

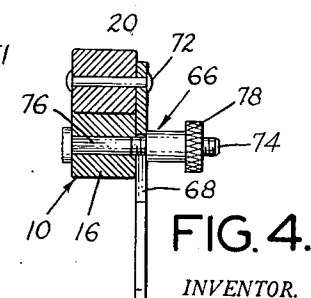
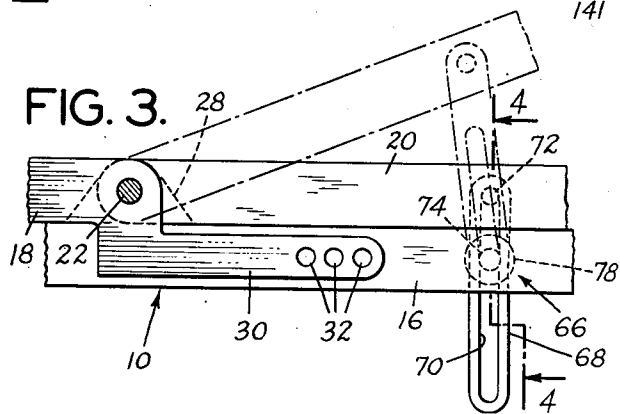
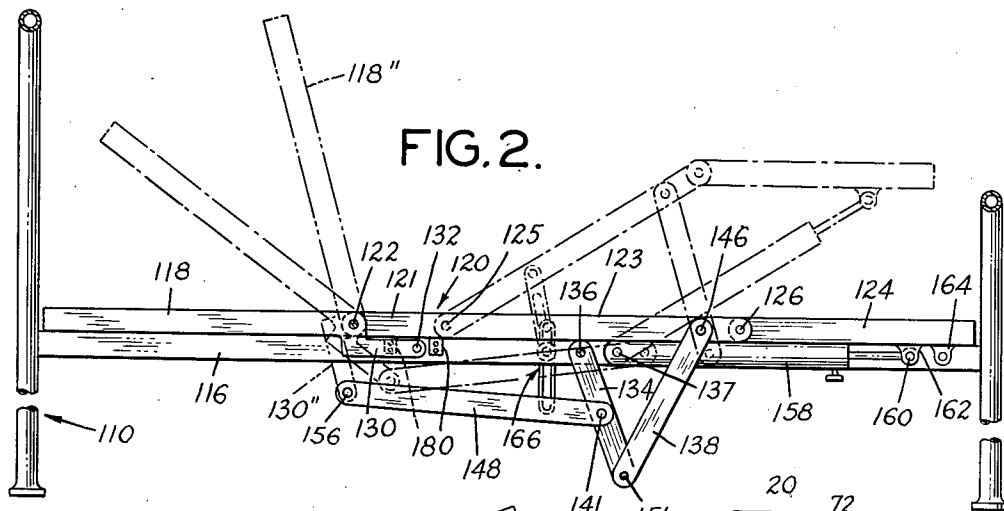
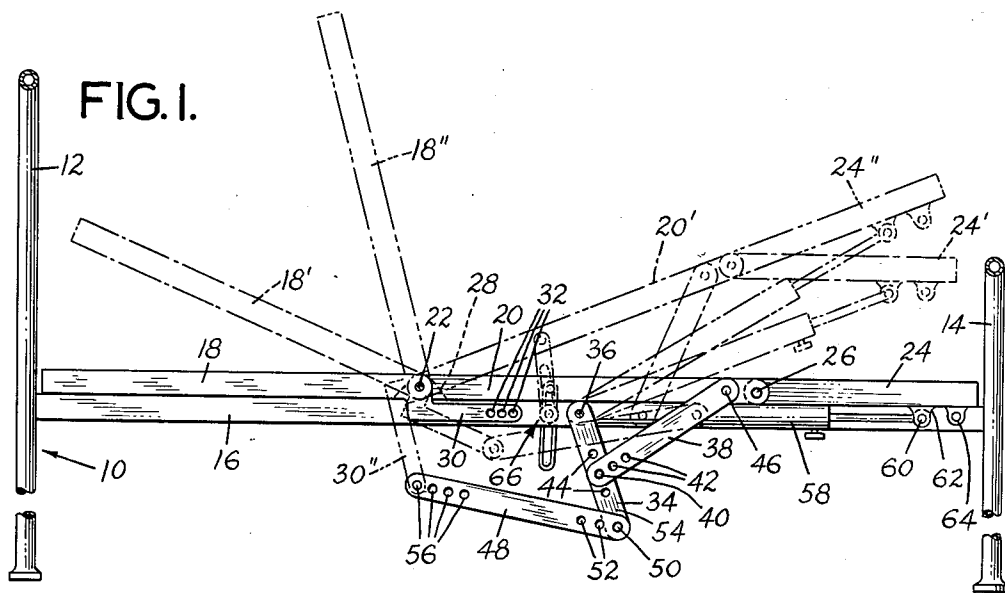
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2,617,118

