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A bed frame

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ABSTRACT

A bed frame 100, 400 comprises a support structure defining a support surface 102a for a mattress 109. The support surface defines a perimeter with lateral and longitudinal edges. The bed frame 100, 400 includes at least one upright safety barrier 106, 110, 106', 110' along the perimeter. In particular, along one of the longitudinal edges 108 of the perimeter, there is a movable safety barrier 110, 110'. The movable safety barrier 110, 110' is pivotal between a closed position which presents a barrier to the bed occupant and an open position which exposes a corresponding longitudinal side of the mattress 109 along the full length of the longitudinal edge 108.

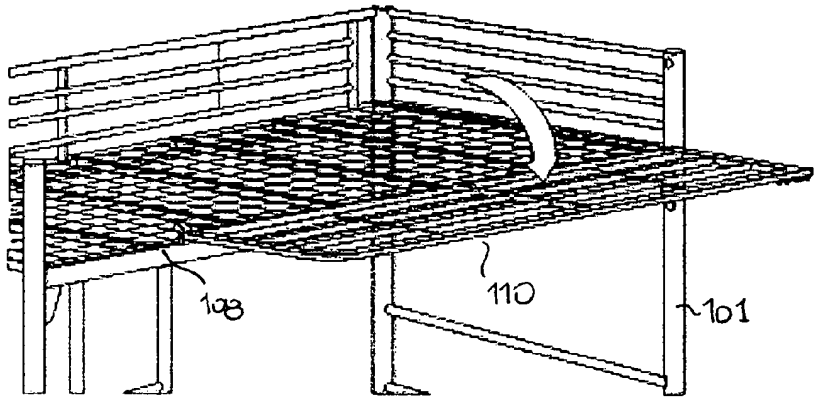

FIG. 2b

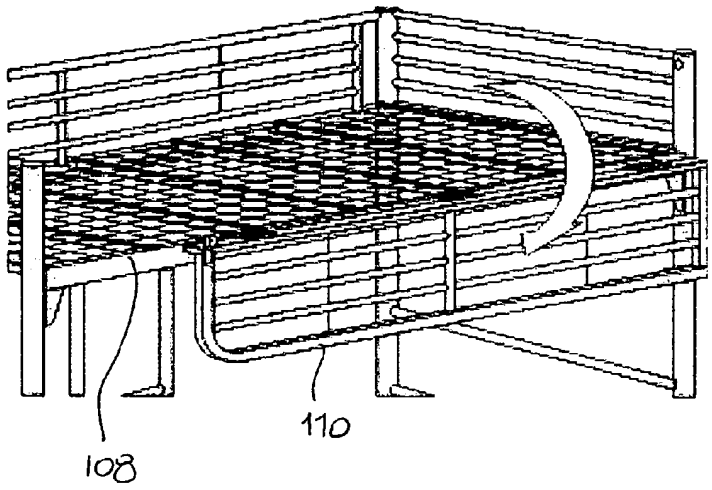

FIG. 2a

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Regulation 3.2

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION
INNOVATION PATENT

Invention Title: A bed frame

The following statement is a full description of this invention, including the best method of performing it known to us:

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A bed frame

Field of the invention

The present invention relates to a bed frame. For illustrative purposes only, the preferred embodiment of the present invention will be described in relation to a bunk bed frame. However the present invention should not be considered limited to this exemplary application.

Background of the invention

Bunk or loft beds save space by providing a second bed overlying a first bed. They are used in a range of environments where limited space is available, so as to maximise the effective use of space. A typical bunk bed includes a single support structure supporting a support surface for a first lower bed. The same support structure supports a second support surface for a second upper bed. Each support surface typically supports a mattress and other bedding.

The ability to position two (or possibly more) beds in this way saves considerable space. However, this saving comes with an increase in the height at which the second bed is located. This increased height is problematic, and is a source of certain disadvantages.

One disadvantage of conventional bunk beds is that the increased height can increase the severity of injury to an occupant who falls from that increased height. There have been attempts in the past to mitigate this problem, for example, by providing a safety barrier to retain the occupant within the perimeter of the support surface. However, this approach has brought its own problems.

For example, in a conventional bunk bed having a safety barrier, a person wishing, for example, to change the bedding of such a bed must reach over the safety barrier. Thus the safety barrier prevents a person conveniently accessing bedding.

A further disadvantage of conventional bunk beds having a safety rail concerns the replacement/airing or turning of the mattress. Although this task may be performed

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relatively infrequently, it is desirable that any additional lifting effort should be avoided where practicable, because of the relatively large weight of the mattress.

It is therefore an object of the present invention to provide a bed frame that addresses at least some of the aforementioned disadvantages. An alternative object of the invention is to provide the public with a useful choice over known products.

Reference to any prior art in the specification is not, and should not be taken as, an acknowledgment or any form of suggestion that this prior art forms part of the common general knowledge in Australia or any other jurisdiction or that this prior art could reasonably be expected to be ascertained, understood and regarded as relevant by a person skilled in the art.

