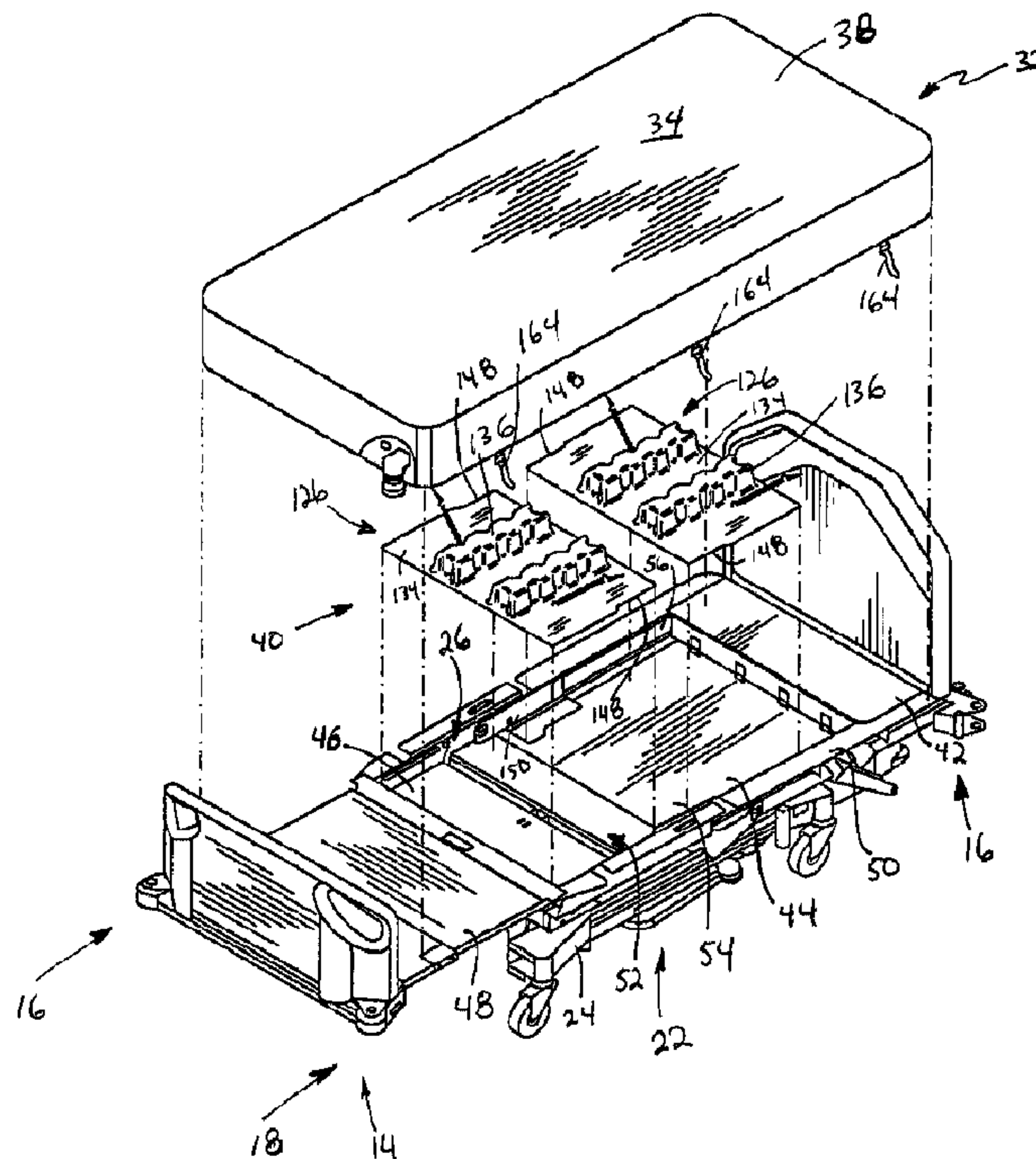




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(71) Demandeur/Applicant:  
HILL-ROM SERVICES, INC., US  
(72) Inventeur/Inventor:  
ELLIS, CRAIG D., US  
(74) Agent: SMART & BIGGAR

(54) Titre : SUPPORT POUR SECTION DE MATELAS  
(54) Title: MATTRESS SECTION SUPPORT



(57) Abrégé/Abstract:

A bed is providing having a frame, a mattress section, and a mattress section support. The frame includes a deck support and a step deck positioned on the deck support. The step deck has an upper deck, a lower deck, and a side wall. The upper deck is spaced apart from the lower deck to define a recess of the deck. The mattress section is configured to define a patient rest surface. The mattress section support is positioned between the mattress section and the step deck to support the mattress section over the recess in a position preventing a portion of the mattress section from being positioned in the recess of the step deck when a person is positioned on the patient rest surface.

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ABSTRACT OF THE DISCLOSURE

A bed is providing having a frame, a mattress section, and a mattress section support. The frame includes a deck support and a step deck positioned on the deck support.

5 The step deck has an upper deck, a lower deck, and a side wall. The upper deck is spaced apart from the lower deck to define a recess of the deck. The mattress section is configured to define a patient rest surface. The mattress section support is positioned between the mattress section and the step deck to support the mattress section over the recess in a position preventing a portion of the mattress section from being positioned in the recess of the step  
10 deck when a person is positioned on the patient rest surface.