BED OR THE LIKE

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**FIG. 4.**

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2,617,118

## BED OR THE LIKE

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This invention relates to a bed, and more particularly to a bed having a bed-bottom comprising a head-section, a seat-section and a foot-section which are adjustable in various positions.

An object of the present invention is to provide a bed or the like of above described type with a mechanism by means of which a person resting on the bed may readily bring the adjustable members of the bed-bottom from one position into another one.

A further object of the present invention is to provide a bed or the like of above described type with a mechanism by means of which the foot-section may be removed through planes parallel to each other when the seat-section is swung about its pivot.

Another object of the present invention is to provide a bed or the like of above described type with a mechanism, by means of which the angle between the foot-section and the seat-section is decreased when the seat-section is swung into an inclined position.

A further object of the present invention is to improve on the art of adjustable beds or the like as now ordinarily made.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts as set forth in the claims hereof, certain embodiments of the same being described in the specification and being illustrated in the accompanying drawings, forming part of this specification, wherein:

Fig. 1 is a vertical sectional view of an adjustable bed according to the invention, said sectional view being taken in such a plane, that the articulated bed-bottom and the mechanism connected therewith appears in elevation,

Fig. 2 is a vertical sectional view of a different embodiment of an adjustable bed according to the invention,

Fig. 3 is a fragmentary elevational view illustrating the locking device of the bed shown in Fig. 1 in an enlarged scale, and

Fig. 4 is a sectional view taken on line 4-4 of Fig. 3.

Referring now to Figs. 1, 3 and 4, 10 generally indicates the supporting frame of a bed. Said supporting frame 10 comprises a head-frame 12 and a foot-frame 14 connected with each other by a pair of longitudinal rails 16, only one of said longitudinal rails being shown in the drawings. A head-section 18 is pivotally connected with one end portion of a central seat-

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section 20 at 22; the other end portion of said central seat-section 20 is pivotally connected with a foot-section 24 at 26. The pivotally joined head-section 18 and central seat-section 20 are pivotally mounted at 22 on lugs 28, carried by the longitudinal rails 16. In other words, the pivotal mounting of said pivotally joined head-section and central seat-section on the support 10 is coaxial with the pivotal connection between said head-section and central seat-section. In normal use of the bed, the head-section 18, central seat-section 20, and foot-section 24 forming an articulated bed-bottom resting on the longitudinal rails 16 of the support in a substantially horizontal position with the sections substantially in alignment with each other, and are capable of supporting a mattress (not shown).

On each side of the bed, the head-section 18 is provided with an extension 30, rigidly connected therewith. Said extension 30 arranged on the head-section 18 for a purpose to be described hereinafter projects from said head-section beyond its pivotal connection 22 with the central seat-section 20. The extension 30 is offset and lies in the plane of the longitudinal rails 16, when the head-section 18 is in its horizontal position resting on the longitudinal rails 16. The extension 30 is provided with a series of bores 32.

On each side of the bed, the upper end of a guiding link 34 is swingably mounted on a transverse rod 36 carried by the longitudinal rails 16. The lower end of a first connecting link 38 is pivotally connected with said guiding link 34 by a pin 40 inserted into a bore of a series of bores 42 of the first connecting link 38 and a bore of a series of bores 44 of the guiding link 34. The upper end of said first connecting link 38 is pivotally connected at 46 with the end portion of the central seat-section 20 adjoining the foot-section 24. The lower end of the guiding link 34 is pivotally connected with one end of a second connecting link 48 normally arranged below the plane of the central seat-section 20 by a pin 50 inserted into a bore of a series of bores 52 of the second connecting link 48 and a bore of a series of bores 54 of the guiding link 34. The other end of said second connecting link 48 is provided with a series of bores 56.

