, the pulp of the finger or palm of the user

spontaneously comes into contact with each data detecting means 30.

[0028] The massage course is started (steps 3, 4) when the control means 50 detects the contact of finger pulps or the palm with the detecting means 30.

The massage course is started first with the detection of living body data (heartbeats) by the data detecting means 30 and with the massage of the user's legs by the leg massage means 24 (step 4). Since the legs only of the user are massaged in this step during the detection of the living body data, the upper half of the user's body remains free of shaking or movement, so that each arm is held stabilized to hold the detecting means 30 in satisfactory contact with the user's finger pulps or palm for the accurate detection of living body data.

[0029] The potential detected by the data detecting means 30 is sent to the control means 50 to detect heartbeats from the potential difference, and the fluctuation detecting circuit 32 detects R-R interval (CVRR). The heartbeats and interval (CVRR) obtained are stored in the memory and are shown on the display of the controller 40 in the form of numerical values and/or a graph (step 5).

[0030] After heartbeats of the user are measured by the data detecting means 30 for a predetermined period of time, for example for 30 seconds (step 6), the detection of heartbeats by the data detecting means 30 and the massage of the legs by the leg massage means 24 are discontinued (step 7), and the seat massage means 20, backrest massage means 22 and leg massage means 23 are operated for massaging the whole body (step 8). After the whole body is massaged for a period of time set by the massage course (step 9), the seat massage means 20, backrest massage means 22 and leg massage means 24 are brought out of operation (step 10), followed by the detection of living body data again.

[0031] Heartbeats are detected after the whole body massage through the same procedure as followed before the whole body massage described.

Upon the control means 50 detecting the contact of the data detecting means 30 with the finger pulps or palm of the user after the completion of the whole body massage (step 11), the detection of living body data (heartbeats) by the detecting means 30 and the leg massage of the user by the leg massage means 24 are started (step 12). Since the legs only of the user are massaged by this step during the detection of living body data, the upper half of the user's body is prevented from shaking or moving, so that the arms are held stabilized with the data detecting means 30 held in satisfactory contact with the user's finger pulps or palm, whereby the living body data can be detected accurately.

[0032] The potential detected by the data detecting means 30 is sent to the control means 50 to detect heartbeats from the potential difference, and the fluctuation detecting circuit 32 detects R-R intervals (CVRR). The heartbeats and interval (CVRR) obtained are stored in the memory and are shown on the display of the controller 40 in the form of numerical values and/or a graph (step

13).

[0033] After heartbeats of the user are measured by the data detecting means 30 for a predetermined period of time, for example for 30 seconds (step 14), the detection of heartbeats by the data detecting means 30 and the massage of the legs by the leg massage means 24 are discontinued (step 15), whereupon the massage course is completed.

[0034] The heartbeats and the interval (CVRR) measured by steps 3-7 before the whole body massage may be compared with the respective heartbeats and interval (CVRR) after the whole body massage for judging the degree of relaxing of the body by the whole body massage to display the result on the controller 40. This ensures the advantage of enabling the user to realize the degree of relaxing not only through feeling but also visually.

[0035] The leg massage means 24 only is operated according to the foregoing embodiment in order to prevent the upper half of the user's body from trembling or shaking during the detection of living body data, whereas when the backrest massage means 22 to be used is, for example, of the kneading ball type, a massage may be given by the upward and downward movement of a kneading ball which assures the body upper half of reduced shaking during the data detection. It is then desirable to further reduce the shaking of the upper half of the body by moving the kneading ball up and down at a lower speed.

Another example of massage involving diminished shakes of the body upper half can be a slow pressure massage with use of an air bag on the waist or back. This mode of massage may be given during the detection of living body data.

[0036] It is also possible to judge the degree of stress on the body of the user with reference to the living body data obtained before the whole body massage and to vary the intensity, duration or type of massage for massaging the whole body.

Stated more specifically, if the stimulation of the body is excessively great in the event of great stress, an impaired massage effect is likely to result, so that a weak massage is to be given. Conversely in the case of small stress, a strong massage can be given to achieve an enhanced massage effect.

For example, if the backrest massage means 22 is of the kneading ball type, the amount of projection of the kneading ball or the speed of movement can be altered to adjust the intensity of massage.

