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(54) **HOSPITAL BED**

(57) The invention relates to a hospital bed (10) with a supporting section (14) for supporting a mattress (16) extending between a foot end member (22) and a head end member (24), and at least one side railing extending between the foot end member (22) and the head end member (24) along a side edge of the supporting section (14), wherein the side railing comprises at least two parts (26, 28) which are independently adjustable in a vertical direction.

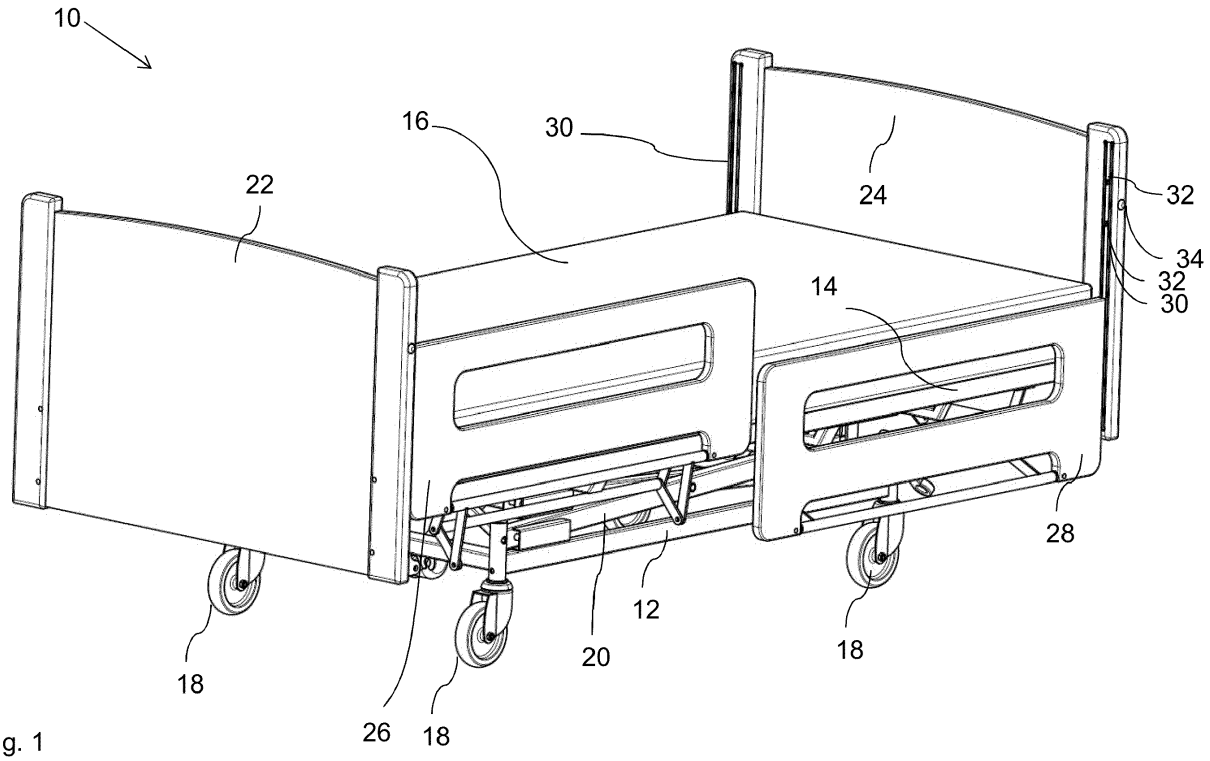

Fig. 1

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Description

[0001] The invention relates to a hospital bed.

[0002] Hospital beds usually comprise a base frame carrying a supporting section for supporting a mattress. In most cases, the supporting section is adjustable to provide, for example, a flat lying position and an upright position for the patient. At the sides of such beds, side rails are provided to offer protection for the patient from falling out of the bed. Depending on the state of the patient, such side rails can be raised or lowered.

[0003] Known mechanisms for adjusting the side rails are often complicated to operate and generate acoustic and mechanical disturbances for the patient. Furthermore, common side rails are hard to adapt for individual positions of the supporting section for the mattress.

[0004] It is therefore the technical problem underlying the present invention to provide a hospital bed with an easily adjustable and flexible side rail.

[0005] This problem is solved by a hospital bed according to claim 1.

