March 2, 1954 D. C. TRAVIS 2,670,476

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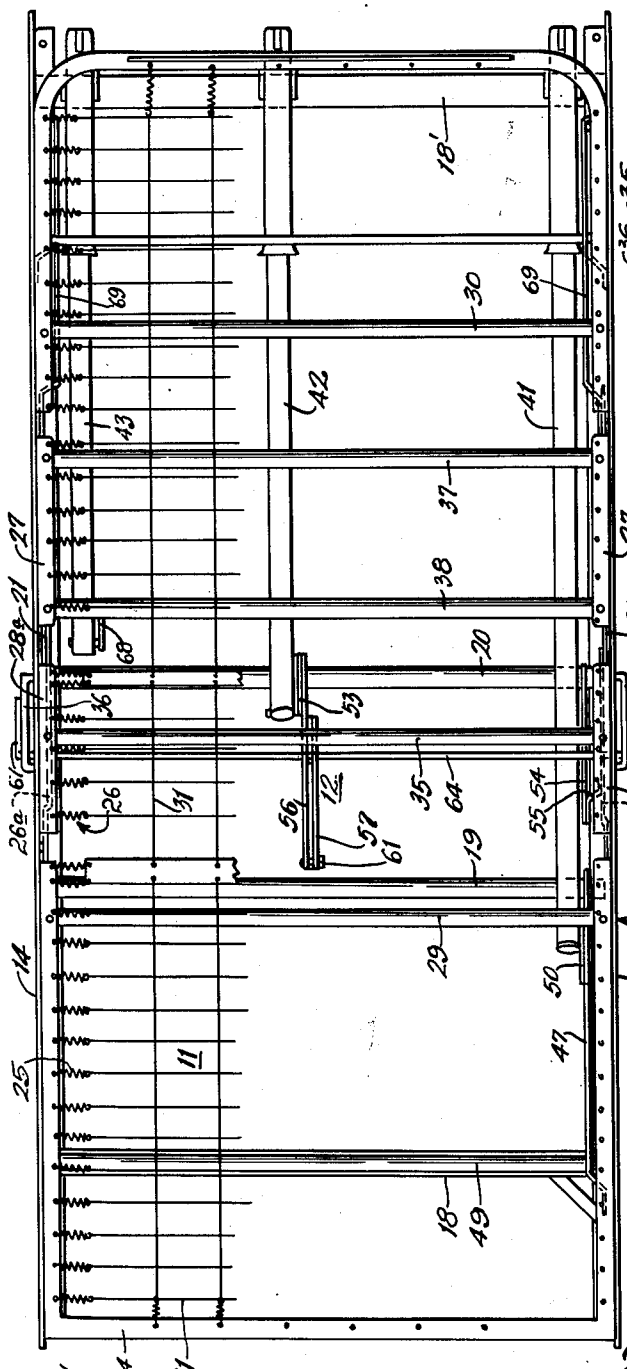


