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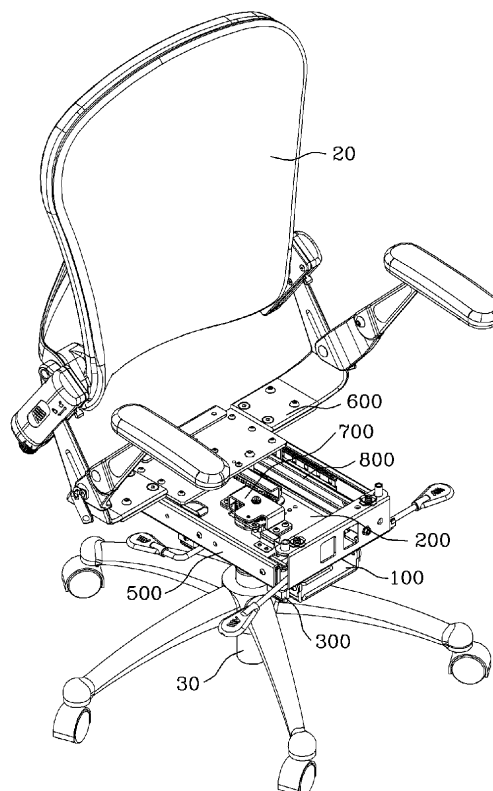
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(54) **SEATING FURNITURE HAVING MOVABLE BACKREST**

(57) The present invention relates to seating furniture, and more specifically, to seating furniture having a movable backrest, which allows a user's back to be supported by a backrest at all times in order to enable seating with proper posture, and comprises: a lower frame which is connected to a support; an upper frame which is connected to the lower frame via a vertical displacement generation means; at least one elastic body which is installed between the lower frame and upper frame; a back and forth moving means which is formed at the edge of the left and right sides of the upper frame, and is connected to a backrest frame to move back and forth; a power generation unit which converts the displacement according to the descent of the upper frame into a straight line movement at the back and forth moving means if a load is applied to a seat unit combined to the upper frame, thereby moving the backrest frame forward; and a switching unit which switches to a half-lock state in which the backrest frame can move forward only if a load is applied to the seat unit, and to an unlock state in which the backrest frame can move backward if the load applied to the seat unit is removed.

[Fig. 1]



Description

Technical Field

[0001] The present invention relates to seating furniture, and in particular to a technology which is directed to allowing a backrest of seating furniture to support, all the time, a user's back so that a user can sit in a correct sitting posture.

Background Art

[0002] Since lots of people spend time sitting on seating furniture such as a chair or a sofa, people suffering from an injury due to an incorrect sitting posture increase. Such injury problems occur because a user sits in an incorrect or wrong posture when sitting on seating furniture with his waists and hips not fitting closer to a backrest.

[0003] A lot of new chairs designed to support a user's back with the aid of movable backrest are already disclosed in the industry. One of such new chairs is disclosed in the Korean Patent Application number 10-2007-0060533.

[0004] The above technology is basically directed to generating a driving force with the aid of a weight when a user sits on a seat part, so a backrest moves forward, thus allowing a backrest to come into close contact with a user's back. The above construction however has some limits in application to diverse chairs because the height in an upward and downward direction is long, and furthermore there are some limits in making the outer appearance of a chair look nice. In addition, a structural stability is bad, so improvements are needed in a conventional construction.

Disclosure of Invention

[0005] Accordingly, it is an object of the present invention to provide seating furniture having a movable backrest which is compact-sized and is more stable than a conventional chair and can be well applied to diverse seating furniture.

[0006] To achieve the above object, there is provided a seating furniture having movable backrest, comprising a lower frame which is connected to a support part; an upper frame which is connected with the lower frame with an upper and lower displacement generation part being disposed between them; at least one elastic part disposed between the lower frame and the upper frame; a forward and backward movement part which is formed at the edge portions of left and right sides of the upper frame and is connected with the backrest frame and is movable in forward and backward directions; a driving force generation part allowing the backrest frame to move in a forward direction as the displacement generating owing to the down movement of the upper frame is converted into a linear movement by means of a forward and

backward movement part when a certain weight is applied to a seat part engaged to the upper frame; and a switching part which becomes a half-lock state in which the backrest frame is movable only in a forward direction when a weight is applied to the seat part, and which becomes an unlock state in which the backrest frame is movable only in a backward direction when the weight having applied to the seat part is removed.

[0007] Preferably, the upper and lower displacement generation part is formed of a plurality of vertical slides or a plurality of foldable link plates, each of said vertical slides or said foldable link plates connecting the lower frame and the upper frame and linearly moving.

[0008] Preferably, the driving force generation part comprises a vertical rack gear which is vertically installed at an upper surface of the lower frame; a gear box which is engaged to the upper frame; a pinion gear which is engaged with a first shaft installed at a lower side of the gear box and then is engaged with the vertical rack gear; a vertical bevel gear which is engaged with the first shaft near the pinion gear; a spur gear which is horizontally installed in the interior of the gear box wherein a horizontal bevel gear connected with the vertical bevel gear is installed at a lower surface of the spur gear and rotates; and a horizontal rack gear which is engaged to a lower side of the backrest and is engaged with the spur gear and transfers a driving force to the backrest frame.

[0009] Preferably, the driving force generation part is formed of a stopper which is connected with a stop lever at one side of the spur gear, thus being selectively engaged with or disengaged from the spur gear.

[0010] Preferably, the switching part comprises a rotation latch which is engaged in the interior of the upper frame in forward and backward directions, thus converting a rotation direction depending on the presence of a weight at the seat part; and a latch hook which is connected with a lower surface of the backrest frame and is in a rotational operation within a limited angle range and is selectively engaged or disengaged with respect to the rotation latch.

