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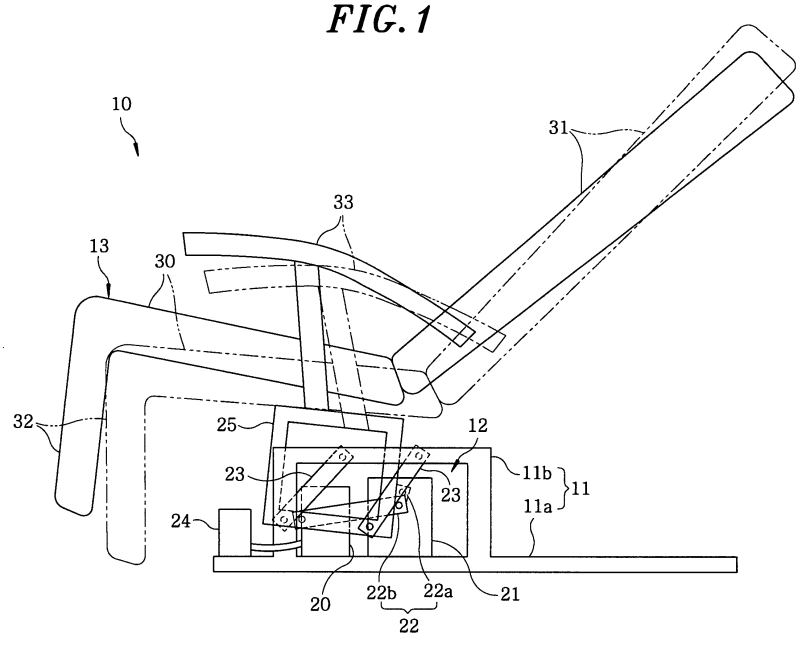
(54) **Relaxation apparatus**

(57) A relaxation apparatus includes a body-supporting unit for supporting a user's body, a rocking unit for rocking the body-supporting unit and a controller for controlling the rocking unit to rock the body-supporting unit. The body-supporting unit includes an airbag which is inflated to press the user's body or contracted in accordance with supply or exhaust of air by an air pump. The controller controls the air pump to increase or decrease its output in accordance with an increase or decrease in at least one of frequency and amplitude of the rocking motion.

FIG. 1



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Description

Field of the Invention

[0001] The present invention relates to an apparatus for providing a user with a relaxing effect.

Background of the Invention

[0002] A conventional relaxation apparatus, which provides a user seating on a chair-shaped body-supporting member with relaxing effect by rocking the user's body, is described in Japanese Patent Laid-open Publication No. 2003-250851 (hereinafter, referred to as the cited reference).

[0003] The relaxation apparatus in the cited reference has a rocking unit (i.e., the relaxation mechanism in the cited reference) which rocks a body-supporting member (i.e., the main body of the seating unit in the cited reference) back and forth and hence provides a user with a relaxing effect by the rocking motion. This relaxation apparatus also has air bags in the left and right portions of the body-supporting member. The air bags, driven by an air pump, inflate and contract alternatively so that it is possible to roll a user to his/her left and right like a hammock or cradle, which can also provide its user with a relaxation effect.

[0004] In the above-mentioned relaxation apparatus, however, the inflation and contraction by the air pump take place independently of the rocking motion of the body-supporting member. Sometimes they give a feeling of insufficient movement due to the mutual cancellation effect of relaxation motions associated with them, resulting in ineffective relaxation effects.

Summary of the Invention

[0005] In view of the above, the present invention provides a relaxation apparatus capable of giving an effective relaxation effect to a user by using the rocking motion of the user's body and the inflation and contraction of air bags.

[0006] In accordance with an aspect of the present invention, there is provided a relaxation apparatus including a body-supporting unit for supporting a user's body, a rocking unit for rocking the body-supporting unit and a controller for controlling the rocking unit to rock the body-supporting unit, **characterized in that**: the body-supporting unit includes an airbag which is inflated to press the user's body or contracted in accordance with supply or exhaust of air by an air pump, and the controller controls the air pump to increase or decrease its output in accordance with an increase or decrease in at least one of frequency and amplitude of the rocking motion.

[0007] During the relaxation rocking, the controller may decrease at least one of the frequency and amplitude of the rocking motion and controls output of the air pump to decrease in accordance with the decreasing frequency and amplitude of the rocking motion.

[0008] The controller may control the rocking unit to impose fluctuations upon at least one of the frequency and amplitude of the rocking motion and the air pump to increase and decrease its output in accordance with the frequency and amplitude upon which the fluctuations are imposed.

[0009] The controller may control the air pump to increase the duration of air supply to the air bag in accordance with a decrease in the frequency of the rocking motion.

[0010] The body-supporting unit may include a seat portion on which a user can sit and a back portion attached to a rear of the seat portion, the back portion being reclinable about the rear of the seat portion, and when the back portion is reclined to a reclined state during the relaxation rocking, the controller may control at least one of a reclining speed and angle of the back portion to change stepwise in accordance with a decrease in at least one of the frequency and amplitude of the rocking motion.

[0011] Here, the term "reclining angle" used herein stands for at least one of the angle that the seat portion makes with the back portion during the reclining and a variation in the angle.

[0012] The controller may control the rocking unit and the air pump to perform, on a user in a relaxed state, a refresh rocking in which at least one of the frequency and amplitude of the rocking motion is increased to refresh the user in the relaxed state and the output of the air pump is increased in accordance with the increase in at least one of the frequency and amplitude of the rocking motion.

[0013] The controller may control the air pump such that its maximum output attained is higher during the refresh rocking than during the relaxation rocking.

[0014] The controller may control the air pump to decrease the duration of air supply to the air bags in accordance with an increase in the frequency of the rocking motion.

[0015] The body-supporting unit may include a seat portion on which a user can sit and a back portion attached to a rear of the seat portion, the back portion being reclinable about the rear of the seat portion, and when the back portion is being raised during the refresh rocking, the controller may control at least one of the rising speed and angle of the back portion to change stepwise in accordance with the increase in at least one of the frequency and amplitude of the rocking motion.

[0016] Here, the term "rising angle" used herein stands for at least one of the angle that the seat portion makes with the back portion when the latter is raised and a variation in the angle.

[0017] The controller may control the amplitude of the rocking motion to increase or decrease in accordance with an increase or decrease in the frequency of the rocking motion.