[0006] Such a hospital bed comprises a supporting section for supporting a mattress extending between a foot end member and a head end member, and at least one side railing extending between the foot end member and the head end member along the side edge of the supporting section. The side railing comprises at least two parts which are independently adjustable in a vertical direction.

[0007] The multi-part nature of the side railing allows for an easy adjustment of the side railing depending on the configuration of the supporting section. For example, if the head end of the mattress is raised to provide an upright position for the patient, the part of the side railing at the head end side of the hospital bed can be raised further to provide additional safety for the patient. Furthermore, the split configuration of the side railing allows for an easier setting of the railing configuration since the parts to be moved are lighter and can therefore be adjusted with a minimum of disturbance for the patient.

[0008] In a further preferred embodiment of the invention, a first part of the side railing is vertically movable along a vertical groove of the foot end member and a second part of the side railing is vertically movable along a vertical groove of the head end member.

[0009] This provides for a smooth and easy adjustment mechanism which can be operated by a single person. In a further preferred embodiment of the invention, the first part and/or the second part of the side railing is lockable into at least one predefined vertical position.

[0010] By providing predefined positions for the side railing, the adjustment of the side railing is improved, since the person operating the side railing does not have to check for the exact position of the railing when adjusting it.

[0011] It is further preferred if the first part and/or the second part of the side railing is unlockable from the at least one predefined vertical position by means of an unlock control element.

[0012] Such an unlock control element can be in the form of a button or a lever. This allows for an easy single-person operation of the side railing. One hand can be used to unlock the railing by operating the unlock control element, while the other hand of the operating person pulls up or pushes down the side railing into the desired position.

[0013] In a further preferred embodiment of the invention, the at least one predefined vertical position is defined by a detent cam extending into the respective vertical grooves of the front end member and the head end member.

[0014] Such a detent cam is preferably spring-loaded and has an asymmetric shape, so as to allow pulling up the side railing beyond the detent cam, while a downward movement of the side railing is blocked by the detent cam. This avoids and accidental or unintentional lowering of the side rail, which could endanger the patient.

[0015] In a further preferred embodiment of the invention, the detent cam is arranged on a locking element which is mechanically coupled to the unlock control element and movable in a direction perpendicular to the vertical groove by operating the unlock control element.

[0016] This provides a stable and easy unlocking mechanism for the side rail parts.

[0017] It is further preferred if the first part and/or the second part of the side railing is attached to a bottom side of the supporting section by a support mechanism.

[0018] Such an attachment provides additional stability for the side railing over its full longitudinal extent and minimizes the force exerted by the side railing part's weight on the head end member or foot end member by its weight.

[0019] In a further preferred embodiment of the invention the first part and/or the second part of the side railing is attached to the bottom side of the supporting section by means of at least one mechanical linkage.

[0020] This provides a stable and easily operable arrangement stabilizing the side railing. Moreover, such a linkage can be arranged in a way which prevents any part of the mechanism extending over the side of the bed. Adjustments of the side railing can thus be performed without removing any bedside equipment.

[0021] It is further preferred if the at least one mechanical linkage comprises a first bar, a second bar and a third bar, wherein a first end of the first bar is attached to the supporting section, the first and of the second bar is pivotably attached to a second end of the first bar, a first end of the third bar is pivotably attached to a second end of the second bar and a second end of the third bar is pivotably attached to the first part or the second part of the side railing.

[0022] Such a mechanical linkage provides a movement mechanism combining a rotational and translational movement mechanism which stabilizes the side railing over its full length without extending over the side of the bed in any possible configuration.

[0023] In a further preferred embodiment of the invention, the second end of the third bar is attached to a pivotable rod of the first part or the second part of the side railing.

[0024] The invention and its embodiments are now explained in detail with reference to the drawings, which show in:

Fig. 1 a perspective view of an exemplary embodiment of a hospital bed according to the invention;

Fig. 2 a close-up view of the control mechanism for the side rails of the hospital bed according to Fig. 1;

Fig. 3 the hospital bed according to Fig. 1 with the foot end and part of the side rail removed for better visibility;

Fig. 4 a detailed view of the sliding and pivoting mechanism of the side rail of the hospital bed according to Fig. 1; and

Fig. 5 an explosion drawing of the parts for the sliding mechanism of the side rail of the hospital bed according to Fig. 1.

[0025] A hospital bed 10 comprises a base frame 12 holding a support section 14 for a mattress 16. The base frame 12 is provided with wheels 18 for easy movability of the hospital bed 10. An adjustment mechanism 20 allows for raising or lowering the front or back end of the support section 14. A foot end member 22 and a head end member 24 are further attached to the base frame 12.