[0011] Preferably, the seating furniture having a movable backrest is **characterized in that** the seat part is movable upward and downward with the rear end portion of the upper frame operating as a fixing part, and a pusher connected with a front end portion of the rotation latch is disposed at a lower surface of the front end portion of the seat part, thus allowing the rotation latch to rotate depending on the motion of the seat part.

[0012] Preferably, the pusher comprises an upper pusher which faces a lower surface of the seat part; a lower pusher of which an upper end portion is inserted through a lower side of the upper pusher and is movable, and a lower end portion is engaged with the rotation latch; and a coil spring which is disposed between the upper pusher and the lower pusher.

[0013] Preferably, the switching part is **characterized in that** a latch guide with slot formed in forward and backward directions is disposed between the rotation latch

and the latch hook, and two limit pins protruded with certain intervals from each other are disposed at the latch hook, and the latch hook passes through the slot, wherein the rotation angle of the latch hook is so limited that the latch hook is limited by two limit pins.

[0014] Preferably, the switching part is formed of a release lever by which the rotation latch can be adjusted to an unlock state by pressing a front end portion of the rotation latch.

ADVANTAGEOUS EFFECTS

[0015] In the seating furniture having a movable backrest according to the present invention, when a user sits on a chair, a backrest automatically moves forwards and supports a user's back, which leads to a user's correct sitting posture, and the construction of a seating further is compact-sized, so the present invention might be well applied to diverse chairs such as an office chair, a student chair at a classroom or a sofa and a train chair or an airplane chair.

Brief Description of the Drawings

[0016] The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein;

[0017] Figure 1 is a schematic partial perspective view illustrating seating furniture according to a first embodiment of the present invention;

[0018] Figure 2 is a partial cross sectional view when seeing from the front side;

[0019] Figure 3 is a cross sectional view when seeing from the lateral side;

[0020] Figure 4 is a plane view;

[0021] Figure 5 is a partial perspective view illustrating part of elements including a lower frame;

[0022] Figure 6 is a cross sectional view illustrating a forward and backward moving part used in the present embodiment;

[0023] Figure 7 is a partial perspective view illustrating major parts of a driving force generation part;

[0024] Figure 8 is a perspective view illustrating an engaged state of a switching part and major parts;

[0025] Figure 9 is a schematic cross sectional view of a chair according to a second embodiment of the present invention;

[0026] Figure 10 is a schematic side view illustrating a structure of a link plate;

<Descriptions of major reference numerals used in the drawings>

[0027] 10: seat part 20: backrest

[0028] 30: support part 100: lower frame

[0029] 200: upper frame 300: upper and lower displacement generation part

[0030] 300a: link plate 310: plate unit part

[0031] 320: connection bracket 400: elastic part

[0032] 500: forward and backward moving part 510: fixing rail

5 **[0033]** 520: intermediate rail 530: driving rail

[0034] 540: ball 531: bracket

[0035] 600: backrest frame 700: driving force generation part

[0036] 710: vertical rack gear 720: gear box

10 **[0037]** 730: pinion gear 740: vertical bevel gear

[0038] 750: horizontal bevel gear 760: spur gear

[0039] 770: horizontal rack gear 780: guide roller

[0040] 790: stopper 800: switching part

[0041] 810: rotation latch 820: latch hook

15 **[0042]** 821: limit pin 830: pusher

[0043] 831: upper pusher 832: lower pusher

[0044] 833: coil spring 840: latch guide

[0045] 841: slot 850: release lever Modes for carrying out the invention

20 **[0046]** The preferred embodiments of the seating furniture having a movable backrest (hereinafter referred to "seating furniture") according to the present invention will be described in detailed with reference to the accompanying drawings which are provided in relation with the preferred embodiments given as means or better understanding of the present invention, provided that the attached drawings are provided for illustrative purposes based on the technical concepts of the present invention, so it should be understood that implementations with simple design changes or substitutions with equivalent elements of partial constructions are also included in the technical scope of the present invention.

<First embodiment>

35 **[0047]** First of all, the seating furniture according to a first embodiment of the present invention will be described. Figure 1 is a schematic partial perspective view of the same. In the first embodiment of the present invention, it is characterized that the technology of the present invention is applied to an ordinary office chair, and Figure 2 is a cross sectional view when seeing from the front side, and Figure 3 is a cross sectional view when seeing from the lateral side, and Figure 4 is a plane view.

40 **[0048]** As a way for allowing a backrest 20 to automatically move forward to support a user's backrest when a user sits on a seat part 10 belonging to a chair, there are provided a lower frame 100, an upper frame 200, an upper and lower displacement generation part 300, an elastic part 400, a forward and backward moving part 500, a backrest frame 600, a driving force generation part 700, and a switching part 800.

45 **[0049]** The lower frame 100 is a portion fixedly secured to a support part 30 wherein the support part 30 represents a lower side including a leg part of a chair. Here the support part 30 might have different shapes and functions depending on the kinds of seating furniture. Some of the office chairs of the present invention are provided

with the functions that the height of the support part can be adjusted. In other words, it is **characterized in that** the length of the portion of the support part can be changed depending on the height of the user. The technology for adjusting the height of the support part belongs to a conventional art.

[0050] Figure 5 is a partial perspective view illustrating partial elements of a lower frame. As shown therein, a lower frame 100 is connected with an upper side of the support part 30, and an upper and lower displacement generation part 300 is disposed at the left and right sides of the lower frame 100, and an upper frame 200 is disposed at an upper side of the lower frame 100 with the aid of the upper and lower displacement generation part 300. In the present embodiment of the present invention, the upper and lower displacement generation unit 300 is **characterized in that** the upper frame 200 is vertically movable about the fixed lower frame 100 as a plurality of balls roll along the rail by a linear movement. For a linear sliding movement, something like a LM guide might be used. The upper and lower displacement generation part used in the present embodiment of the present invention is called an upper and lower slider which has the same construction as the forward and backward movement part.