Summary of the invention

In accordance with an aspect of the invention, there is provided, a bed frame comprising:

a support structure defining a support surface for supporting a mattress thereon, the support surface defining a perimeter with lateral and longitudinal edges; and

at least one upright safety barrier along the perimeter including one or more movable safety barriers extending along one of the longitudinal edges of the perimeter, the movable safety barrier(s) along said longitudinal edge being pivotable between a closed position for presenting a barrier to the bed occupant along the corresponding longitudinal side of the bed frame and an open position to expose a corresponding longitudinal side of the mattress along the full length of the longitudinal edge.

In accordance with a second aspect of the present invention, there is provided a bed frame comprising:

a support structure defining a support surface for supporting a mattress thereon, the support surface defining a perimeter with lateral and longitudinal edges; and

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at least one upright safety barrier along the perimeter including one or more movable safety barriers extending along one of the longitudinal edges of the perimeter, the movable safety barrier(s) along said longitudinal edge being pivotable between a closed position for presenting a barrier to the bed occupant along the corresponding longitudinal side of the bed frame and an open position such that substantially all portions of said movable safety barrier(s) lie substantially at the level of or beneath said longitudinal edge for access to the mattress along the full length of the longitudinal edge.

In a preferred form of the invention, the bed frame is a bunk bed with side ladder access and there is a single moveable safety barrier which extends for a substantial portion of the length of the longitudinal edge, save for an opening for the ladder access.

In an alternative bunk bed with end ladder access, there is a single moveable safety barrier which extends for the full the length of the longitudinal edge.

However, the invention may also have application to another type of bed such as a hospital bed or children's cot.

The moveable safety barrier may have a lower edge which is substantially flat and which in the closed position faces a portion of the support surface. Preferably, the movable safety barrier is hinged along an outside edge to the longitudinal edge of the support surface.

The bed frame may include fixed safety barriers on the three remaining sides.

Preferably, the safety barrier can be locked in the closed position by a draw bolt that is movable between a locked position and unlocked position.

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to

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which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

The invention consists in the foregoing and also envisages constructions of which the following gives examples.

Brief description of the drawings

In order that the invention may be more fully understood, one embodiment will now be described by way of example, with reference to the figures in which:

Figure 1 is a perspective view of a side ladder bunk bed in accordance with a first preferred embodiment having a drop down safety rail in its closed position;

Figure 2a is a detailed perspective view of the side ladder bunk bed showing the movable safety rail in the open position.

Figure 2b is a detailed perspective view of the side ladder bunk bed showing the movable safety rail in an interim position between the closed and open positions;

Figure 3a is a detailed perspective view of the safety rail for the side ladder bunk bed, and in particular the hinges by which the rail attaches to a support structure;

Figure 3b is a detailed perspective view of a first draw bolt;

Figure 3c is a detailed perspective view of a second draw bolt;

Figure 4 is a perspective view of an end ladder bunk bed in accordance with a second preferred embodiment having a drop down safety rail shown in its closed position;

Figure 5a is a detailed perspective view of the end ladder bunk bed showing one of the movable safety rails in an interim position;

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Figure 5b is a detailed perspective view of the end ladder bunk bed showing one of the movable safety rails in an interim position between the closed and open positions and the other fully open;

Figure 6a is a detailed perspective view of the safety rail for the end ladder bunk bed, and in particular the hinges by which the rail attaches to a support structure;

Figure 6b is a detailed perspective view of a first draw bolt;

Figure 6c is a detailed perspective view of a second draw bolt; and

Figure 7 is an end view of the bed of Figures 1 to 3, with the safety barrier open and the mattress slid out.

Detailed description of the embodiments

A first embodiment of the invention will now be described with reference to the accompanying figures 1 to 3.

Figure 1 illustrates a bed frame 100 comprising four upright posts 101 at the corners and substantially horizontal lower and upper side bearers 103a, 103b. The lower side bearers 103a support a first wire mesh panel 102a defining a first support surface for supporting a first mattress (not shown) which forms the lower bunk 102b. Upper side bearers 103b provide the main support for a second wire mesh panel 104a defining a second support surface for supporting a second mattress (not shown) which forms the upper bunk 104b.

The bed frame 100 may include additional cross-bars 105 for structural rigidity and a removable ladder 107 for access to the upper bunk 104b.

As in conventional bunk beds, the upper bunk is surrounded on at least on three sides by fixed safety barriers 106. A fourth longitudinal side of the upper bunk has a moveable safety barrier 110.

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Figures 2a and 2b illustrate in greater detail the nature of the movable safety barrier 110 which is pivotable through 180° to the open position illustrated in Figure 2a. The second support surface of the upper bunk has longitudinal and lateral edges. The movable safety barrier 110 extends along an accessible longitudinal edge 108. The typical thickness of a mattress 109 relative to the height of the safety barriers 106, 110 is illustrated in Figure 7. The thickness of the mattress 109 is approximately ½ to ⅔ the height of the safety barriers 106, 110. Thus, when the movable safety barrier 110 is in the closed position, this provides a barrier around substantially all of the perimeter of the second support surface 104a. This serves to prevent the bed occupant from inadvertently falling out of bed.