Fig. 1

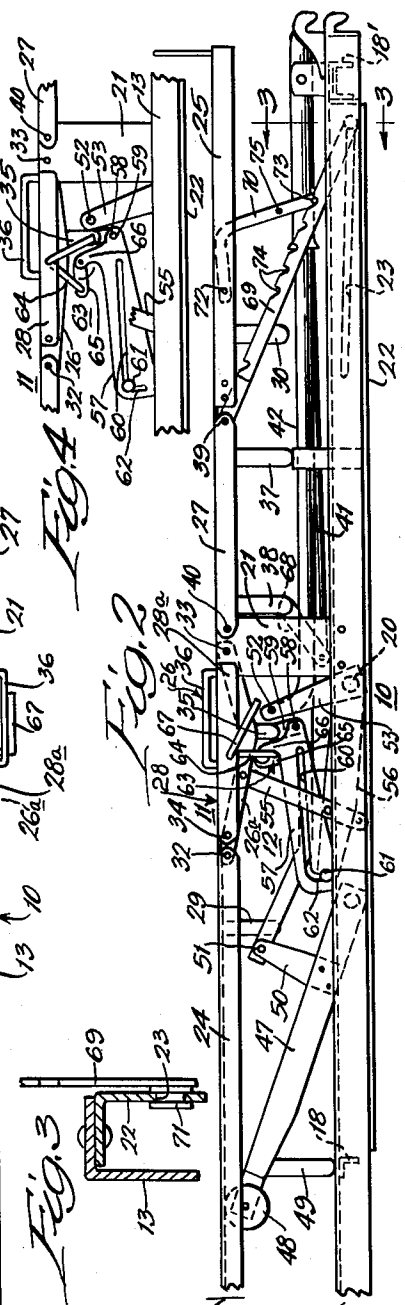


Fig. 4

Fig. 2

Fig. 3

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March 2, 1954 D. C. TRAVIS 2,670,476

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Filed Feb. 13, 1948 3 Sheets-Sheet 2

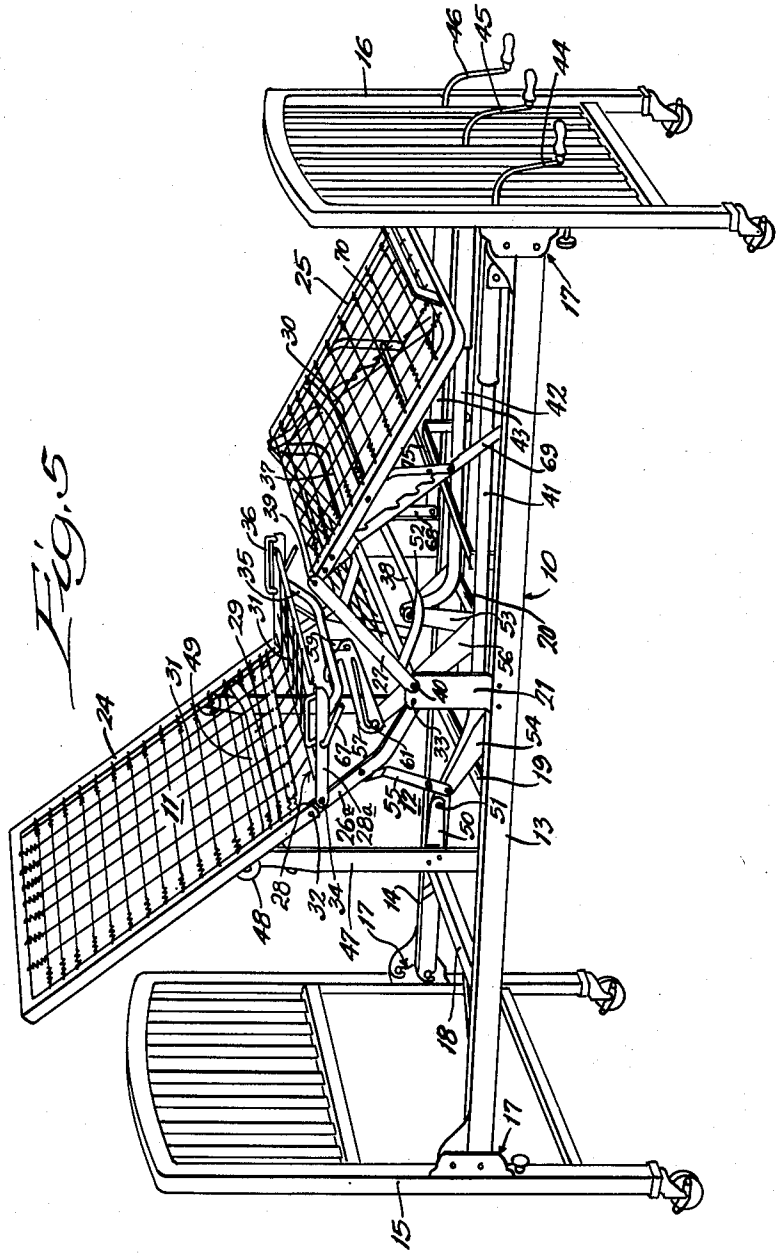


Fig. 5

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March 2, 1954 D. C. TRAVIS 2,670,476

