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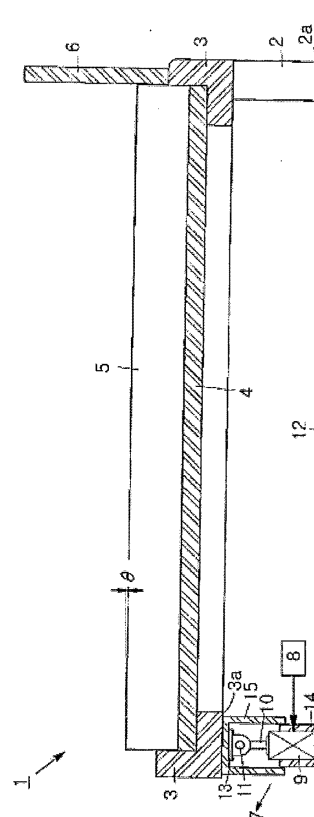
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(54) **FUNCTIONAL BED USING GRAVITY FOR PREVENTING SKIN-AGING, VARIOUS BONE DISEASES, AND VASCULAR DISEASES, AND FOR PROMOTING DEVELOPMENT DURING A GROWTH PERIOD, AND METHOD FOR CONTROLLING SAME**

(57) The present invention relates to a functional bed for improving vascular disease and promoting development during a growth period, and to a method for controlling same. The functional bed of the present invention is useful for the treatment of disorders of the circulatory system, such as varicose veins and hypertension, by minimizing the effects of gravity by enabling the mattress of the bed to be tilted at a predetermined angle for a predetermined amount of time, and can further promote the development of an adolescent during a growth period. The functional bed of the present invention is characterized in that it comprises: a bed including a plurality of legs, a frame installed on the legs, a support plate installed on the frame, and a mattress installed on the support plate; at least one tilting means installed on any one of the legs, frame, and support plate so as to allow the mattress to be tilted at a predetermined angle; and a controller controlling the tilting means according to a rhythm of movement, wherein the rhythm of movement involves a movement time, a movement period, a tilt angle, a tilt time, and a tilt direction, and the tilting means is supported during deep sleep and has a tilt angle -1.0° to 10° .

[Fig. 2]



Description

Technical Field

[0001] The present invention relates to a functional bed, and more particularly to a functional bed and a method of controlling the same, which make mat (a fabric mattress or a stone mattress) to be tilted at a predetermined angle for a desired time so as to minimize an effect of gravity, thereby helping to improve vascular diseases and promote development during a growth period.

Background Art

[0002] In general, gravity of the Earth has various effects on nature. Especially, a human body walking erect is vertically subjected to gravity and has various problems caused by gravity.

[0003] For example, the human body starts aging remarkably after twenty years. As the human body ages, moisture in the skin decreases and an elasticity of the skin is reduced due to aging of an elastic fiber and the like. Also, the skin of the face naturally droops due to gravity and it has an effect of changing a person's appearance. Particularly, drooped cheek flesh, fine wrinkles, crow's feet, nasolabial folds and the like are created so that the elasticity of the skin is deteriorated and a smooth line of a face disappears.

[0004] Further, varicose veins are a representative poor blood circulation. When a venous valve for transferring blood from leg veins to the heart against gravity does not function properly, the leg shows blue veins, veins comes twisted like a bunch of grapes, or the leg becomes swollen. When a person such as a teacher develops varicose veins, he/she is often possessed with an illusion that the varicose veins are caused due to fatigue because of work environment in that he/she stands upright for a long time, thereby making a symptom worse.

[0005] Furthermore, since a bed which is one of instruments for sleeping has a mat (a fabric mattress or a stone mattress) fixed in a horizontal state, it cannot help to prevent or treat aging of the skin and diseases of the circulatory system such as varicose veins and hypertension, which are relatively sensitive to the effect of gravity, during sleep.

Disclosure of Invention

Technical Problem

[0006] As described above, a human being walking upright is generally subjected to pressure on their legs due to gravity so as to cause various problems. Representatively, the human being may develop wrinkled skin, aged skin, diseases related to all kinds of bones and disks, and diseases of the circulatory system which are caused by gravity disturbing a smooth circulation of blood to the heart.

[0007] Therefore, the present invention has been made in view of the above-mentioned problems, and the present invention provides a functional bed and a method of controlling the same, which can help to treat diseases of a circulatory system including varicose veins and operate such that the head of a user is located in a direction of gravity for a basic sleep of 8 hours, and also help growing in the stature of children and teenagers during a growth period.

Solution to Problem

[0008] In accordance with an aspect of the present invention, there is provided a functional bed. The functional bed includes: a frame installed on a plurality of legs; a supporting plate disposed on the frame; a mat disposed on the supporting plate; a tilting means for tilting the mat at a predetermined angle, the tilting means including: an operation unit provided with a ball screw and a nut for adjusting an expansion and contraction of an adjusting rod depending on a forward rotation and a reverse rotation of a motor; the adjusting rod expanding and contracting at a side of the operation unit; and a supporting member connected to the adjusting rod by a pin and installed on one of a bottom surface of the supporting plate and a room floor; and a controller for controlling the tilting means according to a set operation rhythm, wherein a plurality of buffer springs are interposed between the frame and the supporting plate, the operation rhythm of the controller includes an operation time, an operation period, a tilted angle, an inclination time, and a tilted direction, the tilted angle by the tilting means is in a range of -10° to 10° , and the controller stands by until a deep sleep time lapses while controlling the tilting means to adjust an inclination of the bed according to the operation rhythm after the deep sleep time lapses and controls to stop the tilting means within a sleep time after a user has entered a deep sleep state.

[0009] Here, the deep sleep time is about thirty minutes.

[0010] In accordance with another aspect of the present invention, there is provided a method of controlling a functional bed. The method includes: setting an operation rhythm by using a setting unit of a controller; standing-by until an operation starting signal is provided from the controller when the operation rhythm is set; determining whether a deep sleep time lapses, and operating a tilting means capable of adjusting an inclination of the bed according to the set operation rhythm after the deep sleep time set by a user in the operation standing-by step lapses, while standing-by before the deep sleep time lapses; operating the tilting means according to the operation rhythm if it is determined in the deep sleep step time determining that the deep sleep time lapses; stopping the tilting means if a sleep time (sleep time after the deep sleep time lapses) set in the deep sleep time determining step lapses, while continuously operating the tilting means if the set sleep time (sleep time after the

deep sleep time lapses) does not lapse; and stopping the operation of the tilting means if the set sleep time (sleep time after the deep sleep time lapses) lapses.

[0011] The operation rhythm of the controller includes an operation time, an operation period, a tilted angle, an inclination time and a tilted direction, and a tilting angle by the tilting means is in a range of $-10^{\circ}\sim 10^{\circ}$.

[0012] The tilting angle of the mat or the entire bed by the tilting means may be changed according to a height of a user or a sleeper, or a size of the mat. The portion of the mat near the head board of the bed is preferably tilted in a range of an angle of $-10^{\circ}\sim 10^{\circ}$.

[0013] In the functional bed according to the present invention, the mat is maintained in the horizontal state for a time required to enter a deep sleep in which the sleep is not disturbs, for example thirty minutes after a start of sleeping, so that the user has the deep sleep, and the tilting means is controlled according to the set operation rhythm till user's waking after thirty minutes lapse from the entering of the deep sleep.

Advantageous Effects

[0014] The functional bed according to the present invention is controlled to be tilted such that an upper body is located at a position lower than that of a lower body, thereby helping to treat diseases of the circulatory system such as varicose veins. Especially, the functional bed is advantageous in growing the stature of children and teenagers during a growth period.