[0018] The number of the air bag may be two or more,

and the air bags have different capacities, and the controller may control the output of the air pump such that the air bags of different capacities apply a substantially same pressure to the user.

[0019] In accordance with the present invention, the relaxation apparatus gives an effective relaxation effect to a user by using the rocking motion of the user's body and the inflation and contraction of the air bags.

Brief Description of the Drawings

[0020]

Fig. 1 shows a schematic configuration of a relaxation apparatus in accordance with an embodiment of the present invention.

Fig. 2 illustrates a perspective view of a body-supporting member of the relaxation apparatus in Fig. 1.

Fig. 3 depicts a graph for explaining frequency and amplitude of a rocking motion of the body-supporting member.

Fig. 4 illustrates a graph for explaining the relationship between the frequency of the rocking motion and the output of an air pump during a relaxation rocking.

Fig. 5 sets forth a graph for explaining the relationship between the frequency of the rocking motion and the output of the air pump during a refresh rocking.

Figs. 6A and 6B are graphs showing the relationship between the frequency of the rocking motion and the output of the air pump in a modified embodiment of the present invention.

Fig. 7 is a graph showing the relationship between the frequency of the rocking motion, the capacities of the air bags and the output of the air pump in another modified embodiment of the present invention.

Detailed Description of the Embodiments

[0021] Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0022] Fig. 1 shows a schematic configuration of a relaxation apparatus in accordance with an embodiment of the present invention. The relaxation apparatus 10 includes a base 11 having a bottom portion 11a placed on a floor (not shown), a rocking mechanism 12 as a rocking unit provided to the base 11 and a body-supporting member 13 as a body-supporting unit driven by the rocking mechanism 12.

[0023] The rocking mechanism 12 has a motor 20, a reduction gear 21, a crank mechanism 22 and a plurality of, e.g., two, link members 23. The motor 20 is provided on the bottom portion 11a of the base 11. The operation of the motor 20 is controlled by a controller 24 provided on the bottom portion 11a of the base 11. The reduction gear 21 is provided on the bottom portion 11a of the base 11. The reduction gear 21 is operationally coupled with the motor 20 and serves to reduce the power of the motor 20.

[0024] The crank mechanism 22 has two connecting rods 22a and 22b, and converts the rotating motion of the reduction gear 21 into a large circular motion. The base end of the connecting rod 22a is connected to and rotates with an output shaft of the reduction gear 21, while its leading end is ratatably connected to the base end of the connecting rod 22b. The leading end of the connecting rod 22b is connected to the lower portion of a rectangular frame 25 to which the body-supporting member 13 is fixed.

[0025] The base 11 also has a support frame 11b protruded upward from the bottom portion 11a. The base ends of the linkages 23 are rotatably connected to the upper portion of the support frame 11b at an interval, while their leading ends 22b are rotatably connected to the lower portion of the rectangular frame 25. The linkages 23 rotate around their base ends and, therefore, the body-supporting member 13, fixed to the rectangular frame 25, can be rocked back and forth by the power delivered from the crank mechanism 22, like a rocking chair. In the present embodiment of the invention, the movement path of the body-supporting member 13 from the rear to the front is referred to as a forward path and that from the front to the rear is referred to as a backward path.

[0026] The body-supporting member 13 of a chair shape includes a seat portion 30 which is fixed to an upper portion of the rectangular frame 25 so that they can move together, a back portion attached to the rear side of the seat portion 30 so that it can recline about the rear of the seat portion 30, an ottoman fixed at the front side of the seat portion 30 and two arm rests 33 fixed at both sides of the seat portion 30.

[0027] The back portion 31 can be reclined suitably by a reclining mechanism 34, which is controlled by the controller 24 as shown in Fig. 2.

[0028] In the upper part of the back portion 31, a pair of air bags 40 and 41 is provided corresponding respectively to the left and right shoulders of a user. In the middle of the back portion 31, three air bags 42, 43 and 44 are arranged vertically corresponding to the back of a user. In the lower part of the back portion 31, two air bags 45 and 46 corresponding respectively to the left and right sides of the waist of a user. Two air bags 47 and 48 are provided at the left and right sides in the seat portion 30 corresponding to the hip and thigh of a user. The air bags 40 to 48 provided corresponding to respective body parts of a user, are installed to be activated by an air pump 49 provided under the seat portion 30 via connecting hoses (not shown). The operation of the air pump 49 is controlled by the controller 24 so that the air bags 40 to 48 can be inflated and contracted.

[0029] Hereinafter, the operation of the relaxation apparatus 10 configured as described above will be described with reference to Figs. 1 to 5.

[0030] In the controller 24, several modes are provided including a single mode in which a relaxation rocking of the body-supporting member 13 is carried out by driving the rocking mechanism 12 and a combination mode in which the relaxation rocking is carried out in combination with operation of the respective air bags 40 to 48 and reclining of the back portion 31. Among them, in a relaxation-rocking mode having a refresh effect, a "relaxation rocking" is initiated to give a relaxation effect to a user for a predetermined period of time, after which the operation mode is switched from the "relaxation rocking" to "refresh rocking" until the operation mode ends. Fig. 3 shows the variations of amplitude and frequency with time of the motion of the body-supporting member 13 driven by the rocking mechanism 12 in the relaxation-rocking mode.

(Relaxation rocking)

[0031] At first, the controller 24 controls the reclining mechanism 34 to recline the back portion 31 by a specified angle (for example, $\Delta\theta = 30°$) from a normal state (for example, at $\theta = 120°$) to a reclined state (for example, at $\theta = 150°$), where θ denotes the angle the back portion 31 makes with the seat portion 30. During the reclining, the speed at which the back portion 31 is reclined is controlled to have a gradual decrease.

[0032] In order to lead a user to be from an awakened state to a relaxed state, the controller 24 controls the motor 20 to decrease the frequency of rocking of the body-supporting member 13 gradually, for example, from its initial value 0.35 Hz to the final 0.2 Hz in a piecewise manner by a decrement of 0.05 Hz until a predetermined time denoted by A in Fig. 3. At the same time, the motor 20 is controlled to introduce fluctuations to the amplitude of the rocking motion.

