Title: WALL BED ASSEMBLY AND KIT OF PARTS FOR ASSEMBLY INTO A WALL BED

Abstract: A wall bed assembly (10) and a kit of parts for assembly into a wall bed are provided. The wall bed assembly (10) includes a support structure (12), a first portion (16) of a bed frame (14), and a second portion (18) of the bed frame (14). The first portion (16) of the bed frame (14) is pivotally coupled to the support structure (12). The second portion (18) of the bed frame (14) is coupled to the first portion (16) of the bed frame (14). A leg structure (20) is movably coupled to the second portion (18) of the bed frame (14). The leg structure (20) is movable between a first position for use and a second position for storage. A biasing element (46) has a first end pivotally coupled to the support structure (12) and a second end pivotally coupled to the first portion (16) of the bed frame (14).
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WALL BED ASSEMBLY AND KIT OF PARTS FOR ASSEMBLY INTO A WALL BED

Field of the Invention

The present invention relates to wall beds and more particularly to a wall bed assembly and a kit of parts for assembly into a wall bed.

Background of the Invention

A wall bed, also known as a Murphy bed or a pull down bed, is a bed that is movable between a vertical stored position and a horizontal position when in use. Wall beds are typically installed in places where floor space is limited. Examples include small apartments, hotel rooms, college dormitories and mobile homes.

A drawback of conventional wall bed systems is that assembly is typically complicated, involving numerous components and parts. Consequently, self-installation often takes awhile and is error prone.

It is therefore desirable to have an easy to assemble wall bed assembly and a kit of parts that can be easily assembled into a wall bed.

Summary of the Invention

Accordingly, in a first aspect, the present invention provides a wall bed assembly. The wall bed assembly includes a support structure, a first portion of a bed frame, and a second portion of the bed frame. The first portion of the bed frame is pivotally coupled to the support structure. The first portion of the bed frame includes a first rail, a first portion of a first side rail extending from the first rail, a first portion of a second side rail extending from the first rail, and a plurality of first slats extending between the first portion of the first side rail and the first portion of the second side rail. The second portion of the bed frame includes a second rail, a second portion of the first side rail extending from the second rail, a second portion of the second side rail extending from the second rail, and a plurality of second slats
extending between the second portion of the first side rail and the second portion of the second side rail. The second portion of the first side rail is coupled to the first portion of the first side rail, and the second portion of the second side rail is coupled to the first portion of the second side rail. A leg structure is movably coupled to the second portion of the bed frame. The leg structure is movable between a first position for use and a second position for storage. A biasing element has a first end pivotally coupled to the support structure and a second end pivotally coupled to the first portion of the bed frame.

In a second aspect, the present invention provides a kit of parts for assembly into a wall bed. The kit of parts includes a support structure, a first portion of a bed frame, and a second portion of the bed frame. A biasing element has a first end pivotally coupled to the support structure. The first portion of the bed frame includes a first rail, a first portion of a first side rail extending from the first rail, a first portion of a second side rail extending from the first rail, and a plurality of first slats extending between the first portion of the first side rail and the first portion of the second side rail. The second portion of the bed frame includes a second rail, a second portion of the first side rail extending from the second rail, a second portion of the second side rail extending from the second rail, and a plurality of second slats extending between the second portion of the first side rail and the second portion of the second side rail. A leg structure is movably coupled to the second portion of the bed frame. The leg structure is movable between a first position for use and a second position for storage. On assembly, the first portion of the bed frame is pivotally coupled to the support structure, a second end of the biasing element is pivotally coupled to the first portion of the bed frame, the first portion of the first side rail is coupled to the second portion of the first side rail and the first portion of the second side rail is coupled to the second portion of the second side rail.

Other aspects and advantages of the invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.
Brief Description of the Drawings

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a wall bed assembly in accordance with one embodiment of the present invention;

FIG. 2 is a perspective view illustrating the securing of a support structure of the wall bed assembly of FIG. 1 to a wall via a plurality of first wall brackets;

FIG. 2A is an exploded view of various elements that are used with one of the first wall brackets to secure the support structure to the wall;

FIG. 2B is an enlarged perspective view of the leveling indicator shown in FIG. 2;

FIGS. 2C and 2D are cross-sectional views illustrating the mounting of a first wall bracket for the support structure to the wall;

FIG. 2E is an enlarged perspective view illustrating the securing of a frame member of the support structure to the first wall bracket of FIGS. 2C and 2D;

FIG. 3 is a perspective view illustrating the coupling of a first portion of a bed frame of the wall bed assembly of FIG. 1 to the support structure;