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## MATTRESS SECTION SUPPORT

### Background and Summary of the Invention

5           The present invention relates to beds. More particularly, the present invention relates to beds having a deck and a mattress positioned on the bedframe to provide a patient rest surface.

          It is known to provide a bed including a bedframe having a deck. Furthermore, it is known to provide such a bed with a mattress positioned on the deck to  
10       define a patient rest surface. Typically, such mattresses have a compliant mattress section providing a resilient surface on which to support a patient.

          According to the present invention, a mattress is provided for use with a step deck having an upper deck and a lower deck coupled to the upper deck by a deck side wall so that the lower deck is spaced apart from the upper deck to define a recess of the step deck.  
15       The mattress includes a mattress section having a generally planar upwardly-facing patient rest surface and a rigid mattress section support positioned on the deck to support the patient rest surface above the recess of the step deck.

          According to preferred embodiments of the present invention, the mattress section support has a top surface and a bottom surface. The top surface of the mattress  
20       section support is positioned to support the mattress section over the recess to maintain a substantial void in the recess. The mattress section support is positioned above the lower deck to support the mattress section in a position substantially outside of the recess of the step deck. The mattress section support is substantially rigid to prevent substantial deflection of the bottom surface of the mattress section during use of the mattress support system by a  
25       patient.

          According to another preferred embodiment of the invention, the mattress further includes a cover including a top surface and a bottom surface cooperating with the top surface to define an interior region. The mattress section being positioned in the interior

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region of the cover. The mattress section support is positioned outside the cover to support the mattress section in a position spaced apart from the lower deck of the step deck.

Additional features of the disclosure will become apparent to those skilled in the art upon consideration of the following detailed description when taken in conjunction  
5 with the accompanying drawings.

#### Brief Description of the Drawings

The detailed description particularly refers to the accompanying figures in which:

10 Fig. 1 is a perspective view of a hospital bed having a bedframe including a deck, a set of siderails coupled to the deck, and a mattress positioned on the deck to provide a patient rest surface;

15 Fig. 2 is an exploded view of the bed of Fig. 1 showing the bedframe in a lowered position and the mattress including a mattress section and ridged plates positioned between the mattress section and the deck;

Fig. 3 is an assembly view showing the mattress section and a plurality of flat plates positioned to be coupled to the bottom of the mattress section;

Fig. 4 is an assembly view of the mattress section showing the various components thereof;

20 Fig. 5 is a perspective view of the step deck, with portions broken away, showing the ridged plates positioned on the step deck;

Fig. 6 is a cross-sectional view taken along line 6-6 of Fig. 5, showing the step deck, one of the flat plates positioned on the step deck, the mattress section supported by the flat plate and one of the ridged plates; and

25 Fig. 7 is a perspective view of the step deck.

#### Detailed Description of the Drawings

A bed 10 in accordance with the present disclosure is provided having a head end 12, a foot end 14, and right and left sides 16, 18, as illustrated in Fig 1. As used in this

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description, the phrase "head end 12" will be used to denote the end of any referred-to object that is positioned nearest to head end 12 of bed 10. Likewise, the phrase "foot end 14" will be used to denote the end of any referred-to object that is positioned nearest foot end 14 of bed 10.

5           Bed 10 includes a bedframe 20 having a base frame 22 and a deck support or intermediate frame 24 connected to base frame 22 as shown in Figs. 1-2. Bedframe 20 further includes a step deck 26 coupled to intermediate frame 24. Bed 10 also includes head and foot end siderails 28, 30 coupled to step deck 26 and a mattress 32 positioned on step deck 26 that provides a patient rest surface 34 to support a person (not shown).

10           Mattress 32 includes a mattress section 36 and a cover 38 positioned around mattress section 36 as shown in Fig. 4. Mattress section 36 is resilient to provide a patient rest surface 33. Cover 38 protects mattress section 36 from becoming soiled during use and provides patient rest surface 34 that covers patient rest surface 33 of mattress 32. Mattress 32 also includes a set of mattress section supports 40 positioned on step deck 26 to support  
15 mattress section 36 on step deck 26 as shown in Fig. 2.

          Bed 10 can assume a variety of positions such as a bed position, as shown in Fig. 1, and a chair position (not shown). Articulating step deck 26 includes a head section 42, a seat section 44, a thigh section 46, and a foot section 48. During movement of bed 10 between the various positions, deck sections 42, 44, 46, 48 move relative to one another.  
20 Head section 42, thigh section 46, and foot section 48 rotate relative to each other to change the angle of inclination of the back, thighs, and lower legs of the person (not shown) with respect to seat section 46. Additional description of the articulation of step deck 26 and the mechanisms that facilitate such movement are described in U.S. Patent No. 5,715,548 (to Weismiller, et al.) filed August 4, 1995, the disclosure of which is expressly incorporated by  
25 reference herein.