[0033] The controller 24 drives the air pump 49 until the predetermined time A to inflate and contract the air bags 45 and 46 for the waist, for example. At the same time, the controller 24 controls the output of the air pump 49 to decrease in accordance with a decrease in frequency of the rocking motion; for example, an air pump is controlled to operate at duty ratios (output) of 100%, 90% and 80%, at frequencies of 0.35 Hz, 0.3 Hz and 0.25 Hz, respectively, as illustrated in Fig. 4.

[0034] Until a predetermined time B after the time A has lapsed, the controller 24 controls the motor 20 to generate fluctuations in the amplitude of the body-supporting member 13 at the minimum value of the frequency, 0.2 Hz in the present embodiment, and to continue the rocking motion in order to let the user rest in sleep in the relaxation state. During the time interval between A and B, the controller 24 suspends the operation of the air pump 49 and the air bags 45 and 46 as well.

(Refresh rocking)

[0035] After the lapse of time B, the controller 24 controls the motor 20 to increase the frequency of the rocking motion in a piecewise manner, for example, from 0.2 Hz to 0.3 Hz, 0.4 Hz and 0.6 Hz, in order to induce a user in the sleep (or relaxation) state to an awakened state. At this time, the controller 24 controls the frequency change timings, for example, such that the frequency changes every ten round trips the rocking motion of the body-supporting member 13 makes. Further, the controller 24 controls the motor 20 such that the amplitude increases stepwise in synchronization with the frequency change timings.

[0036] During a refresh rocking, the controller 24 drives the air pump 49 at rest to inflate and contract the air bags 45 and 46 for the waist, for example. At this time, the controller 24 controls the output of the air pump 49 to increase in accordance with an increase in frequency of the rocking motion; for example, an air pump is controlled to operate at duty ratios (output) of 80%, 90% and 100%, at frequencies of 0.25 Hz, 0.3 Hz and 0.35 Hz, respectively, as illustrated in Fig. 5.

[0037] After the afore-mentioned operation of the air bags is completed, the controller 24 controls the air pump 49 to supply air to the air bags 42 to 44 to lift the back of a user, leading to stretching his/her back. Further, the controller 24 controls the reclining mechanism 34 to raise the back portion 31 by a specified angle (for example, $\Delta\theta = 30°$) from a reclined state (for example, at $\theta = 150°$) to a normal state (for example, at $\theta = 120°$), where θ denotes the angle the back portion 31 makes with the seat portion 30.

[0038] Next, the characteristic effects of the present embodiments will be described.

(1) The body-supporting member 13 includes the air bags 40 to 48 that inflate to press a user and contract by supply or exhaust of the air with the air pump 49. The controller 24 controls output (duty ratio) of the air pump 49 to increase or decrease in accordance with an increase or decrease of the frequency of the rocking motion. In other words, with the output of the air pump 49 being synchronized with the frequency of the body-supporting member 13 in a relaxation-rocking motion, it becomes possible to synergically drive a relaxation motion to a user's body by combining the inflation or contraction of the air bags 45 and 46 with the rocking motion of the body-supporting member 13, yielding an effective relaxation effect.

(2) The controller 24 controls the output of the air pump 49 to decrease with the decrease in frequency of a relaxation-rocking motion. That is, in a rocking motion with its frequency decreasing, a user can be lead to a relaxation state because stimulations (pressure in unit time) imposed on the user by the air bags 45 and 46 get reduced due to the reduced output of the air pump 49 during the motion.

(3) The controller 24 controls the rocking mechanism 12 to carry out the refresh rocking that increases the frequency of the rocking motion after the relaxation rocking, thereby refreshing a user in a relaxation state. In addition, the controller 24 controls the output of the air pump 49 to increase with the increase in frequency of a refresh-rocking motion. Accordingly, in a rocking motion with its frequency increasing, a user can be lead to an awakened state from a relaxation state because stimulations (pressure in unit time) imposed on the user by the air bags 45 and 46 get increased due to the increased output of the air pump 49 during the motion.

[0039] The embodiments of the present invention may be modified as described below.

[0040] Although the relaxation rocking is followed by a refresh rocking in the aforementioned embodiment, the relaxation rocking may be carried out alone without the refresh rocking.

[0041] In the embodiment described above, although, during the relaxation-rocking motion and the refresh-rocking motion, the duty ratio (output) of the air pump 49 remains constant in a time interval the frequency of a rocking motion is held constant, the present invention is not limited to the above.

[0042] For example, the controller 24 (see Fig. 2) may control an air pump 49 such that, during a relaxation rocking, it attains duty ratios (output) of 90%, 80% and 70% at frequencies of 0.35 Hz, 0.3 Hz and 0.25 Hz, respectively, as illustrated in Fig. 6A, and, during a refresh rocking, it attains duty ratios (output) of 80%, 90% and 100% at frequencies of 0.25 Hz, 0.3 Hz and 0.4 Hz, respectively, as illustrated in Fig. 6B. With such configuration, the air pump 49 is controlled such that its maximum output attained is higher during the refresh rocking (100%) than during the relaxation rocking (90%). Accordingly, the rate of inflation of the air bags 40 to 48 is increased and the pressure in unit time imposed on a user becomes higher during the refresh rocking than during the relaxation rocking, which can effectively lead the user in a relaxation state to a state of being awakened.

[0043] In the embodiment described above, although, during the relaxation-rocking (between the start and the predetermined time A in Fig. 3) and the refresh-rocking (after the predetermined time B in Fig. 3), the duty ratio (output) of the air pump 49 remains constant while the frequency of the rocking motion is held constant, the present invention is not limited thereto. As shown in Figs. 2 and 7, for example, when the air bags 40 to 48 have different capacities (large, medium and small), the air pump 49 may be controlled to operate at duty ratios (output) of 100%, 97% and 95%, respectively, for the large, medium and small air bags, during the rocking motion of a constant frequency (e.g., 0.35 Hz), imposing almost identical pressure in unit time on the user. With such configuration, since an almost identical pressure in unit time can be imposed on a user during a relaxation rocking even with air bags of different capacities, it becomes possible to give an effective relaxation effect even when the air bags 40 to 48 are switched as desired. During a refresh rocking, an almost identical pressure in unit time can also be imposed on a user, and hence it becomes possible to give an effective refresh effect even when the air bags 40 to 48 are switched as desired.