FIG. 3A is an enlarged perspective view illustrating how a pin provided on the first portion of the bed frame is received in a slot member provided on an inner side surface of the support structure;

FIG. 4 is a perspective view illustrating the coupling of a second portion of the bed frame of the wall bed assembly of FIG. 1 to the first portion of the bed frame;

FIG. 4A is an enlarged perspective view illustrating how the second portion of the bed frame is secured to the first portion of the bed frame;
FIG. 5 is a perspective view illustrating the coupling of a biasing element of the wall bed assembly of FIG. 1 to the first portion of the bed frame;

FIG. 5A is an enlarged exploded view illustrating how the biasing element is secured to the first portion of the bed frame;

FIG. 6 is a perspective view illustrating the installation of a lower apron of the wall bed assembly of FIG. 1 onto the support structure;

FIG. 6A is an enlarged perspective view illustrating the relationship between one of the protrusions formed on a rear facing of the lower apron and one of the first double-width slots formed in a base frame member of the support structure;

FIG. 7 is a perspective view illustrating the installation of a plurality of panels of the wall bed assembly of FIG. 1 onto the first and second portions of the bed frame;

FIG. 7A is an enlarged perspective view illustrating how one of the panels is coupled to the first and second portions of the bed frame;

FIG. 8 is a perspective view illustrating how the panels are secured to the bed frame of the wall bed assembly of FIG. 1;

FIG. 8A is an enlarged perspective view illustrating how one of the panels is secured to the second rail of the bed frame;

FIG. 9 is a perspective view illustrating the installation of a first side panel and a second side panel of the wall bed assembly of FIG. 1 onto the support structure;

FIG. 9A is an enlarged perspective view illustrating how the first side panel is secured to the support structure;

FIG. 10 is a perspective view illustrating the mounting of a backing panel of the wall bed assembly of FIG. 1 between the first and second side panels;
FIG. 10A is an enlarged perspective view illustrating how the backing panel engages the first side panel;

FIGS. 10B and 10C are enlarged perspective views illustrating a first locking mechanism that is used to secure the backing panel to the first and second side panels;

FIG. 11 is a perspective view illustrating the mounting of an upper panel of the wall bed assembly of FIG. 1 over the first and second side panels and the backing panel;

FIGS. 11A and 11B are enlarged perspective views illustrating a second locking mechanism that is used to secure the backing panel to the first and second side panels;

FIG. 12 is a perspective view illustrating the securing of the upper panel of the wall bed assembly of FIG. 1 to the wall;

FIGS. 12A and 12B are enlarged perspective views illustrating how a second wall bracket is used to secure the upper panel to the wall;

FIG. 13 is a perspective view illustrating the placement of a mattress on the bed frame of the wall bed assembly of FIG. 1;

FIGS. 14A, 14B and 14C are enlarged perspective views illustrating how a leg structure of the wall bed assembly of FIG. 1 is moved from a first position for use to a second position for storage;

FIG. 15 is a perspective view illustrating the wall bed assembly of FIG. 1 in a stored state; and

FIGS. 15A and 15B are enlarged perspective views illustrating how the wall bed assembly is locked when not in use.
Detailed Description of An Exemplary Embodiment

The detailed description set forth below in connection with the appended drawings is intended as a description of a presently preferred embodiment of the invention, and is not intended to represent the only form in which the present invention may be practiced. It is to be understood that the same or equivalent functions may be accomplished by different embodiments that are intended to be encompassed within the scope of the invention.

Referring now to FIG. 1, a wall bed assembly 10 is shown. The wall bed assembly 10 includes a support structure 12 and a bed frame 14 pivotally coupled to the support structure 12. The bed frame 14 includes a first portion 16 and a second portion 18. The first portion 16 of the bed frame 14 is pivotally coupled to the support structure 12 and the second portion 18 of the bed frame 14 is coupled to the first portion 16 of the bed frame 14. A leg structure 20 is movably coupled to the second portion 18 of the bed frame 14. A first side panel 22 and a second side panel 24 are coupled to respective sides of the support structure 12 and an upper panel 26 is mounted over the first and second side panels 22 and 24. A plurality of straps 28 is provided at respective corners of the bed frame 14 to hold a mattress 30 in place during storage, when in use and when being moved between storage and use positions.