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Filed Feb. 13, 1948 3 Sheets-Sheet 3

Fig. 6

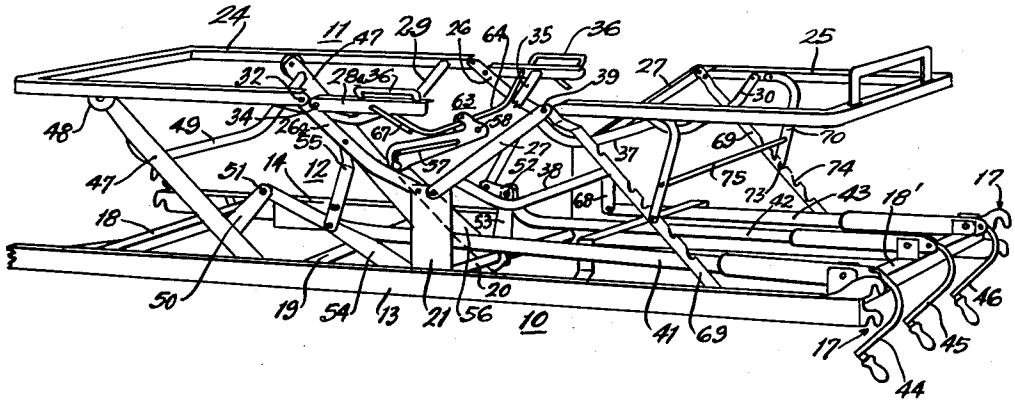


Fig. 7

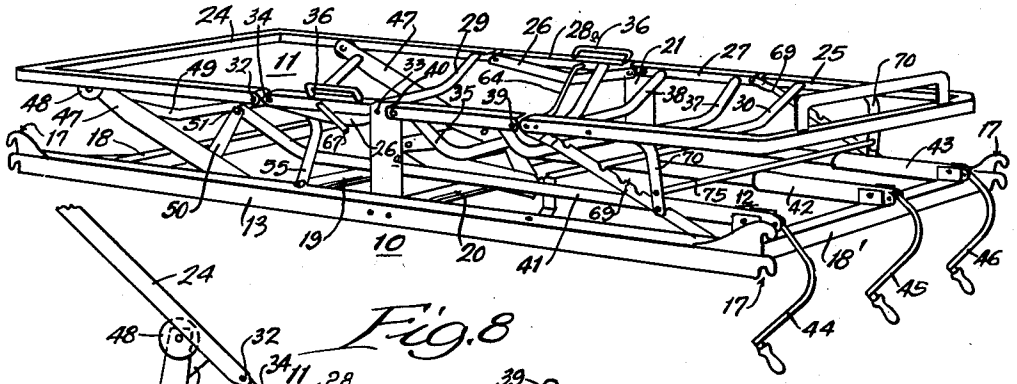
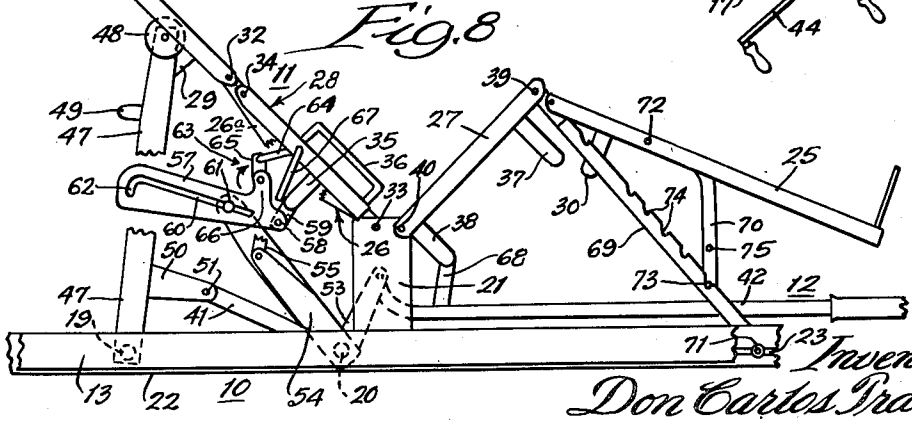