However, as it will be appreciated, the safety barriers 106, 110 present a fetter to any one who needs to make the bed or change, replace or turn the mattress 109. However, with the movable safety barrier 110 of the present invention, in the open position, substantially all of the safety barrier 110 lies at or below the longitudinal edge 108. This enables access to the longitudinal side 111 of the mattress along the full length of the longitudinal edge 108. Additionally, because substantially all of the safety barrier 110 is at or below the longitudinal edge 108, the mattress 109 can be slid out sideways in the manner illustrated in Figure 7. The height of the safety barrier 110 is sufficient to provide a suitable barrier in the closed position but not so great as to present an effective barrier to the occupant of the lower bunk 102b.

Figure 3 illustrates the safety barrier 110 and the means by which it is attached to the bed frame 100. The safety barrier 110 has an outer peripheral frame comprising a lower section 314, an L section 316 and an end section 318. Each of the sections 314, 316 and 318 are comprised of rectangular or square section. The L section 316 is bent through a curve 320 so that the bed occupant accessing the upper bunk by means of the latter 107 will not be exposed to injury. The sections 314, 316 and 318 may be welded together. Additionally, the safety barrier 110 has crossbars 322 spanning from one end to a central strut 324.

Three hinges 302, 304 and 306 are evenly spaced along the underside of section 314. The other plate of each of the three hinges 302, 304 and 306 is attached to the upper

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side of upper bearer 103b. These hinges facilitate the pivoting action of the safety barrier 110. Additionally, it will be appreciated that the square or rectangular metal section 314 enables attachment of the flat hinged plates and also enables the lower surface of lower section 314 to face or sit upon the upper surface of bearer 103b.

The safety barrier 110 also includes first and second locking means 310, 312 to secure the safety barrier 110 in the closed position. The locking means may comprise draw bolts. The first draw bolt 310 is affixed to the inside of bearer 103b as illustrated in Figure 3b. The upright portion of L section 316 is provided with a dependent loop 326 which extends downwardly below the level of the lower section 314 to receive the bolt of the draw bolt 310. The dependent loop 326 will be the only portion of the safety barrier 110 which is exposed above the longitudinal edge 108 when the safety barrier 110 is in the open position. Thus, the underside of the lower section 314 will lie substantially flush with the upper surface of the bearer 103b when the safety barrier 110 is in the open position. Also, in the closed position, the outer surface of the safety barrier 110 is flush with the outer surface of the bearer 103b.

The second draw bolt is disposed on the outside of the safety barrier 110 along the L section 316, adjacent to the end section 318. The bolt of the draw bolt 312 is received in an aperture of one of the upright posts 101.

Figures 4 to 6 illustrate an alternative form of the invention which is similar in many respects to the first embodiment. Since many of the parts are similar or the same, like numerals will be used to represent like parts. The prime symbol (') will be used to indicate where a part has been adapted for the second embodiment.

The bed frame 400 according to the second embodiment is similar in many respects with four upright posts 101 at the corners and substantially horizontal lower and upper side bearers 103a, 103b. As before, the lower side bearers 103a support a first wire mesh panel 102a defining a first support surface for supporting a first mattress which forms the lower bunk 102b. Upper side bearers 103b provide the main support for a second wire mesh panel 104a defining a second support surface for supporting a second mattress which forms the upper bunk 104b.

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The main difference with the second embodiment is that the ladder 107' is no longer a separable attachment and is instead incorporated into the end of the bed frame 400. Each of the stiles 402 of the ladder 107' is formed in a C-shape, the upper ends of which form part of the safety barriers 106' at the end of the bed. Such a bed is used in a army barracks situation.

The other significant difference in this embodiment is that both of the longitudinal safety barriers are now movable safety barriers 110'. Furthermore, these movable safety barriers 110' extend for the full length of the longitudinal edge 108. Thus, as shown in Figures 5a and 5b access to both sides of the mattress may be provided by moving both movable safety barriers 110' into the open position. This enables access to both sides of the mattress for easy bed making.

As shown in Figure 6, the construction of the safety barrier 110' is also changed somewhat to suit the new embodiment. There is a lower section 314', an upper section 316' and two end sections 318' constructed of rectangular or square metal section as before. In this embodiment, instead of three hinges, there are four equally spaced hinges 602, 604, 606 and 608 attached to the upper bearer 103b as per the previous embodiment.

This embodiment also has two locking devices in the form of draw bolts 412 and 414 which are located at opposite ends of the safety barrier 110 on the outside of the upper section 316'. The bolts of the draw bolts 412, 414 extend into holes in the upright posts 101.

