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(54) **LOWER-BACK SUPPORTING STRUCTURE FOR A BED OR A CHAIR**

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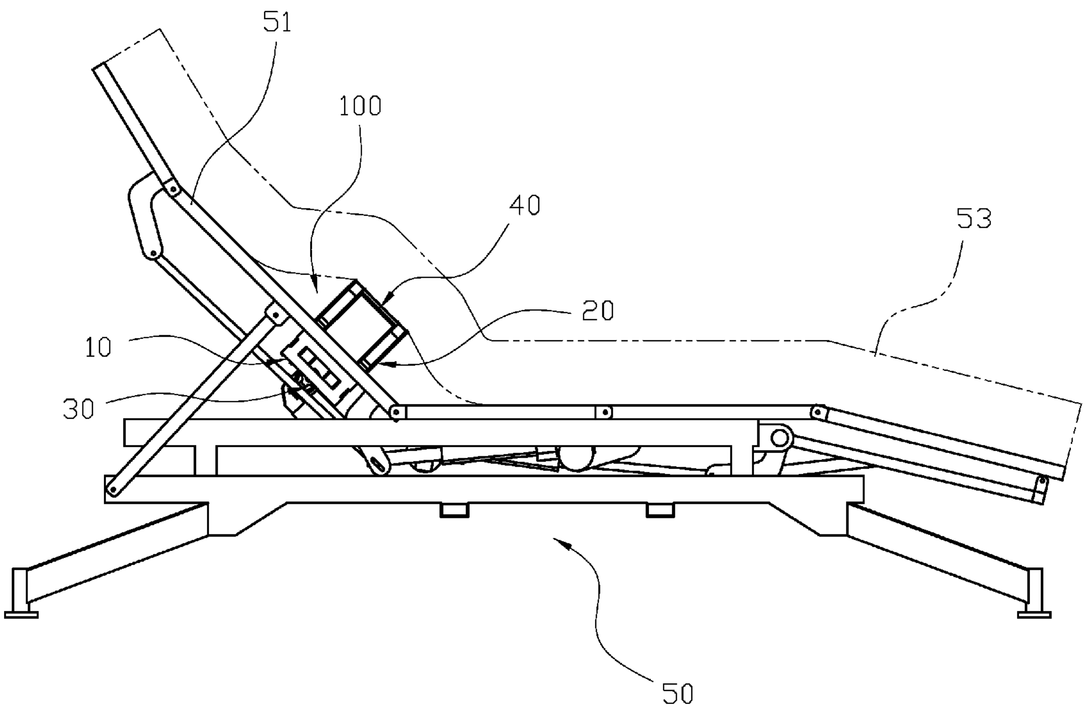
(57) **ABSTRACT**

A lower-back supporting structure for a bed or a chair includes a sliding base, two scissor lifts, a driver and a supporting member. The sliding base has a pair of slide slots and a pair of rotating pins, a securing portion between the two rotating pins, and a plurality of the locking apertures. Two scissor lifts both have an X-shaped frame having a pivot. A driver has a positioning end, an extendable rod, a through hole and a sliding rod placed through the slide slot, the through hole and the first front cotter holes. A supporting member has a pair of slide tracks and a pair of rotating holes. The driver drives the sliding rod along the slide slot of the sliding base to shorten the extendable rod, the scissor lifts rotate around the pivots to lift such that the supporting member is pushed away from the sliding base.