[0051] At least one elastic part 400 is disposed between the lower frame 100 and the upper frame 200, thus generating a repulsive force, preferably, a coil spring might be used. When a person sits on the seat part 10, the upper frame 200 moves down, and the elastic part 400 is contracted, thus storing a repulsive force. In this state, when the weight is removed, the elastic part 400 recovers, thus pushing upward the upper frame 200.

[0052] When a certain weight is applied to the seat part 10, the backrest frame 600 linearly moves in a forward direction. Here, the forward and backward movement part 500 is provided for a linear movement of the backrest frame 600. The forward and backward movement part 500 is installed at the front and back sides at an inner edge position of the left and right sides of the upper frame 200 and is connected with the backrest frame 600. The forward and backward movement part 500 is not limited to its construction when it can move linearly. In the present embodiment, it adapts the same format as the upper and lower displacement generation part 300.

[0053] Figure 6 is a cross sectional view illustrating a forward and backward movement part 500 used in the present embodiment. The upper and lower displacement generation part 300 has the same construction as the forward and backward movement part 500 provided that the lengths of the same are different from each other. As shown therein, the forward and backward movement part 500 is provided with a fixing rail 510 fixed at the upper frame 200, and the fixed rail 510 has a certain length matching with the forward and backward length of the upper frame 200. An intermediate rail 520 shorter than a driving rail 530 is formed at an inner side of the fixing rail 510, and the driving rail 530 is engaged into the in-

terior of the intermediate rail 520. Meanwhile, a plurality of balls 540 are disposed at the intermediate rail 520 and roll while coming into contact with the fixing rail 510 and the driving rail 530. In addition, the upper frame 200 is connected to the bracket 531 engaged with the driving rail 530, so the backrest frame 600 can linearly move by receiving a driving force from the driving force generation part 700. In other words, as the backrest frame 600 linearly moves in the forward and backward directions, the intermediate rail 520 and the driving rail 530 move concurrently with respect to the fixed rail 510. In particular, the driving rail has longer moving distance than the moving distance of the intermediate rail. The forward and backward movement part with the above mechanism is commercially available and has a known element.

[0054] The driving force generation part 700 will be described. Figure 7 is a partial perspective view illustrating major parts of a driving force generation part.

[0055] In the driving force generation part 700, weight is applied to the seat part 10 engaged to the upper frame 200, and the upper frame 200 moves down. The movement is converted into a linear movement by the front and back movement part 500 by using the displacement occurring during the above down movement, thus allowing the backrest frame 600 move forward.

[0056] In more details, the structure of the driving force generation part 700 will be described.

[0057] The driving force generation part 700 comprises a vertical rack gear 710, a gear box 720, a pinion gear 730, a vertical bevel gear 740, a horizontal bevel gear 750, a spur gear 760, and a horizontal rack gear 770. The vertical rack gear 710 is vertically installed at an upper surface of the lower frame 100 and is engaged with a pinion gear 730 which will be described later. The gear box 720 is installed at the upper frame 200, and a first shaft s1 is horizontally installed at a lower side belonging to the gear box 720, and a pinion gear 730 and a vertical bevel gear 740 is installed at the first shaft s1. The pinion gear 730 is engaged with the vertical rack gear 710, and the pinion gear 730 and the vertical bevel gear 740 integrally rotate.

[0058] In addition, the spur gear 760 horizontally laying down in the interior of the gear box 720 is drivingly installed at a portion higher than the vertical bevel gear 740. The horizontal bevel gear 750 engaged with the vertical bevel gear 740 is engaged to the lower surface of the spur gear 760. Through the above engaging relationship, when the upper frame 200 moves down, the pinion gear 730 rotates along with the vertical rack gear 710, and its rotational force is transferred to the horizontal bevel gear 750 via the vertical bevel gear 740, thus allowing the spur gear 760 start rotating.

[0059] As the upper frame 200 moves down, a driving force generating owing to the displacement allows the spur gear 760 to rotate. There is further provided a horizontal rack gear 770 for transferring the rotational force of the spur gear 760 to the backrest frame 600. The horizontal rack gear 770 is installed with its upper end being

engaged to a lower side of the backrest frame 600 and is disposed at front and back sides, thus linearly moving as the spur gear 760 rotates, by which the backrest frame 600 can move. More preferably, there is provided a guide roller 780, which rotates in contact with the outer side (opposite side where the gear teeth are formed), at one side of the upper surface of the gear box 720 so that the horizontal rack gear 770 can precisely engage with the spur gear 760. Since the relatively longer horizontal rack gear 770 is supported by the guide roller 780 at the point where it is engaged with the spur gear 760, a precise engagement between the spur gear 760 and the horizontal rack gear 770 is obtained, thus obtaining a desired reliable driving force transfer.

[0060] More preferably, a stopper 790 is provided at the driving force generation part 700 in order to fix the backrest frame 600 at a certain position by forcibly preventing the rotation of the spur gear 760. The stopper 790 is connected with the stop lever 791, thus being engaged or disengaged from the spur gear 760 by means of an operation of the stop lever 791. In other words, when the stopper 790 is engaged with the spur gear 760, even when the weight applied to the seat part 10 is removed, the backrest frame 600 does not move backward, staying at the moved position. The stopper 790 is connected rotatable at one side of the gear box 720 and is engaged with an end portion of the stop lever 791, so an intermittent operation with the spur gear 760 is obtained by lifting-up or lifting-down the stop lever 791.

[0061] In the present embodiment, the driving force generation part is formed of a plurality of gears, but it is obvious that it alternatively might be formed of a belt or a chain.

[0062] The switching part 800 will be described. Figure 8 is a perspective view illustrating an engaged state of the switching part and the major elements of the present invention. The construction of the same will be described along with Figures 2 through 4 and 8.