It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A bed frame comprising:

a support structure defining a support surface for supporting a mattress thereon, the support surface defining a perimeter with lateral and longitudinal edges; and

at least one upright safety barrier along the perimeter including one or more movable safety barriers extending along one of the longitudinal edges of the perimeter, the movable safety barrier(s) along said longitudinal edge being pivotable between a closed position for presenting a barrier to the bed occupant along the corresponding longitudinal side of the bed frame and an open position to expose a corresponding longitudinal side of the mattress along the full length of the longitudinal edge.

2. A bed frame comprising:

a support structure defining a support surface for supporting a mattress thereon, the support surface defining a perimeter with lateral and longitudinal edges; and

at least one upright safety barrier along the perimeter including one or more movable safety barriers extending along one of the longitudinal edges of the perimeter, the movable safety barrier(s) along said longitudinal edge being pivotable between a closed position for presenting a barrier to the bed occupant along the corresponding longitudinal side of the bed frame and an open position such that substantially all portions of said movable safety barrier(s) lie substantially at the level of or beneath said longitudinal edge for access to the mattress along the full length of the longitudinal edge.

3. A bed frame as claimed in claim 1 or 2 wherein the bed frame is for a bunk bed with side ladder access and there is a single moveable safety barrier which extends for a substantial portion of the length of the longitudinal edge, save for an opening for the ladder access.

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4. A bed frame as claimed in claim 1 or 2 wherein the bed frame is for a bunk bed with end ladder access and there is a single moveable safety barrier which extends for the full the length of the longitudinal edge.

5. The bed frame as claimed in any one of the preceding claims wherein the moveable safety barrier has a lower edge which is substantially flat and in the closed position, faces a portion of the support surface.

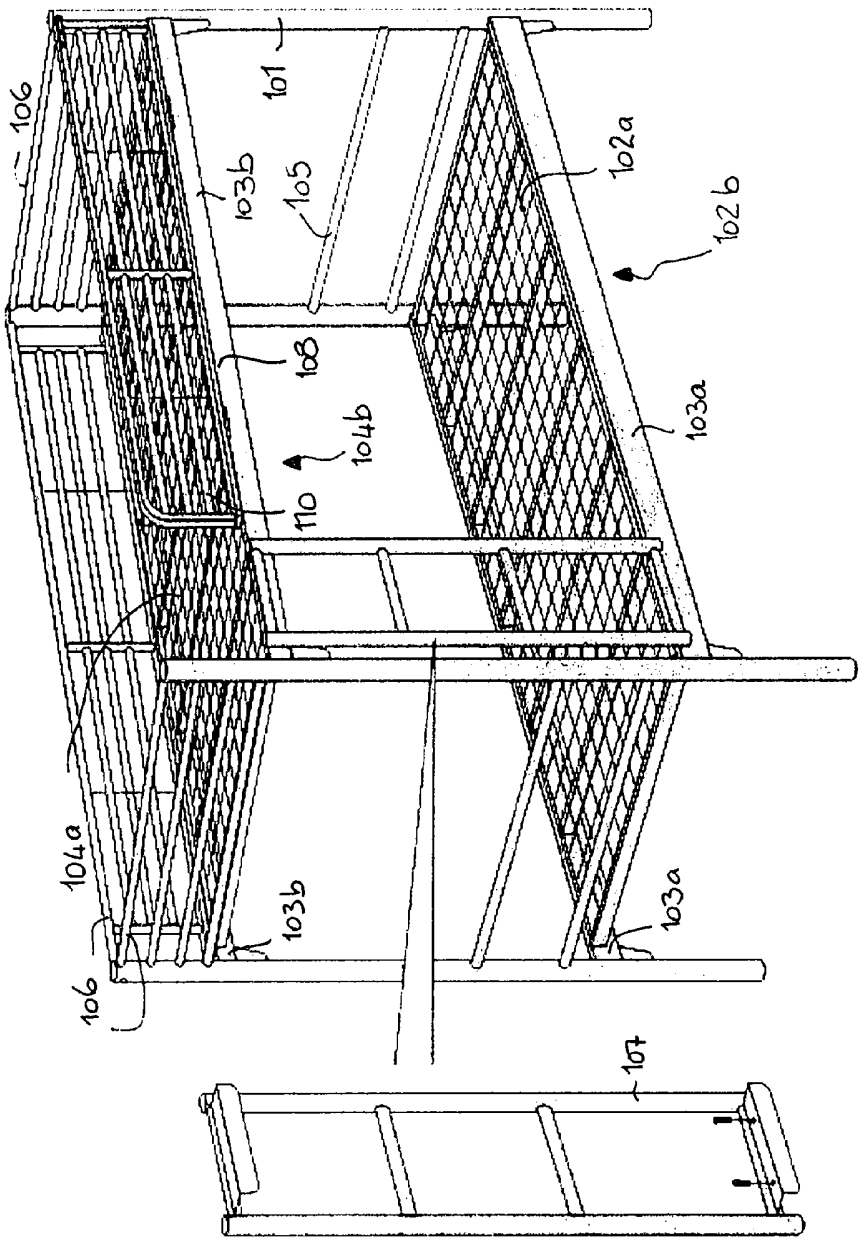
106
101
103b
105
102a
102b
108
104b
103a
110
104a
103b
106
103a
107
100