          Additionally, step deck 26 includes an upper deck 50 and a central, longitudinally extending recess 52 defined by a lower deck 54 of step deck 26 and a side wall 56 surrounding recess 52 and connecting lower deck 54 to upper deck 50. As shown in Fig. 7, upper deck 50 includes longitudinally extending upper deck side portions 58, a head end

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upper deck portion 60 appended to a head end of head section 42, a foot end upper deck portion 62 appended to a foot end of intermediate frame 24 adjacent to thigh section 46, and side upper deck portions 64, 66, 68, 70, 72, 74 appended to sides of head, seat, and thigh sections 42, 44, 46. Upper deck portions 60, 64, 66, 68, 70, 72, 74, 62 and a top surface 76 of foot section 48 are coplanar when articulating deck 26 is in the horizontal position and cooperate to form upper deck 50 which is generally parallel to intermediate frame 24.

Lower deck 54 includes a head section 78, a seat section 80, and a thigh section 82. Head, seat, and thigh sections 78, 80, 82 are coplanar when articulating deck 26 is in the horizontal position and cooperate to form lower deck 54 which is generally parallel to intermediate frame 24 and to upper deck 50 when articulating deck 26 is in the horizontal position.

Lower deck 54 is connected to upper deck 50 by side wall 56 that includes a head end wall 84 connecting head section 78 to head end upper deck portion 60, side walls 86, 88, 90, 92, 94, 96 connecting head, seat, and thigh sections 78, 80, 82 to side upper deck portions 64, 66, 68, 70, 72, 74, and a foot end wall 98 connecting thigh section 82 to foot end upper deck portion 62 as shown in Fig. 7. Step deck 26, then, comprises upper deck 50 and is formed to include central, longitudinally extending recess 52 defined by lower deck 54 and by side wall 56 connecting lower deck 54 to upper deck 50. In the preferred embodiment, foot section 48 of step deck 26 is displaced from recess 52 and forms part of upper deck 50, as shown in Figs. 2 and 7.

Head end siderails 28 are mounted to head section 42 of articulating deck 26, and foot end siderails 30 are mounted to intermediate frame 24 adjacent to thigh section 46 of deck 26. Step deck 26 cooperates with siderails 28, 30 to maximize the height relative to the patient rest surface 34 at which siderails 28, 30 are mounted. The tops of siderails 28, 30 are higher when in the patient-restraining position for improved coverage and protection of the person (not shown) on patient rest surface 34 and the bottoms can be higher when in the tucked position for improved access to base frame 22 and to the space beneath intermediate frame 24.

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Head end siderails 28 are mounted to move with head section 42 as head section 42 pivots relative to intermediate frame 24 between a down position and a back-support position. Foot end siderails 30 are mounted to intermediate frame 24 and do not move relative to intermediate frame 24 and seat section 44 when head, thigh, and foot sections 42, 46, 48 of articulating deck 26 move.

As shown in Fig. 4, mattress section 36 includes several inflatable bladders 108 that provide support to a patient positioned on patient rest surface 34. Mattress section 36 also includes a pair of rotational bladders 110 used during rotational therapy of a patient positioned on mattress 32. According to alternative embodiments, other configurations of mattress sections are provided using components such as low air loss bladders, foam pads, fluidized bladders, or any other configuration that provides support for a patient positioned on the mattress section.

Cover 38 includes top and bottom sections 112, 114 as shown in Fig. 6. Top section 112 defines patient rest surface 34 and protects patient rest surface 33 of mattress section 36. Bottom section 114 defines a lower surface 118 positioned over upper deck 50 and a perimeter side wall 120. Top and bottom sections 112, 114 cooperate to define an interior region 122 of cover 38 in which air bladders 108 and rotational bladders 110 are positioned. As shown in Fig. 6, mattress section supports 40 are positioned outside and below cover 38.

Series of mattress section supports 40 are configured to support mattress section 36 in a position spaced apart from lower deck 54 so that mattress section 36 is positioned outside of recess 52 as shown in Fig. 6. Series of mattress section supports 40 includes five flat plates 124 coupled to cover 38 that extend across and over recess 52 to a position on top of respective portions 60, 62, 64, 66, 68, 70, 72, 74 of upper deck 50. Flat plates 124 are substantially rigid to provide support for mattress section 36 and to facilitate sliding of mattress 32 off of step deck 26. Further description of flat plates 124 and mattress 32 is provided in U.S. Patent No. 6,021,533 to Ellis et al., filed August 25, 1997, the disclosure of which is expressly incorporated herein by reference.

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Series of mattress section supports 40 further include a pair of ridged plates 126 positioned on lower deck 54, as shown in Fig. 5. Ridged plates 126 extend up from lower deck 54 to support flat plates 124 and mattress section 36 so that mattress section 36 is positioned outside of recess 52 as shown in Fig. 6.

5 Each flat plate 124 is coupled to lower surface 118 of bottom section 114 of cover 38 by snaps 128 as shown in Fig. 3. Each flat plate 124 includes an upper surface 130 positioned adjacent to lower surface 118 of top section 112 of cover 38 and a downwardly facing lower surface 132 positioned on and adjacent to upper deck 50 so that flat plates 124 are positioned between mattress section 36 and step deck 26, as shown, for example, in Fig.  
10 6.