The wall bed assembly 10 is provided as a kit of parts for assembly into a wall bed by breaking up the entire wall bed system into modules with preinstallation of certain fixtures and components done at a factory before the wall bed system is sold. Advantageously, this reduces the number of individual components a user has to work with when installing the wall bed assembly 10 and this thus simplifies the assembly process. Various components of the kit of parts and installation of the wall bed assembly 10 will now be described below with reference to FIG. 2 through FIG. 15B.
Referring now to FIG. 2, the support structure 12 of the wall bed assembly 10 is shown being secured to a wall 32 by a plurality of first wall brackets 34. The support structure 12 includes a plurality of frame members 36, the frame members 36 being arranged to define a rear portion 38, side portions 40 and a base portion 42 of the support structure 12. In the embodiment shown, a plurality of reinforcing members 44 is provided at the rear portion 38 to strengthen the support structure 12. At each of the side portions 40, a first end of a biasing element 46 is pivotally coupled to the support structure 12. More particularly, in the embodiment shown, a first plate member 48 is provided in an upper rear corner of the side portion 40 of the support structure 12 and the first end of the biasing element 46 is pivotally coupled to the first plate member 48. A plurality of adjustable glides 50 is coupled to the base portion 42 of the support structure 12. In the embodiment shown, a leveling indicator 52 is provided on one of the frame members 36 of the support structure 12.

Referring now FIG. 2A, an exploded view of various elements that are used with one of the first wall brackets 34 to secure the support structure 12 to the wall 32 is shown. The various elements include a first toggle anchor 54, also known as a butterfly toggle or a butterfly anchor, a second toggle anchor 56, corresponding first and second screws 58 and 60 and a first thumb screw 62. Each of the first wall brackets 34 includes a first backing plate 64 and two (2) forward extending plates 66 defining a C-shaped channel for receiving one of the frame members 36 of the support structure 12 with the first backing plate 64. A first aperture 68 is formed at a first end of the first backing plate 64 to receive the first screw 58 and a second aperture 70 is formed at a second end of the first backing plate 64 to receive the second screw 60. A third aperture 72 is formed in the lower of the two (2) forward extending plates 66 to receive the first thumb screw 62.

Referring again to FIG. 2, the frame members 36 and the reinforcing members 44 of the support structure 12 of the present embodiment are made of a metal or an alloy.
The biasing element 46 facilitates lowering of the bed frame 14 for use and raising of the bed frame 14 for storage. In the present embodiment, the biasing element 46 is a pair of gas pistons. However, it should be understood by those of ordinary skill in the art that the biasing element 46 is not limited to gas pistons or by the number of gas pistons provided. For example, the biasing element 46 may be one (1) or more torsion springs in an alternative embodiment. As can be seen from FIG. 2, the biasing element 46 is pre-mounted on the support structure 12. Advantageously, this reduces the number of individual components a user has to work with when installing the wall bed assembly 10 and thus simplifies the assembly process.

Referring now to FIG. 2B, an enlarged perspective view of the leveling indicator 52 is shown. Advantageously, use of the leveling indicator 52 during installation helps reduce the installation time by eliminating any unnecessary guess work and the need for any specialized tools for set up.

Installation of the support structure 12 of the wall bed assembly 10 will now be described below with reference to FIG. 2 and FIG. 2C through FIG. 2E.

Referring again to FIG. 2, the first wall brackets 34 are first loosely fitted over an upper rear frame member 36 of the support structure 12 during assembly and the support structure 12 with the first wall brackets 34 loosely fitted thereon is then placed in a desired position for installation of the wall bed.

During assembly, the leveling indicator 52 is placed on the support structure 12 and is used to level the support structure 12 by adjusting the glides 50.

Once the positioning of the support structure 12 is confirmed, the positions of the first wall brackets 34 and the first and second apertures 68 and 70 of the first wall brackets 34 are marked out on the wall 32 with, for example, a pencil. Through holes are then drilled through the wall 32 at the positions marked for the first and second apertures 68 and 70 of the first wall brackets 34.
Although three (3) first wall brackets 34 are employed in the present embodiment, it should be understood by those of ordinary skill in the art that the present invention is not limited by the number of first wall brackets 34 that are used. In alternative embodiments, fewer or more first wall brackets 34 may be employed depending on the size and mass of the wall bed assembly 10.

Referring now to FIG. 2C, the mounting of one of the first wall brackets 34 to the wall 32 is shown. As can be seen from FIG. 2C, the first screw 58 is passed through the first aperture 68 of the first wall bracket 34 and threaded through the first toggle anchor 54. The first toggle anchor 54 and a portion of the first screw 58 are inserted into a through hole 74 formed in the wall 32.