FIG. 1

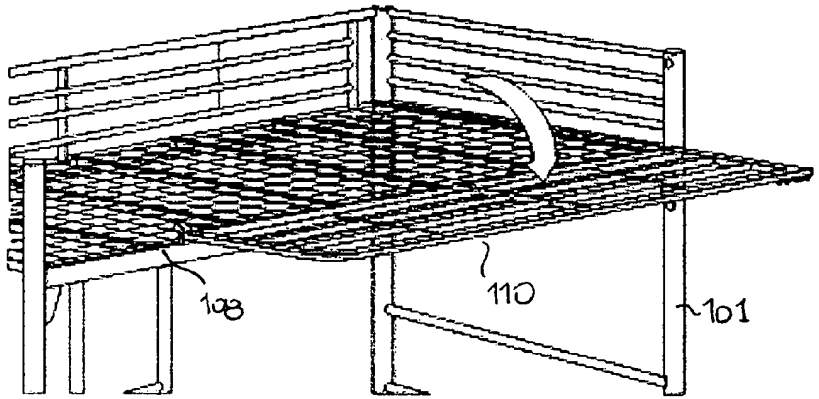

FIG. 2b

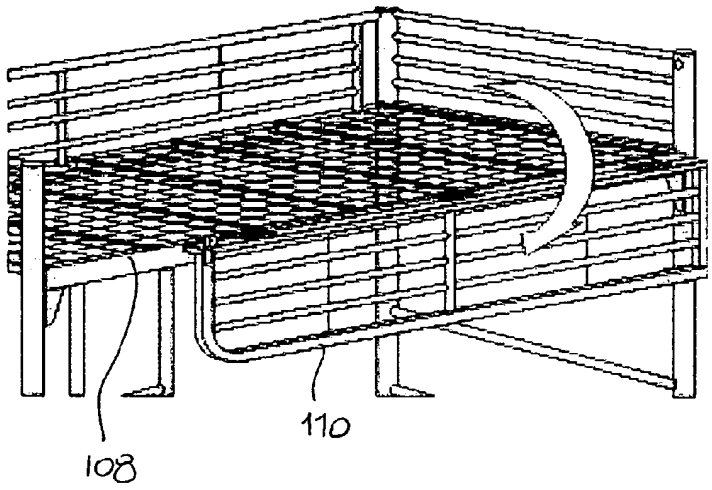

FIG. 2a

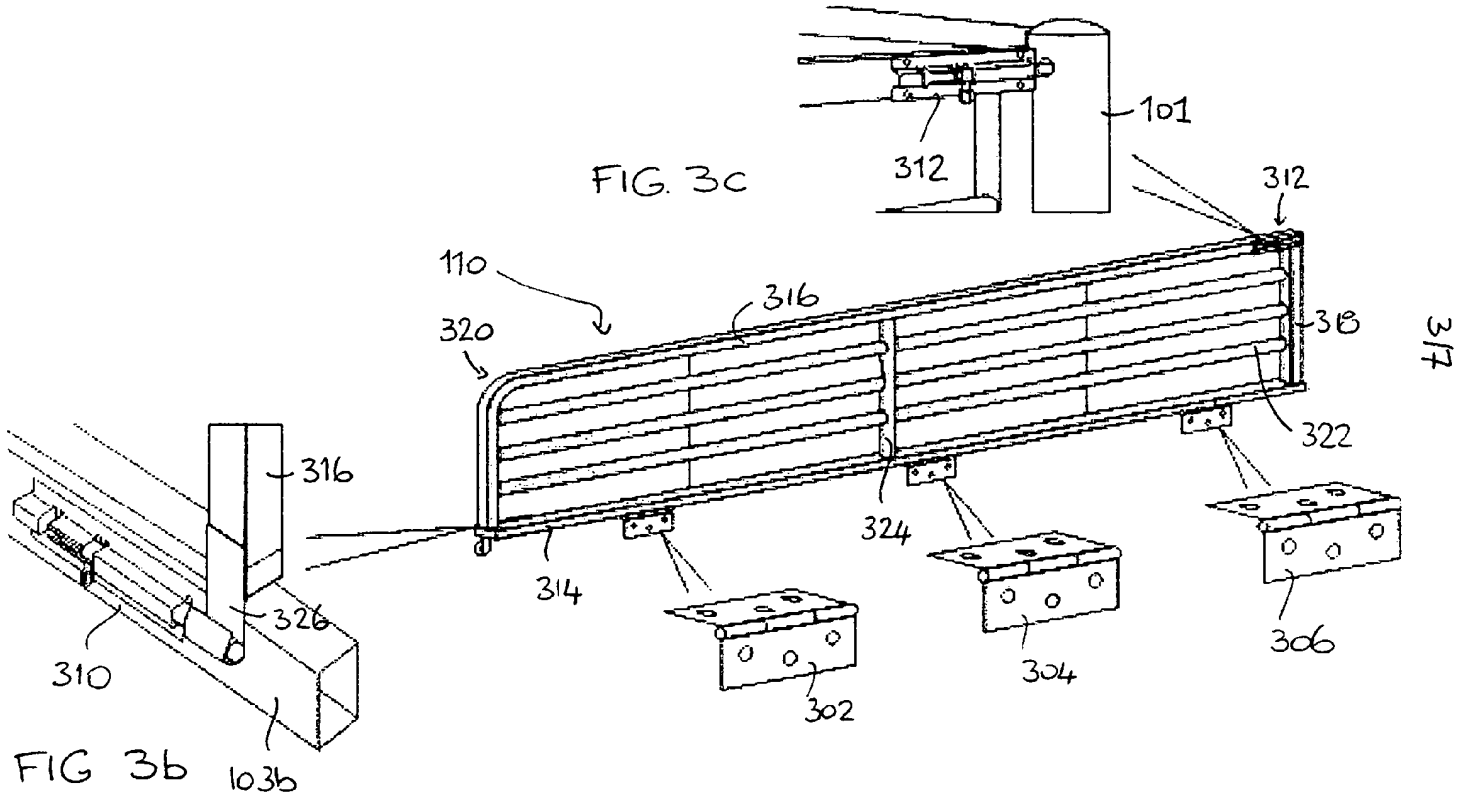