Each flat plate 124 is substantially rigid to support mattress 32 and to facilitate sliding of mattress section 36 off of step deck 26. When a patient is positioned on mattress 32, flat plates 124 may bow under the weight of the patient so that a portion of mattress section 36 is positioned in recess 52. Ridged plates 126 are provided to provide additional  
15 support for mattress section 36 so that flat plates 124 bow only slightly, or not at all, when a patient is positioned on mattress section 36. Rigid plates 126 also provide support to plates 124 and mattress section 36 when mattress section 36 is slid off of step deck 26. According to alternative embodiments of the present disclosure, ridged plates are not provided so that flat plates are the only support of the mattress section over the lower deck.

20 As shown in Figs. 5 and 6, ridged plates 126 are positioned on lower deck 54 of step deck 26 within recess 52. Each ridged plate 126 includes a base 134 positioned on lower deck 54 and a pair of upwardly extending ridges 136. Base 134 has a length 138 substantially equal to an internal width 140 of lower deck 54 and a length 142 of sections 78, 80, 82. Base 134 also includes a width that is slightly less than a width of respective sections  
25 78, 80, 82. Thus, each base 134 covers a substantial portion of the respective deck sections 78, 80, 82 of lower deck 54.

As shown in Figs. 2 and 5, each base 134 includes a pair of notches 148 sized to provide clearance for hinges 150 of step deck 26. Ridges 136 cooperate to define a top surface 152 of ridged plates 126 that has a height 154 substantially equal to a height of side

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walls 156 of step deck 26 so that top surface 152 of ridged plates 126 is substantially coplanar with upper deck 50 as shown in Fig. 6. Because upper deck 50 and top surface 152 of ridged plates 126 are coplanar, perimeter portions 155 and middle portions 156 of flat plates 124 are supported at substantially the same height. Side walls 158 of ridged plates 126 are provided with corrugations 160 to provide additional rigidity to ridges 136.

As shown in Fig. 6, ridged plates 126 do not fill recess 52 so that a substantial portion of recess 52 remains a void. According to alternative embodiments, substantially rigid members are provided that substantially fill recess 52.

Ridged plates 126 are also provided with tethers 162 coupled near the bottom of ridges 136 and to straps 164 of mattress section 32. Tethers 162 align ridged plates 124 with deck sections 78, 80, 82 so that during articulation of step deck 26, ridged plates 126 remain in proper orientation. One end of each tether 162 is provided with a clip 166 to facilitate attachment of tethers 162 to straps 164.

Although the invention has been described in detail with reference to preferred embodiments, variations and modifications exist within the scope and spirit of the invention as described and defined in the following claims.

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CLAIMS

1. A mattress for use with a step deck having an upper deck and a lower deck coupled to the upper deck by a deck side wall so that the lower deck is spaced apart from the upper deck to define a recess of the step deck, the mattress comprising
- 5 a mattress section having a generally planar upwardly-facing patient rest surface and
- a rigid mattress section support positioned on the deck to support the patient rest surface above the recess of the step deck.
2. The mattress of claim 1, wherein the mattress section support is
- 10 positioned in the recess.
3. The mattress of claim 1, wherein the mattress section support is positioned on the lower deck of the step deck.
4. The mattress of claim 1, wherein the mattress section support positions the mattress section in a spaced-apart relationship with the lower deck of the step deck.
- 15 5. The mattress of claim 1, further comprising a cover defining an interior region, the mattress section is positioned in the interior region of the cover, and the mattress section support is positioned outside of the cover.
6. The mattress of claim 1, wherein the mattress section support is positioned on the upper deck of the step deck to extend over the recess of the step deck.
- 20 7. A mattress for use with a step deck having an upper deck and a lower deck coupled to the upper deck by a deck side wall so that the lower deck is spaced apart from the upper deck to define a recess of the step deck, the mattress comprising
- a mattress section having a top surface, a bottom surface, and a side wall, the top surface of the mattress section providing a patient rest surface, and the bottom surface of
- 25 the mattress section being positioned over the upper deck and
- a mattress section support having a top surface and a bottom surface, the top surface of the mattress section support being positioned to support the mattress section over the recess to maintain a substantial void in the recess.

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8. The mattress of claim 7, wherein the bottom surface of the mattress section support is positioned on the lower deck so that the mattress section support is positioned in the recess of the step deck.

5 9. The mattress of claim 7, wherein the mattress section support further includes a pair of side walls extending from the bottom surface to the top surface to provide support for the top surface in a position spaced apart from the lower deck.

10. The mattress of claim 7, wherein the top surface of the mattress section support is substantially coplanar with the upper deck of the step deck.

10 11. The mattress of claim 7, wherein the top surface of the mattress section defines a plane, the upper deck of the step deck defines a plane, and the plane defined by the top surface of the mattress section is substantially parallel with the plane defined by the upper deck of the step deck.

15 12. The mattress of claim 7, wherein the mattress section support includes a ridge extending from the bottom surface of the mattress section support, the ridge defines the top surface of the mattress section support.

13. The mattress of claim 7, wherein the mattress section support is positioned over the upper deck of the step deck to extend across the recess defined by the step deck.