As may be readily gathered from Fig. 1, the pivotal connection 50 between the second connecting link 48 and the guiding link 34 is at a point spaced from the pivotal connection 40 between the first connecting link 38 and the guiding link 34. The first connecting link 38 is pivoted at 40 to an intermediate point of the guiding link

34, which is located between the pivotal connection 36 of the guiding link with the support 10 and the pivotal connection 50 of the guiding link 34 with the second connecting link 48.

When the head-section 18 is swung about its pivot 22 into the elevated position 18'', the extension 30 of said head-section 18 is brought into the position 30'', wherein it may be connected with the left-hand end portion of the second connecting link 48 by means of the pin inserted into a bore 32 of the extension 30 being in register with a bore 56 of the second connecting link 48. When the extension 30 thus is pivotally connected with the second connecting link 48, a constrained complex linkage including the head-section 18, with its extension 30, the central seat section 20, the first connecting link 38, the guiding link 34 and the second connecting link 48 is formed. Thus, when now the head-section is swung from its position 18'' into the position 18', the central seat-section 20 will be swung about its pivot 22 into the lifted inclined position 20'. Of course, if the head-section is swung into a position other than the position 18', the central seat-section 20 will be swung into a position other than the position 20', as determined by the arrangement of the links of the constrained complex linkage.

One end of a telescopic controlling link 58 is pivoted at 60 to a lug 62 arranged on the lower surface of the foot-section 24 substantially in the center thereof. The other end of said controlling link 58 is swingably arranged on the transverse rod 36 carried by the support 10. Thus, when the central seat-section 20 is swung into an inclined position, for example into the position 20', the foot-section 24 will be displaced by means of the controlling link 58, for example into the position 24'. In the embodiment shown in Fig. 1, the link-system formed by the central seat-section 20, the foot-section 24, the controlling link 58 and the portion of the support between its pivotal connection 36 with the controlling link 58 and its pivotal connection 22 with the central seat-section 20 is in the shape of a parallelogram, i. e. the pivots 26, 60, 36 and 22 are at the corners of a parallelogram, when the controlling link 58 is pivotally connected with the lug 62, so that the foot-section 24 is moved through planes parallel to each other, when the central seat-section 20 is swung about its pivot 22.

If desired, however, the telescopic controlling link 58 may be disengaged from the lug 62, and may be pivoted to another lug 64 of the foot-section 24. In such a case, the above mentioned link-system is not in the shape of a parallelogram and the foot-section 24 will be at an angle to the horizontal plane when the central seat-section 20 is lifted.

In any case, however, the arrangement of the controlling link 58 as shown in the drawings will cause a decrease of the angle between the foot-section 24 and the seat-section 20, when the latter is lifted.

As shown in Figs. 1, 3 and 4, the bed is provided with a locking device, generally indicated by 66, by means of which the central seat-section 20 may be held in any desired position relative to the support 10. Of course, if the extension 30 of the head-section 18 is pivotally connected with the second connecting link 48, and all the other links are pivotally connected with adjacent members as shown in Fig. 1, the head-section 18 and the foot-section 24 will be likewise held in a desired position when the central seat-section 20 is locked by said locking device 66. The locking device 66 comprises a bar 68 having a slot 70;

said bar 68 is swingably mounted on the central seat-section 20 at 72. A bolt 74 having a square portion 76 is inserted into a corresponding square aperture of the rail 16 of the support 10, so that said bolt is prevented from rotating. The end of said bolt 74 projecting from said rail 16 passes through the slot 70 of the bar 68 and is provided with a threaded portion. A locking knob 78 is screwed on said threaded portion of said bolt 74. If the locking knob 78 is loosened, the bar 68 may be freely moved, so that the seat-section 20 may be brought into any desired position. If, however, the locking knob 78 is tightened, so that it clamps the bar 68 against the rail 16, the seat-section 20 is firmly held in its position. Apparently, if none of the pivotal connections of the link-system of the bed is disengaged, all movable links of said link-system are likewise firmly held in their position. Of course, a different type of locking device could be used, and such a locking device could be arranged between other members of the link-system.