FIG. 3c

FIG 3b

FIG 3a

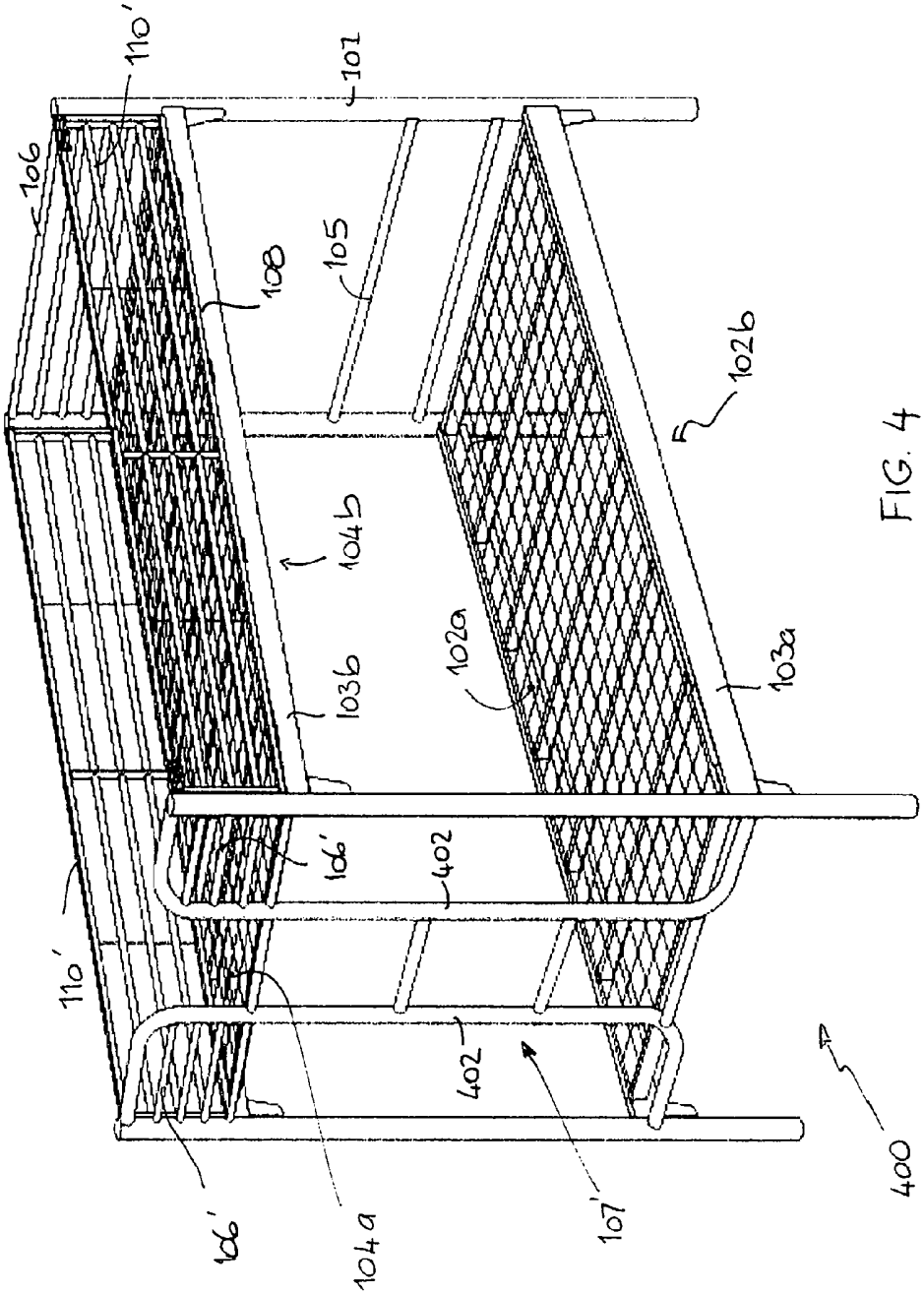
110'
101
106
108
105
102b
104b
103b
103a
102a
104a
106'
402
107'
400