20 14. A mattress for use with a step deck having an upper deck and a lower deck coupled to the upper deck by a deck side wall so that the lower deck is spaced apart from the upper deck to define a recess of the step deck, the mattress comprising

a mattress section configured to define a patient rest surface, the mattress section includes a top surface defining the patient rest surface and a bottom surface facing away from the top surface and

25 a mattress section support positioned above the lower deck to support the mattress section in a position substantially outside of the recess of the step deck, the mattress section support is substantially rigid to prevent substantial deflection of the bottom surface of the mattress section during use of the mattress by a patient.

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15. The mattress of claim 14, wherein the mattress section support is positioned between the mattress section and the lower deck of the step deck to support the mattress section in the position substantially outside of the recess of the step deck.

5 16. The mattress of claim 15, wherein the mattress section support is positioned between the upper deck of the step deck and the mattress section.

17. The mattress of claim 14, wherein the mattress section support is positioned on the lower deck of the step deck.

10 18. The mattress of claim 14, wherein the mattress section support is configured to support the mattress section in the position substantially outside of the recess so that the recess is substantially void.

19. A mattress for use with a step deck having an upper deck and a lower deck positioned below the upper deck to define a recess in the step deck, the mattress comprising

a mattress section having a patient rest surface,

15 a cover including a top surface and a bottom surface cooperating with the top surface to define an interior region, the mattress section being positioned in the interior region of the cover, and

a mattress section support positioned outside the cover to support the mattress section in a position spaced apart from the lower deck of the step deck.

20 20. The patient support surface of claim 19, wherein the mattress section support is positioned between the mattress section and the step deck.

21. The patient support surface of claim 19, wherein the mattress section support and the lower deck of the step deck cooperate to define a void in the recess of the step deck.

25 22. The patient support surface of claim 19, wherein the bottom surface of the cover is spaced apart from the lower deck of the step deck.

23. The patient support surface of claim 22, wherein the mattress section support is positioned between the bottom surface of the cover and the lower deck.

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24. A mattress for use with a step deck having an upper deck and a lower deck positioned below the upper deck to define a recess in the step deck, the mattress comprising

5 a mattress section configured to support a patient above the step deck and means for supporting the mattress section in a position spaced apart from the lower deck of the step deck so that the mattress section is prevented from being positioned inside of the recess defined by the step deck during use of the mattress.

25. The mattress of claim 24, wherein the supporting means includes a rigid member positioned between the mattress section and the step deck.

10 26. The mattress of claim 25, wherein the rigid member is positioned between the upper deck and the mattress section.

27. The mattress of claim 25, wherein the rigid member is positioned in the recess to extend from the lower deck to a height substantially equal to a height of the upper deck to support the mattress section.

15 28. The mattress of claim 24, wherein a portion of the supporting means is positioned over the upper deck of the step deck.

29. A bed comprising  
a frame including a deck support and a step deck positioned on the deck support, the step deck having an upper deck, a lower deck, and a side wall, the upper deck  
20 being spaced apart from the lower deck to define a recess of the deck,  
a mattress section configured to define a patient rest surface, and  
a mattress section support positioned between the mattress section and the step deck to support the mattress section over the recess in a position preventing a portion of the mattress section from being positioned in the recess of the step deck when a person is  
25 positioned on the patient rest surface.

30. The bed of claim 29, wherein the mattress section support is coupled to a bottom surface of the mattress section.

31. The bed of claim 29, wherein the mattress section support is rigid.

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32. The bed of claim 29, further comprising a siderail coupled to the upper deck of the step deck.

33. The bed of claim 29, wherein the step deck includes first and second sections configured to articulate relative to one another, the mattress section includes first and second portions positioned over the first and second sections of the deck, the mattress section support includes a first section positioned over the first section of the deck to support the first portion of the mattress section, the mattress support includes a second section positioned over the second section of the deck to support the second portion of the mattress section, and the first and second sections of the mattress section support are configured to move relative to one another during articulation of the first and second sections of the step deck.

34. A mattress section support for use with a bed having a step deck and a mattress section, the step deck having an upper deck and a lower deck spaced apart from the upper deck to define a recess of the step deck, the mattress section being positioned over the step deck to define a patient rest surface, the mattress section support comprising  
a rigid support section positioned between the step deck and the mattress section to support the mattress section in a position spaced apart from the lower deck of the step deck so that a substantial portion of the mattress section is positioned outside of the recess of the step deck.

35. The mattress section support of claim 34, wherein the rigid support section is positioned between the mattress section and the upper deck of the step deck.

36. The mattress section support of claim 34, wherein the rigid support section is positioned in the recess of the step deck.

37. The mattress section support of claim 34, wherein the rigid support section is positioned over the upper deck of the step deck to extend over the recess of the step deck.

38. The mattress section support of claim 48, further comprising another rigid support section configured to move relative to the other rigid support section during articulation of the step deck.

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39. The mattress section support of claim 38, wherein the rigid support sections are spaced apart.