As mentioned above, the leg-rest 24 will be in the horizontal position 24', when the seat-section 20 is swung into the inclined position 20'. If it is desired to bring the foot-section into the position 24'' in alignment with the inclined seat-section 20', the seat-section is held in its inclined position by means of the locking device 66, whereupon the set screw of the telescopic controlling link 58 may be loosened for swinging the foot-section from the position 24' into the position 24''. Of course, when the foot-section is in said position 24'', the set screw of the telescopic controlling link is tightened again.

Moreover, the relative movements of the head-section 18 and central seat-section 20 may be adjusted by changing the position of one or more pivotal connections between two adjacent links of the constrained complex linkage. This may be effected by engaging the pins 40 and 50 for example with different bores of the series of bores 52, 54 and 42, 44 respectively. Likewise, the pin connecting the extension 30 with the second connecting link 48 may be engaged with other bores than the last bores of the series of bores 32 of the extension 30 and the last bore of the series of bores 56 of the second connecting link 48.

In the embodiment shown in Fig. 2, the central seat-section generally indicated by 120 comprises a stationary portion 121 secured to the rails 116 of the support 110 by brackets 180 or the like, and a movable portion 123 pivoted at 125 to the stationary portion 121. The head-section 118 having the extension 130 is pivoted to the stationary portion 121 of the central seat-section 120 at 122. The foot-section 124 is pivoted to the movable portion 123 of the central seat-section 120 at 126. The head-section 118, central seat-section 120 and foot-section 124 form an articulated bed-bottom normally resting in a horizontal position on the rails 116 of the support 110 with the individual sections thereof in alignment.

Again, the upper end of a guiding link 134 is swingably mounted on a transverse rod 136 of the support 110. The lower end of said guiding link 134 is pivoted at 151 to the lower end of a first connecting link 138, the upper end of which is pivoted to the movable portion 123 of the central seat-section 120 at 146. One end of a second connecting link 148 is pivoted to the guiding link 134 at 141 at a point located between the pivotal connection 136 of the guiding link 134 with the support 110 and the pivotal connection 151 of the

guiding link 134 with the first connecting link 138. The other end of said second connecting link 148 is provided with a bore 156, which may be brought into registering position with a bore 132 of the extension 130, when the head-section 118 is brought into the elevated position 118'', whereupon the extension 130 of the head-section 118 now being in the position 130'' may be pivotally connected with the second connecting link 148 by a pin inserted into the bores 156 and 132. When the extension 130 is pivotally connected with the second connecting link 148, a constrained complex linkage is formed so that the head-section 118 and the movable portion 123 of the seat-section 120 are moved in dependence on each other, when the head-section 118 is swung about its pivot 122.

One end of a telescopic controlling link 150 is pivoted at 160 to a lug 162 arranged on the foot-section 124. The other end of said controlling link is swingably mounted on a transverse rod 137 carried by the longitudinal rails 116 of the support 110 at a distance from the transverse rod 136. The pivotal connection 125 of the swingable portion 123 of the seat-section with the stationary portion 121 of said seat-section, the pivotal connection of the movable portion 123 of the seat-section with the foot-section 124, the pivotal connection 160 of the foot-section 124 with the controlling link 158 and the pivotal connection 137 of the controlling link 158 with the support 110 are arranged in such a manner, that they are at the corners of a parallelogram, whereby the foot-section 124 will be moved through planes parallel to each other, when the movable portion 123 of the seat-section is swung about its pivot 125. Of course, if desired, said pivotal connections may be arranged in a different manner, for example by connecting the controlling link 158 with the lug 164 instead of the lug 162 or by arranging one or more of the other pivots in a different position.

The movable members of the bed may be held in any desired position by means of a locking device 166 arranged between the movable portion 123 of the seat-section 120 and the support 110.

Fig. 2 does not illustrate the arrangement of series of bores in the various links, for altering the position of the pivotal connections relative to each other, but it is understood that such means may be arranged.