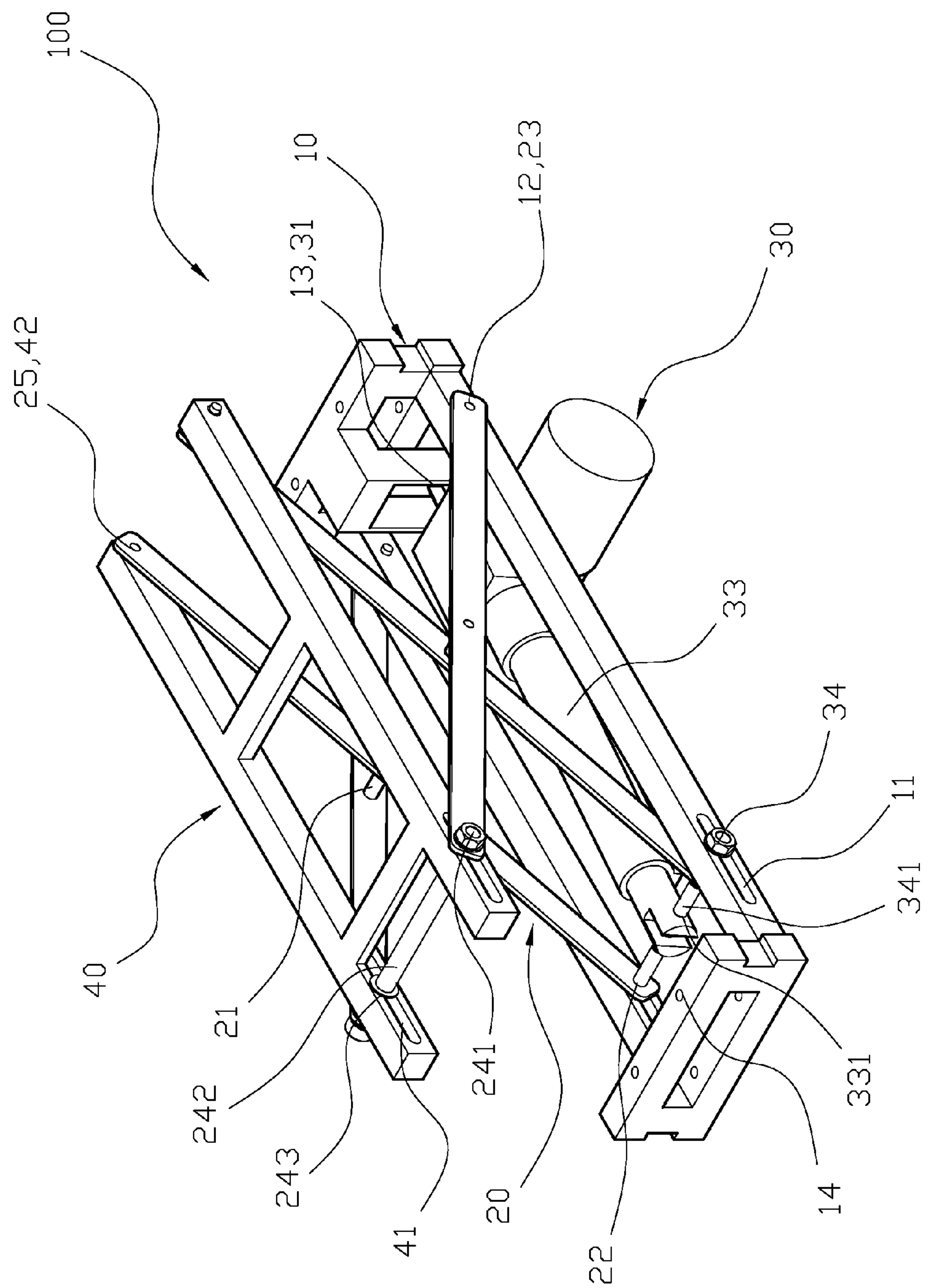

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FIG. 1

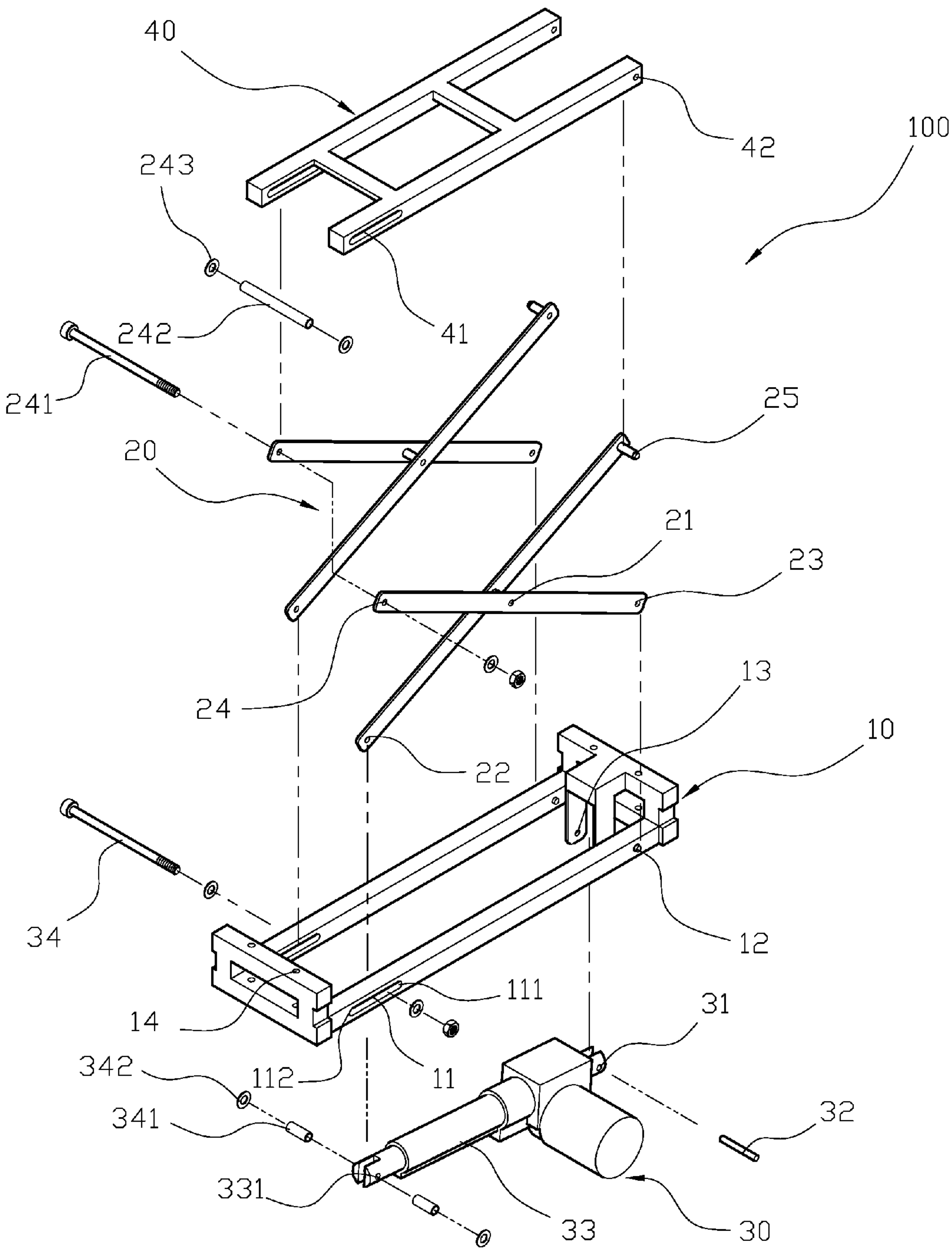
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FIG. 2