[0037] Furthermore, the angle of inclination of the seat 12, backrest 14 and leg unit 16 may be altered in accordance with the living body data measured before the whole body massage.

For example as schematically shown in FIG. 5, (a) and (b), a massage can be given to the user in a relaxed lying posture, with the backrest 14 greatly inclined rearward when the stress is great [FIG. 5 (a)]. Conversely in the event of small stress, the backrest 14 may be inclined rearward at a small angle [FIG. 5 (b)].

[0038] With a chair-type massage machine 10 wherein heaters 60 are provided on the seat 12, backrest 14 and/or leg unit 16, the heater 60 may be on-off controlled or made controllable in temperature, in accordance with the degree of stress. For example in the case of great stress, the heater 60 is turned on to massage the affected part with heating to obtain a warming effect and increased massage effect and bring the user to a relaxed state.

[0039] In the case where air bags are used as the massage means 20, 22, 24, it is possible to provide the heater 60 on the surface of the air bag (preferably the surface facing the user), and a solenoid valve between the air bag and an air pump or a pressure sensor in the piping system. With reference to the flow chart of FIG. 6, the heater 60 is turned on (step 4) when the air bag is to be inflated, i.e., when the solenoid valve is open, or upon the pressure sensor detecting a pressure level exceeding a predetermined value (step 1). The heater 60 is turned off (step 3) when the air bag is to be contracted (step 1), i.e., when the solenoid valve is closed or upon the detected value of the pressure sensor becoming lower than a predetermined value. In this way, the heater 60 can be utilized efficiently with savings in energy because the heater 60 is pressed against the user by the inflation of the air bag for efficient warming.

Incidentally, when the temperature of the heater 60 is in excess of a predetermined value (for example, 43 degree C), the heater 60 can be held off (step 2) even when the air bag is to be inflated to prevent overheating.

If the heater 60 is turned on and off repeatedly, this leads to the advantage that the same part will be prevented from being heated by the heater 60 for a long period of time.

[0040] The embodiment described above has living body data detecting means provided on opposite elbow rests, such that the user presses finger pulps or palm on the elbow rest against each of the detecting means for measurement of data. In the case of living body data detecting means which is gripped by the hand for measurement, a massage is given which is less likely to move or shake the body upper half when the living body data is to be detected. Examples of such massages are a massage performed by operating the leg massage means 24 only, a massage to be performed by using means of the roller type (kneading ball type), i.e. by slowly moving a kneading ball upward and downward along the spine, and a pressure massage to be applied to the waist or back with an air bag. These modes of massage achieve an improved measurement accuracy. The detecting means of the type to be gripped with the hand is easy to use since the body is free of restraint.

[0041] Although the foregoing embodiment has two data detecting means provided on opposite sides for measuring heartbeats, only one data detecting means may be provided depending on the living body data to be measured.

[0042] The present invention provides a chair-type massage machine which is useful for accurately meas-

uring living body data, such as heartbeats, of the user to be treated.

Claims

1. A chair-type massage machine comprising a seat for the person to be treated to sit in, a backrest provided at a rear end of the seat and a leg unit provided at a forward end of the seat for accommodating the legs of the person,
the seat and/or the backrest having massaging means for massaging an affected part of the person, the leg unit having leg massage means for giving a massage to the legs of the person, the massage machine having control means for controlling the massaging means and the leg massage means, the massage machine being **characterized in that** the machine comprises living body data detecting means electrically connected to the control means for detecting living body data of the person, the control means being adapted to operate the leg massage means alone without operating the massaging means when the living body data of the person is measured by the living body data detecting means. 25
2. A chair-type massage machine comprising a seat for the person to be treated to sit in and a backrest provided at a rear end of the seat, 30
the backrest being provided with massage means comprising an air bag for massaging an affected part of the person and/or a kneading ball movable upward and downward along the spine, the massage machine having control means for controlling the massage means, 35
the massage machine being **characterized in that** the machine comprises living body data detecting means electrically connected to the control means for detecting living body data of the person, 40
the control means being adapted to give a massage only by inflating the air bag or by moving the kneading ball along the spine when the living body data of the person is measured by the living body data detecting means. 45
3. The chair-type massage machine according to claim 1 or 2 wherein the seat is provided with an elbow rest at each of opposite sides thereof, the elbow rests at opposite sides being each provided with the living body data detecting means for measuring the living body data of the person. 50
4. The chair-type massage machine according to any one of claims 1 to 3 wherein the living body data detecting means measures heartbeats of the person. 55