As can be seen from FIG. 2D, once the first toggle anchor 54 is inserted past the through hole 74, the first toggle anchor 54 opens up, anchoring the first wall bracket 34 to the wall 32. The first wall bracket 34 is fastened to the wall 32 by screwing the first screw 58 completely into the wall 32.

The procedure is repeated with the second screw 60 and the second toggle anchor 56 in respect of the second aperture 70 of the first wall bracket 34.

In this manner, each of the first wall brackets 34 is secured to the wall 32 by the first toggle anchor 54 and the second toggle anchor 56 on assembly.

Referring now to FIG. 2E, the first wall bracket 34 is secured to one of the frame members 36 of the support structure 12 on assembly by passing the first thumb screw 62 through the third aperture 72 formed in the lower of the two (2) forward extending plates 66 of the first wall bracket 34 and fastening the first thumb screw 62 to the frame member 36 of the support structure 12.

Advantageously, the use of the first wall brackets 34 together with the first and second toggle anchors 54 and 56, the first and second screws 58 and 60 and the first thumb screw 62 simplifies the installation of the support structure 12 to the wall 32.
Referring now to FIGS. 3 and 3A, the coupling of the first portion 16 of the bed frame 14 of the wall bed assembly 10 to the support structure 12 is shown. The first portion 16 of the bed frame 14 includes a first rail 76, a first portion 78 of a first side rail 80 extending from the first rail 76, a first portion 82 of a second side rail 84 extending from the first rail 76, a first portion 86 of a support rail 88 extending from the first rail 76, and a plurality of first slats 90 extending between the first portion 78 of the first side rail 80 and the first portion 82 of the second side rail 84.

The first rail 76, the first and second side rails 80 and 84 and the support rail 88 of the bed frame 14 of the present embodiment are made of a metal or an alloy. Although a support rail 88 is provided in the present embodiment, it should be understood by those of ordinary skill in the art that the present invention is not limited to wall beds having a centre support rail. For example, in alternative embodiments, no support rail or additional support rails may be provided depending on the size and mass of the wall bed.

The first slats 90 are provided perpendicular to the first and second side rails 80 and 84 and the support rail 88 of the bed frame 14 to support the mattress 30 when the mattress 30 is strapped on. The first slats 90 of the present embodiment may be made of wood, a metal or an alloy.

A first slot member 92 is provided on an inner side surface of the support structure 12 and a second slot member 94 is provided on an opposing inner side surface of the support structure 12.

Each of the first and second slot members 92 and 94 has a slot 96 formed at an incline, the slot 96 having an open end and a rounded end. The first and second slot members 92 and 94 are arranged to receive respective ones of a plurality of corresponding first pins 98 provided on the first portion 16 of the bed frame 14 on assembly. In this manner, the first portion 16 of the bed frame 14 is simply and easily slipped onto the support structure 12 during the installation process.
Furthermore, on assembly, the first portion 16 of the bed frame 14 is secured to the support structure 12 by a plurality of hexagon socket head cap screws 100, each of the hexagon socket head cap screws 100 extending through an aperture 102 formed in the support structure 12 adjacent the respective first and second slot members 92 and 94 and into a first hole 104 formed in the corresponding first pins 98 provided on the first portion 16 of the bed frame 12.

In this manner, the first portion 16 of the bed frame 14 is pivotally coupled to the support structure 12 on assembly.

Referring now to FIGS. 4 and 4A, the coupling of the second portion 18 of the bed frame 14 of the wall bed assembly 10 to the first portion 16 of the bed frame 14 is shown. The second portion 18 of the bed frame 14 includes a second rail 106, a second portion 108 of the first side rail 80 extending from the second rail 106, a second portion 110 of the second side rail 84 extending from the second rail 106, a second portion 112 of the support rail 88 extending from the second rail 106, a plurality of second slats 114 extending between the second portion 108 of the first side rail 80 and the second portion 110 of the second side rail 84.

The second slats 114 are provided perpendicular to the first and second side rails 80 and 84 and the support rail 88 of the bed frame 14 to support the mattress 30 when the mattress 30 is strapped on. The second slats 114 of the present embodiment may be made of wood, a metal or an alloy.

On assembly, the second portion 108 of the first side rail 80 is coupled to the first portion 78 of the first side rail 80, the second portion 110 of the second side rail 84 is coupled to the first portion 82 of the second side rail 84, and the second portion 112 of the support rail 88 is coupled to the first portion 86 of the support rail 88.

In the embodiment shown, distal ends of the first portions 78, 82 and 86 of the first and second side rails 80 and 84 and the support rail 88 relative to the first rail 76 are formed with a hollow section and distal ends of the second portions 108,
110 and 112 of the first and second side rails 80 and 84 and the support rail 88 relative to the second rail 106 are formed with an extended portion.