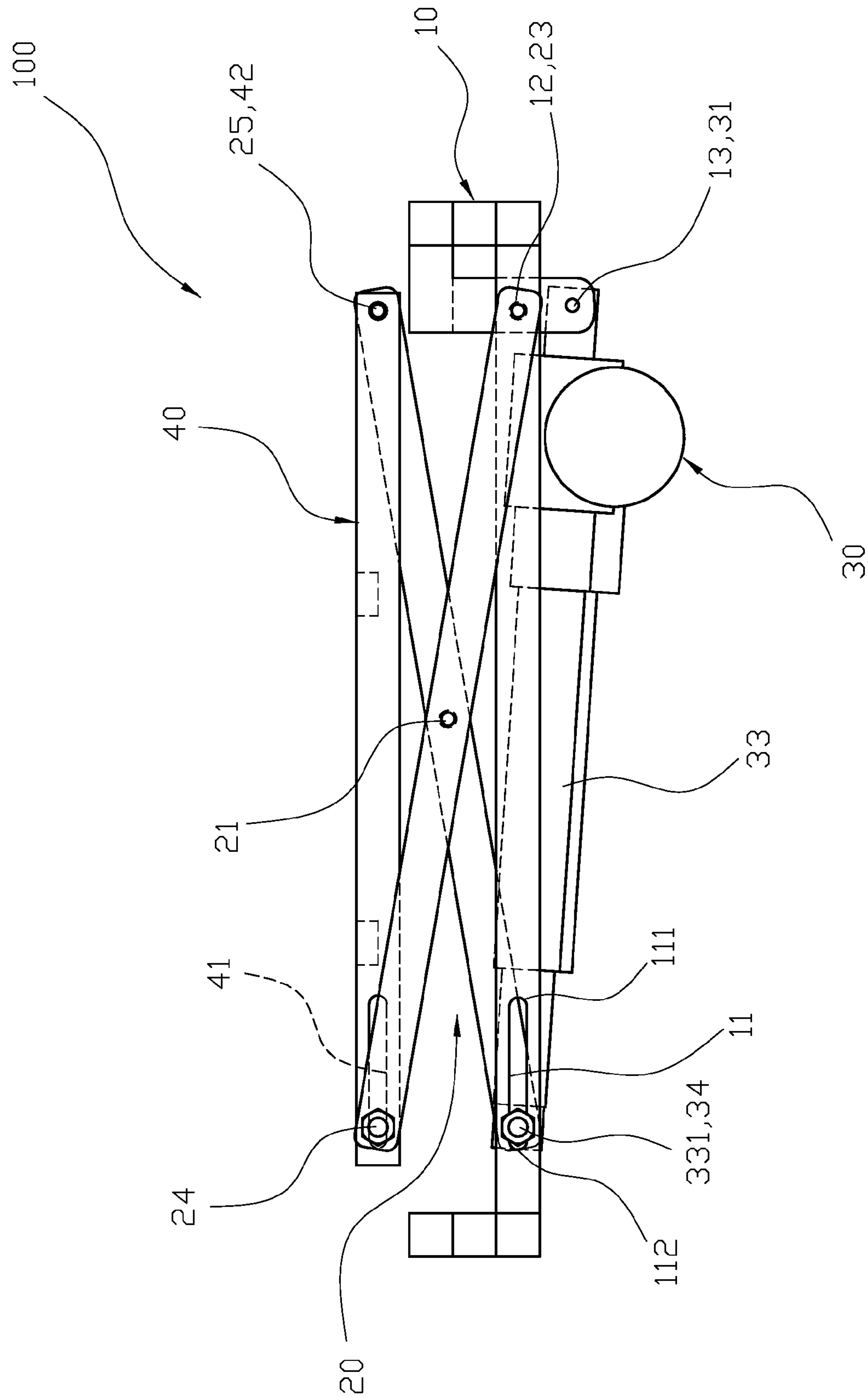

FIG. 3

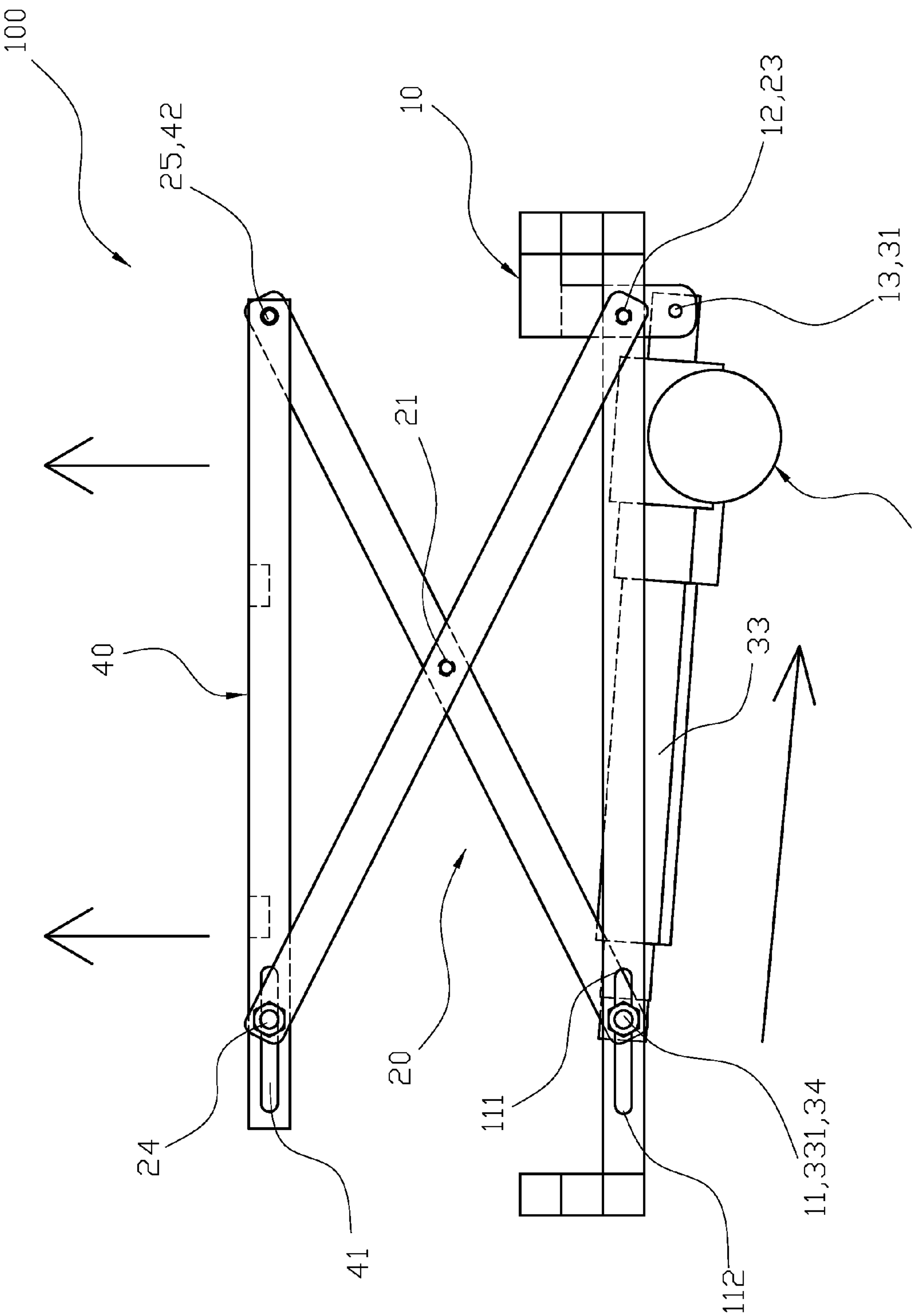

FIG. 4