I have described preferred embodiments of my invention, but it is understood that numerous changes and omissions may be made without departing from the spirit and scope of the appended claims. For example, the bed shown in Fig. 2 could be equipped with an arrangement of the first connecting link, guiding link and second connecting link as shown in Fig. 1, wherein the first connecting link is pivoted to an intermediate point of the guiding link, or else, the bed shown in Fig. 1 could be equipped with an arrangement of the first connecting link, guiding link and second connecting link in the manner shown in Fig. 2, wherein the second connecting link is pivoted to an intermediate point of the guiding link.

What I claim is:

1. A bed unit, comprising: a support including longitudinal rails, a head-section, a central seat-section, a foot-section, said head-section being pivoted to one end portion of said central seat-section, said foot-section being connected with the other end portion of said central seat-section, said head-section, central seat-section and foot-section forming a bed-bottom normally resting on said longitudinal rails in a substantial-

ly horizontal position with the sections substantially in alignment with each other, at least one section of said pivotally joined head-section and central seat-section being pivotally mounted on said support, an extension arranged on said head-section, said extension projecting from said head-section beyond its pivotal connection with the central seat-section, a guiding link, the upper end portion of said guiding link being pivoted to said support, a first connecting link, the upper end portion of said first connecting link being pivoted to the end portion of said central seat-section adjoining the foot-section, the lower end portion of said first connecting link being pivoted to said guiding link, and a second connecting link normally arranged below the plane of said central seat-section, one end of said second connecting link being pivoted to said guiding link at a point spaced from the pivotal connection of the latter with said first connecting link, the other end of said second connecting link being in pivotal connection with said extension of the head-section, and at least one pivotal connection between one of said links and a member joined thereto being disengageable whereby said head-section, central seat-section and foot-section may be brought substantially into alignment with each other so as to form said bed-bottom resting on said longitudinal rails.

2. In a bed unit as claimed in claim 1, said first connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the second connecting link.

3. In a bed unit as claimed in claim 1, said second connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the first connecting link.

4. In a bed unit as claimed in claim 1, means whereby the position of the pivotal connections between two adjacent links may be adjusted.

5. In a bed unit as claimed in claim 1, locking means associated with the support and a movable member of the bed unit for locking said movable member in a predetermined position relative to the support.

6. In a bed unit as claimed in claim 1, the pivotal mounting of said pivotally joined head-section and central seat-section on the support being coaxial with the pivotal connection between said head-section and said central seat-section.

7. A bed unit, comprising: a support including longitudinal rails, a head-section, a central seat-section including a stationary portion and a portion movable relative thereto, a foot-section, said stationary portion of the central seat-section being rigidly connected with said support, said head-section being swingable relative to said stationary portion of said central seat-section, said foot-section being connected with the end portion of the movable portion of said central seat-section remote from the stationary portion thereof, said head-section, central seat-section and foot-section forming a bed-bottom normally resting on said longitudinal rails in a substantially horizontal position with the sections substantially in alignment with each other, and extension arranged on said head-section, said extension projecting from said head-section beyond its pivotal connection with the central

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seat-section, a guiding link, the upper end portion of said guiding link being pivoted to said support, a first connecting link, the upper end portion of said first connecting link being pivoted to the end portion of the movable portion of said central seat-section adjoining the foot-section, the lower end portion of said first connecting link being pivoted to said guiding link, and a second connecting link normally arranged below the plane of said central seat-section, one end of said second connecting link being pivoted to said guiding link at a point spaced from the pivotal connection of the latter with said first connecting link, the other end of said second connecting link being in pivotal connection with said extension of the head-section, and at least one pivotal connection between one of said links and a member joined thereto being disengageable whereby said head-section, central seat-section and foot-section may be brought substantially into alignment with each other so as to form said bed-bottom resting on said longitudinal rails.

8. In a bed unit as claimed in claim 7, said second connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the first connecting link.