[0026] Between the foot end member 22 and the head end member a first side rail part 26 and a second side rail part 28 are located along the longitudinal sides of the support section 14. The side rail parts 26, 28 extend from the respective members 22, 24 roughly along half of the length of the support section.

[0027] The first side rail part 26 and the second side rail part 28 are individually adjustable in their vertical position. To this end, the first side rail part 26 and the second side rail part 28 are slidably attached to the foot end member 22 and the head end member 24 in respective vertical grooves 30. The grooves 30 comprise detent cams 32, which allow locking the side rail parts 26, 28 into predefined vertical positions.

[0028] The detent cams 32 are preferably spring-loaded and allow in cooperation with asymmetrical shape slider 54 an upward movement of the side rail parts 26, 28 but to inhibit a downward movement of the side rail parts 26, 28 as soon as a corresponding notch of the side rail parts 26, 28 has moved past a detent cam 32.

[0029] To allow for a downward movement of the side rail parts 26, 28, the detent cams 32 can be retracted by means of a push button 34. In order to move the side rail parts 26, 28 downwards, the user has to slightly lift the respective part 26, 28 with one hand and press the push button 34 with the other hand. The detent cams are thus retracted and the side rail parts 26, 28 can be lowered as desired.

[0030] Preferably, the grooves 30 comprise two detent cams defining three different vertical positions for the side rail parts 26, 28. It is further preferred if the side rail parts 26, 28 extend about 40 cm above the support section 14 in its highest position, which can be seen in Fig. 3. The second side rail part 28 is shown in its lowest position in Fig. 1. It can be seen that the top edge of the side rail part 28 is a few centimeters lower than the top surface of the mattress 16 in this position. The first side rail part 26 as depicted in Fig. 1 is shown in an intermediate position.

[0031] The arrangement of the push button 34 can be seen in detail in Figs. 2 and 4 for the head end and the foot end side of the hospital bed 10, respectively.

[0032] To provide stability along the whole length of the side rail parts 26, 28, each side rail part 26, 28 is provided with a support mechanism 36 which can be seen in detail in Figs. 3 and 4. The support mechanism comprises two sets of three bars 38, 40, 42 for each side rail part 26, 28. The first bar 38 is attached to the support section 14 with its first end and to a first end of the second bar 40 with its second end. The second end of the second bar 40 is pivotably attached to the first end of the third bar 42, while the second end of the third bar 42 is fixed to a pivotable rod 44 forming the respective lower end of the first and second side rail parts 26, 28.

[0033] A second rod 46 connects the pivot joints between the first bar 38 and the second bar 40 of both sets of bars 38, 40, 42 associated with each side rail part 26, 28. The complex joint formed by the bars 38, 40, 42 translates a vertical sliding motion of the first or second side rail parts 26, 28 into a pivot motion. The specific construction of the support mechanism 38 is shown in Figs. 3 and 4 ensures that no part of the support mechanism or the side rail parts 26, 28 extends sideways beyond the boundaries set by the foot end member 22 and the head end member 24 in a horizontal direction perpendicular to the longitudinal extent of the hospital bed 10. This allows for movement of the first side rail part 26 and the second side rail part 28 without the need to remove any bed side equipment.

[0034] The individual parts of the sliding mechanism and the support mechanism 36 for the first side rail part 26 and the second side rail part 28 can be seen in detail in Fig. 5. The figure shows a guiding rail 48 which can be inserted into the foot end member 22 or the head end member 24 and forms the respective groove 30 in said members 22, 24. A locking element 50 provides the detent cams 32 which can be inserted through notches 52 of the guiding rail 48. In order to lock the side rail parts 26, 28 in place, the detent cams 32 insert into notches 52 provided on corresponding locking elements 56 to support slider 54 of the side rail parts 26, 28. An unlock

mechanism 58 comprises a cylindrical body 60 which connects to the locking element 50 by means of a hole 62 in the cylindrical body 60 and a corresponding pin 64 on the locking element 50. The unlock mechanism is preloaded with a spring 66.