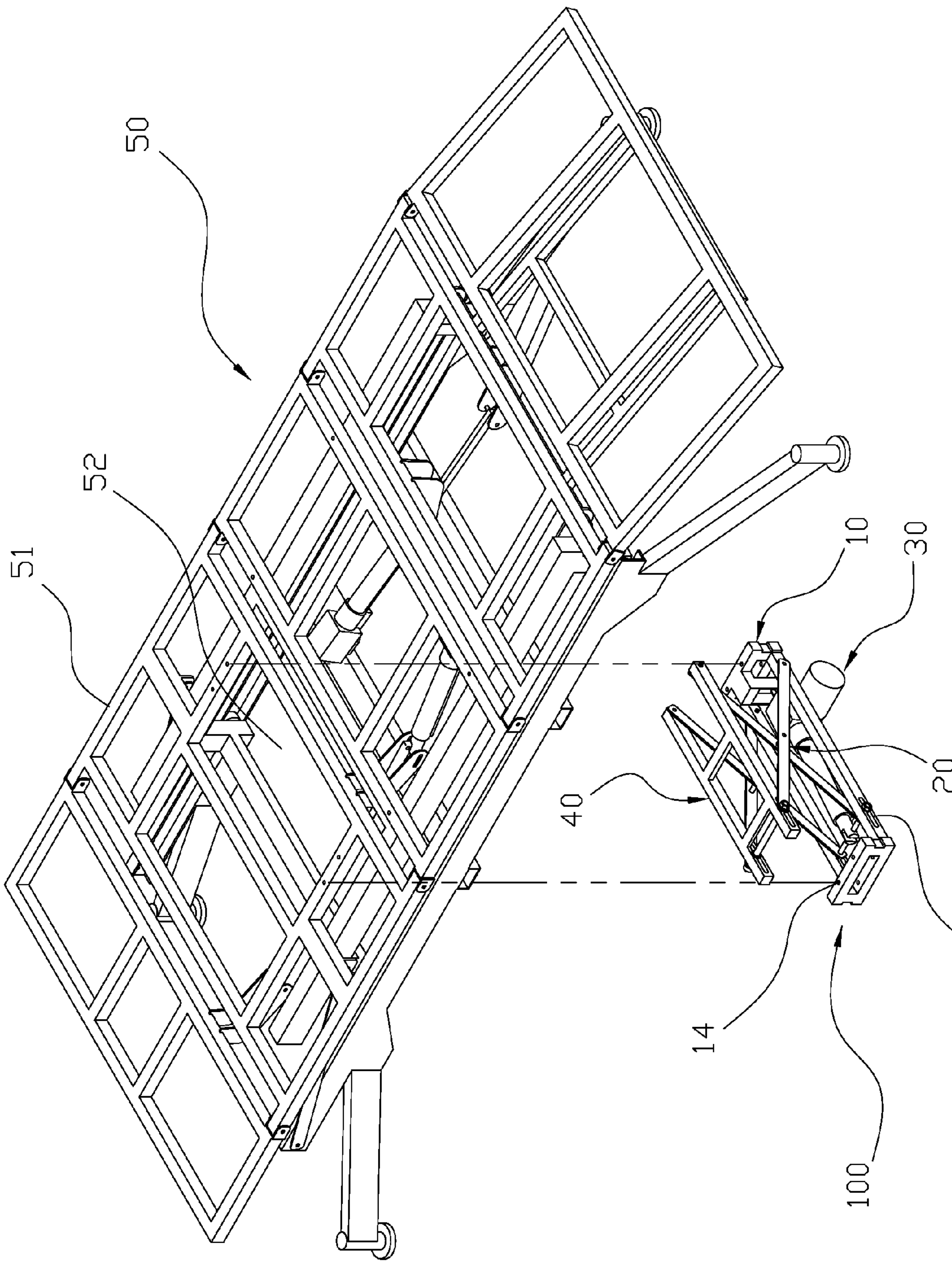

FIG. 5

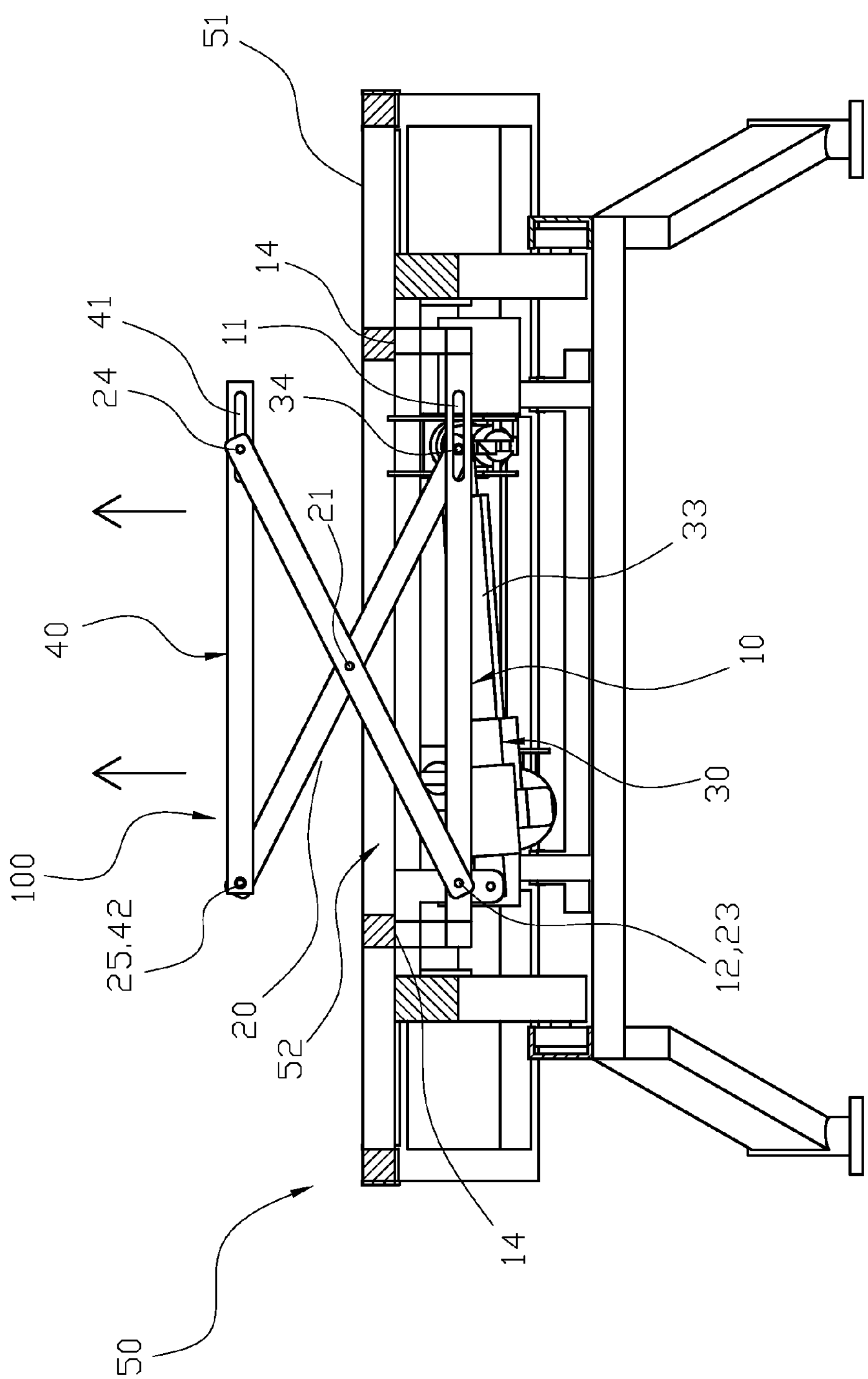

FIG. 6

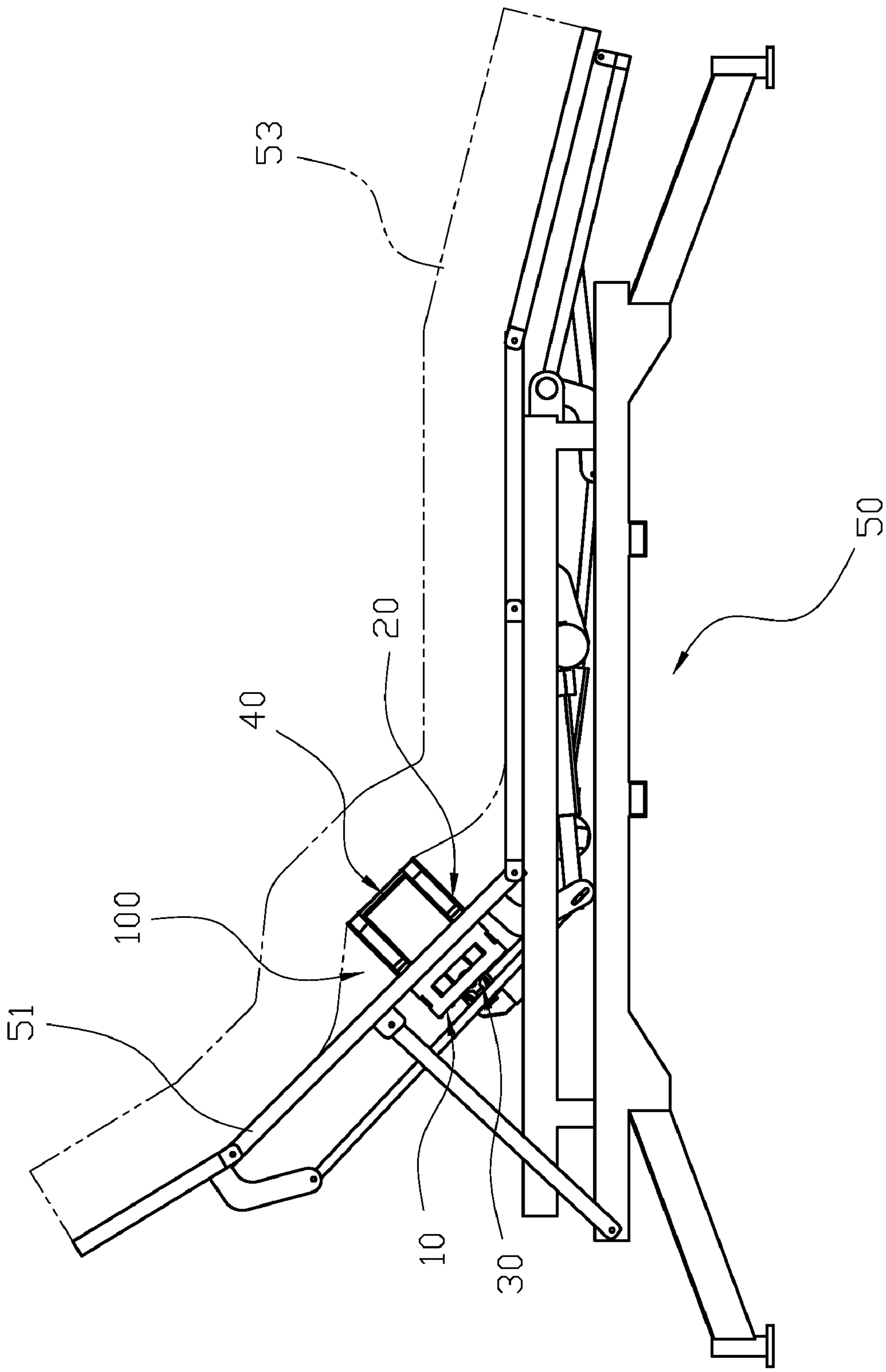