FIG. 4

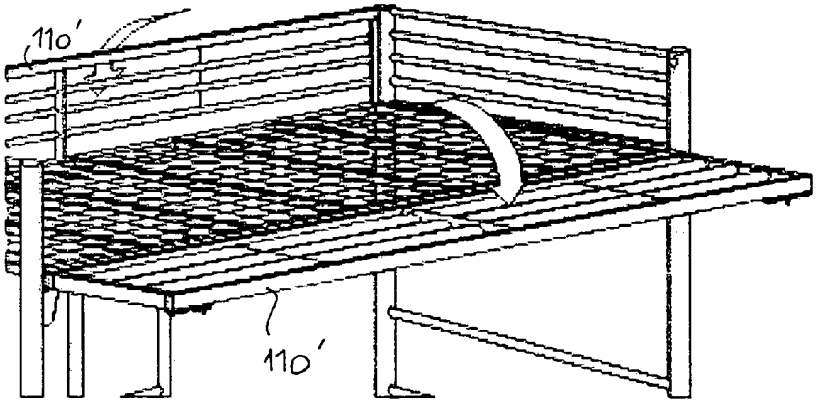

FIG. 5b

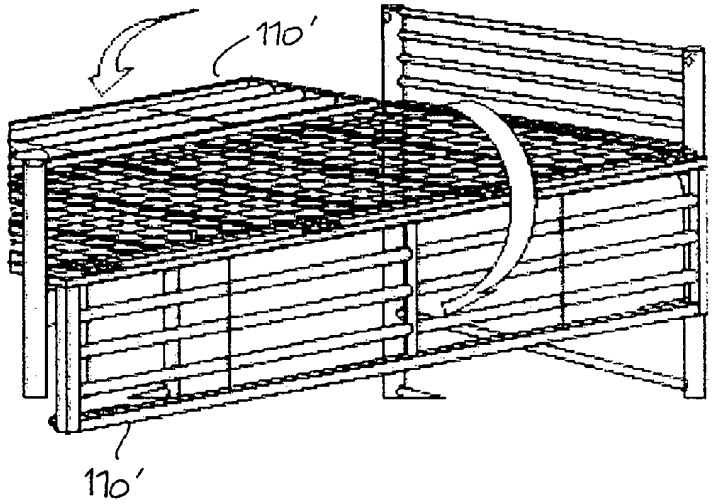