On assembly, the extended portion of the second portions 108, 110 and 112 of the first and second side rails 80 and 84 and the support rail 88 are received in the hollow section of the first portions 78, 82 and 86 of the first and second side rails 80 and 84 and the support rail 88 and secured in place by a plurality of second thumb screws 116.

In an alternative embodiment, the arrangement may be reversed with the extended portion being formed at distal ends of the first portions 78, 82 and 86 of the first and second side rails 80 and 84 and the support rail 88 relative to the first rail 76 and the hollow section being formed at distal ends of the second portions 108, 110 and 112 of the first and second side rails 80 and 84 and the support rail 88 relative to the second rail 106.

Referring now to FIGS. 5 and 5A, the coupling of the biasing element 46 of the wall bed assembly 10 to the first portion 16 of the bed frame 14 is shown. As can be seen from FIG. 5, a second end of the biasing element 46 is pivotally coupled to the first portion 16 of the bed frame 14 on assembly.

In the embodiment shown, a second plate member 118 is provided at each end of the first rail 76 adjacent the first and second side rails 80 and 84 and the second end of the biasing element 46 is pivotally coupled to the second plate member 118 via a bolt adapter 120, a series of washers 122 and a plurality of corresponding nuts 124.

Referring now to FIGS. 6 and 6A, the installation of a lower apron 126 of the wall bed assembly 10 onto the support structure 12 is shown. In the present embodiment, a plurality of protrusions 127 are formed on a rear facing of the lower apron 126 at positions corresponding to a plurality of first double-width slots 128 formed in a base frame member 36 of the support structure 12.
On assembly, the protrusions on the lower apron 126 are first mated to corresponding ones of the first double-width slots 128 at the wider portion and the lower apron 126 is then secured to the support structure 12 by sliding the protrusions into the narrower portion of the first double-width slots 128. The lower apron 126 is fastened to the support structure 12 with a plurality of thumb screws 129.

Referring now to FIG. 7 through 8A, the installation of a plurality of panels 130 of the wall bed assembly 10 onto the first and second portions 16 and 18 of the bed frame 14 is shown. A plurality of first protruding members 132 is provided on a rear surface of each of the panels 130 at positions corresponding to a plurality of first slots 134 formed in the first rail 76 of the bed frame 14 and a plurality of second slots 136 formed in a crosspiece 138 of the second portion 18 of the bed frame 14.

On assembly, the first protruding members 132 on the panels 130 are received in corresponding ones of the first and second slots 134 and 136 formed in the first rail 76 of the bed frame 14 and the crosspiece 138 of the second portion 18 of the bed frame 14 and the panels 130 are secured to the second rail 106 by a plurality of third thumb screws 140.

Referring now to FIGS. 9 and 9A, the installation of a first side panel 142 and a second side panel 144 of the wall bed assembly 10 onto the support structure 12 is shown. A plurality of second protruding members 146 is provided on the first and second side panels 142 and 144 and a plurality of second double width slots 148 is formed in the support structure 12. In the embodiment shown, a narrower portion is formed below a wider portion of the second double width slots 148.

On assembly, the second protruding members 146 on the first and second side panels 142 and 144 are received in corresponding ones of the double width slots 148 formed in the support structure 12. Due to the weight of the first and second side panels 142 and 144, the second protruding members 146 are naturally inclined to slide downwards to engage the narrower portions of the second double
width slots 148, thereby securing the first and second side panels 142 and 144 to the support structure 12.

Referring now to FIG. 10 through FIG. 10C, the mounting of a backing panel 150 of the wall bed assembly 10 between the first and second side panels 142 and 144 is shown.

As can be seen from FIG. 10A, a plurality of first locks 152 and a plurality of second pins 154 are provided on each side of the backing panel 150 where the backing panel 150 meets the first and second side panels 142 and 144 and a plurality of corresponding second holes 156 are formed in the first and second side panels 142 and 144.

In the present embodiment, the first locks 152 are finger-operated cam locks with FIG. 10B showing one of the first locks 152 in an unlocked state and FIG. 10C showing the first lock 152 in a locked state.

Although two (2) first locks 152 and two (2) second pins 154 are provided in the present embodiment, it should be understood by those of ordinary skill in the art that the present invention is not limited by the number of first locks 152 or the number of second pins 154 that are provided. In alternative embodiments, fewer or more first locks 152 and/or second pins 154 may be provided depending on the dimensions and mass of the backing panel 150. The backing panel 150 may also be provided with only one of the first locks 152 and the second pins 154 in alternative embodiments.