FIG. 7

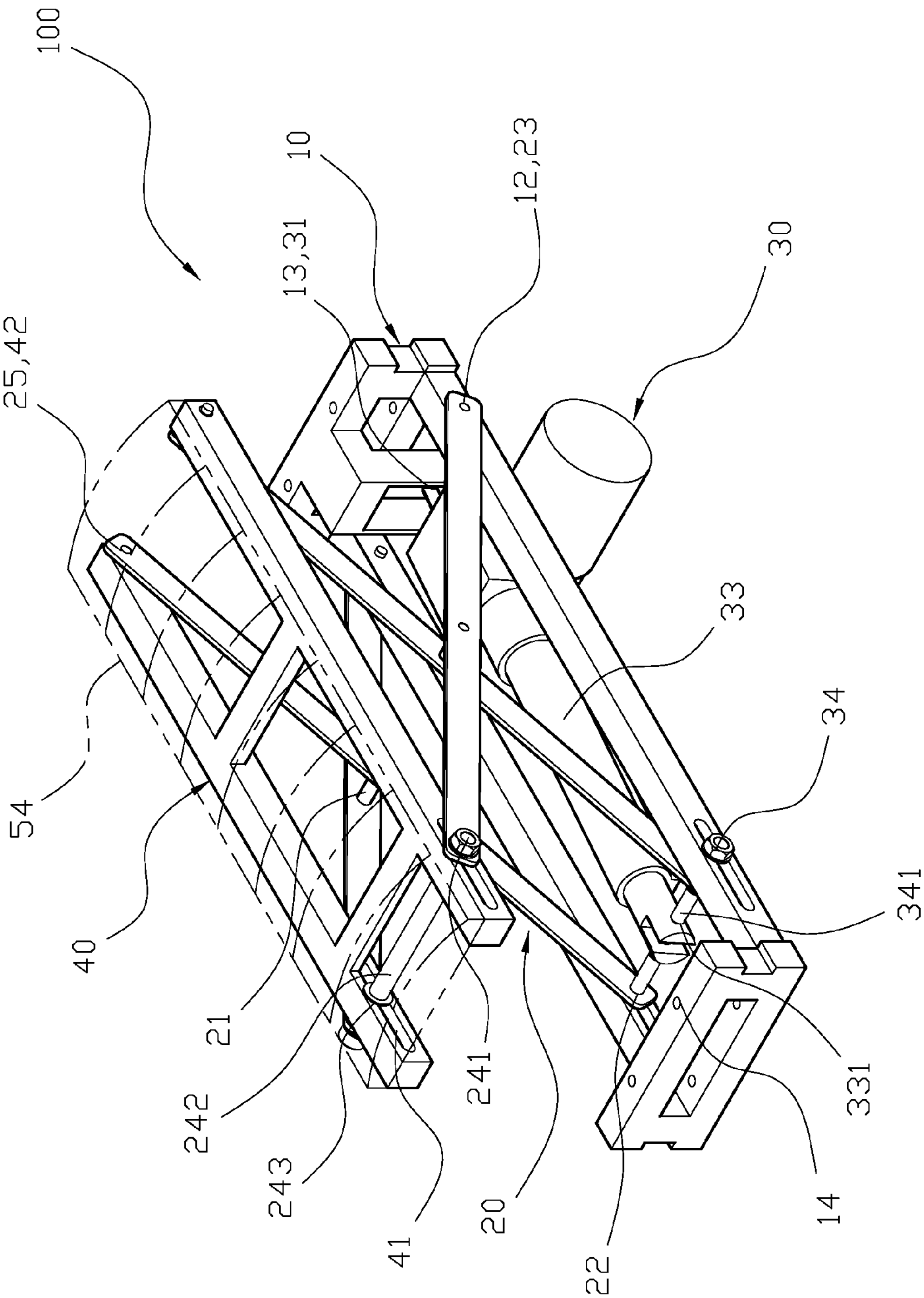
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FIG. 8