Brief Description of Drawings

[0015] The foregoing and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a sectional view illustrating a bed in which a tilting means is attached to front legs thereof, according to a first embodiment of the present invention;

FIG. 2 is a view illustrating an operational state of the bed of FIG. 1;

FIG. 3 is a sectional view illustrating a bed in which a tilting means is attached to rear legs thereof, according to a second embodiment of the present invention;

FIG. 4 is a view illustrating an operational state of the bed of FIG. 2;

FIG. 5 is a sectional view illustrating a bed in which a telescopic bellows is mounted on a case of the tilting means, according to a third embodiment of the present invention;

FIG. 6 is a view illustrating an operational state of the bed of FIG. 5;

FIG. 7 is a sectional view illustrating a bed in which

a support plate for a mat is tilted, according to a fourth embodiment of the present invention;

FIG. 8 is a view illustrating an operational state of the bed of FIG. 7;

FIG. 9 is a sectional view illustrating a bed in which a support plate for a mat is tilted, according to a fifth embodiment of the present invention;

FIG. 10 is a view illustrating an operational state of the bed of FIG. 9;

FIG. 11 is a view illustrating a bed having tilting means mounted on both sides of a frame thereof so as to tilt a support plate for a mat, according to a sixth embodiment of the present invention;

FIG. 12 is a view illustrating an operational state of the bed of FIG. 11;

FIG. 13 is a block diagram illustrating a controller according to the embodiment of the present invention; and

FIG. 14 is a flowchart illustrating a process of controlling the bed according to the embodiment of the present invention.

[Description of Reference Numerals]

[0016]

1: functional bed	2: leg
2a: rounded cut portion	3: frame
3a: bottom surface of frame	4: support plate
5: mat (mattress)	6: head board
7: tilting means	8: controller
9: operating unit	10: adjusting rod
11: pin	12: floor
13: supporting member	14, 15: case
16: buffer spring	17: hinge
18: coupling member	19: bellows
20: telescopic case	C: control unit
D: display unit	S: setting unit

Best Mode

Mode for the Invention

[0017] Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. In the description of the embodiments of the present invention, the same reference numerals denote the same structural elements in the drawings, and the detailed descriptions of related known structures or functions will be omitted to avoid obscuring the subject matter of the present invention.

[0018] In a functional bed of the present invention, a mat (fabric mattress or stone mattress) is tilted at a predetermined angle for a desired time, so as to minimize gravity acting on a human body during sleep, thereby helping to prevent a skin on a face from being drooped

and aged, and to prevent and treat diseases of circulatory system such as varicose veins and hypertension.

[0019] In the above description, the phrase "minimize gravity" means that a user lies in the bed tilted at a predetermined angle so that the head of the user is located lower than other portions of the body and the skin drooped when the user stands upright is moved to the head by an action of gravity to reduce or prevent drooping of the skin and generation of wrinkles.

[0020] The functional bed 1 according to the embodiment of the present invention includes a plurality of legs 2, a frame 3 coupled to the legs 2, a supporting plate 4 disposed in or on the frame 3, a mat 5 arranged on the supporting plate 4, and a head board 6 extending upwardly from a side of the frame 3, like a general bed. The functional bed 1 further includes a tilting means 7 installed at a side of the supporting plate 4 or a leg 2 which supports the mat 5. The bed 1 or the mat 5 may be tilted at the predetermined angle by means of the tilting means 7. The tilting means 7 has an operation rhythm (operation pattern) set by means of a controller 8.

[0021] The operation rhythm (operation pattern) includes an operation time (sleep time), an operation period, a tilting angle, a tilting time, and a tilting direction.

[0022] Referring to FIGS. 1 to 4, the tilting means 7 instead of the leg 2 is installed at a position corresponding to the leg 2 of the bed 1, and enables the bed to be tilted according to the operation rhythm which is previously set by the controller 8.

[0023] That is, in the case that two legs 2 are installed as a pair at a front portion and other two legs 2 are installed as a pair at a rear portion, with respect to the head board 6 of the bed 1, the tilting means 7 are fixed to the two legs 2 of the rear portion respectively, and function as the legs while moving upward and downward according to the operation rhythm so as to adjust a height of the rear portion of the bed, as shown in FIG. 1.

[0024] To the contrary, as shown in FIGS. 3 and 4, the tilting means 7 are installed at the two legs 2 of the front portion of the bed respectively, and function as the legs so as to adjust a height of the front portion of the bed according to the operation rhythm.

[0025] The tilting means 7 includes an operation unit 9 such as a hydraulic cylinder, a pneumatic cylinder, or a motor, an adjusting rod 10 expanded or contracted upward or downward from a side of the operation unit 9 by means of the operation unit 9 so as to adjust a length thereof, and a supporting member 13 coupled to an end of the adjusting rod 10 by means of a pin 11, and attached to a bottom surface 4a of the mat supporting plate 4 or a bottom surface 3a of the bed frame 3, or supported by a room floor 12.

[0026] The tilting means 7 and the supporting plate 13 are received and protected in the cases 14 and 15, respectively. The case 14 for the operation unit, which has a small size, freely enters and exits the case 15 for the supporting member 13 with a large size. The cases 14 and 15 prevent parts constituting the tilting means 7 from

being exposed to the outside, thereby preventing poor appearance, an introduction of alien substances therein, and a malfunction or a trouble thereof.

[0027] The case 14 which receives the operation unit 9 therein is supported on the room floor 12 as shown in FIGS. 1 and 2, or fixed to the bottom surface 3a of the bed frame 3 as shown in FIGS. 3 and 4 or the bottom surface 4a of the supporting plate 4 as shown in FIGS. 7 and 8 by means of a coupling member such as screws, bolts and the like. Thereby, it is possible to prevent the tilting means 14 from deviating from their positions. Similarly, the case 15 which receives the supporting member 13 therein is supported on the room floor 12 as shown in FIGS. 3 and 4, or fixed to the bottom surface 3a of the bed frame 3 as shown in FIGS. 1 and 2 or the bottom surface 4a of the supporting plate 4 as shown in FIGS. 7 and 8 by means of a coupling member such as screws, bolts and the like. Thereby, it is possible to prevent the tilting means 14 from deviating from their positions.

[0028] The operation unit 9 may be constituted of the hydraulic cylinder, the pneumatic cylinder, or the motor, as described above. In the case that the operation unit 9 is constituted of the hydraulic cylinder or the pneumatic cylinder, the operation unit 9 is provided with the a hydraulic pressure providing source or a pneumatic pressure providing source, a direction control valve, a check valve, and a safety valve. In the case that the operation unit 9 is constituted of the motor, the operation unit 9 is provided with a ball screw and a nut which adjust the expansion and contraction of the adjusting rod as the motor rotates in forward and reverse directions. Such technology is applied to and implemented in various industrial fields. Therefore, in the present invention, the detailed description of the technology will be omitted.

[0029] In the present invention, a low noise type operation unit 9 is employed in order to reduce operational noise. The cases 14 and 15 are preferably made from a material with excellent strength and absorbency against impact or noise, and may further have an impact absorbing material or an impact buffering material therein or at a connection portion thereof.

[0030] In the present invention, the legs 2 which have no operation units 9 fixed thereto have rounded cut portions 2a formed at lower portions thereof, i.e. corner portions contacting the room floor 12, respectively. In the case that a side of the bed is tilted toward the other side by the operation (or forward rotation) and a reverse operation (or reverse rotation) of the operation unit 9 fixed to the leg of the bed, the room floor 12 can be prevented from being damaged.