Fig. 8



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UNITED STATES PATENT OFFICE

2,670,476

HOSPITAL BED

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Application February 13, 1948, Serial No. 8,092

9 Claims. (Cl. 5—66)

1

The main objects of this invention are, to provide an improved construction and arrangement of hospital beds of the type shown in Patent No. 2,373,018, issued April 3, 1945, to C. A. Deckert, wherein the several sections of an articulated multi-section bed-bottom are capable of being shiftable from normal horizontal alinement into and out of various relative, angularly-disposed positions with regard to the bed-bottom supporting-frame; to provide an improved construction of one of the intermediate sections of a bed bottom of this kind which permits a shifting of the mattress-supporting portion relative to said section; to provide improved bed-bottom-section shifting-mechanism whereby said mattress-supporting portion is either automatically or manually shiftable angularly of said one bed-bottom section; and to provide improved means for rendering said bed-bottom-section shifting-mechanism operative or inoperative to effect or permit either of the aforesaid movements of said mattress-supporting portion.

In the accompanying drawings,

Fig. 1 is a plan view of a preferred form of hospital bed embodying this invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is an enlarged fragmentary detail of the bed-frame construction taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail showing the inoperative position of the latch mechanism by means of which the mattress-supporting portion of one of the intermediate bed-bottom sections is operatively or inoperatively connected with the operating mechanism which shifts said bed-bottom section into and out of angular relationship with the supporting frame;

Fig. 5 is a perspective view of the preferred form of hospital bed embodying this invention, the bed-bottom sections being shown in one of the extreme relatively angular positions into which they may be shifted;

Fig. 6 is a perspective view of this improved type of hospital bed (the bed ends and mattress-supporting fabric, respectively, being omitted for the sake of clarity) with the bed-bottom sections shifted to dispose a patient in an elevated horizontal position;

Fig. 7 is a view similar to Fig. 6 but showing the bed-bottom sections in their normally alined lowered positions with respect to the supporting frame; and

Fig. 8 is an enlarged fragmentary side elevation showing the relatively-shiftable mattress-supporting portion for one of the intermediate

2

bed-bottom sections lowered into angular relationship with respect to the end bed-bottom section whereto said intermediate section is hinged.

A bed constructed in accordance with this invention comprises, a main frame 10 supporting an articulated multi-section bed-bottom 11 which, by means of operating mechanism 12, is adapted to have the sections thereof shifted into and out of differing angular relationships for the purpose of supporting a body in diverse positions required for special surgical or medical treatment.

The supporting frame 10 is of conventional construction for beds of this kind. A pair of side rails 13 and 14 are attached to a head section 15 and a foot section 16 by suitable locking means 17, which is herein shown to be of the type disclosed in co-pending application Serial No. 3,891, filed January 23, 1948, now Patent No. 2,566,541, issued September 4, 1951. The side rails are preferably angle bars connected together by reinforcing struts 18 and 18' and mounting rock shafts 19 and 20 which form a part of the operating mechanism 12. Upstanding brackets 21 are secured to the side rails 13 and 14 to serve as supports for the hinge connection of the intermediate sections of the bed bottom 11.

An angle bar 22 is secured to the inner under part of each of the side rails 13 and 14, extending nearly the full length of the rails. In addition to providing reinforcement for the side rails these angle bars 22 provide extra bearing surface for the rock shafts 19 and 20. Adjacent their foot ends, these bars 22 have slots 23 formed therein (Fig. 3) to receive a part of the adjustable support means, hereinafter to be described, for one of the main sections of the bed bottom 11.

The bed bottom 11 comprises a pair of the main or end sections 24 and 25 which are hingedly connected to intermediate sections 26 and 27 which in turn are hinged to the brackets 21. By means of the operating mechanism 12 these bed-bottom sections may be selectively shifted into and out of various angular relationships as exemplified in the drawings.