During assembly, the first locks 152 and the second pins 154 are first brought into alignment with the corresponding second holes 156 formed in the first and second side panels 142 and 144, mated and then the first locks 152 are applied to secure the backing panel 150 to the first and second side panels 142 and 144. In this manner, the backing panel 150 is mounted between the first and second side panels 142 and 144 on assembly.
Referring now to FIG. 11 through FIG. 11B, the mounting of an upper panel 158 of the wall bed assembly 10 over the first and second side panels 142 and 144 and the backing panel 150 is shown. In the present embodiment, the upper panel 158 includes an upper apron 160. A plurality of second locks 162 and a plurality of third pins 164 are provided at upper edges of the first and second side panels 142 and 144 and the backing panel 150 where the first and second side panels 142 and 144 and the backing panel 150 meet the upper panel 158 and a plurality of corresponding holes (not shown) are formed in the underside of the upper panel 158.

In the present embodiment, the second locks 162 are finger-operated cam locks with FIG. 11A showing one of the second locks 162 in an unlocked state and FIG. 11B showing the second lock 162 in a locked state.

Although eight (8) second locks 162 and three (3) third pins 164 are provided in the present embodiment, it should be understood by those of ordinary skill in the art that the present invention is not limited by the number of second locks 162 or the number of third pins 164 that are provided. In alternative embodiments, fewer or more second locks 162 and/or third pins 164 may be provided depending on the dimensions and mass of the upper panel 158. The upper panel 158 may also be provided with only one of the second locks 162 and the third pins 164 in alternative embodiments.

During assembly, the second locks 162 and the third pins 164 are first brought into alignment with the corresponding holes formed in the upper panel 158, mated and then the second locks 162 are applied to secure the upper panel 158 to the first and second side panels 142 and 144 and the backing panel 150. In this manner, the upper panel 158 is mounted over the first and second side panels 142 and 144 and the backing panel 150 on assembly.

Advantageously, the use of simple bracketry, thumb screws 140 and toolless locking bracketry 152 and 162 not only simplifies the installation of the decorative
panels 126, 130, 142, 144 and 158 of the wall bed assembly 10 for a general user, but also increases versatility in changing the outward appearance of the wall bed assembly 10 as this can be done by simply changing the decorative panels 126, 130, 142, 144 and 158 of the wall bed assembly 10, providing a wider range of aesthetic options for the user and also at the factory side.

Referring now to FIG. 12 through FIG. 12B, the securing of the upper panel 158 of the wall bed assembly 10 to the wall 32 with a plurality of second wall brackets 166 is shown. Each of the second wall brackets 166 includes a second backing plate 168 and a base plate 170 formed at right angles to one another. A plurality of fourth apertures 172 is formed in the second backing plate 168 to receive corresponding ones of a plurality of third screws 174 and a plurality of fifth apertures 176 is formed in the base plate 170 to receive corresponding ones of a plurality of fourth screws 178.

Referring now to FIG. 13, placement of the mattress 30 on the bed frame 14 of the wall bed assembly 10 is shown. The mattress 30 is held in place by the straps 28 provided at respective corners of the bed frame 14. The straps 28 help to hold the mattress 30 in place during storage, when in use and when being moved between storage and use positions. In the present embodiment, the straps 28 are made of an elastic material.

Referring now to FIG. 14A through FIG. 14C, the leg structure 20 coupled to the bed frame 14 is movable between a first position for use shown in FIG. 14A and a second position for storage shown in FIG. 14C. A locking mechanism 180 is provided on the second rail 106. The locking mechanism 180 is arranged to lock the leg structure 20 in the first position when in use. As can be seen from FIG. 14A through FIG. 14C, the locking mechanism 180 is released when the leg structure 20 transitions from the first position for use to the second position for storage.

Referring now to FIG. 15, the wall bed assembly 10 is shown in a stored state. The wall bed assembly 10 is provided with a key-lock 182. The key-lock 182
may be any conventional lock that is unlocked with a key. Accordingly, a detailed description of the key-lock 182 is not required for a complete understanding of the present invention.

Referring now to FIGS. 15A and 15B, the key-lock 182 is shown in an unlocked state in FIG. 15A and a locked state in FIG. 15B.