[0044] In the embodiment described above, although fluctuations are imposed on the amplitude of a rocking motion, the present invention is not limited thereto. For example, fluctuations may be imposed on the frequency of the rocking motion, instead, or on both the amplitude and frequency of the rocking motion.

[0045] In addition, the output of the air pump 49 may be controlled to increase or decrease in accordance with the frequency and amplitude of a rocking motion on which fluctuations are imposed. In other words, the relaxation effect can be increased by imposing fluctuations on at least one of the frequency and amplitude of a rocking motion, and by changing (increasing or decreasing) the output of the air pump 49 in synchronization with the change in the fluctuations, so that a user can have an increased feeling of a relaxation motion, yielding a more effective relaxation effect.

[0046] Even though it is not mentioned explicitly in the embodiment described above, during a relaxation rocking, the air pump 49 (see Fig. 2) may be controlled to increase the duration of air supply to the air bags 45 and 46 in accordance with a decrease in the frequency of the rocking motion as illustrated in Fig. 6A. In other words, since the duration of a rocking motion of the body-supporting member 13 increases with the decrease in the frequency of the rocking motion and also does the duration of air supply to air bags 45 and 46, stimulations get a sufficient interval of application. In particular, in the aforementioned embodiment where the output of the air pump 49 is decreasing, an effective relaxation effect can be obtained since the inflation rate of the air bags 45 and 46 is suppressed even if the duration of air supply to the air bags 45 and 46 is increased.

[0047] Even though it is not mentioned explicitly in the embodiment described above, during a refresh rocking, the air pump 49 (see Fig. 2) may be controlled to decrease the duration of air supply to the air bags 45 and 46 in accordance with an increase in the frequency of the rocking motion as illustrated in Fig. 6B. In other words, since the duration of a rocking motion of the body-supporting member 13 decreases with the increase in the frequency of the rocking motion and also does the duration of air supply to air bags 45 and 46, stimulations are applied in a relatively short interval of time. In particular, in the aforementioned embodiment where the output of the air pump 49 is increasing, an effective refresh effect can be obtained since the inflation rate of the air bags 45 and 46 is increased even if the duration of air supply to the air bags 45 and 46 is decreased.

[0048] Even though it is not mentioned explicitly in the embodiment described above, during a refresh rocking,

it may be configured to increase the amplitude of the rocking motion in accordance with an increase in the frequency of the rocking motion. With such configuration, the increasing timings of the frequency and amplitude of the rocking motion and the output of the air pump get synchronized with each other so that an effective refresh effect can be obtained with an increased feeling of motion. During a relaxation-rocking motion, as well, an effective relaxation effect can be obtained with an increased feeling of motion by configuring such that the amplitude of the rocking motion decreases with a decrease in the frequency of the rocking motion.

[0049] In the embodiment described above, even though it is not mentioned explicitly, when the back portion 31 is reclined during the relaxation-rocking motion (between the start and the predetermined time A in Fig. 3) for example, it may be configured such that at least one of the reclining speed and angle of the back portion is controlled to change stepwise in accordance with a decrease in at least one of the frequency and amplitude of the rocking motion, where the angle of reclining, denoted by θ, is defined as the angle the back portion 31 makes with the seat portion 30. Here, the configuration in which the reclining angle is changed stepwise stands for at least one of a configuration in which the angle of reclining is changed successively (for example, from 120 ° to 150° by 10° at a time) and a configuration in which the variation of the reclining angle is changed stepwise (for example, $\Delta\theta$ = 15°, 10° and 5°). With such configuration, the reclining motion of the back portion 31 gets combined with at least one of the frequency and amplitude of the rocking motion and a user can obtain an improved feeling of relaxation with the increased feeling of motion. In addition, because the bust of the user gets reclined stepwise in concert with a decrease in at least one of the frequency and amplitude of the rocking motion, an abrupt change in the vital signs, such as blood pressure, of the user gets suppressed, so does the physical burden imposed upon the user.

[0050] In the embodiment described above, even though it is not mentioned explicitly, when the back portion 31 is raised during the refresh-rocking motion (after the predetermined time B in Fig. 3) for example, it may be configured such that at least one of the rising speed and angle of the back portion 31 is controlled to change stepwise in accordance with an increase in at least one of the frequency and amplitude of the rocking motion, where the angle, denoted by θ, is defined as the angle the back portion 31 makes with the seat portion 30. Here, the configuration in which the rising angle is changed stepwise stands for at least one of a configuration in which the rising angle is changed successively (for example, from 150° to 120° by 10° at a time) and a configuration in which the variation of the rising angle is changed stepwise (for example, $\Delta\theta$ = 5°, 10° and 15°). With such configuration, the rising motion of the back portion 31 gets comined with at least one of the frequency and amplitude of the rocking motion and a user obtains an improved feeling of refresh with the increased feeling of motion. In addition, because the bust of the user gets raised stepwise in concert with an increase in at least one of the frequency and amplitude of the rocking motion, an abrupt change in the vital signs, such as blood pressure, of the user gets suppressed, so does the physical burden imposed upon the user.

[0051] In the embodiment described above, during the relaxation and refresh-rocking motions, the air bags 45 and 46 are configured to inflate or contract by synchronizing the change in output of the air pump 49 with the change in frequency of the rocking motion. However, the present invention is not limited to the above. For example, at least one of the air bags 40 to 44, 47 and 48 other than the air bags 45 and 46 may be inflated and contracted by the air pump 49.

[0052] In the embodiment described above, during the relaxation rocking, the controller 24 controls the motor 20 to change the frequency of the rocking motion of the body-supporting member 13 (the rectangular frame 25) in a range from 0.35 Hz to 0.2 Hz. However, controller 24 controls the motor 20 to change the frequency of the rocking motion of the body-supporting member 13 in other frequency bands for the relaxation-rocking motion.

[0053] In the embodiment described above, during the refresh rocking, the controller 24 controls the motor 20 to change the frequency of the rocking motion of the body-supporting member 13 (the rectangular frame 25) from 0.2 Hz to 0.35 Hz stepwise. However, other frequency bands for the refresh-rocking motion may be used.

[0054] In the embodiment described above, after the elapse of time B, the controller 24 controls the motor 20 to increase the amplitude and frequency of the rocking motion in synchronization with each other. In a modified configuration, however, such synchronization is not necessary. In addition, either of the amplitude and frequency may be made to increase.