[0035] The cylindrical body 60 connects to the push button 34. When the push button 34 is operated, the unlock mechanism 58 moves the detent cams 32 out of the notches 52 of the side rail parts 26, 28, thus allowing vertical movement of the side rail parts 26, 28. If the push button 34 is no longer pressed, the unlock mechanism 58 and, with it, the locking element 50 returns to its original position by force of the spring 66. If the side rail parts 26, 28 are now moved vertically past the detent cams 32 of the locking element 50, the detent cams 32 can insert into the notches 52, thus fixing the side rail parts 26, 28 into position again.

[0036] The support mechanism for the side rail parts 26, 28 can again be seen in Fig. 5, this time from the back side. It is visible, how the first bars 38 are attached to the support section 14 by means of plates 68 which distribute the forces generated by the weight and movement of the side rail parts 26, 28 over a large area of the support section 14, so as to provide a stable support.

[0037] In summary, the invention provides a hospital bed 10 with individually adjustable side rail parts 26, 28 which can be moved easily in a vertical direction without disturbing the patient or any bed side equipment.

Claims

1. Hospital bed (10) with a supporting section (14) for supporting a mattress (16) extending between a foot end member (22) and a head end member (24), and at least one side railing extending between the foot end member (22) and the head end member (24) along a side edge of the supporting section (14), wherein the side railing comprises at least two parts (26, 28) which are independently adjustable in a vertical direction.

2. Hospital bed (10) according to claim 1, wherein a first part (26) of the side railing is vertically movable along a vertical groove (30) of the foot end member (22) and a second part (28) of the side railing is vertically movable along a vertical groove (30) of the head end member (24).

3. Hospital bed (10) according to any of the preceding claims, wherein the first part (26) and/or the second part (28) of the side railing is lockable into at least one predefined vertical position.

4. Hospital bed (10) according to claim 3, wherein the first part (26) and/or the second part (28) of the side railing is unlockable from the at least one predefined vertical position by means of an unlock control element (34).

5. Hospital bed (10) according to claim 3 or 4, wherein the at least one predefined vertical position is defined by a detent cam (32) extending into the respective vertical grooves (30) of the front end member (22) and head end member (24).

6. Hospital bed (10) according to claim 5 in reference to claim 4, wherein the detent cam (32) is retractable by means of the unlock control element (34).

7. Hospital bed (10) according to claim 6, wherein the detent cam (32) is arranged on a locking element (50) which is mechanically coupled to the unlock control element (34) and movable in a direction perpendicular to the vertical groove (30) by operating the unlock control element (34).

8. Hospital bed (10) according to any of the preceding claims, wherein the first part (26) and/or the second part (28) of the side railing is attached to a bottom side of the supporting section (14) by means of a support mechanism (36).

9. Hospital bed (10) according to claim 8, wherein the first part (26) and/or the second part (28) of the side railing is attached to the bottom side of the supporting section (14) by means of at least one mechanical linkage forming the support mechanism (36).

10. Hospital bed (10) according to claim 9, wherein the at least one mechanical linkage comprises a first bar (38), a second bar (40) and a third bar (42), wherein a first end of the first bar (38) is attached to the supporting section, a first end of the second bar (40) is pivotably attached to a second end of the first bar (38), a first end of the third bar (42) is pivotably attached to a second end of the second bar (40), and a second end of the third bar (42) is pivotably attached to the first part (26) or the second part (28) of the side railing.

11. Hospital bed (10) according to claim 10, wherein the second end of the third bar (42) is attached to a pivotable rod (44) of the first part (26) or the second part (28) of the side railing.