[0031] In the present invention, alternatively, a plurality of hinges 17 is installed on one side of the supporting plate 4 which is a reference point of inclination as shown in FIGS. 11 and 12. In the case that the other side of the supporting plate 4 is tilted toward the one side by the operation (or forward rotation) and a reverse operation (or reverse rotation) of the operation unit 9 fixed to the supporting plate 4 for the mat, the supporting plate 4 can

be prevented from moving when the inclination is adjusted.

[0032] FIG. 2 shows a state of a bed in which the tilting means 7 operate to expand the adjusting rod 10 while the rear portion of the bed is elevated and tilted at a predetermined angle, and the cases 14 and 15 prevent the tilting means 7 from being exposed to the outside.

[0033] FIG. 4 shows a state of a bed in which the tilting means 7 operate to expand the adjusting rod 10 while the front portion of the bed is elevated and tilted at a predetermined angle, and the cases 14 and 15 prevent the tilting means 7 from being exposed to the outside.

[0034] FIG. 5 shows a state of a bed in which a flexible case 20 with a bellows 19 is installed outside of the cases 14 and 15 so that the cases 14 and 15 are prevented from being exposed to the outside. In FIG. 5, when the tilting means 7 operates according to the operation rhythm of the controller 8, the flexible case 20 can hide that the cases 14 and 15 become more distance from or close to each other. Also, the flexible case 4 can dampen noise which is generated during the operation of the tilting means 7.

[0035] An upper surface of the flexible case 20 is in close contact with and fixed to a bottom surface 3a of the frame 3, and a lower surface of the flexible case 20 is in close contact with the room floor 12 so as to prevent the poor appearance of the tilting means 7 from being exposed and also to prevent the noise from escaping.

[0036] In the present invention, the adjusting rod 10 is linearly moved by means of the operation unit 9. The supporting member 13 connected to the adjusting rod 10 pivotally rotates around a tilting point. However, since the supporting member 13 is coupled by a pin 11 to the adjusting rod 10, it can normally operate.

[0037] FIG. 6 shows a state of a bed in which as the adjusting rod 10 is expanded, the bed is elevated at the rear portion thereof and tilted at a predetermined angle, resulting in the expansion of the bellows of the flexible case 20 to prevent the exposure of the cases 14 and 15.

[0038] In FIG. 7, the tilting means 7 is installed at a position near a center portion of the bottom surface thereof between the room floor 12 and the supporting plate 4 for supporting a mat 5, so that the supporting plate 4 and the mat 5 are controlled according to the operation rhythm previously set in the controller 8. In FIG. 8, the adjusting rod 10 is expanded by the operation of the tilting means 7 while the rear portion of the bed is elevated and tilted at a predetermined angle. Further, the cases 14 and 15 prevent the exposure of the tilting means 7.

[0039] In FIG. 7, the case 14 in which the operation unit 9 is received is supported on the room floor 12, and the case 15 in which the supporting member 13 is received is fixed to the bottom surface 4a of the supporting plate 4 by means of a coupling member such as a screw or a bolt. Accordingly, the case 15 in which the supporting member 13 is received and installed is supported on the room floor 12, thereby preventing the separation of the tilting means 7 from its position.

[0040] FIG. 9 is a cross sectional view illustrating the functional bed 1 which is cut not in a longitudinal direction but in a width direction. In FIG. 9, a plurality of buffer springs 16 are interposed between the frame 3 and the supporting plate 4, so as to buffer the supporting plate 4 and the mat 5 when the tilting means 7 operates according to the operation rhythm. FIG. 10 shows a state of the bed in which the tilting means 7 operates to expand the adjusting rod 10 so as to elevate and tilt the bed at a predetermined angle to a side, and the cases 14 and 15 prevent the exposure of the tilting means 7.

[0041] In FIG. 11, the tilting means 7 are installed in inner surfaces of both sides of the frame 3, respectively.

[0042] That is, brackets 9a extending from sides of the operation unit 7 are made to contact inner surfaces of both sides of the frame respectively, and securely fixed to the frame 3 by means of the coupling member 18. The supporting member 13 is fixed to the bottom surface 4a of the supporting plate 4 by means of the coupling member. Therefore, the adjusting rod 10 is expanded by the operation of the operating unit 9 so as to elevate the bed upwardly and to tilt the bed at a predetermined angle. On the other hand, the structure of the cases 14 and 15, or the structure of the cases 14 and 15 and the flexible case 20 may be excluded.

[0043] As described above, when the operation (or forward rotation) and the reverse operation (reverse rotation) of the operation unit 9 make the supporting plate 4 to be tilted from one side to the other side, the supporting plate 4 may move irregularly. As shown in FIGS. 11 and 12, therefore, a plurality of hinges 17 are attached to the other side of the supporting plate 4 which becomes a reference point of the inclination. Accordingly, when the inclination of the supporting plate 4 and the mat 5 is adjusted according to the operation rhythm, the irregular movement of the supporting plate 4 can be prevented.

[0044] In the present invention, the inclination of the mat 5 or the bed may be slightly different according to a height of a user or a sleeper, and preferably is in a range of angle of -10° ~ 10° . When the tilting means 7 stops to operate or is in a standby state, the inclination of the mat or the bed is maintained at an angle of 0° . Accordingly, the mat 5 stays in a horizontal state. As the adjusting rod 10 is expanded and/or contracted according to a user's setting, the horizontal mat 5 is inclined periodically or aperiodically within a range of an angle of -10° ~ 10° .

[0045] For example, a height of a pillow suitable for a human body is about 7~8cm. In the case that a user has height of 155~190cm, a portion of the mat at which the head of the user using the functional bed 1 is located may be periodically or aperiodically inclined at an angle of 3° ~ 5° and stay in a horizontal state by means of the tilting means 7 for a set time, repeatedly.

[0046] That is, in order to treat diseases or to manage health of the user according to a purpose of use, the tilting means 7 can be set such that the front portion or the rear portion of the functional bed 1 is tilted for a desired time, and then returns to the horizontal state. Accordingly, the

horizontal state and the tilted state may be controlled periodically or aperiodically.

[0047] Of course, the positively tilted state (+), the horizontal state, and the negatively tilted state (-) may be periodically or aperiodically controlled.

[0048] With the functional bed 1 of the present invention, the tilting means 7 stays in a stopped state so that the mat 5 is initially maintained in the horizontal state for thirty minutes till the user is in a deep sleep. After a time lapse of thirty minutes while the user enters the deep sleep, the tilting means 7 operates according to the set operation rhythm to control the inclination of the mat 5 periodically or aperiodically.

[0049] FIG. 12 is a block diagram illustrating a circuit of the controller 8 according to the embodiment of the present invention. In FIG. 12, a setting unit S with a keypad to select and set an operation mode and to turn on/off an electric power source is connected to an input terminal of a control unit C constituted of a Central Processing Unit (CPU) or PLC. A display unit D for displaying an operation state, a setting state, and a time, a drive for controlling the tilting means 7, and an alarm unit for signaling malfunction or operational errors are connected to an output terminal of the control unit C.

[0050] The controller 8 including the setting unit S is mounted on the head board 6 or a portion of the frame 3 of the bed 1 in order for the user to easily operate the controller 8.