[0063] The switching part 800 is configured in such a way that when a user sits on a seat part 10, and weight is applied to the seat part 10, the backrest frame 600 remains in a half-lock state in which the backrest frame 600 can move only forward. When the weight is removed from the seat part 10, it becomes unlocked so that the backrest frame 600 can move backward. In other words, as a user sits on the seat part 10, the backrest frame 600 moves forward by means of the driving force generation part 700. At this time, the switching part 800 does not have any limits with respect to the forward movement of the backrest frame 600; however it limits the operation in such a way that when the backrest frame 600 comes into contact with a user's back, its backward movement is limited so that the backrest frame 600 cannot move backward from the then current position, which state is called a half-lock state. Even when a user's body slightly moves or a user's weight loses for a second by a certain reason, the backrest frame 600 can be prevented from moving unexpectedly.

[0064] When a user gets up from the sit state, since the external force applied to the seat part 10 becomes zero, the upper frame 200 moves upward, so a force is generated from the driving force generation part 700, thus allowing the backrest frame 600 to move backward. Since the backrest frame 600 is supposed to move back toward the original position, the switching part 800 becomes an unlock state, thus not limiting the backward movement of the backrest frame 600.

[0065] The switching part 800 will be described in more details. Along with the rotation latch 810 and the latch hook 820, the rotation latch 810 is installed in the interior of the upper frame 200 in rotatable states in forward and backward directions. The rotation latch 810 is installed in parallel with the forward and backward movement part 500 is installed at one edge side of the upper frame 200 and is supported to be rotatable at front and back end portions. When a weight is applied to the seat part 10, the rotation latch 810 rotates inwardly, and when the weight is removed, it rotates outwardly.

[0066] The latch hook 820 is connected to a lower surface of the bracket frame 600; however it might be installed in a such a way to rotate within a limited angle range, thus being engaged to the rotation latch 810 or disengaged from the same, so the forward or backward or only backward movements of the backrest frame 600 can be limited. As shown in the drawings, the latch hook 820 is formed to have a sharp end, thus being engaged with the toothed rotation latch 810. When the latch hook 820 is engaged with the rotation latch 810, the backrest frame 600 does not move backward.

[0067] The rotation of the rotation latch 810 is determined depending on whether or not the weight is applied to the seat part 10. The interrelationship between the rotation latch 810 and the seat part 10 will be described.

[0068] In the present embodiment, the rear end portion of the seat part 10 is engaged with a rear end portion of the upper frame 200 in such a way that the front end portion of the seat part 10 can move upward and downward. When a person sits on a seat part 10, the front end portion of the seat part is pressed down and moves downward. Since a pusher 830 is provided at an end lower surface of the front side of the seat part 10, with the pusher being connected with the front end portion of the rotation latch 810, the rotation direction of the rotation latch 810 can be determined depending on the motion of the seat part 10.

[0069] The detailed construction of the pusher 830 connected with the rotation latch 810 is as follows.

[0070] The pusher 830 consists of an upper pusher 831 and a lower pusher 832, and a coil spring 833 is disposed between the upper and lower pushers 831 and 832. The upper end portion of the upper pusher 831 faces the lower surface of the seat part 10, and the upper end portion of the lower pusher 832 is movably inserted into the lower end portion of the upper pusher 831, and the lower end portion of the lower pusher 832 is connected with the front end portion of the rotation latch 810. In other

words, the upper end portion of the lower pusher 832 is inserted into the upper pusher 831 with the coil spring 833 being disposed between them. When a weight is applied to the seat part 10, the upper pusher 831 is pressed, and moves downward. At this time, force is applied via the coil spring 833, and then the lower pusher 832 is pressed, and the rotation latch 810 rotates inwardly. When the rotation latch 810 rotates internally, the switching part 800 becomes a half-lock state, and since the latch hook 820 is not engaged with the rotation latch 810, the backrest frame 600 can move forwardly; whereas after the backrest frame 600 is moved forwardly and is fixed temporarily, the latch hook 820 keeps being engaged with the rotation latch 810, thus limiting the backrest frame 600 from moving backward.

[0071] The latch hook 820 belonging to the switching part 800 is needed to rotate within a limited angle range, so the end portions of the rotation latch 810 and the latch hook 820 can be placed to be engaged with each other. In the present embodiment, a latch guide 840 having a punched slot 841 is formed between the formed positions of the rotation latch 810 and the latch hook 820. The latch guide 840 is installed at the upper frame 200, and the latch hook 820 is partially inserted into and passes through the slot 841. One limit pin 821 is formed near an end portion of the latch hook 820, and another limit pin 821 is protruded spaced apart from the above limit pin 821. The latch hook 820 can rotate within a limited range by means of two limit pins 821. One limit pin 821 is disposed at left and right sides of the slot 841.

[0072] More preferably, the switching part 800 might be configured in such a way that the rotation latch 810 can be adjusted to a unlock state, if necessary, so the position of the backrest frame 600 can be precisely adjusted in a state that a user sits on the chair. For the above operation, a release lever 850 is provided, which is able to allow the rotation latch 810 rotate outwardly as a front end portion of the rotation latch 810 is pressed. The operation that the rotation latch 810 moved outwardly in a state that a user sits on the chair can be obtained with the aid of the pusher 830. The pusher 830 consists of an upper pusher 831 and a lower pusher 832 as described earlier, with a coil spring 833 being disposed between the same. Since the lower pusher 832 is movably inserted in the upper pusher 831, when the coil spring 833 is compressed by means of the motion of the release lever 850, the lower pusher 832 moves upward along the fixed upper pusher 831, thus adjusting the rotation latch 810.

<Second embodiment>

[0073] Next, the second embodiment of the present invention will be described. In this embodiment, it is assumed that the present invention is adapted to the chairs used at a classroom of school.