As is evident from the foregoing discussion, the present invention provides an easy to assemble wall bed assembly and a kit of parts that can be easily assembled into a wall bed. Advantageously, by breaking up the entire wall bed system into modules with preinstallation of certain fixtures and components done at a factory before the wall bed system is sold, assembly time required by the end user is greatly reduced and the need for complicated assembly instructions and huge inventories of components that are confusing to an average person is eliminated. Further advantageously, installation of the wall bed assembly of the present invention can be performed with only a few simple tools. Consequently, as the use of complicated tools is not required, the average person would be able to install the wall bed assembly of the present invention without having to engage a professional installer and thus avoid incurring additional charges.

While a preferred embodiment of the invention has been illustrated and described, it will be clear that the invention is not limited to this embodiment only. Numerous modifications, changes, variations, substitutions and equivalents will be apparent to those skilled in the art without departing from the scope of the invention as described in the claims.

Further, unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising" and the like are to be construed in an inclusive as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".
1. A wall bed assembly, comprising:
   a support structure;
   a first portion of a bed frame, wherein the first portion of the bed frame is pivotally coupled to the support structure and wherein the first portion of the bed frame comprises:
   a first rail;
   a first portion of a first side rail extending from the first rail;
   a first portion of a second side rail extending from the first rail; and
   a plurality of first slats extending between the first portion of the first side rail and the first portion of the second side rail;
   a second portion of the bed frame, wherein the second portion of the bed frame comprises:
   a second rail;
   a second portion of the first side rail extending from the second rail, wherein the second portion of the first side rail is coupled to the first portion of the first side rail;
   a second portion of the second side rail extending from the second rail, wherein the second portion of the second side rail is coupled to the first portion of the second side rail; and
   a plurality of second slats extending between the second portion of the first side rail and the second portion of the second side rail;
   a leg structure movably coupled to the second portion of the bed frame, wherein the leg structure is movable between a first position for use and a second position for storage;
   a biasing element having a first end pivotally coupled to the support structure and a second end pivotally coupled to the first portion of the bed frame.

2. The wall bed assembly of claim 1, further comprising a first slot member provided on an inner side surface of the support structure and a second
slot member provided on an opposing inner side surface of the support structure, each of the first and second slot members having a slot formed at an incline, the slot having an open end and a rounded end, wherein the first and second slot members are arranged to receive respective ones of a plurality of corresponding pins provided on the first portion of the bed frame.

3. The wall bed assembly of claim 2, wherein the first portion of the bed frame is secured to the support structure by a plurality of hexagon socket head cap screws, each of the hexagon socket head cap screws extending through an aperture formed in the support structure adjacent the respective first and second slot members and into a hole formed in the corresponding pins provided on the first portion of the bed frame.

4. The wall bed assembly of claim 1, further comprising:

   a plurality of glides coupled to a base portion of the support structure; and

   a leveling indicator which, during assembly, is placed on the support structure and used to level the support structure by adjusting the glides.

5. The wall bed assembly of claim 1, wherein distal ends of the first portions of the first and second side rails relative to the first rail are formed with a hollow section and distal ends of the second portions of the first and second side rails relative to the second rail are formed with an extended portion, and wherein the extended portion of the second portions of the first and second side rails are received in the hollow section of the first portions of the first and second side rails and secured in place by a plurality of second thumb screws.

6. The wall bed assembly of claim 1, further comprising a locking mechanism provided on the second rail, wherein the locking mechanism is arranged to lock the leg structure in the first position when in use.

7. The wall bed assembly of claim 1, further comprising:
a plurality of panels;
a plurality of first protruding members provided on each of the panels;
a plurality of first slots formed in the first rail of the bed frame;
a plurality of second slots formed in a crosspiece of the second portion of the bed frame;
wherein the first protruding members on the panels are received in corresponding ones of the first and second slots formed in the first rail of the bed frame and the crosspiece of the second portion of the bed frame.

8. The wall bed assembly of claim 7, wherein the panels are secured to the second rail by a plurality of third thumb screws.

9. The wall bed assembly of claim 1, further comprising:
a first side panel;
a second side panel;
a plurality of second protruding members provided on the first and second side panels; and
a plurality of double width slots formed in the support structure;
wherein the second protruding members on the first and second side panels are received in corresponding ones of the double width slots formed in the support structure.

10. The wall bed assembly of claim 1, further comprising:
a backing panel, wherein the backing panel is mounted between the first and second side panels; and
an upper panel, wherein the upper panel is mounted over the first and second side panels and the backing panel.