[0051] According to the present invention, the operation (or forward rotation) and the reverse (or reverse rotation) of the operation unit 9 makes the adjusting rod 10 expand and contract. It enables the mat 5 or a side of the bed to be periodically or aperiodically elevated, descended, or maintained in the horizontal state according to the operation rhythm which the user previously has set to the controller 8 considering his/her bio-rhythm and a sleeping habit, thereby controlling the inclination θ of the mat 5.

[0052] FIG. 13 is a flowchart illustrating a process of controlling the bed according to the embodiment of the present invention. The process of controlling the bed includes the steps of setting the operation rhythm by using the setting unit S of the controller 8 in step S1, standing by for an operation until an operation starting signal is provided by the controller 8 when the operation rhythm is set, in step S2, determining whether a deep sleep time, for example thirty minutes, which a user sets in the operation standby step S2, lapses, and operating the tilting means according to a set operation rhythm if the deep sleep time exceeds thirty minutes, while making the tilting means stand by if the deep sleep time is less than thirty minutes, in step S3, operating the tilting means if a counted time exceeding thirty minutes lapses, in step S4, stopping the tilting means 7 if the counted time exceeds the set sleep time (after the deep sleep time) and continuously operating the tilting means 7 if the counted time does not exceed the set sleep time, in step S5, and stopping the tilting means 7 if the counted time (after the deep

sleep time) exceeds the set sleep time, in step S6.

[0053] The deep sleep time and the sleep time may be differently set according to a present time at which it enters the operation starting step. That is, if the current time at which it enters the operation starting step is at midnight, the deep sleep time and the sleep time are set to be short. If the current time at which it enters the operating starting step is early in the evening, the deep sleep time and the sleep time are set to be long.

[0054] In addition to the above-mentioned method, the bed according to the present invention further includes a weight sensor and a sleeping recognition sensor. The weight sensor recognizes a weight of the user, and then the tilting angle of the bed may be controlled. The tilting angle of the bed proposed in the present invention can be controlled according to the weight of the user. Further, it is determined by using the sleeping recognition sensor whether the user is sleeping. If the user substantially does not sleep, the bed proposed in the present invention may not perform the operation rhythm. Further, if the weight sensor detects a user with a weight within an error range of the set weight, the controller may automatically operate. If the weight sensed by the weight sensor is out of the error range of the set weight, the controller automatically stops the operation of the operation unit.

[0055] Furthermore, the present invention may be set to have a different rhythm according to information on the user's health input by the user. For example, the present invention is set to have different pieces of information on the health with relation to obesity, malnutrition, hypertension, hypotension, diseases related to bones (arthritis and various kinds of disk), varicose veins, poor blood circulation, aging of the skin and the like. The user may set the operation rhythm by selecting one of plural operation rhythms, or set an optimal operation rhythm through the controller by using information stored in storing space. The tilting angle may be set in a range of certain angles as well as in the range of angles of $-10^{\circ} \sim 10^{\circ}$. In addition, the present invention may be set to have an optimal operation rhythm according to gender, age, and occupation.

[0056] The bed may have a different motor depending on its size. That is, in the case that the bed has a large size, a motor with a large capacity may be used. In the case that the bed has a small size, a motor with a small capacity may be used. Also, a geared motor of a low noise which has a separate noise preventing unit may be used. In order to reduce noise in mechanical parts, a mechanical structure may be disposed in a soundproof box made from a soundproof material. Various sorts of motors as well as the above-mentioned motor may be used. That is, a motor such as a hydraulic type motor using oil or water and a pneumatic type motor may be used. In order to save electric charges and to prevent overload or mechanical troubles, a control unit for isolating electricity and a sensor for detecting the overload or the mechanical problems may be attached to the motor.

[0057] In the case that the user wakes, furthermore,

the above-mentioned operation of the bed may be performed according to the user's setting. That is, the bed may be applied as a bed for beauty. Moreover, it is possible to differently adjust a time until the bed is tilted and arrives at a set angle. That is, in the case that the set tilting angle is 10°, it is possible to set the time to five seconds, ten seconds, and the like according to the user.

[0058] In the case that a new signal is input from the user before a lapse of the set deep sleep time, the control unit of the bed according to the present invention counts again a time from a beginning until the user enters the deep sleep. Of course, in the case that the user does not enter the deep sleep, although a separate signal is not input, it is possible to newly count a time from the beginning by using the sleeping recognition sensor until the user enters the deep sleep. The sleeping recognition sensor is mounted on an upper portion of the bed, and identifies a pupil of the user and a movement of the user, thereby determining whether the user is sleeping. Of course, it may be determined in various manners as well as the above-mentioned manner whether the user is sleeping.

[0059] In addition, the present invention can classify the sleep state into various states such as the deep sleep state, a provisional sleep state, and the like. According to each sleep state, the bed may be set to operate with a different operation rhythm. In addition, by adding a structure of determining a present time, the bed may be set to operate a different operation rhythm according to the present invention. That is, at midnight, i.e. one a.m. to three a.m., when the user is in the deep sleep state, or at dawn, the bed may be set to operate with different operation rhythms.

[0060] Moreover, the bed may be classified into plural parts, and a tilting angle or a tilting time may be differently set to correspond to each part. That is, according to the above description, it is described that the bed is configured to have one piece and be entirely tilted at a predetermined angle. However, the present invention is not limited thereto. That is, the bed is divided into two parts, and then different operation rhythms may be set to the two parts respectively in order for the two parts to individually operate. For example, only one of the two parts may be set to operate at a predetermined angle. To do this, a separate operation unit is provided to each part of the bed.

[0061] Initially, the bed is disposed in a state of being tilted at a predetermined angle. That is, when the bed is initially disposed to be in close contact with a wall in parallel with the room floor, the bed cannot be tilted at the predetermined angle. Accordingly, the bed is initially disposed to be tilted at the predetermined angle, and then is moved in parallel with the floor when the weight sensor recognizes the user. Then, the bed performs a predetermined operation under a control of the controller.

[0062] The functional bed according to the present invention has various advantages for health.

[0063] For example, during the remaining 60~70% of

a lifetime except for sleeping time, the more aged a person is, the more drooped his/her skin becomes due to gravity. The functional bed 1 of the present invention uses gravity during the sleeping time, so as to prevent the drooping of the skin and to delay the aging of the human body.

[0064] Presently, a woman may use a functional pack which is hung on her ears and pulls skin upward. However, when she uses the functional bed 1 of the present invention, the action of gravity is greatly reduced while she lies in the functional bed 1 for the sleeping time or the waking time. As a result, it is possible to delay or prevent the aging of the skin including the drooping of the skin and a generation of wrinkles such as grabellar frown lines, nasolabial folds, crow's feet, kissing lines and marionette lines.

[0065] Further, the bed of the present invention provides an improvement of blood circulation in patients with diseases related to varicose veins which are caused by user's weight and gravity in living and vascular diseases such as hypertension and hypotension.

[0066] Furthermore, according to the present invention, when a user lies in the bed, the skin of the user is subjected to a pressure of gravity which is less than that while standing, and the body of the user is tilted in such a manner that his/her head is located to be lower than his/her legs. Accordingly, the user is stable and comfortable rather than sleeping in a horizontal state. As described above, the bed may be tilted at a predetermined angle so that the user's head is higher than his/her legs, according to circumstance. In addition, since the bed helps the user have a good sleep, fatigue which the user's skin feels can be reduced, thereby preventing wrinkles, melisma and the like. Elasticity is provided to pores, thereby preventing growth of the pores.

[0067] The present invention has advantages in that the action of gravity is minimized in a sleeping state in which the user's face has no tension so that wrinkles on the face are stably and clearly flattened or removed while the elasticity of the skin increases.