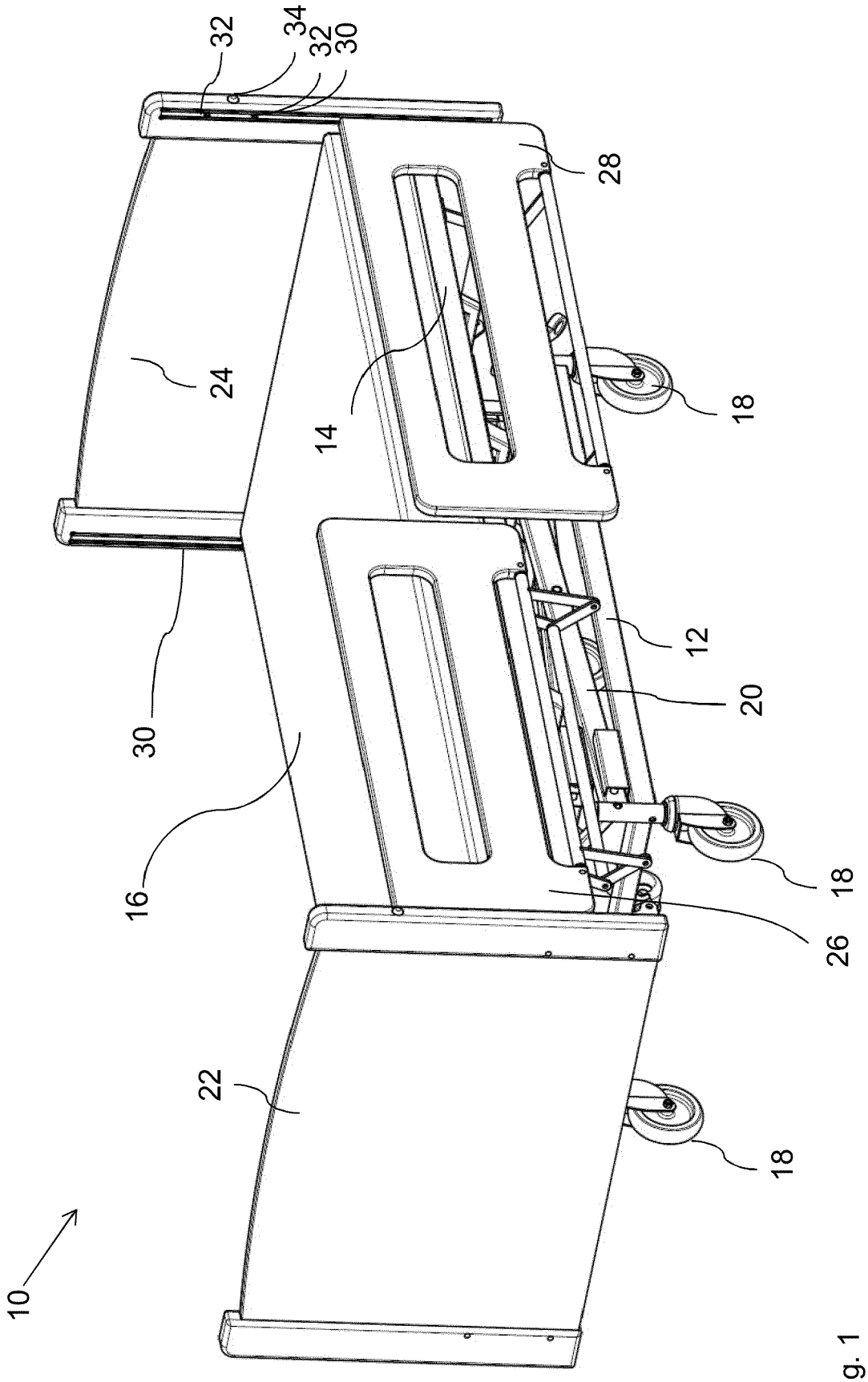

Fig. 1

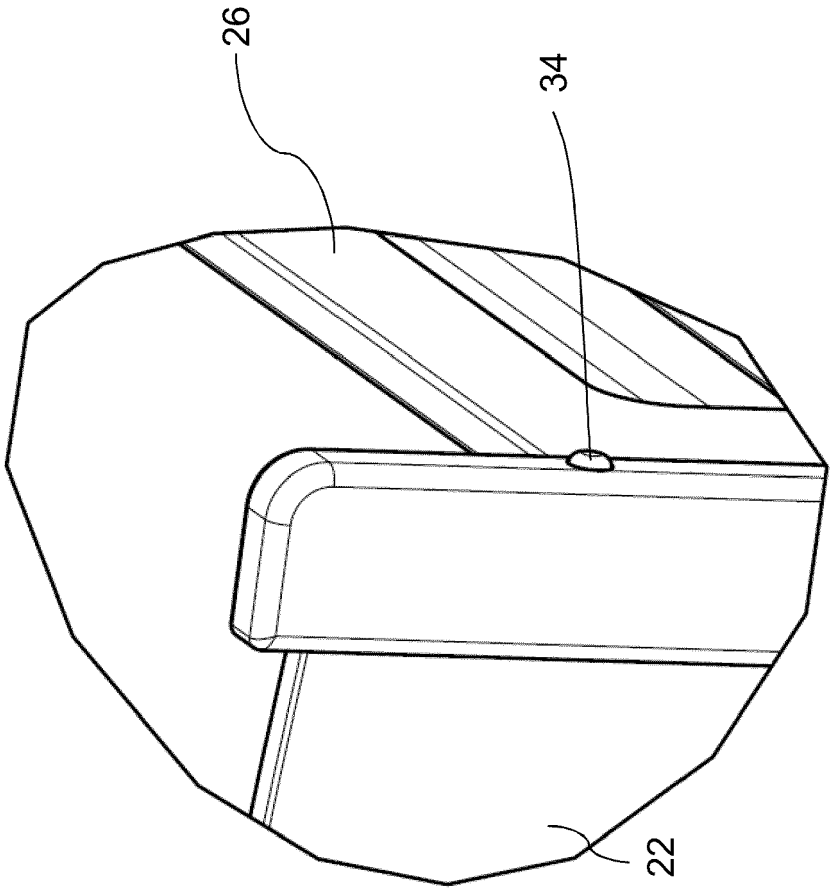

Fig. 2

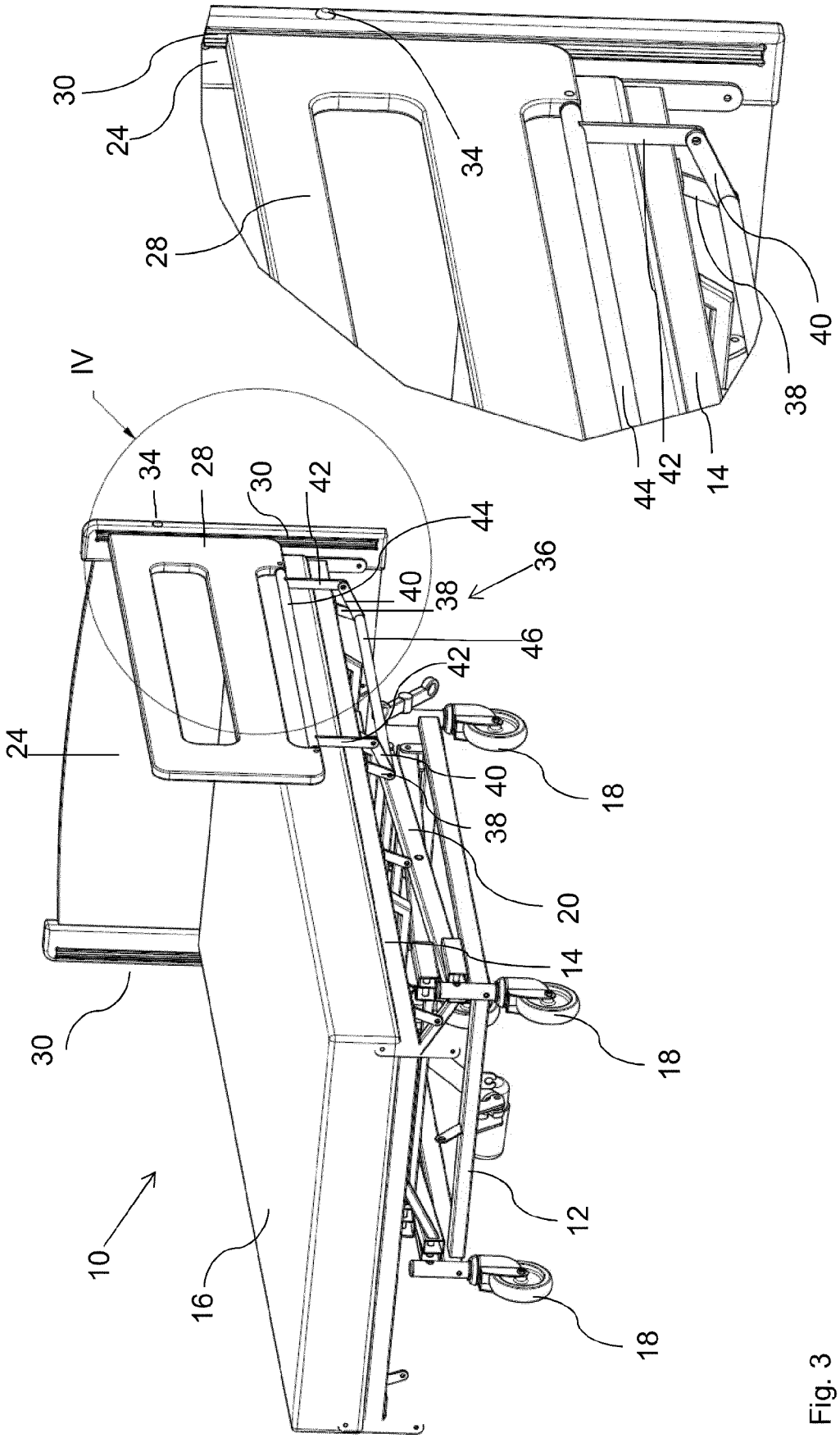

Fig. 4

Fig. 3