11. A kit of parts for assembly into a wall bed, the kit of parts comprising:
a support structure;
a biasing element having a first end pivotally coupled to the support structure;
a first portion of a bed frame, wherein the first portion of the bed frame comprises:

- a first rail;
- a first portion of a first side rail extending from the first rail;
- a first portion of a second side rail extending from the first rail; and
- a plurality of first slats extending between the first portion of the first side rail and the first portion of the second side rail;

a second portion of the bed frame, wherein the second portion of the bed frame comprises:

- a second rail;
- a second portion of the first side rail extending from the second rail;
- a second portion of the second side rail extending from the second rail; and
- a plurality of second slats extending between the second portion of the first side rail and the second portion of the second side rail;

a leg structure movably coupled to the second portion of the bed frame, wherein the leg structure is movable between a first position for use and a second position for storage;

wherein, on assembly, the first portion of the bed frame is pivotally coupled to the support structure, a second end of the biasing element is pivotally coupled to the first portion of the bed frame, the first portion of the first side rail is coupled to the second portion of the first side rail and the first portion of the second side rail is coupled to the second portion of the second side rail.

12. The kit of parts of claim 11, further comprising a first slot member provided on an inner side surface of the support structure and a second slot member provided on an opposing inner side surface of the support structure, each of the first and second slot members having a slot formed at an incline, the slot having an open end and a rounded end, wherein the first and second slot members are arranged to receive respective ones of a plurality of corresponding pins provided on the first portion of the bed frame on assembly.
13. The kit of parts of claim 12, wherein, on assembly, the first portion of the bed frame is secured to the support structure by a plurality of hexagon socket head cap screws, wherein, on assembly, each of the hexagon socket head cap screws extends through an aperture formed in the support structure adjacent the respective first and second slot members and into a hole formed in the corresponding pins provided on the first portion of the bed frame.

14. The kit of parts of claim 11, further comprising:

   a plurality of glides coupled to a base portion of the support structure; and
   a leveling indicator which, during assembly, is placed on the support structure and used to level the support structure by adjusting the glides.

15. The kit of parts of claim 11, further comprising:

   a plurality of wall brackets, each of the wall brackets having a backing plate and defining a C-shaped channel for receiving a frame member of the support structure;

   wherein, on assembly, each of the wall brackets is secured to a wall by a first toggle anchor and a second toggle anchor; and

   wherein, on assembly, each of the wall brackets is secured to the support structure by a first thumb screw.

16. The kit of parts of claim 11, wherein distal ends of the first portions of the first and second side rails relative to the first rail are formed with a hollow section and distal ends of the second portions of the first and second side rails relative to the second rail are formed with an extended portion; and

   wherein, on assembly, the extended portion of the second portions of the first and second side rails are received in the hollow section of the first portions of the first and second side rails and secured in place by a plurality of second thumb screws.
17. The kit of parts of claim 11, further comprising a locking mechanism provided on the second rail, wherein the locking mechanism is arranged to lock the leg structure in the first position when in use.

18. The kit of parts of claim 11, further comprising:
   a plurality of panels;
   a plurality of first protruding members provided on each of the panels;
   a plurality of first slots formed in the first rail of the bed frame;
   a plurality of second slots formed in a crosspiece of the second portion of the bed frame;
   wherein, on assembly, the first protruding members on the panels are received in corresponding ones of the first and second slots formed in the first rail of the bed frame and the crosspiece of the second portion of the bed frame.

19. The kit of parts of claim 18, wherein, on assembly, the panels are secured to the second rail by a plurality of third thumb screws.

20. The kit of parts of claim 11, further comprising:
   a first side panel;
   a second side panel;
   a plurality of second protruding members provided on the first and second side panels; and
   a plurality of double width slots formed in the support structure;
   wherein, on assembly, the second protruding members on the first and second side panels are received in corresponding ones of the double width slots formed in the support structure.

21. The kit of parts of claim 11, further comprising:
   a backing panel, wherein, on assembly, the backing panel is mounted between the first and second side panels; and
an upper panel, wherein, on assembly, the upper panel is mounted over the first and second side panels and the backing panel.
**INTERNATIONAL SEARCH REPORT**

**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. A47C17/40 A47C17/44 A47C17/52 A47C23/06

ADD.

According to International Patent Classification (IPC) or both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols) A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>US 2010/043142 Al (WHITFORD PETER D [US]) 25 February 2010 (2010-02-25)</td>
<td>1, 3, 5, 7-11, 15, 16, 18-21</td>
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<td>paragraph [0036] - paragraph [0039]</td>
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<td>Y</td>
<td>FR 990 608 A (HAMPTON &amp; SONS LTD) 24 September 1951 (1951-09-24) column 3, line 18; figures</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

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