Smart & Biggar  
Ottawa, Canada  
Patent Agents

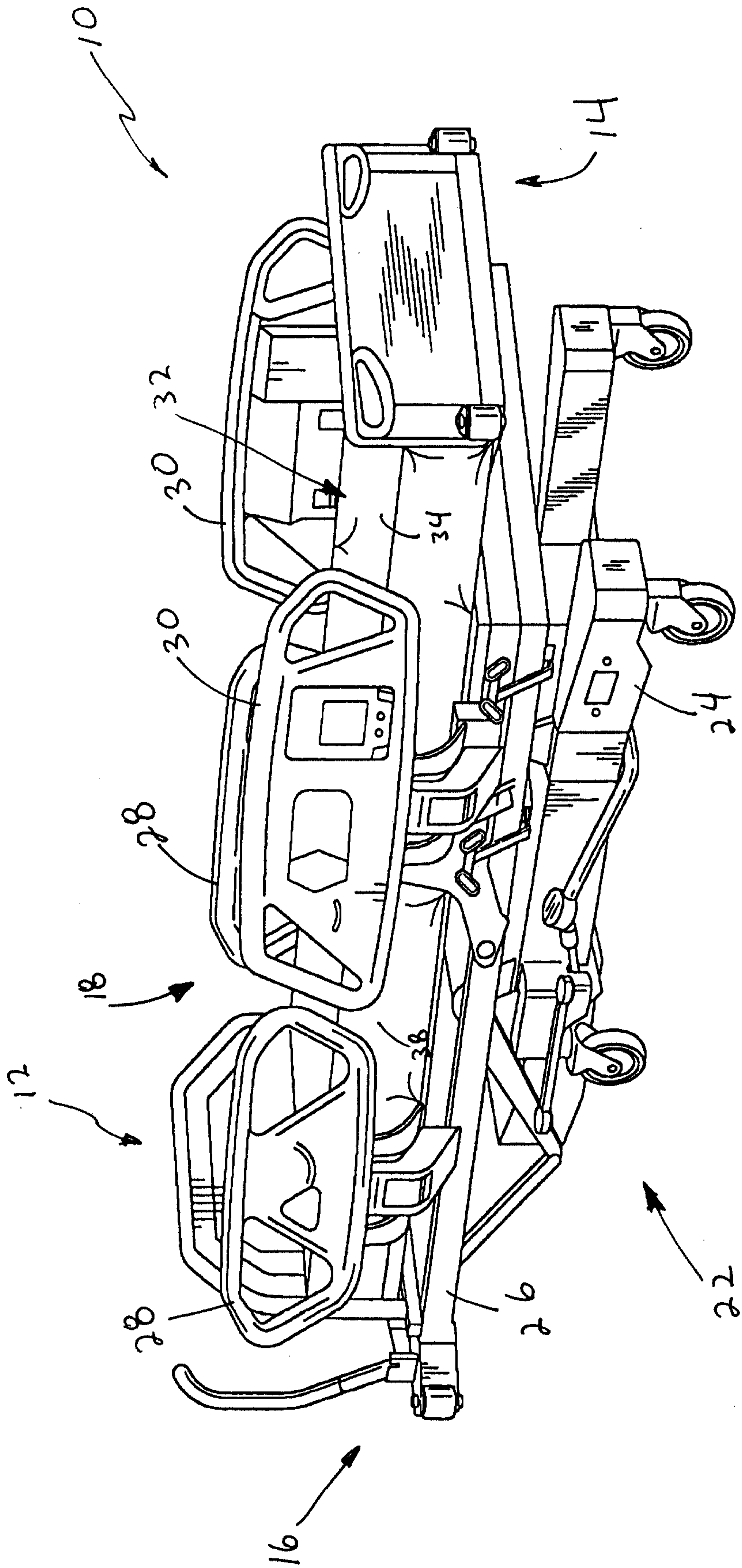