5. The chair-type massage machine according to claim 3 wherein the living body data detecting means has electrodes provided on the elbow rest for measuring heartbeats of the person by bringing fingers of the person into contact with the electrodes. 5
6. The chair-type massage machine according to claim 4 or 5 wherein the control means is provided with a fluctuation detecting circuit for detecting fluctuations in heartbeats, and the fluctuation detecting circuit detects fluctuations in the heartbeats measured by the means for detecting heartbeats. 10
7. The chair-type massage machine according to claim 1 wherein the leg massage means massages the leg of the person by inflating and contracting an air bag. 15
8. The chair-type massage machine according to claim 1 wherein the seat, the backrest and/or the leg unit can be inclined by a reclining mechanism, and the control means operates the reclining mechanism according to the living body data from the living body data detecting means. 20

FIG. 1

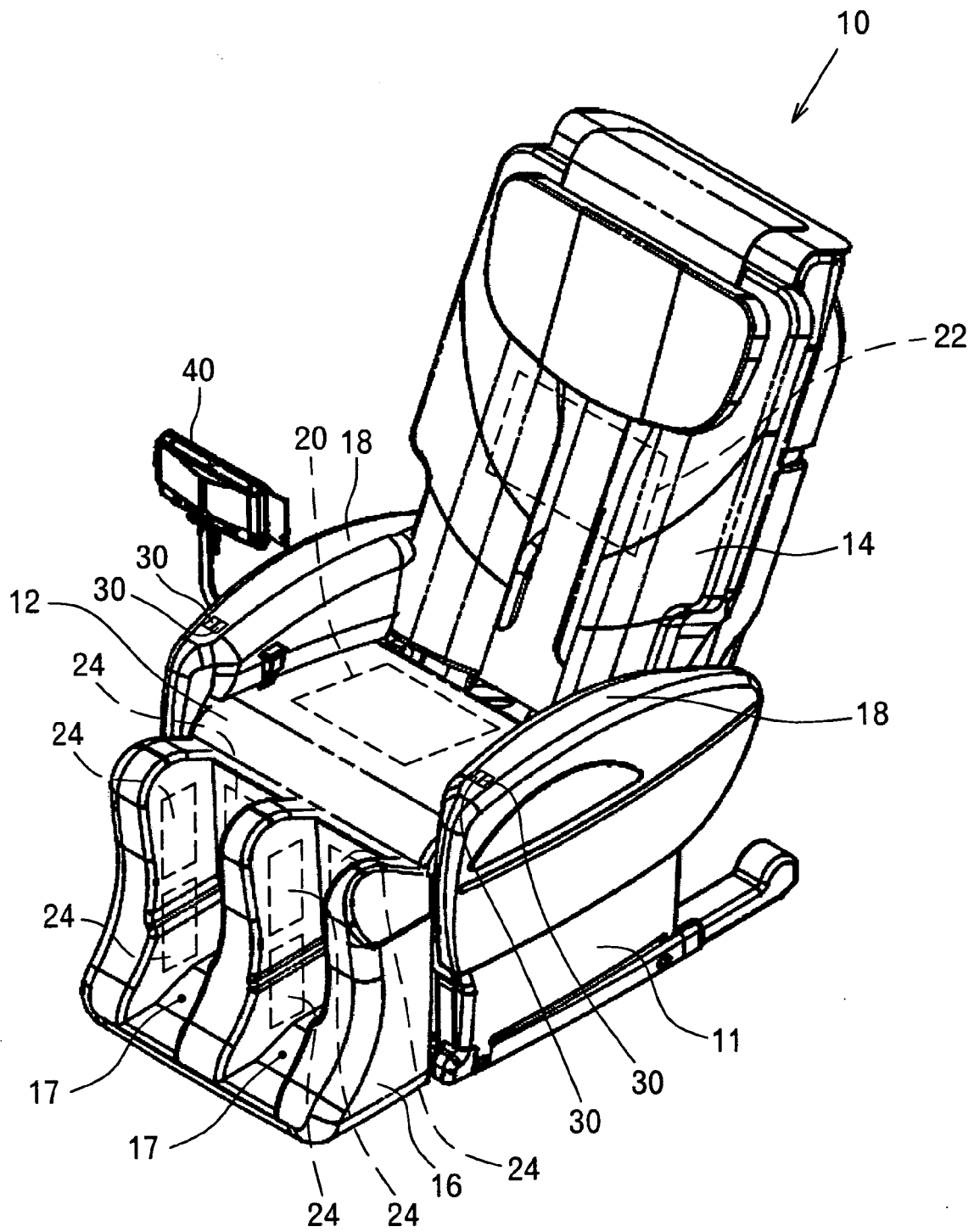


FIG. 2

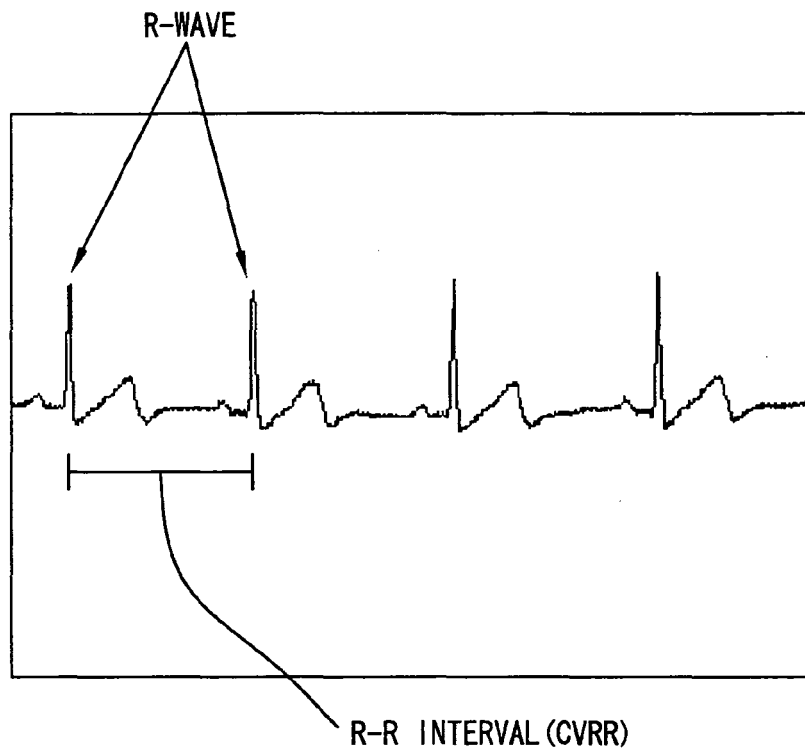


FIG. 3

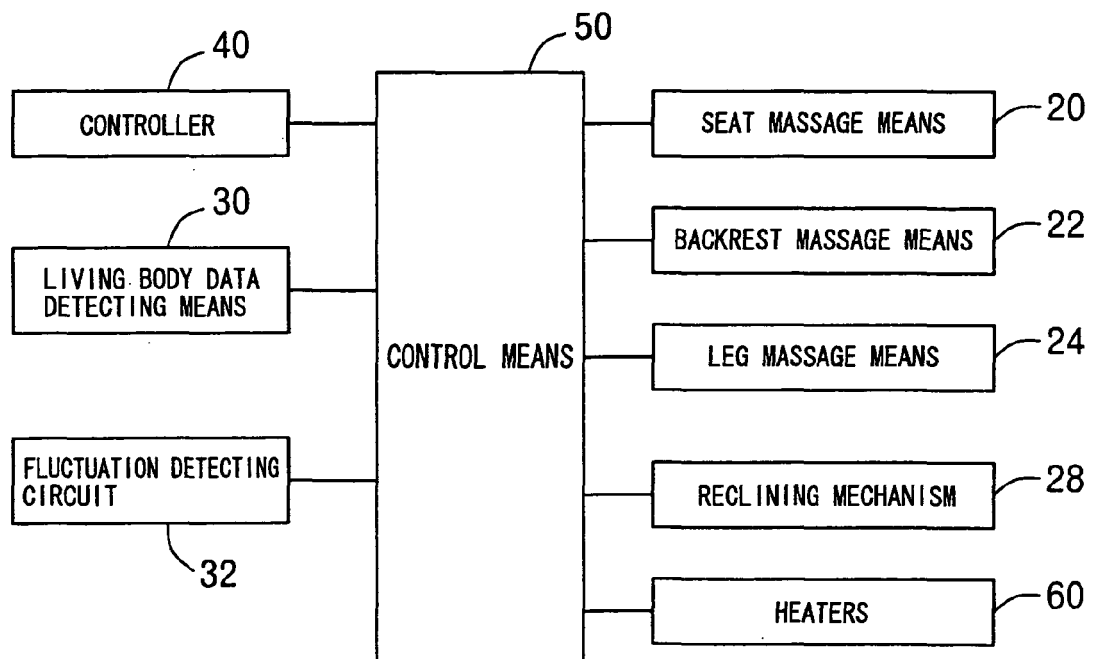


FIG. 4

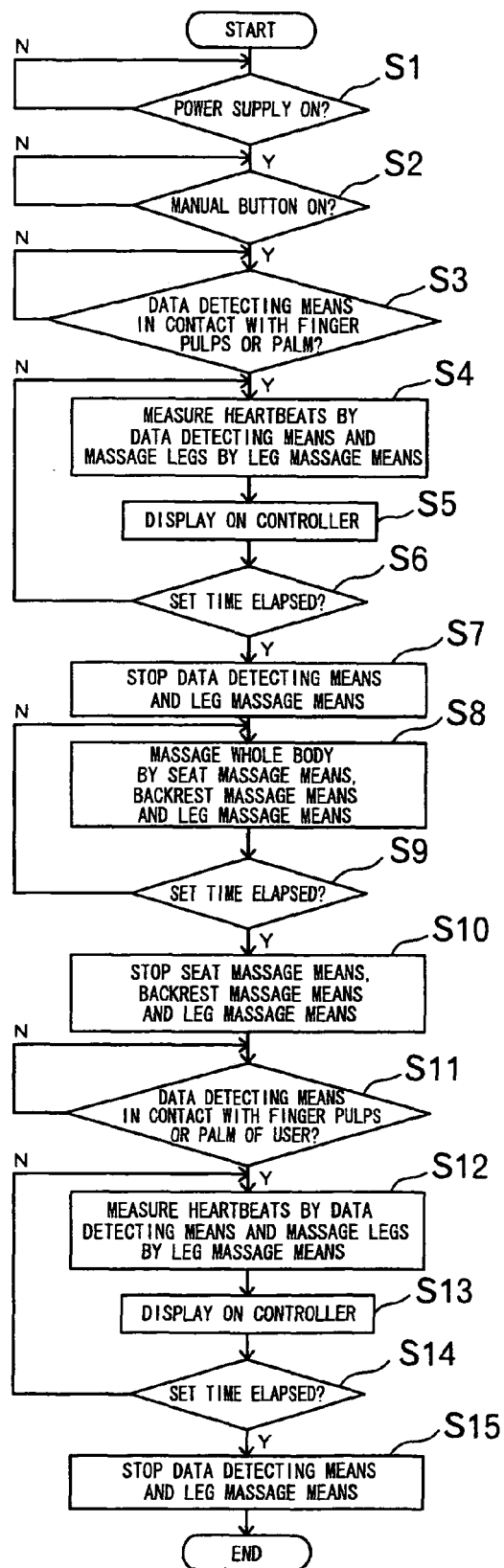


FIG. 5

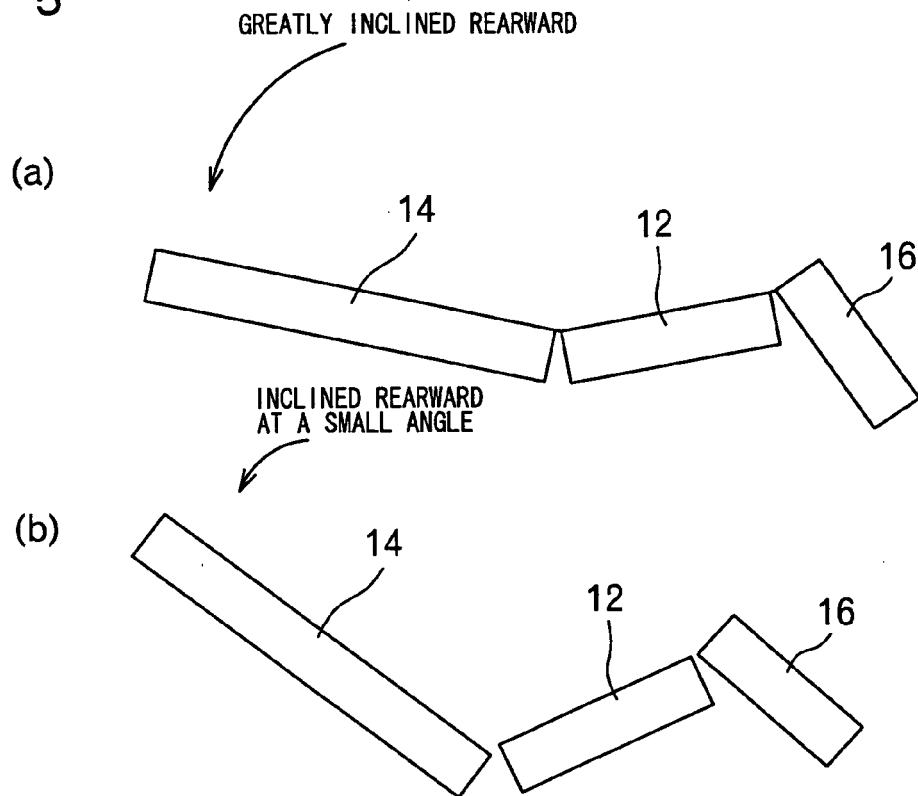