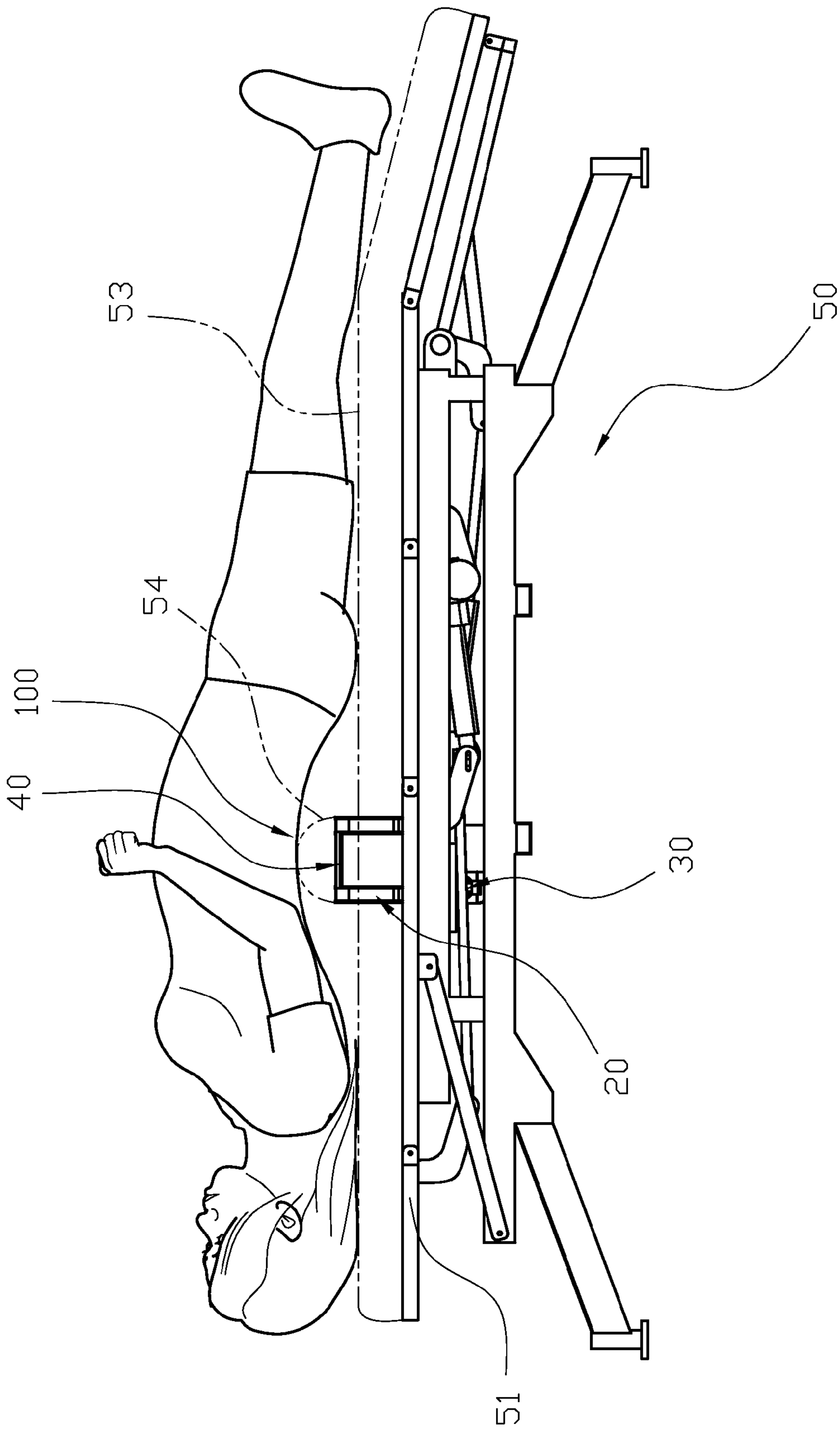

FIG. 9

LOWER-BACK SUPPORTING STRUCTURE FOR A BED OR A CHAIR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a lower-back supporting structure for a bed or a chair, and more particularly to a lower-back supporting assembly that provides lower-back support to improve the comfort afforded by a bed frame or chair, which employs scissor lifts that are capable of a scissoring movement to increase the lift height of the supporting member, thereby providing a lower-back supporting structure that can help users suffering from lower-back pain.

[0003] 2. Description of the Related Art

[0004] Currently, most bed frames are designed for a user to lay flat while sleeping, and a typical bed frame includes four legs and supports. However, due to the stresses of modern life, many people suffer from insomnia and therefore suffer from a lack of sufficient rest. Consequently, many bed frames have included additional features, such as providing head or leg lifting capabilities, and the user can select and adjust a suitable position for him or herself. However, these prior art bed frames all lack a lower-back support function. The lower-back of the human body supports the upper-body weight and has a concaved shape, which is the narrowest portion in the upper body; therefore, the lower-back endures tremendous pressure. If, when the user is laying flat, his or her lower-back is not supported by the bed surface, the user cannot experience the most comfortable posture or release the stresses around the lower-back.

[0005] Some typical chairs have lower-back support structures, but the user must manually do the adjustment. The prior structure utilizes an elastic sheet to provide support to a back board, and the back board is attached to a string. With a tightening rotation or release of the string, the back board is placed in different positions to provide lower-back support. However, the prior art lower-back support structure requires manual operation which is inconvenient, and the elastic sheet cannot provide sufficient support height.

[0006] Therefore, it is desirable to provide a lower-back supporting structure for a bed or a chair to mitigate and/or obviate the aforementioned problems.

SUMMARY OF THE INVENTION

[0007] An objective of the present invention is to provide a lower-back supporting structure for a bed or a chair.

[0008] In order to achieve the above-mentioned objective, a lower-back supporting structure for a bed or a chair comprises a sliding base, two scissor lifts, a driver and a supporting member. The sliding base is a rectangular frame, and front ends and rear ends of two length-wise sides respectively have a pair of slide slots and a pair of rotating pins. Each slide slot is an elongate slot having an inner arcuate region and an outer arcuate region at two respective ends. A securing portion is disposed on a down-extended portion between the two rotating pins, and the sliding base includes a plurality of locking apertures. The two scissor lifts both are an X-shaped frame having a pivot; two bottom ends of each has a first front cotter hole and a rear cotter hole, and two top ends of each has a second front cotter hole and rear rotating pin. The first front cotter hole of each scissor lift is aligned with the slide slot of the sliding base, the rear cotter hole of each scissor lift is pivoted to the rotating pin, and a sliding pin is placed through the two second front cotter holes of the two scissor lifts. A first spacer tube and a first pair of washers are jacketed on the sliding pin. The driver is an electric motor or a hydraulic device. The driver has a positioning end; the positioning end is pivoted to the securing portion of the sliding base, and the securing portion of the sliding base and the positioning end of the driver are pivoted together by a pin. Another end of the driver has an extendable rod and a through hole disposed at an end of the extendable rod. The through hole is aligned with the slide slot of the sliding base. A sliding rod is placed through the slide slot, the through hole and the first front cotter holes. Furthermore, two second spacer tubes and a second pair of washers are jacketed on the sliding rod among the slide slot, the through hole and the first front cotter holes. Therefore, the driver and the sliding base are capable of moving relative to each other. A supporting member has four corners corresponding to the four top ends of the two scissor lifts, a pair of slide tracks and a pair of rotating holes; each slide track corresponds with the sliding pin, and each rotating hole is pivoted to a corresponding rear rotating pin. Subsequently, the driver drives the sliding rod along the slide slot of the sliding base to shorten the extendable rod, the scissor lifts rotate around the pivots to lift such that the supporting member is pushed away from the sliding base.