[0068] It is obvious to a person skilled in the art to which the present invention belongs that the present invention described above is not limited to the embodiments and the accompanying drawings, and may be substituted, changed and modified in various forms within the scope of the present invention without departing from the technical spirit of the present invention.

Claims

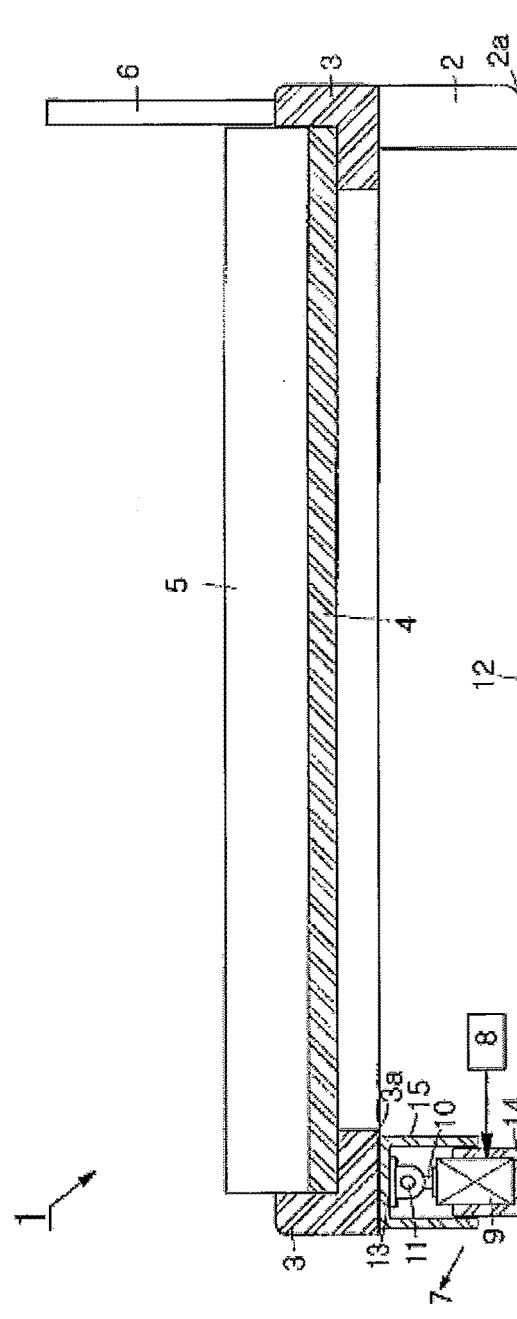
1. A functional bed comprising:

a frame installed on a plurality of legs;
a supporting plate disposed on the frame;
a mat disposed on the supporting plate;
a tilting means for tilting the mat at a predetermined angle, the tilting means including: an op-

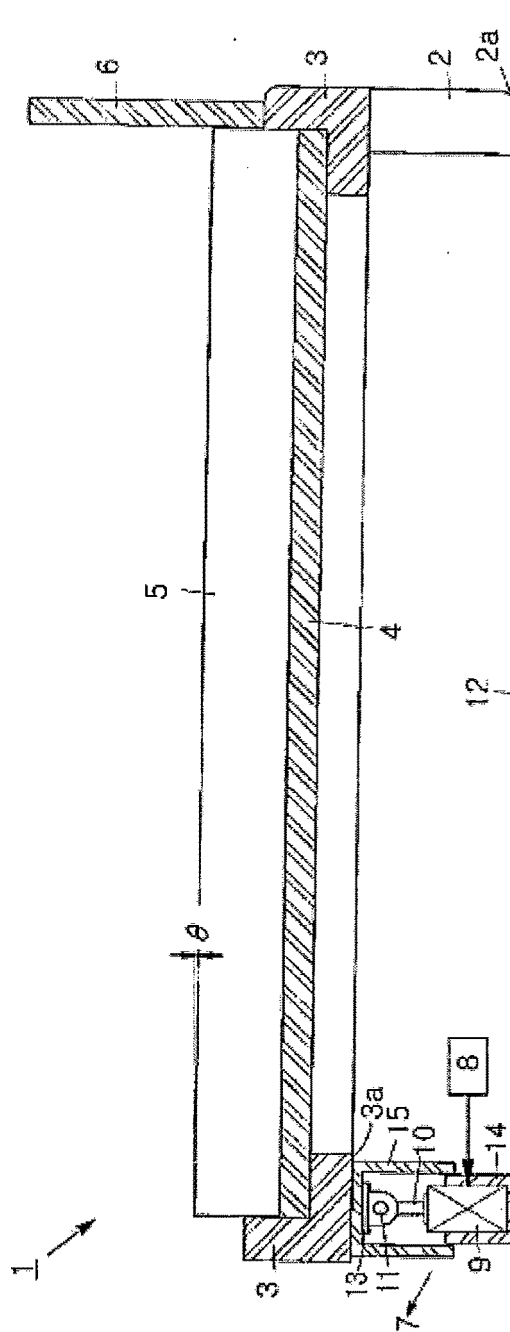
- eration unit provided with a ball screw and a nut for adjusting an expansion and contraction of an adjusting rod depending on a forward rotation and a reverse rotation of a motor; the adjusting rod expanding and contracting at a side of the operation unit; and a supporting member connected to the adjusting rod by a pin and installed on one of a bottom surface of the supporting plate and a room floor; and
a controller for controlling the tilting means according to a set operation rhythm, wherein a plurality of buffer springs are interposed between the frame and the supporting plate, the operation rhythm of the controller includes an operation time, an operation period, a tilted angle, an inclination time, and a tilted direction, the tilted angle by the tilting means is in a range of -10° to 10° , and the controller stands by until a deep sleep time lapses while controlling the tilting means to adjust an inclination of the bed according to the operation rhythm after the deep sleep time lapses and controls to stop the tilting means within a sleep time after a user has entered a deep sleep state.
2. A method of controlling a functional bed as claimed in claim 1, wherein the deep sleep time is about thirty minutes.
3. A method of controlling a functional bed, the method comprising the steps of:
- setting an operation rhythm by using a setting unit of a controller;
standing-by until an operation starting signal is provided from the controller when the operation rhythm is set;
determining whether a deep sleep time lapses, and operating a tilting means capable of adjusting an inclination of the bed according to the set operation rhythm after the deep sleep time set by a user in the operation standing-by step lapses, while standing-by before the deep sleep time lapses;
operating the tilting means according to the operation rhythm if it is determined in the deep sleep step time determining that the deep sleep time lapses;
stopping the tilting means if a sleep time (sleep time after the deep sleep time lapses) set in the deep sleep time determining step lapses, while continuously operating the tilting means if the set sleep time (sleep time after the deep sleep time lapses) does not lapse; and
stopping the operation of the tilting means if the set sleep time (sleep time after the deep sleep time lapses) lapses.

4. The method as claimed in claim 3, wherein the operation rhythm includes an operation time, an operation period, a tilted angle, an inclination time and a tilted direction, and an tilting angle by the tilting means is in a range of -10° ~ 10° .
5. The method as claimed in claim 4, wherein the deep sleep time is about thirty minutes.
6. The method as claimed in claim 5, wherein the operation rhythm is changeable according to an occupation, age, gender and health information of the user.
7. The method as claimed in claim 6, wherein the functional bed is divided into at least two parts, and the tilting means operates according to an operation rhythm set to each part.