[0055] In the embodiment described above, the controller 24 makes changes in control over the respective parts at times A and B. In a modified configuration, for example, there may be provided a switch capable of changing the control of the respective parts by the controller 24 so that a user can selectively control the respective parts by using the switch as needed.

[0056] In the embodiment described above, although the body-supporting member 13 is configured to rock forward and backward, the present invention is not limited thereto. For example, the body-supporting member 13 may be configured to rock left and right, or in any combined direction of the left, right, forward and backward rocking motions.

[0057] Although the body-supporting member 13 has the shape of a chair in the embodiment described above, it may have other shapes, for example, a bed.

[0058] In the embodiment described above, even though it is not mentioned explicitly, there may be provided a mechanism for generating music or vibration corresponding to the relaxation rocking or refresh rocking.

[0059] While the invention has been shown and described with respect to the embodiments, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

Claims

1. A relaxation apparatus comprising a body-supporting unit for supporting a user's body, a rocking unit for rocking the body-supporting unit and a controller for controlling the rocking unit to rock the body-supporting unit, **characterized in that:**

   the body-supporting unit includes an airbag which is inflated to press the user's body or contracted in accordance with supply or exhaust of air by an air pump, and
   the controller controls the air pump to increase or decrease its output in accordance with an increase or decrease in at least one of frequency and amplitude of the rocking motion.

2. The relaxation apparatus of claim 1, wherein, during the relaxation rocking, the controller decreases at least one of the frequency and amplitude of the rocking motion and controls output of the air pump to decrease in accordance with the decreasing frequency and amplitude of the rocking motion.

3. The relaxation apparatus of claim 1 or 2, wherein the controller controls the rocking unit to impose fluctuations upon at least one of the frequency and amplitude of the rocking motion and the air pump to increase and decrease its output in accordance with the frequency and amplitude upon which the fluctuations are imposed.

4. The relaxation apparatus of any one of claims 1 to 3, wherein the controller controls the air pump to increase the duration of air supply to the air bag in accordance with a decrease in the frequency of the rocking motion.

5. The relaxation apparatus of any one of claims 1 to 4, wherein the body-supporting unit includes a seat portion on which a user can sit and a back portion attached to a rear of the seat portion, the back portion being reclinable about the rear of the seat portion, and
   wherein, when the back portion is reclined to a reclined state during the relaxation rocking, the controller controls at least one of a reclining speed and angle of the back portion to change stepwise in accordance with a decrease in at least one of the frequency and amplitude of the rocking motion.

6. The relaxation apparatus of any one of claims 1 to 4, wherein the controller controls the rocking unit and the air pump to perform, on a user in a relaxed state, a refresh rocking in which at least one of the frequency and amplitude of the rocking motion is increased to refresh the user in the relaxed state and the output of the air pump is increased in accordance with the increase in at least one of the frequency and amplitude of the rocking motion.

7. The relaxation apparatus of claim 6, wherein the controller controls the air pump such that its maximum output attained is higher during the refresh rocking than during the relaxation rocking.

8. The relaxation apparatus of claim 6 or 7, wherein the controller controls the air pump to decrease the duration of air supply to the air bags in accordance with an increase in the frequency of the rocking motion.

9. The relaxation apparatus of any one of claims 6 to 8, wherein the body-supporting unit includes a seat portion on which a user can sit and a back portion attached to a rear of the seat portion, the back portion being reclinable about the rear of the seat portion, and
   wherein, when the back portion is being raised during the refresh rocking, the controller controls at least one of the rising speed and angle of the back portion to change stepwise in accordance with an increase in at least one of the frequency and amplitude of the rocking motion.

10. The relaxation apparatus of any one of claims 1 to 9, wherein the controller controls the amplitude of the rocking motion to increase or decrease in accordance with an increase or decrease in the frequency of the rocking motion.

11. The relaxation apparatus of any one of claims 1 to 10, wherein the number of the air bag is two or more, and the air bags have different capacities, and
    wherein the controller controls the output of the air pump such that the air bags of different capacities apply a substantially same pressure to the user.