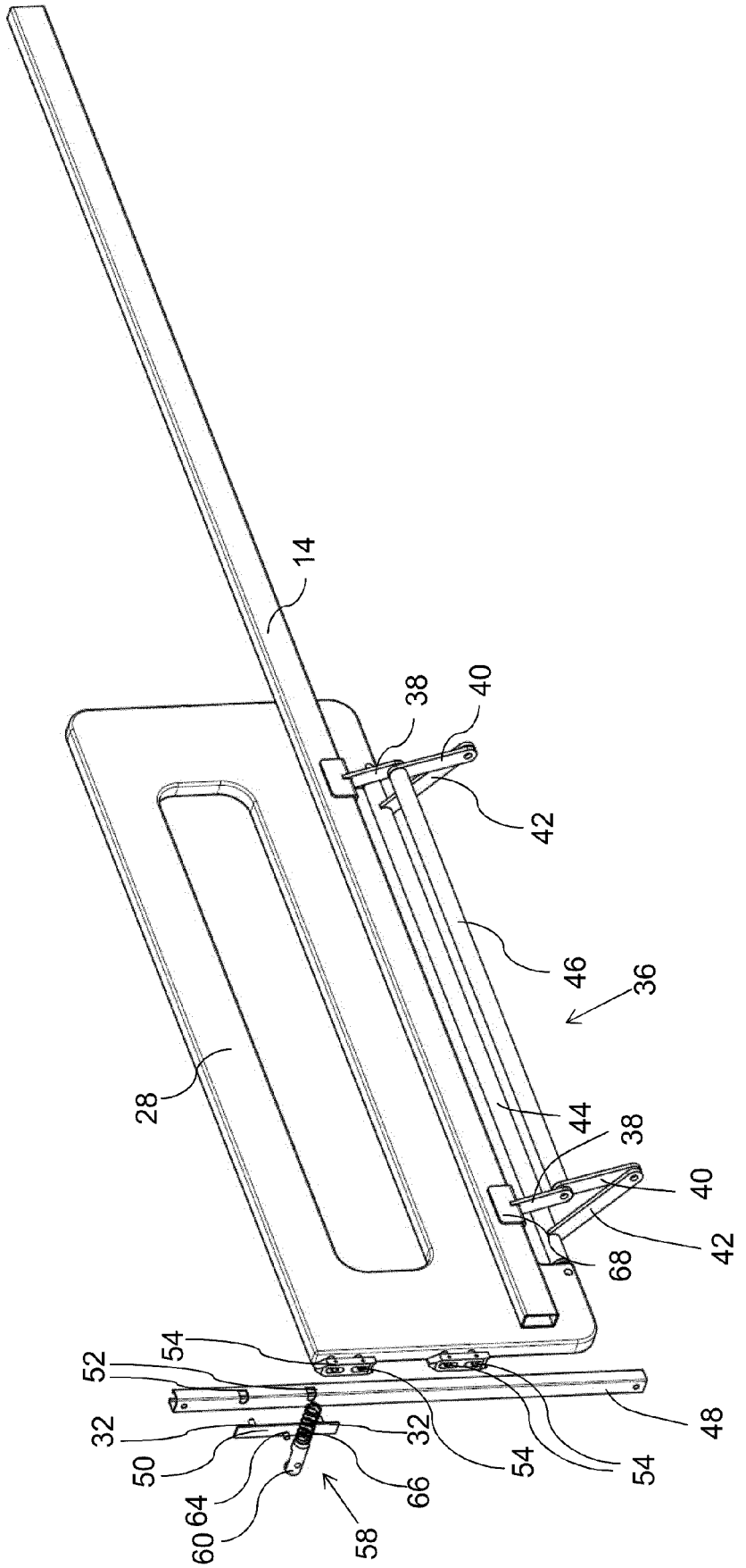
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Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 1915

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 October 2017	Koszewski, Adam

CATEGORY OF CITED DOCUMENTS

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