[0009] When the extendable rod of the driver is extended, the extendable rod pushes the sliding rod towards the outer arcuate regions of the slide slots, and the first front cotter holes of the scissor lifts are pushed in the same direction so the scissor lifts rotate around their pivots. A maximum distance between the first front cotter hole and the rear cotter hole is then reached. Alternatively, when the extendable rod of the driver contracts, the through hole of the extendable rod pulls the sliding rod to slide towards the inner arcuate regions of the slide slots, and with the sliding rod being pivoted to the first front cotter holes of the scissor lifts the sliding rod simultaneously pulls the first front cotter holes to slide towards the rear cotter holes. Meanwhile, the scissor lifts rotate around their pivots, and a minimum distance between the first front cotter holes and the rear cotter holes is then reached. Additionally, the second front cotter holes and the rear rotating pins of the scissor lifts also move to closer to each other. The rear rotating pins are pivoted on the rotating holes of the supporting member, and the rear rotating pins of the scissor lifts lift the ends having the rotating holes of the supporting member. The second front cotter holes with the sliding pin slides and pushes against the slide track of the supporting member. Therefore, with the contraction of the driver and the simultaneous rotation of the scissor lifts, the supporting member is able to lift up while remaining horizontal.

[0010] The lower-back supporting structure utilizes the driver to push the sliding rod along the slide slots, and with the scissoring movement of the scissor lifts the supporting is lifted horizontally. This simple assembly structure can provide lower-back support to improve the comfort of the bed frame or chair. Moreover, the scissor lifts both are an X-shaped frame and capable of scissoring movement around the pivots to increase the lift height of the supporting member. Therefore, the lower-back supporting structure can help users to ease their lower-back pain.

[0011] Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a perspective view of an embodiment of the present invention.

[0013] FIG. **2** is a perspective exploded view of an embodiment of the present invention.

[0014] FIG. **3** is a side view of an embodiment of the present invention.

[0015] FIG. **4** is a schematic drawing of a pushing movement according to an embodiment of the present invention.

[0016] FIG. **5** is a perspective exploded view showing an embodiment of the present invention being installed onto a bed frame.

[0017] FIG. **6** is a cross-sectional view of a lower-back supporting structure according to an embodiment of the present invention.

[0018] FIG. **7** is a schematic drawing showing an embodiment lower-back supporting structure being installed onto a bed frame and lifting up.

[0019] FIG. **8** is a schematic drawing showing an embodiment supporting member with a soft padding according to the present invention.

[0020] FIG. **9** is a schematic drawing showing a user laying flat on an embodiment bed frame.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] Please refer to FIG. **1** and FIG. **2**. An embodiment lower-back supporting structure **100** for a bed or a chair comprises a sliding base **10**, two scissor lifts **20**, a driver **30** and a supporting member **40**. The sliding base **10** is a rectangular frame, and front ends and rear ends of two length-wise sides respectively have a pair of slide slots **11** and a pair of rotating pins **12**. Each slide slot **11** is an elongate slot having an inner arcuate region **111** and an outer arcuate region **112** at two respective ends. A securing portion **13** is disposed on a down-extended portion between the two rotating pins **12**, and the sliding base **10** includes a plurality of locking apertures **14**. The two scissor lifts **20** both are an X-shaped frame having a pivot **21**; two bottom ends of each has a first front cotter hole **22** and a rear cotter hole **23**, and two top ends of each has a second front cotter hole **24** and rear rotating pin **25**. The first front cotter hole **22** of each scissor lift **20** is aligned with the slide slot **11** of the sliding base **10**, the rear cotter hole **23** of each scissor lift **20** is pivoted to the rotating pin **12**, and a sliding pin **241** is placed through the two second front cotter holes **24** of the two scissor lifts **20**. A first spacer tube **242** and a first pair of washers **243** are jacketed on the sliding pin **241**. The driver **30** is an electric motor or a hydraulic device. The driver **30** has a positioning end **31**; the positioning end **31** is pivoted to the securing portion **13** of the sliding base **10**, and the securing portion **13** of the sliding base **10** and the positioning end **31** of the driver **30** are pivoted together by a pin **32**. Another end of the driver **30** has an extendable rod **33** and a through hole **331** disposed at an end of the extendable rod **33**. The through hole **331** is aligned with the slide slot **11** of the sliding base **10**. A sliding rod **34** is placed through the slide slot **11**, the through hole **331** and the first front cotter holes **22**. Furthermore, two second spacer tubes **341** and a second pair of washers **342** are jacketed on the sliding rod **34** among the slide slot **11**, the through hole **331** and the first front cotter holes **22**. Therefore, the driver **30** and the sliding base **10** are capable of moving relative to each other. A supporting member **40** has four corners corresponding to the four top ends of the two scissor lifts **20**, a pair of slide tracks **41** and a pair of rotating holes **42**; each slide track **41** corresponds with the sliding pin **241**, and each rotating hole **42** is pivoted to a corresponding rear rotating pin **25**. Subsequently, the driver **30** drives the sliding rod **34** along the slide slot **11** of the sliding base **10** to shorten the extendable rod, the scissor lifts **20** rotate around the pivots **21** to lift such that the supporting member **40** is pushed away from the sliding base **10**.