Fig. 1

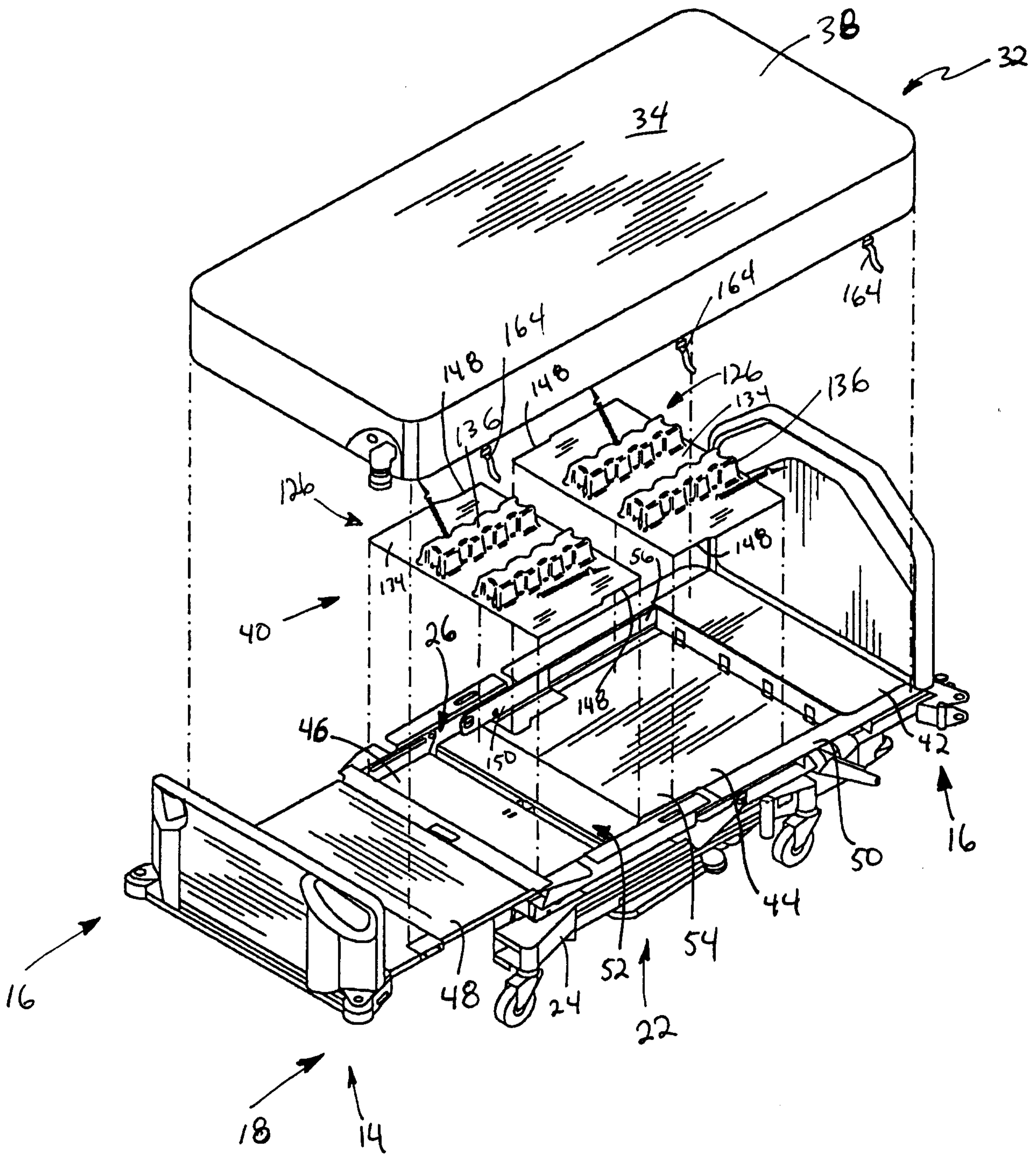


Fig. 2

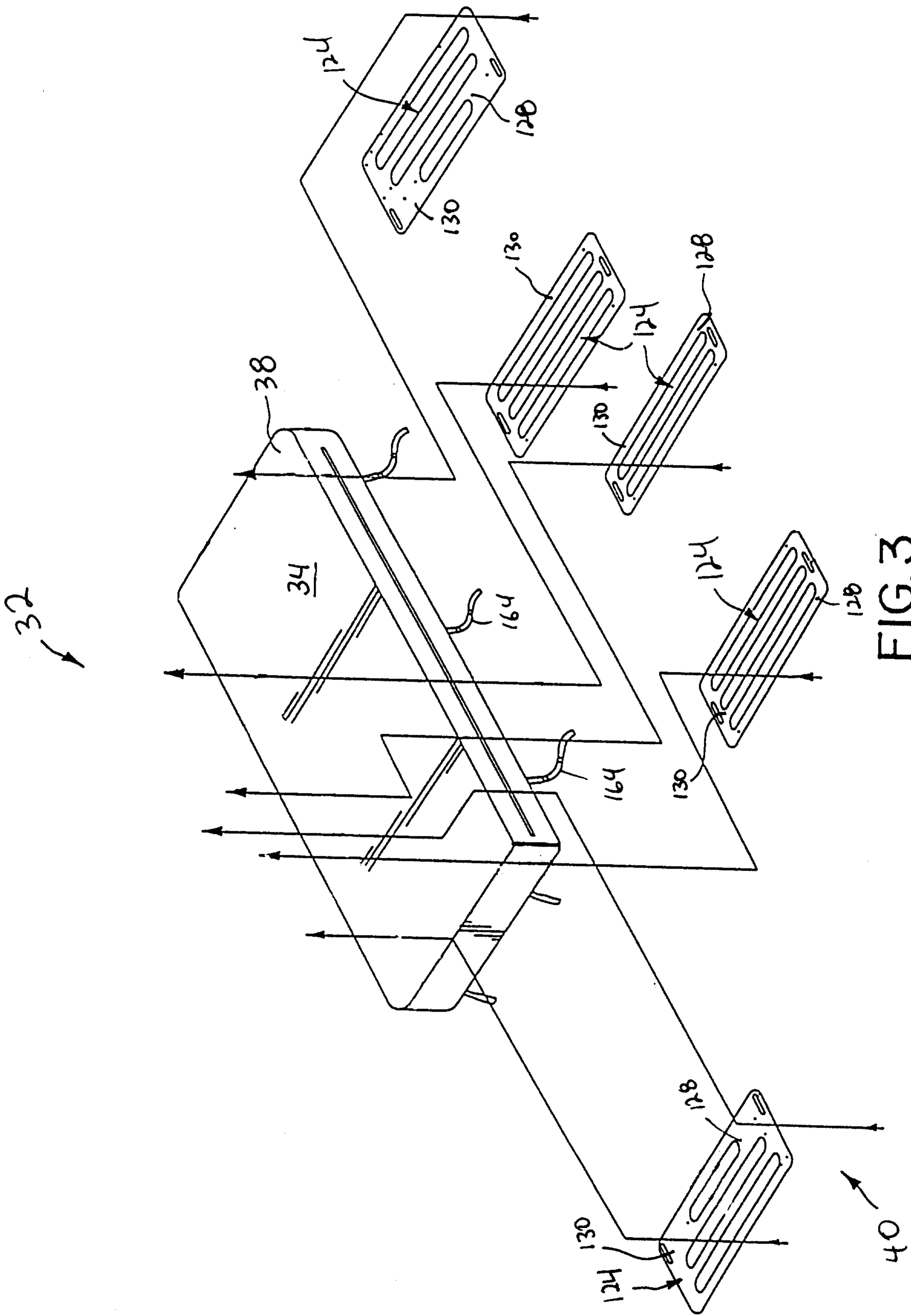