FIG 5a

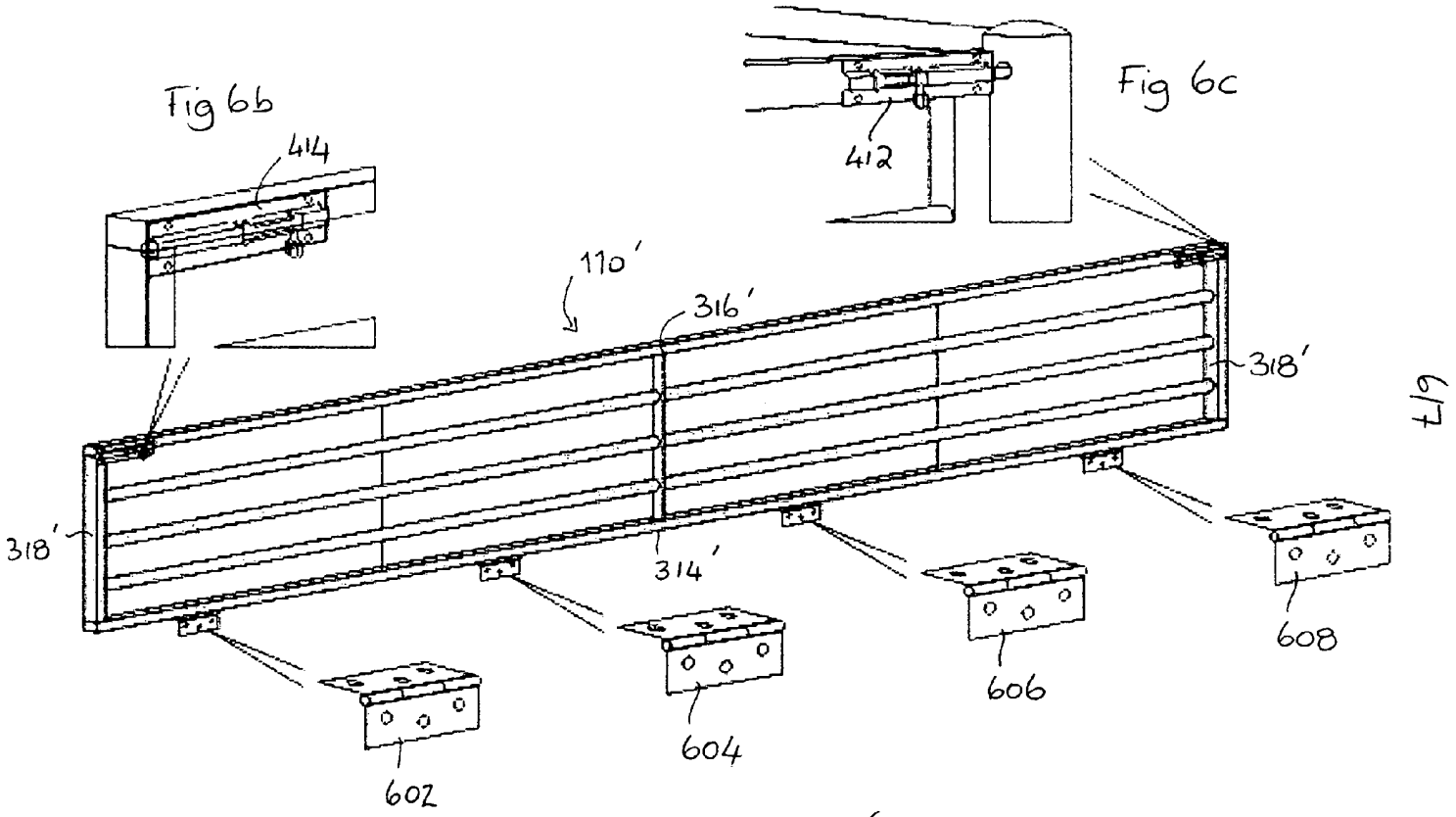

Fig 6a

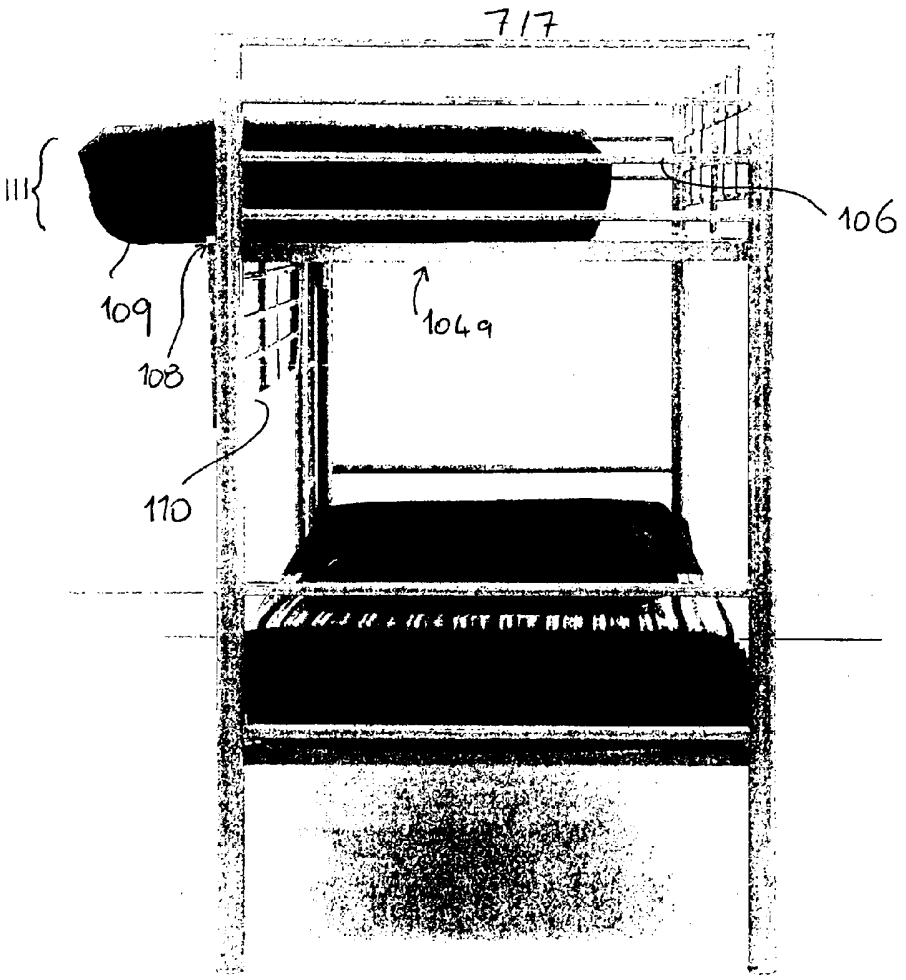

Figure 7