[0074] Differently from the first embodiment of the present invention, there are some differences in the

shape of the support part 30 and the shape of the lower frame in which the lower frame 100 is fixedly installed. In particular, the upper and lower displacement generation part 300 connecting the upper frame 200 and the lower frame 100 is formed of a plurality of foldable link plates 300a. Figure 9 is a schematic cross section illustrating a chair according to the second embodiment, and Figure 10 is a schematic lateral view illustrating the structure of the link plate.

[0075] As shown therein, the link plates 300a are disposed in four directions, thus stably connecting the upper frame 200 and the lower frame 100 and are connected with the aid of a laterally laid-down channel-shaped plate unit part 310, thus allowing the upper frame 200 to move upward and downward with respect to the lower frame 100. The 90° angled connection bracket 320 is engaged to the upper frame 200 and the lower frame 100, respectively, and the plate unit part is connected by inserting a shaft. Preferably, the size of the plate unit part 310 positioned at the upper most portion is large, and its size is getting smaller toward the lower direction, thus constituting the like plates 300a by which the plate unit parts 310 can be folded without any interference. Since the movement operations of the other backrest frames are same, so the detailed descriptions thereon will be omitted.

[0076] The seating furniture having movable backrest according to the present invention can be well adapted to an ordinary office chair as well as a chair at classroom of school, and can be adapted to a sofa and a chair of train or airplane.

Industrial applicability:

[0077] The seating furniture having movable backrest according to the present invention is **characterized in that** when a person sits on a seat part, the backrest frame connected with a backrest automatically moves forward, thus reliably supporting a user's back, which leads to a correct sitting posture, so the present invention can be well adapted to all kinds of chairs such as a student chair, a home chair or an office chair, etc. as well as a sofa. In the detailed application of the present invention, the present invention can be adapted to a chair of a train, a chair of an airplane or the like.

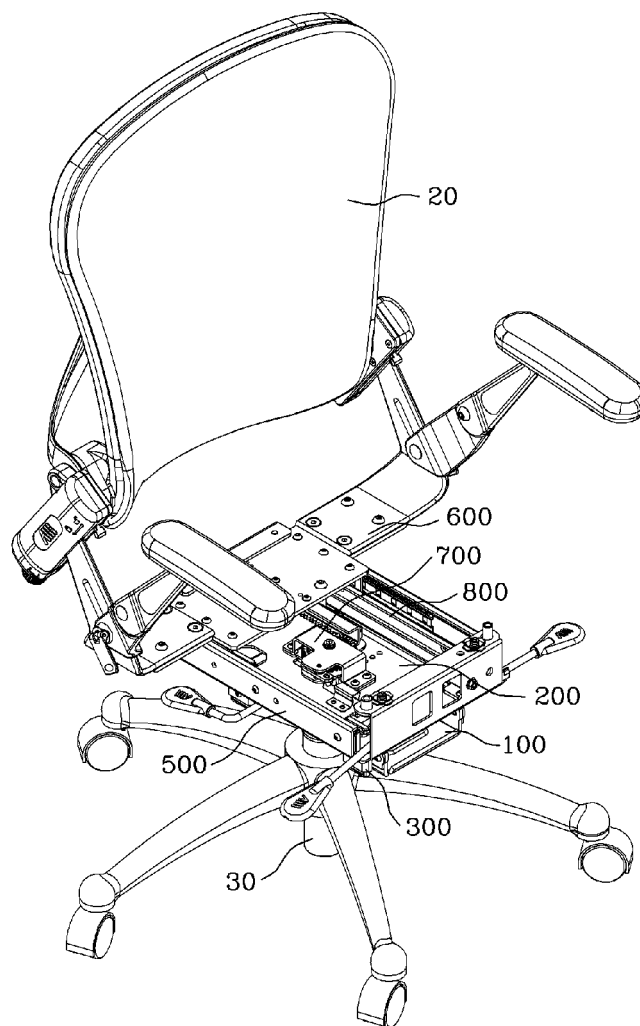
Claims

1. A seating furniture having movable backrest, comprising:

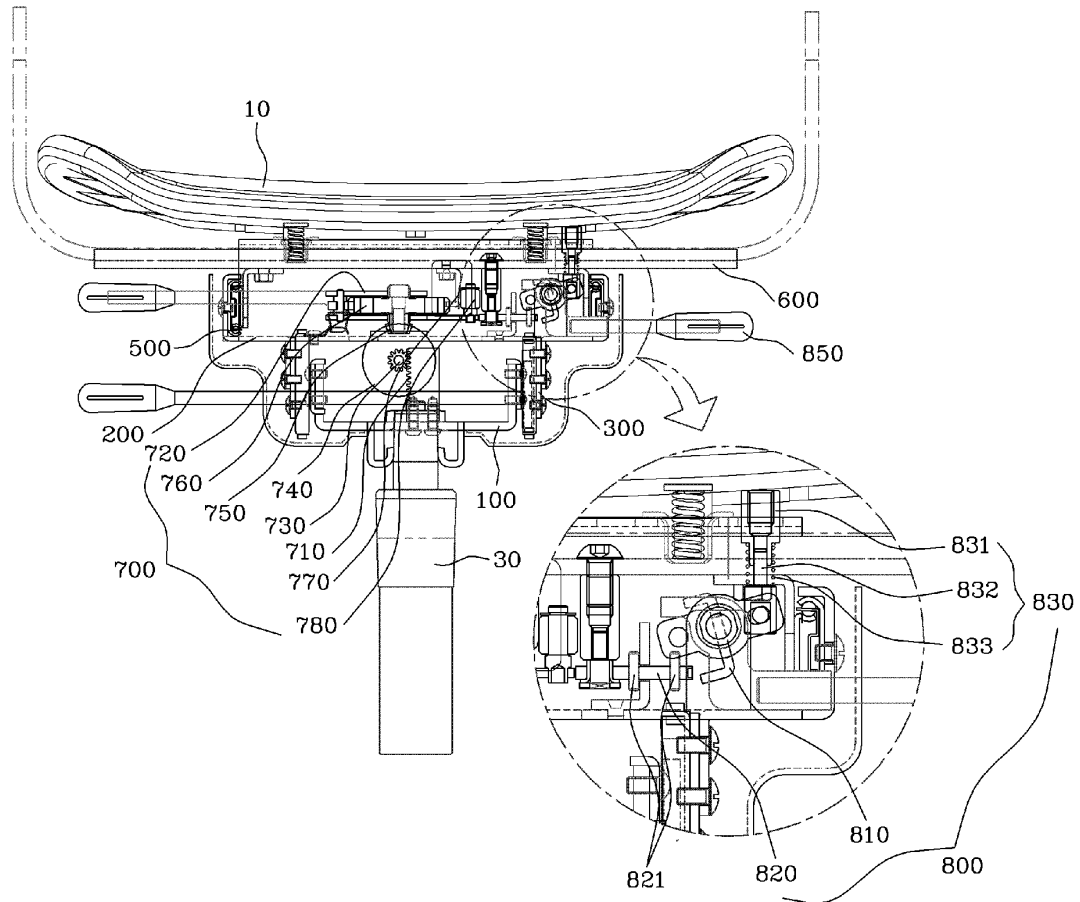
- a lower frame which is connected to a support part;
- an upper frame which is connected with the lower frame with an upper and lower displacement generation means being disposed between them;
- at least one elastic part disposed between the