FIG. 1

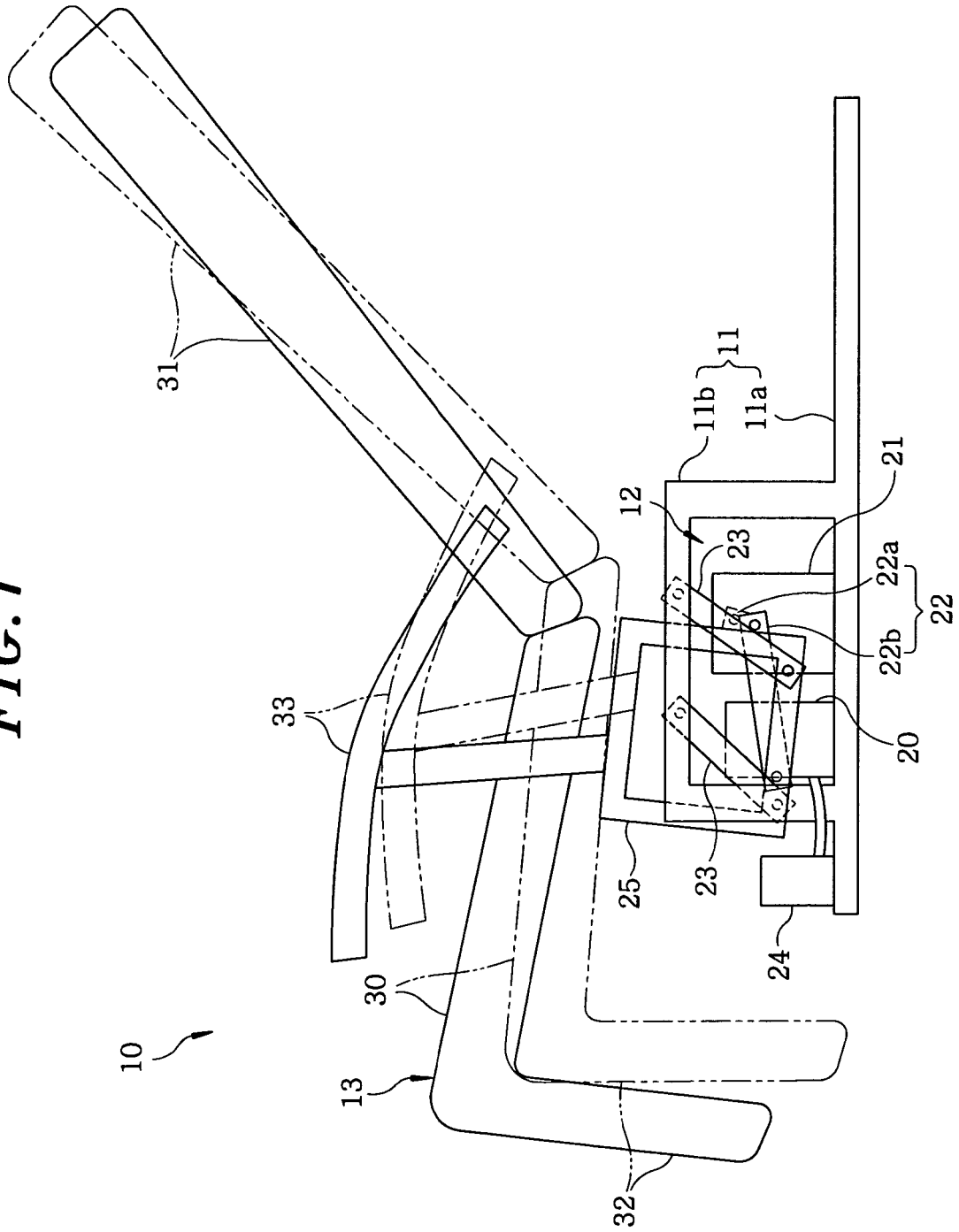


FIG.2

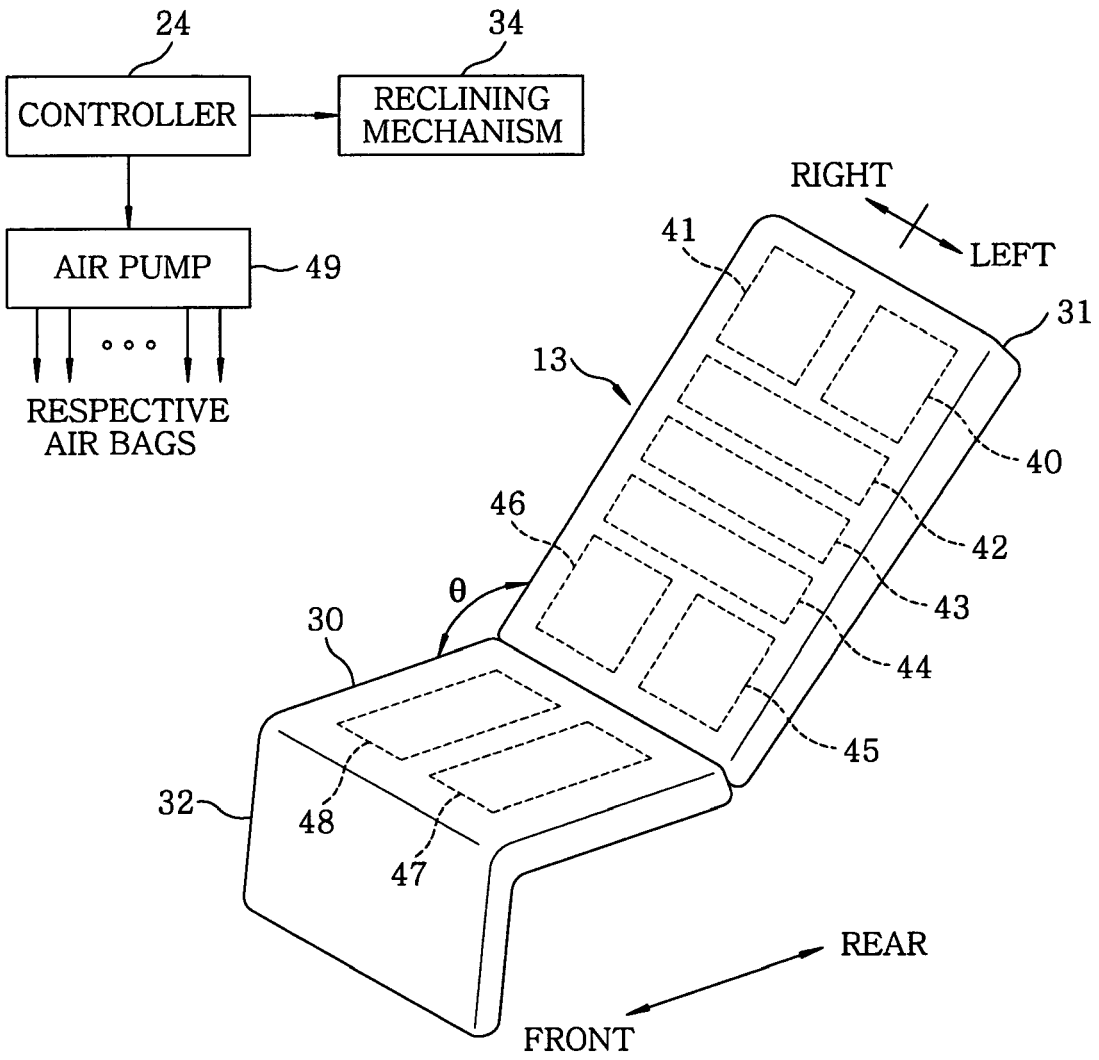

24
34
CONTROLLER
RECLINING MECHANISM
AIR PUMP
49
RESPECTIVE AIR BAGS
RIGHT
LEFT
41
31
13
40
46
42
θ
43
30
44
45
32
48
47
REAR
FRONT