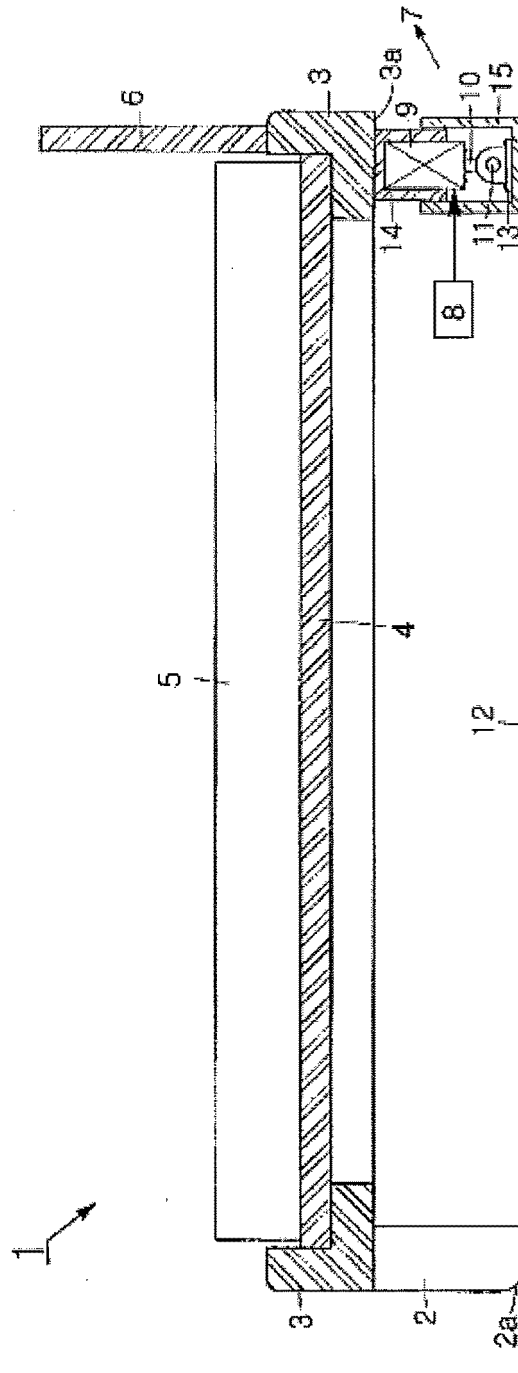
[Fig.1]



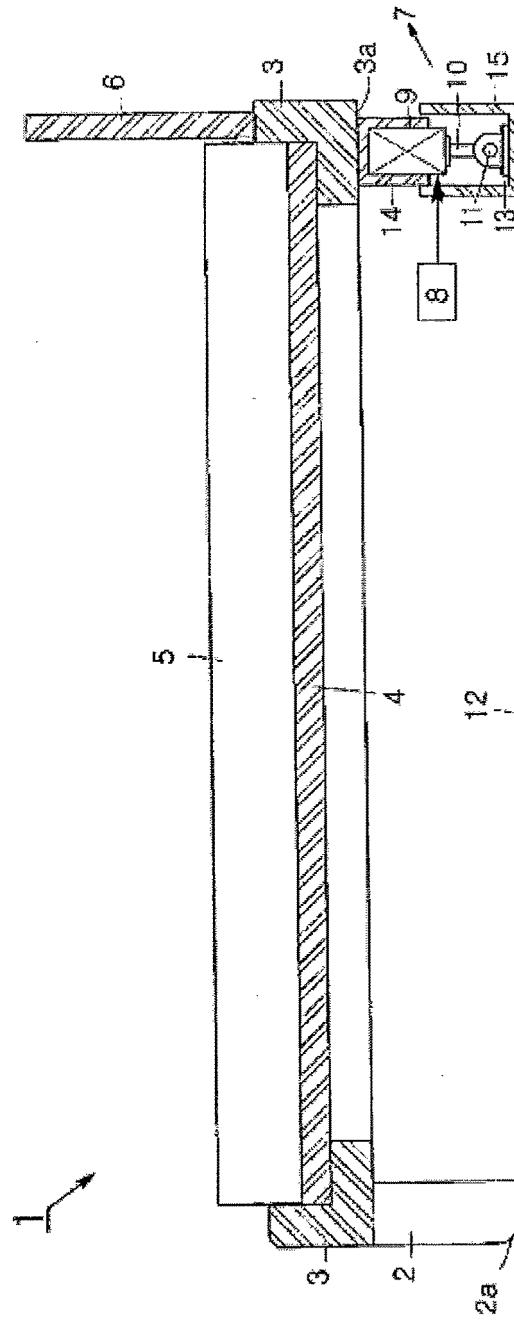
[Fig.2]



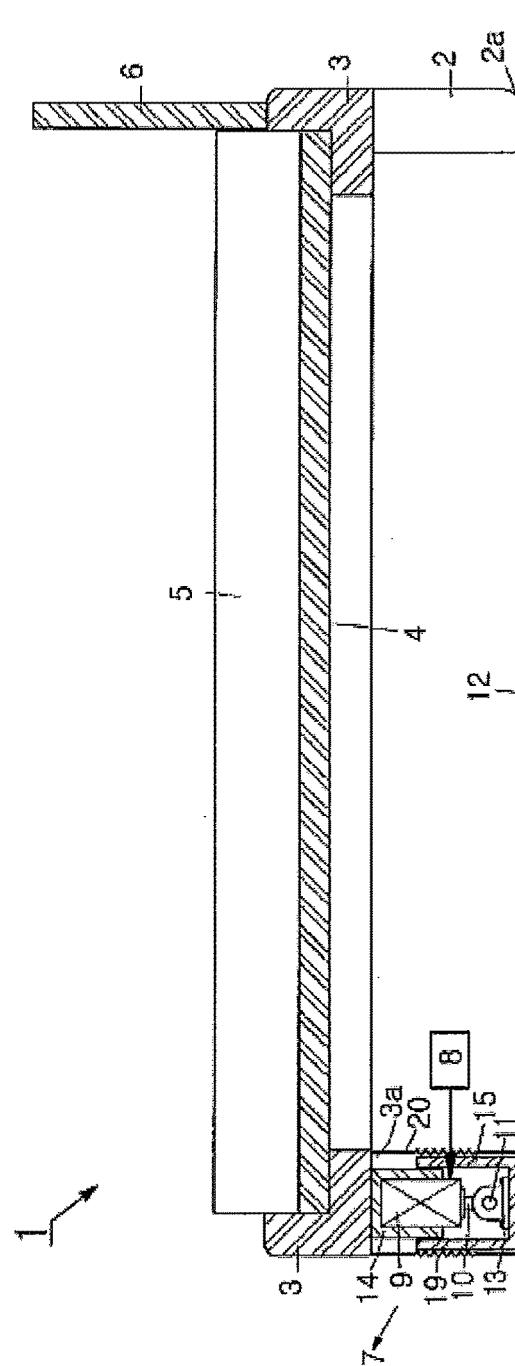
[Fig. 3]