9. A bed unit, comprising: a support including longitudinal rails, a head-section, a central seat-section, a foot-section, said head-section being pivoted to one end portion of said central seat-section, said foot-section being pivoted to the other end portion of said central seat-section, said head-section, central seat-section and foot-section forming an articulated bed-bottom normally resting on said longitudinal rails in a substantially horizontal position with the sections substantially in alignment with each other, at least one section of said pivotally joined head-section and central seat-section being pivotally mounted on said support, an extension arranged on said head-section, said extension projecting from said head-section beyond its pivotal connection with the central seat-section, a guiding link, the upper end portion of said guiding link being pivoted to said support, a first connecting link, the upper end portion of said first connecting link being pivoted to the end portion of said central seat-section adjoining the foot-section, the lower end portion of said first connecting link being pivoted to said guiding link, a second connecting link normally arranged below the plane of said central seat-section, one end of said second connecting link being pivoted to said guiding link at a point spaced from the pivotal connection of the latter with said first connecting link, the other end of said second connecting link being in pivotal connection with said extension of the head-section, at least one pivotal connection between one of said links and a member joined thereto being disengageable whereby said head-section, central-section and foot-section may be brought substantially into alignment with each other so as to form said articulated bed-bottom resting on said longitudinal rails, and a controlling link, one end of said controlling link being pivoted to said support, and the other end of said controlling link being pivoted to said foot-section.

10. In a bed unit as claimed in claim 9, said first connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the second connecting link.

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11. In a bed unit as claimed in claim 9, said second connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the first connecting link.

12. In a bed unit as claimed in claim 9, said central seat-section being pivoted to the support, and the link-system formed by the central seat-section, the foot-section, the controlling link and the portion of the support between its pivotal connections with the controlling link and with the central seat-section being in the shape of a parallelogram for moving the foot-section through planes parallel to each other.

13. In a bed unit as claimed in claim 9, the pivotal connection between the controlling link and the support being coaxial with the pivotal connection between the upper end of the guiding link and the support.

14. In a bed unit as claimed in claim 9, the pivotal connection between the controlling link and the support being spaced from the pivotal connection between the upper end of the guiding link and the support.

15. In a bed unit as claimed in claim 9, means whereby the position of the pivotal connections between two adjacent links may be adjusted.

16. In a bed unit as claimed in claim 9, the pivotal mounting of said pivotally joined head-section and central seat-section on the support being coaxial with the pivotal connection between said head-section and said central seat-section.

17. A bed unit, comprising: a support including longitudinal rails, a head-section, a central seat-section including a stationary portion and a portion movable relative thereto, a foot-section, said stationary portion of the central seat-section being rigidly connected with said support, said head-section being swingable relative to said stationary portion of said central seat-section, said foot-section being pivoted to the end portion of the movable portion of said central seat-section remote from the stationary portion thereof, said head-section, central seat-section and foot-section forming an articulated bed-bottom normally resting on said longitudinal rails in a substantially horizontal position with the sections substantially in alignment with each other, an extension arranged on said head-section, said extension projecting from said head-section beyond its pivotal connection with the central seat-section, a guiding link, the upper end portion of said guiding link being pivoted to said support, a first connecting link, the upper end portion of said first connecting link being pivoted to the end portion of the movable portion of said central seat-section adjoining the foot-section, the lower end portion of said first connecting link being pivoted to said guiding link, a second connecting link normally arranged below the plane of said central seat-section, one end of said second connecting link being pivoted to said guiding link at a point spaced from the pivotal connection of the latter with said first connecting link, the other end of said second connecting link being in pivotal connection with said extension of the head-section, at least one pivotal connection between one of said links and a member joined thereto being disengageable whereby said head-section, central-section and foot-section may be brought substantially into alignment with each other so as to form said articulated bed-bottom resting on said longitudinal rails, and a controlling link, one end of said controlling link

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being pivoted to said support, and the other end of said controlling link being pivoted to said foot-section.

18. In a bed unit as claimed in claim 17, said second connecting link being pivoted to a point of said guiding link located between the pivotal connection of the guiding link with the support and the pivotal connection of the guiding link with the first connecting link.

19. In a bed unit as claimed in claim 17, a pivotal connection between said stationary and movable portions of said central seat-section, the distance between said last mentioned pivotal connection and the pivot connecting said movable seat-portion with the foot-section being equal to the distance between the pivot connecting said foot-section with the controlling link and the pivot connecting said controlling link with the support, and the distance between the pivot connecting said foot-section with the movable seat-portion and the pivot connecting said foot-section with the controlling link being equal

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to the distance between the pivot connecting the movable seat-portion with the stationary seat portion and the pivot connecting the controlling link with the support whereby a four-sided link-system including the foot-section is formed in the shape of a parallelogram so that the foot-section may be moved through planes parallel to each other.

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