FIG. 3

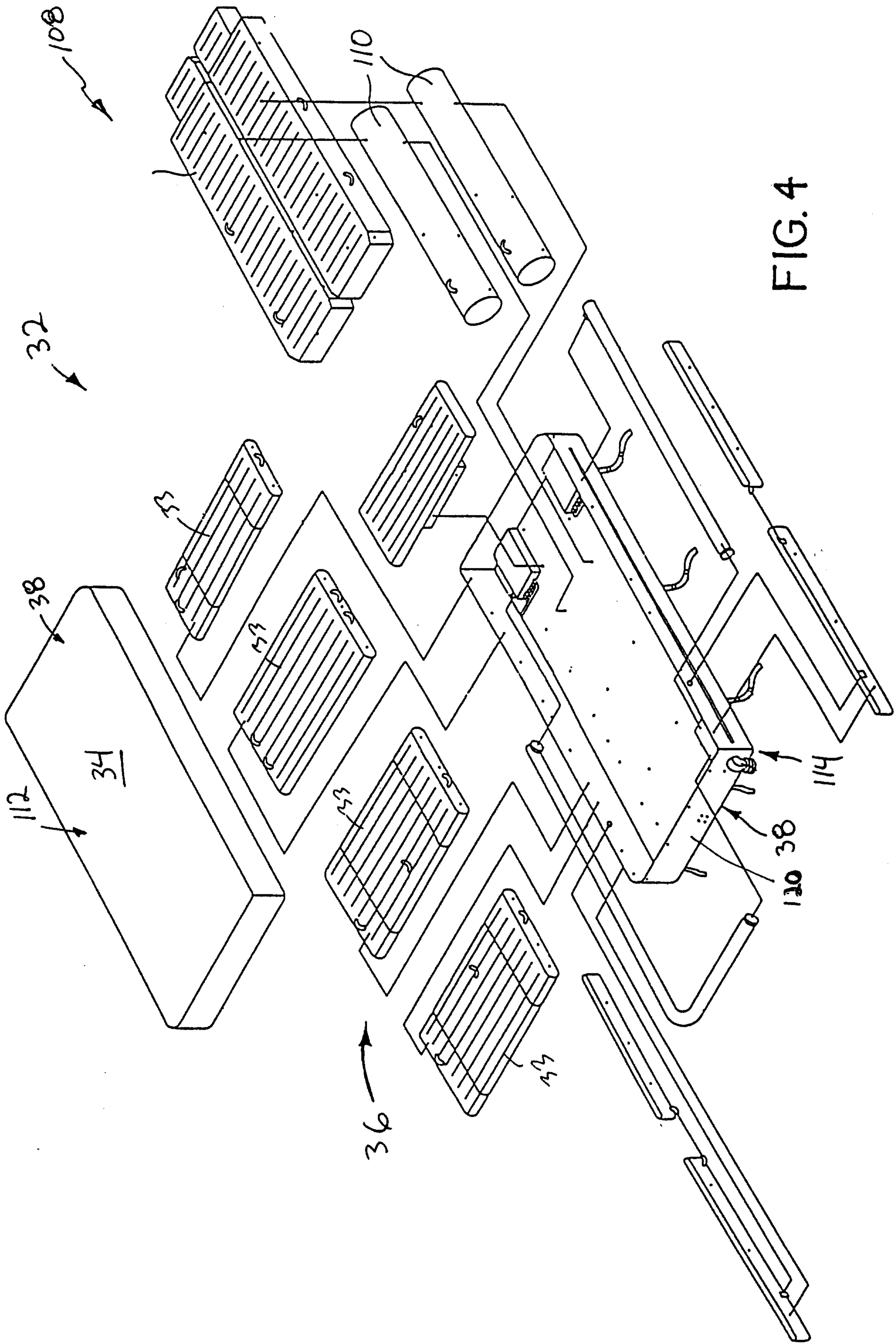


FIG. 4