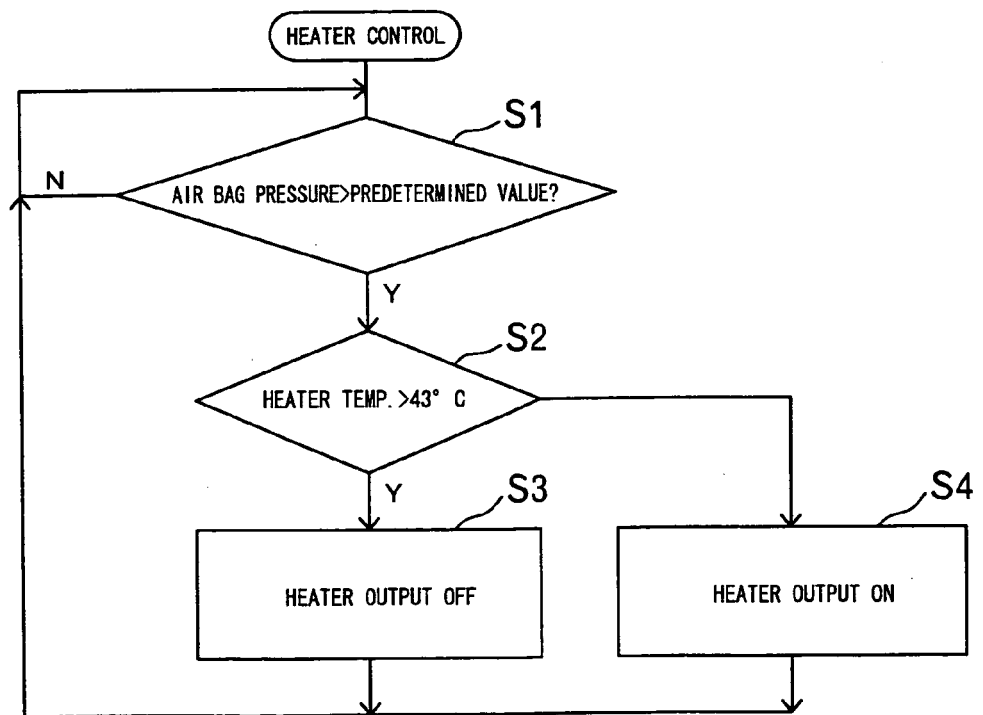


FIG. 6





EUROPEAN SEARCH REPORT

Application Number
EP 09 01 5720

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 February 2010	Examiner Fischer, Elmar
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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 01 5720

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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