- lower frame and the upper frame;
 a forward and backward movement means which is formed at the edge portions of left and right sides of the upper frame and is connected with the backrest frame and is movable in forward and backward directions;
 a driving force generation part allowing the backrest frame to move in a forward direction as the displacement generating owing to the down movement of the upper frame is converted into a linear movement by means of a forward and backward movement means when a certain weight is applied to a seat part engaged to the upper frame; and
 a switching part which becomes a half-lock state in which the backrest frame is movable only in a forward direction when a weight is applied to the seat part, and which becomes an unlock state in which the backrest frame is movable only in a backward direction when the weight having applied to the seat part is removed.
2. A seating furniture having movable backrest according to claim 1, wherein said upper and lower displacement generation means is formed of a plurality of vertical slides or a plurality of foldable link plates, each of said vertical slides or said foldable link plates connecting the lower frame and the upper frame and linearly moving.
3. A seating furniture having movable backrest according to claim 2, wherein said driving force generation part comprises:
- a vertical rack gear which is vertically installed at an upper surface of the lower frame;
 a gear box which is engaged to the upper frame;
 a pinion gear which is engaged with a first shaft installed at a lower side of the gear box and then is engaged with the vertical rack gear;
 a vertical bevel gear which is engaged with the first shaft near the pinion gear;
 a spur gear which is horizontally installed in the interior of the gear box wherein a horizontal bevel gear connected with the vertical bevel gear is installed at a lower surface of the spur gear and rotates; and
 a horizontal rack gear which is engaged to a lower side of the backrest and is engaged with the spur gear and transfers a driving force to the backrest frame.
4. A seating furniture having movable backrest according to claim 3, wherein said driving force generation part is formed of a stopper which is connected with a stop lever at one side of the spur gear, thus being selectively engaged with or disengaged from the spur gear.
5. A seating furniture having movable backrest according to claim one among claims 1 through 4, wherein said switching part comprises:
- a rotation latch which is engaged in the interior of the upper frame in forward and backward directions, thus converting a rotation direction depending on the presence of a weight at the seat part; and
 a latch hook which is connected with a lower surface of the backrest frame and is in a rotational operation within a limited angle range and is selectively engaged or disengaged with respect to the rotation latch.
6. A seating furniture having movable backrest according to claim 5, wherein said seating furniture having a movable backrest is **characterized in that** the seat part is movable upward and downward with the rear end portion of the upper frame operating as a fixing part, and a pusher connected with a front end portion of the rotation latch is disposed at a lower surface of the front end portion of the seat part, thus allowing the rotation latch to rotate depending on the motion of the seat part.
7. A seating furniture having movable backrest according to claim 6, wherein said pusher comprises:
- an upper pusher which faces a lower surface of the seat part;
 a lower pusher of which an upper end portion is inserted through a lower side of the upper pusher and is movable,
 and a lower end portion is engaged with the rotation latch; and
 a coil spring which is disposed between the upper pusher and the lower pusher.
8. A seating furniture having movable backrest according to claim 5, wherein said switching part is **characterized in that** a latch guide with slot formed in forward and backward directions is disposed between the rotation latch and the latch hook, and two limit pins protruded with certain intervals from each other are disposed at the latch hook, and the latch hook passes through the slot, wherein the rotation angle of the latch hook is so limited that the latch hook is limited by two limit pins.
9. A seating furniture having movable backrest according to claim 5, wherein said switching part is formed of a release lever by which the rotation latch can be adjusted to an unlock state by pressing a front end portion of the rotation latch.

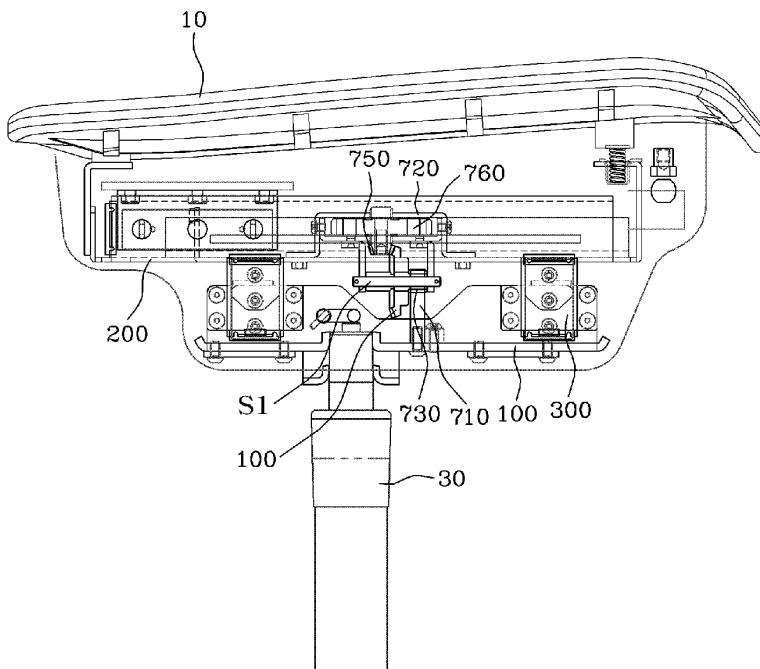
[Fig. 1]