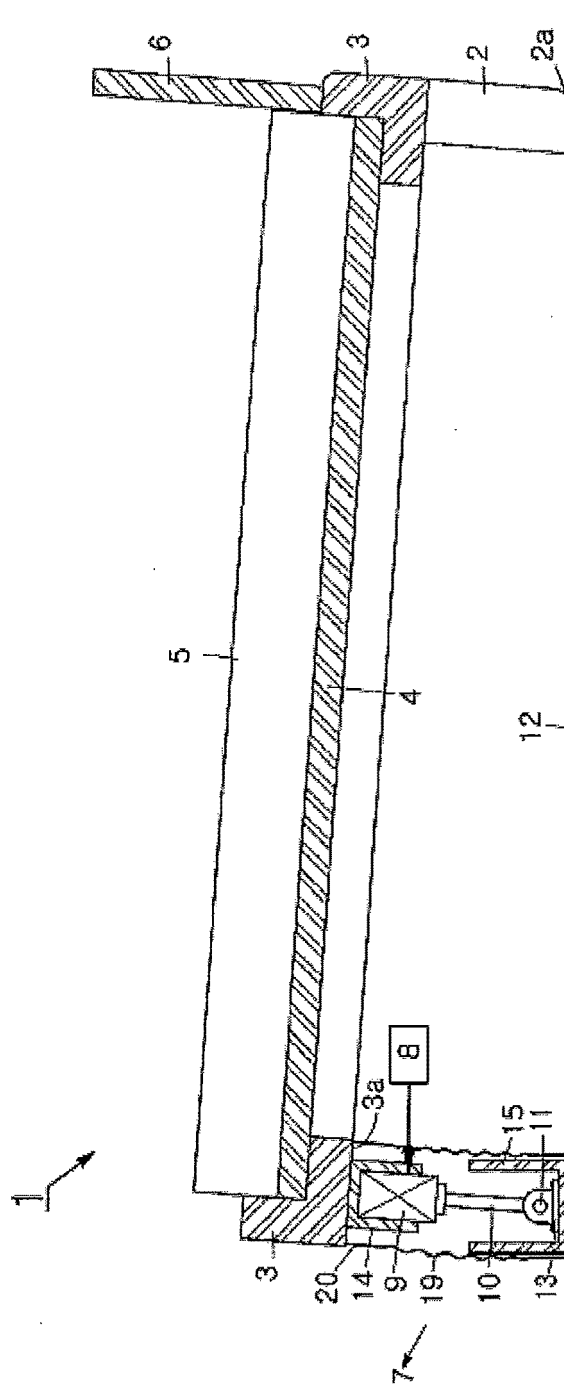
[Fig. 4]



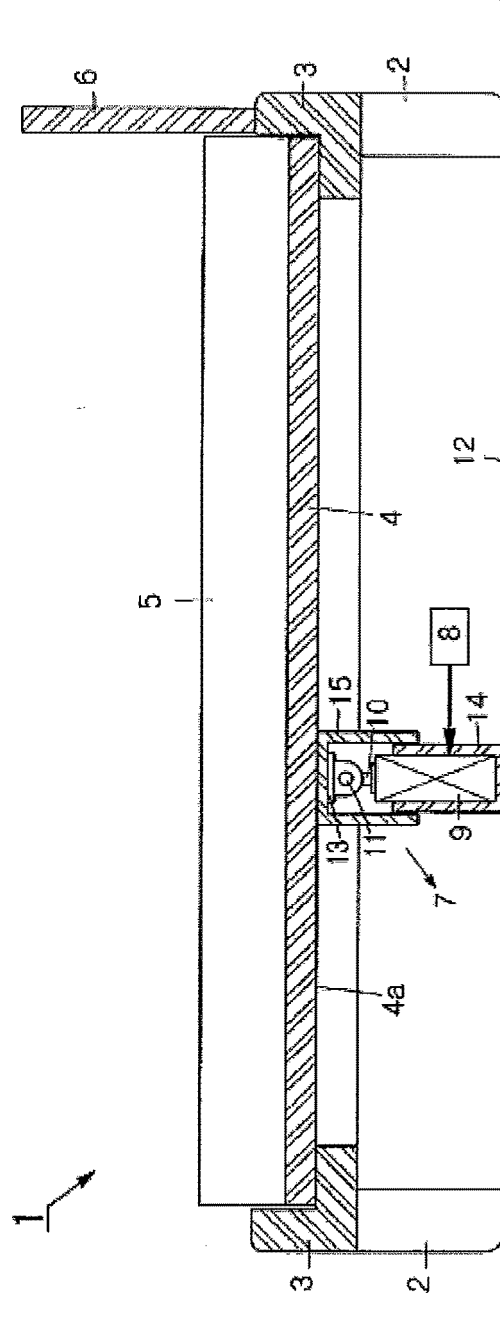
[Fig. 5]



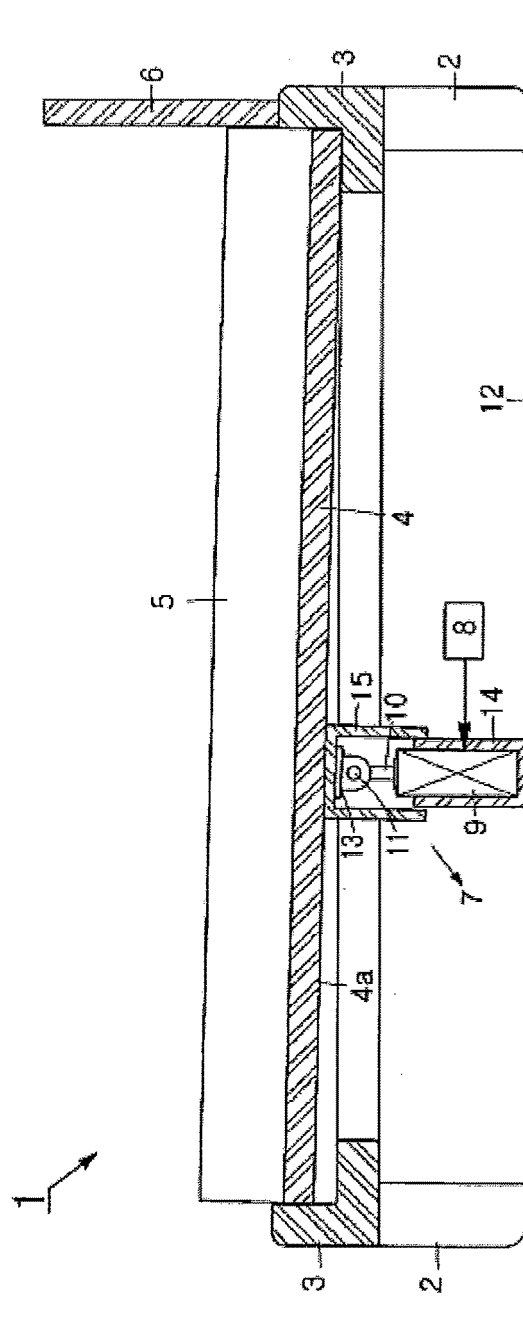
[Fig. 6]



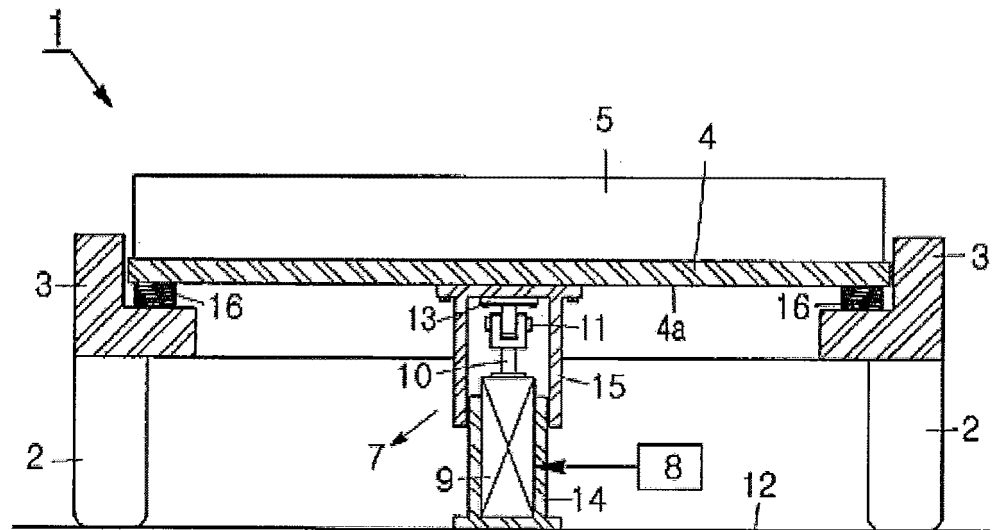
[Fig. 7]