[0022] For an embodiment structure of the present invention, please refer to FIGS. **1**, **2** and **3**. The two scissor lifts **20** are separately placed at two length-wise sides of the sliding base **10**, and the first front cotter holes **22** of the scissor lifts **20** are placed adjacent to the inner side of the slide slot **11**. The rear cotter holes **23** of the scissor lifts **20** are pivoted to the rotating pin **12** so that the two scissor lifts **20** are installed symmetrically. The driver **30** is coupled with the pin **32**, which passes through the positioning end **31**, so that the positioning end **31** is pivoted to the securing portion **13** of the sliding base **10**. The extendable rod **33** of the driver **30** is arranged towards the slide slots **11** of the sliding base **10** and placed between the two scissor lifts **20**. The sliding rod **34** is placed through the slide slot **11** for sliding movement and also through the first front cotter holes **22** of the two scissor lifts **20** and the through hole **331** of the driver **30**, and the first spacer tube **341** and the washer **342** are jacketed on the sliding rod **34** at two sides of the through hole **331** to secure the movement of the driver **30** and also serve as spacers to prevent the legs of the scissor lifts **20** from collapsing towards each other. The supporting member **40** is placed above the scissor lifts **20**, and the inner side of the rotating holes **42** are pivoted to the rear rotating pins **25** of the two scissor lifts **20**. The second front cotter holes **24** of the scissor lifts **20** are placed on the outer side of the slide track **41** of the supporting member **40**, and the sliding pin **241** is placed through both of the second front cotter holes **24** and the slide tracks **41**. The first spacer tube **242** and the washer **243** are jacketed on the sliding pin **241** between the two slide tracks **41**. Therefore, the scissor lifts **20** and the supporting member **40** are capable of relative sliding movements, and the assembly structure of the lower-back supporting structure **100** is completed.

[0023] For the actual operation, please refer to FIG. **3** and FIG. **4** with further reference to FIG. **2**. When the extendable rod **33** of the driver **30** is extended, the extendable rod **33** pushes the sliding rod **34** towards the outer arcuate regions **112** of the slide slots **11**, and the first front cotter holes **22** of the scissor lifts **20** are pushed in the same direction so the scissor lifts **20** rotate around their pivots **21**. A maximum distance between the first front cotter hole **22** and the rear cotter hole **23** is then reached. Alternatively, when the extendable rod **33** of the driver **30** contracts, the through hole **331** of the extendable rod **33** pulls the sliding rod **34** to slide towards the inner arcuate regions **111** of the slide slots **11**, and with the sliding rod **34** being pivoted to the first front cotter holes **22** of the scissor lifts **20** the sliding rod **34** simultaneously pulls the first front cotter holes **22** to slide towards the rear cotter holes **23**. Meanwhile, the scissor lifts **20** rotate around their pivots **21**, and a minimum distance between the first front cotter holes **22** and the rear cotter holes **23** is then reached. Additionally, the second front cotter holes **24** and the rear rotating pins **25** of the scissor lifts **20** also move to closer to each other. The rear rotating pins **25** are pivoted on the rotating holes **42** of the supporting member **40**, and the rear rotating pins **25** of the scissor lifts **20** lift the ends having the rotating holes **42** of the supporting member **40**. The second front cotter holes **24** with the sliding pin **241** slides and pushes against the slide track **41** of the supporting member **40**. Therefore, with the contraction of the driver **30** and the simultaneous rotation of the scissor lifts **20**, the supporting member **40** is able to lift up while remaining horizontal.

[0024] For an embodiment application, please refer to FIG. **5** to FIG. **7** with further reference to FIG. **2**. The lower-back supporting structure **100** can be installed onto an upper bed board **51** of a bed frame **50** or a chair back of a chair. Therefore, when a user lays flat or sits, his or her lower-back is above the lower-back supporting structure **100**. Taking the bed frame **50** as an example, the lower-back supporting structure **100** is screwed onto an opening **52** of the bed frame **50** through the locking aperture **14** of the sliding base **10**, and the opening **52** is located at a position on upper bed board **51** corresponding to the lower-back of the user. When the lower-back supporting structure **100** is not activated, the driver **30** is extended, the scissor lifts **20** stretch out like opened scissors, and so the supporting member **40** is not pushed away from the sliding base **10**. In addition, the upper bed board **51** is able to have a raised lower-back supporting structure in a horizontal state or an inclined state. A mattress **53** is placed above the bed frame **50** to provide more comfort for the user. When the user wants to have lower-back support, he or she only needs to control the driver **30** for contraction to drive the scissor lifts **20** to close up and thus lift up the supporting member **40**, and a raised area on the mattress **53** is thereby formed under the lower-back of the user. Please refer to FIG. **8** and FIG. **9**. A soft padding **54** is placed on the upper side of the supporting member **40**, and the entire structure is capable of being contained in the mattress **53** and individually supporting the lower-back area. Accordingly, the supporting member **40** can support the lower-back area of the user, to reduce stress around the lower-back area when the user is laying flat, which can help the user feel more comfortable.

[0025] With the above-mentioned structure, the following benefits can be obtained: the lower-back supporting structure **100** utilizes the driver **30** to push the sliding rod **34** along the slide slots **11**, and with the scissoring movement of the scissor lifts **20** the supporting **40** is lifted horizontally. This simple assembly structure can provide lower-back support to improve the comfort of the bed frame **50** or chair. Moreover, the scissor lifts **20** both are an X-shaped frame and capable of scissoring movement around the pivots **21** to increase the lift height of the supporting member **40**. Therefore, the lower-back supporting structure **100** can help users to ease their lower-back pain.

[0026] Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A lower-back supporting structure for a bed or a chair comprising:

a sliding base forming a rectangular frame, front ends and rear ends of two length-wise sides respectively having a pair of slide slots and a pair of rotating pins, a securing portion disposed on a down-extended portion between the two rotating pins, and the sliding base including a plurality of the locking apertures;

two scissor lifts both forming an X-shaped frame having a pivot, two bottom ends of each having a first front cotter hole and a rear cotter hole, two top ends of each having a second front cotter hole and rear rotating pin, the first front cotter hole of each scissor lift aligned with the slide slot of the sliding base, the rear cotter hole of each scissor lift pivoted to the rotating pin, and a sliding pin is placed through the two second front cotter holes of the two scissor lifts;

a driver having a positioning end, the positioning end pivoted to the securing portion of the sliding base, another end of the driver having an extendable rod and a through hole disposed at an end of the extendable rod, the through hole aligned with the slide slot of the sliding base; and a sliding rod is placed through the slide slot, the through hole and the first front cotter holes; and

a supporting member having four corners corresponding to the four top ends of the two scissor lifts, a pair of slide tracks and a pair of rotating holes, each slide track corresponding to the sliding pin, and each rotating hole pivoted to the rear rotating pins;

wherein the driver drives the sliding rod along the slide slot of the sliding base to shorten the extendable rod, the scissor lifts rotate around the pivots to lift such that the supporting member is pushed away from the sliding base.

2. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein the slide slot is an elongate slot having an inner arcuate region and an outer arcuate region at two respective ends.

3. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein the securing portion of the sliding base and the positioning end of the driver are pivoted together.

4. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein the driver is an electric motor.

5. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein the driver is a hydraulic device.

6. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein a first spacer tube and a first pair of washers are jacketed on the sliding pin between the two slide tracks of the supporting member.

7. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein at least two second spacer tubes and a second pair of washers are jacketed on the sliding rod among the slide slot, the through hole and the first front cotter hole.

8. The lower-back supporting structure for a bed or a chair as claimed in claim **1**, wherein a soft padding is disposed on the supporting member.

* * * * *