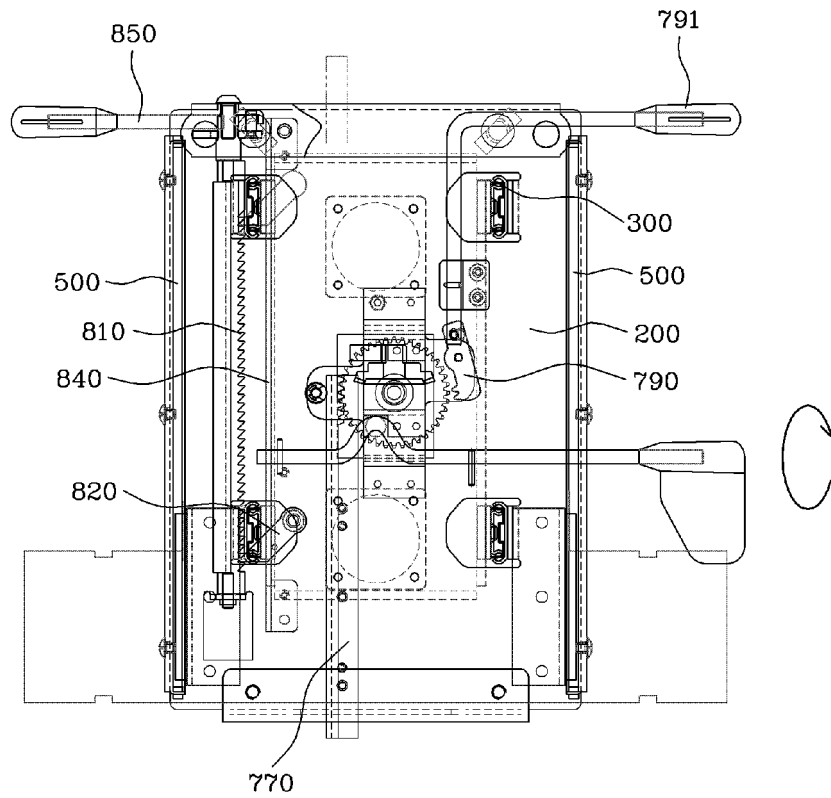
[Fig. 2]



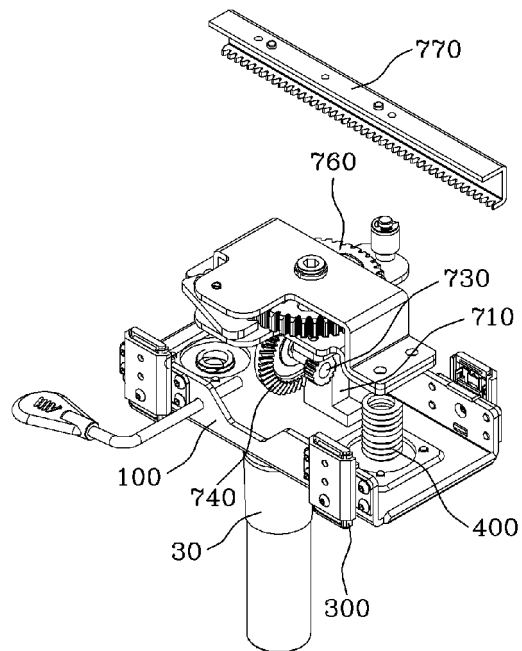
[Fig. 3]



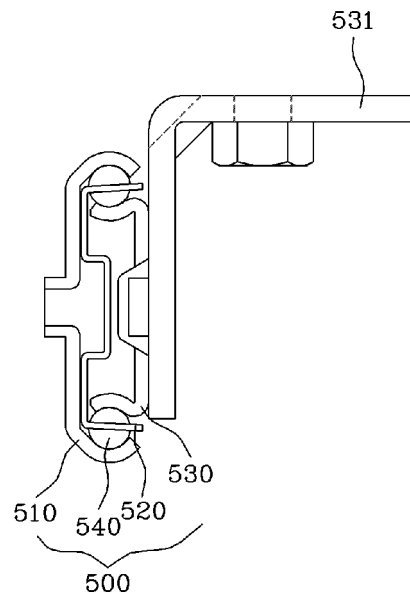
[Fig. 4]



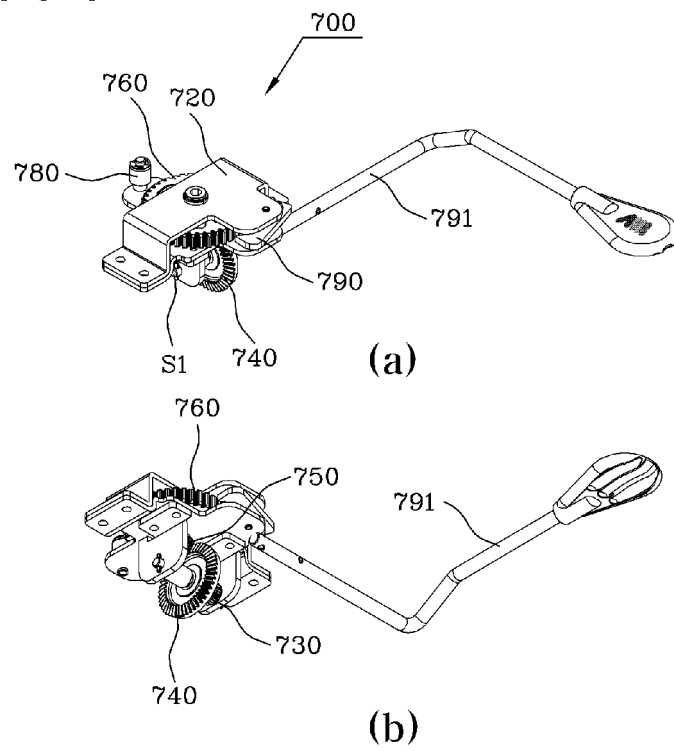
[Fig. 5]