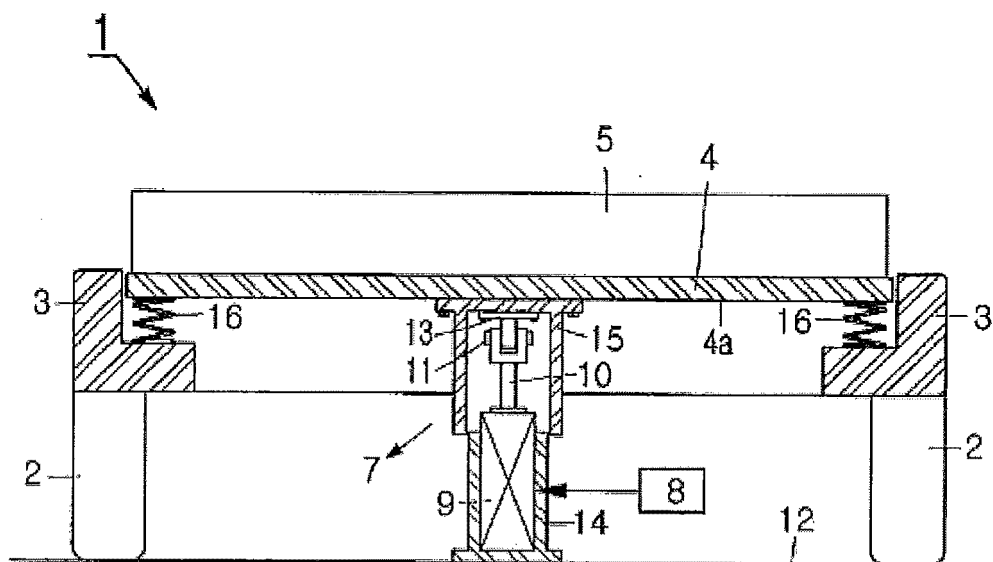
[Fig. 8]



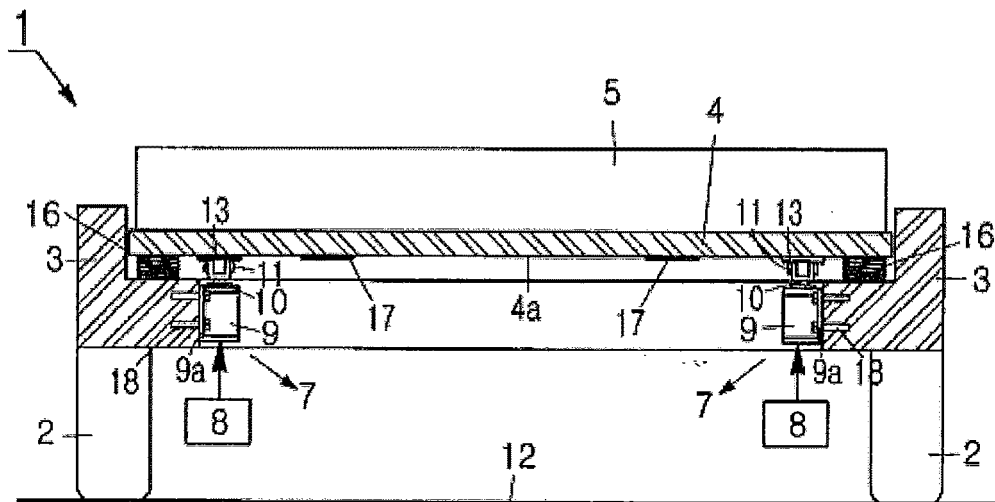
[Fig.9]



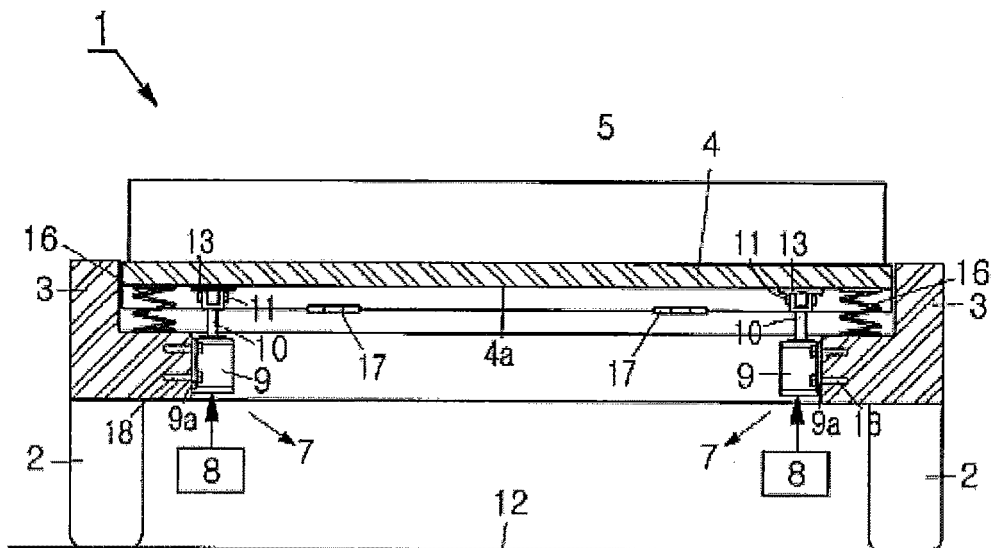
[Fig.10]



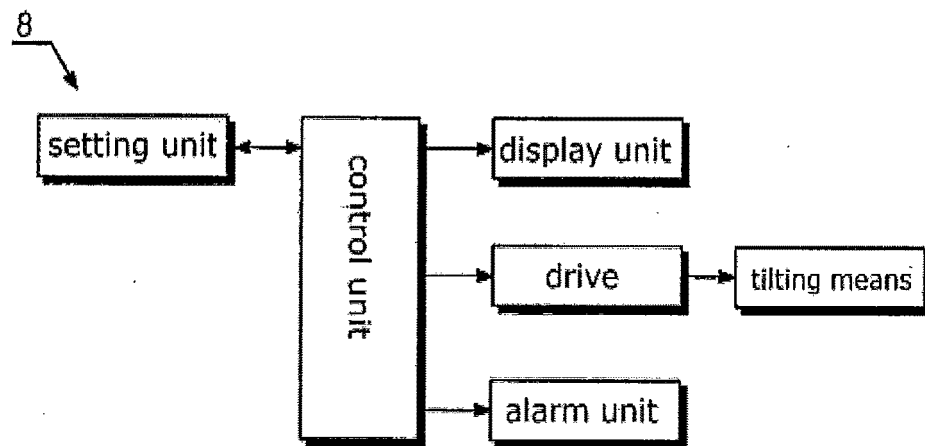
[Fig.11]



[Fig.12]



[Fig.13]



[Fig.14]