FIG.3

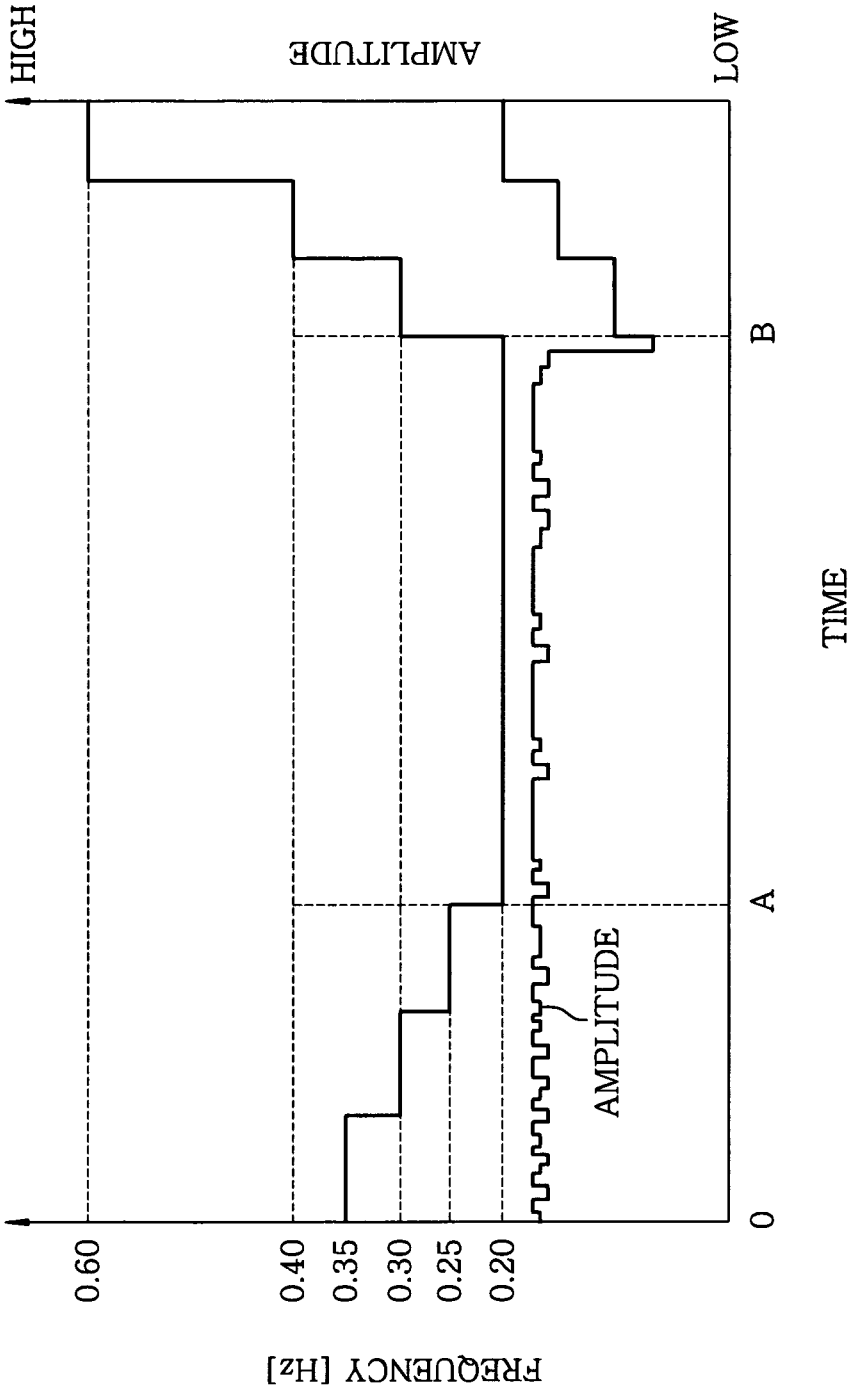

HIGH
AMPLITUDE
LOW
B
A
0
TIME
AMPLITUDE
0.60
0.40
0.35
0.30
0.25
0.20
FREQUENCY [Hz]