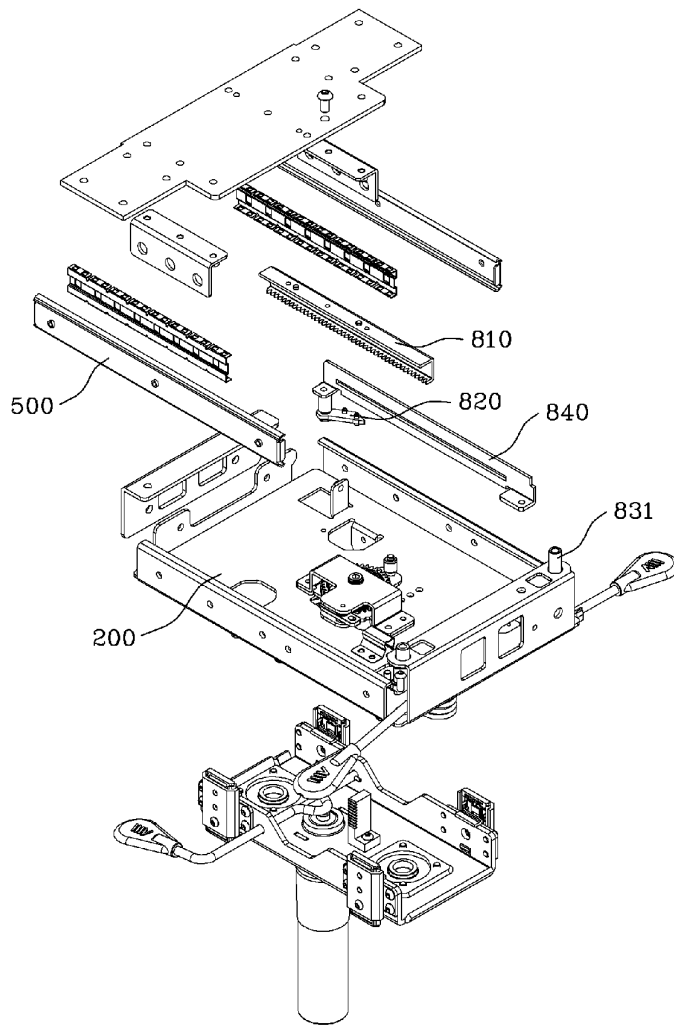
[Fig. 6]



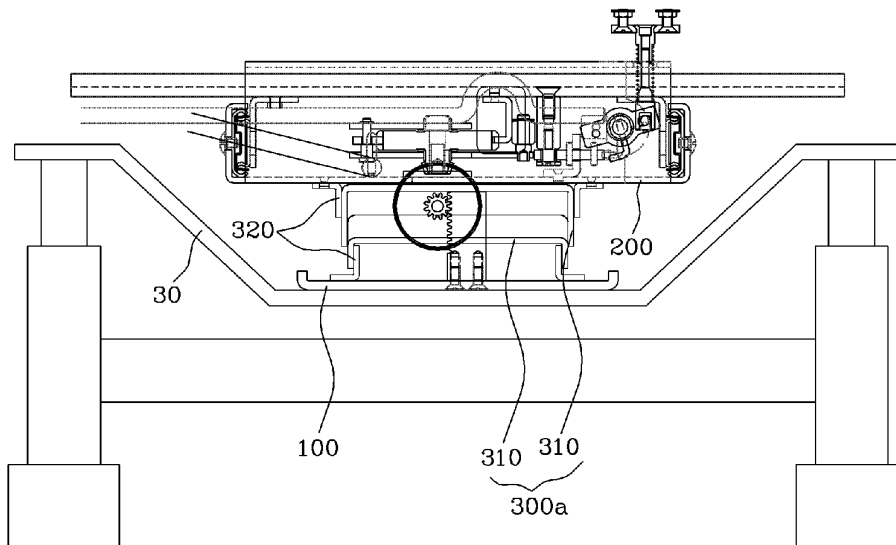
[Fig. 7]



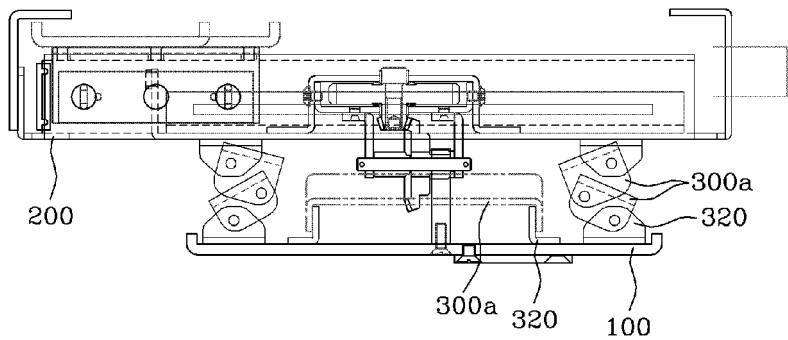
[Fig. 8]



[Fig. 9]



[Fig. 10]



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 1020070060533 [0003]