FIG. 4

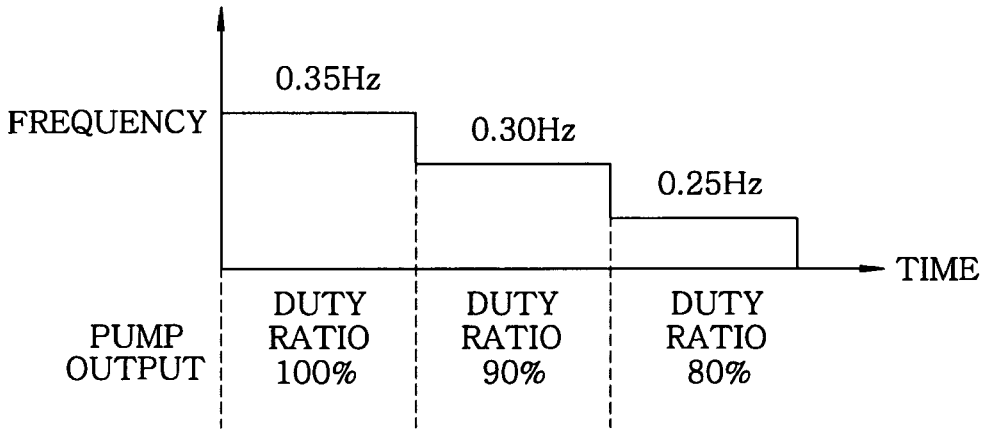

FREQUENCY
0.35Hz
0.30Hz
0.25Hz
TIME
PUMP OUTPUT
DUTY RATIO 100%
DUTY RATIO 90%
DUTY RATIO 80%

FIG. 5

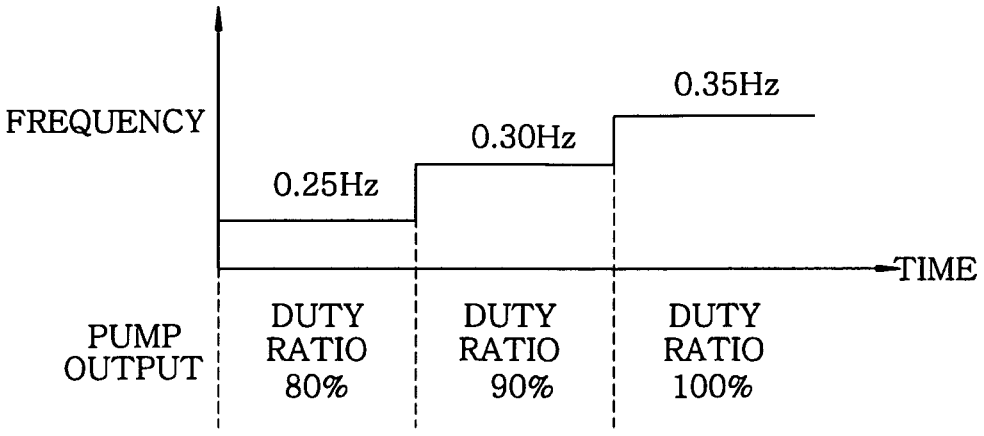

FREQUENCY
0.25Hz
0.30Hz
0.35Hz
TIME
PUMP OUTPUT
DUTY RATIO 80%
DUTY RATIO 90%
DUTY RATIO 100%

FIG. 6A

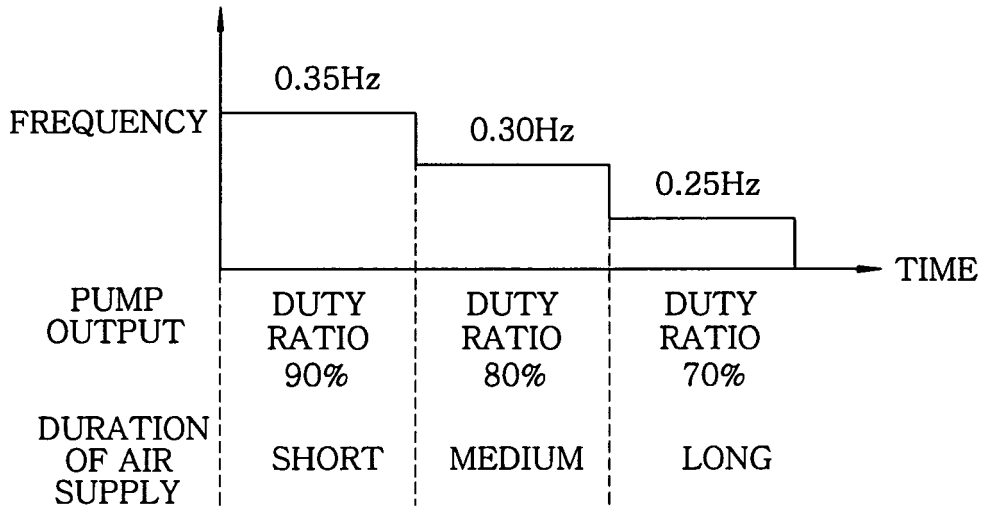

0.35Hz
FREQUENCY
0.30Hz
0.25Hz
TIME
PUMP OUTPUT
DUTY RATIO 90%
DUTY RATIO 80%
DUTY RATIO 70%
DURATION OF AIR SUPPLY
SHORT
MEDIUM
LONG

FIG. 6B

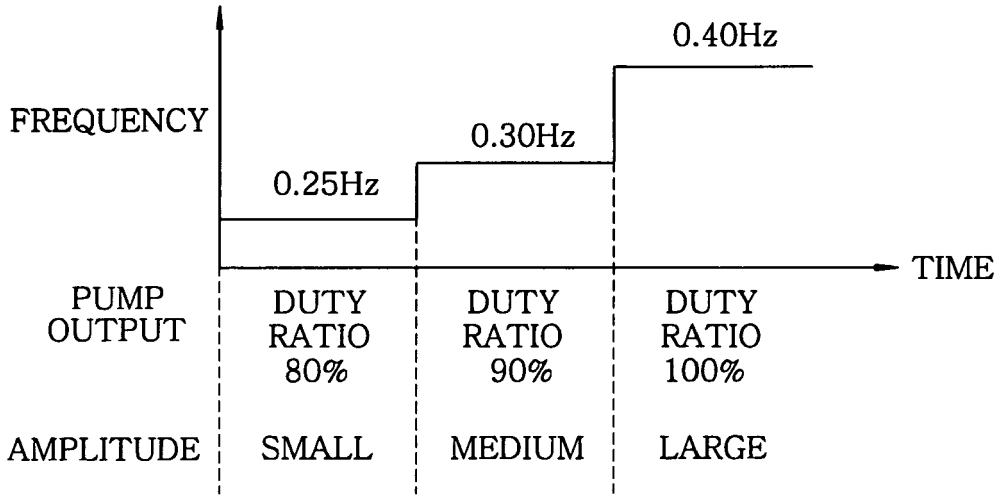
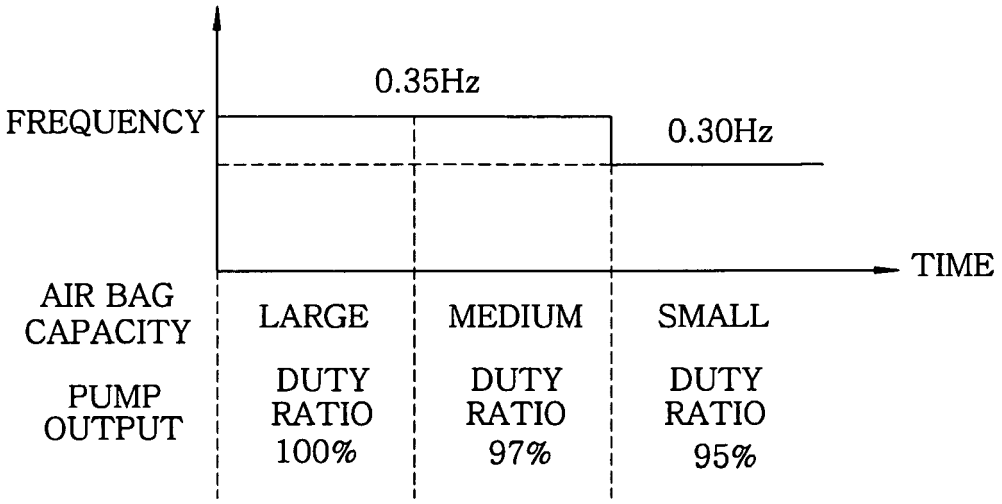

0.40Hz
FREQUENCY
0.30Hz
0.25Hz
TIME
PUMP OUTPUT
DUTY RATIO 80%
DUTY RATIO 90%
DUTY RATIO 100%
AMPLITUDE
SMALL
MEDIUM
LARGE

FIG. 7


0.35Hz
FREQUENCY
0.30Hz
TIME
AIR BAG CAPACITY
LARGE
MEDIUM
SMALL
PUMP OUTPUT
DUTY RATIO 100%
DUTY RATIO 97%
DUTY RATIO 95%

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EUROPEAN SEARCH REPORT

Application Number
EP 09 00 9997

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 October 2009	Teissier, Sara

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