The main bed-bottom sections 24 and 25, generally referred to as the head-wing and foot-wing respectively, are of usual construction. For each this embodies an angle bar bent to U-shaped form and reinforced at the open end by means of a transverse strut 29 or 30, welded at the ends to said angle bars and depending from the under sides of the respective sections 24 and

25. The mattress-supporting fabric 31 is supported on these U-shaped angle frames in the conventional manner.

The intermediate bed-bottom section 26 includes a carrier portion or member comprising a pair of arms 26a pivoted to the bracket 21 and to the head wing 24, and a mattress supporting portion 28 comprising a pair of opposed angle iron side members 28a each hinged to the outer end of one of the arms 26a, and connected by a transverse spreader tube or bar 35. The spreader bar 35 assures the unison movement of the side members 28a and is downwardly bowed so as not to interfere with the deflection of the mattress-supporting fabric 31 which extends between the side members 28a. Handles 36 on the side members 28a permit manual shifting of the mattress supporting portion 28 relative to the arms 26a.

The intermediate bed-bottom section 27 comprises a pair of opposed, angle iron side members connected by a pair of tubular struts or spreader bars 37 and 38 and hinged at 39 to the inner ends of the foot wing 25 and at 40 to the brackets 21, the mattress-supporting fabric being connected to the side members of the section 27.

The operating mechanism 12, for effecting the desired angular adjustments of the several sections of the bed bottom 11, is of a conventional nature. This comprises three extensible elements 41, 42, and 43, operated by folding, non-detachable cranks 44, 45, and 46. These extensible elements are connected to the rock shafts 19 and 20 and the strut 38 of the intermediate bed-bottom section 27, respectively, whereby the head wing 24 and the intermediate sections 26 and 27 are individually shiftable into and out of various angular positions with respect to each other and to the supporting frame 10. Said elements are in the form of telescoping steel screws and nuts enclosed in dust-tight lubrication-retaining tubular housings which are swingably anchored on the reinforcing frame strut 18'.

The rock shaft 19 is operatively connected to the head wing 24 by means of a pair of arms 47 the upper ends of which are provided with rollers 48 engaging the under face of the sides of the U-shaped angle-bar frame of said section. A strut 49 extends between the upper ends of the arms 47 so as to maintain the rollers 48 in proper spacing and provide appropriate strength for the strains to which these arms 47 will be subjected in swinging the main section or head wing 24, when a patient is lying on the bed bottom 11. A bracket 50, rigid on one of the arms 47, provides for a pivotal connection 51 of the extensible element 41.

The rock shaft 20, to which the extensible element 42 is pivotally connected at 52 by an arm 53, is connected to the arms 26a of the intermediate bed-bottom section 26 by an arm and link 54 and 55, which are located beneath and adjacent one side of the bed bottom (Fig. 1), and to the mattress-supporting portion 28 by means of an arm 56 and link 57 which are disposed beneath the center of the bed bottom.

The link 55 is pivoted to the arms 26a of the intermediate bed-bottom section 26 intermediate the ends of said arms. The link 57 is fixedly pivoted at 58 to a finger 59 depending from the reinforcing strut or spreader bar 35 and is slidably pivoted by means of a slot 60 and pin 61 to the arm 56. As clearly shown in the figures, the slot 60 extends nearly the entire length of the link 57. At its outer or head end the slot 60 terminates in an offset 62. The slot 60 and the offset 62 are so arranged as to permit the latching means 63, presently to be described (see Figs. 2, 4, and 6), to position the pin 61 in the offset 62 to lock the link 57 in fixed hinged relationship with the arm 56 or to release it to permit the pin to move freely in the slot 60.

The latch mechanism 63, as most clearly shown in Figs. 2 and 4, comprises a U-shaped rod 64 which is swingably suspended from the fabric-supporting side members 28a of the mattress-supporting portion 28 of the intermediate section 26, and a link 65 which is pivoted to the rod 64 at about the center of the rod, and to an extension 66 of the link 57. The rod 64 is provided with end arms or handles 67 for operating the latch mechanism. As will be most clearly observed from Figure 4, the pivot of the link 65 to the rod 64 and to the extension 66, and the pivots of the rod 64 on the side members 28a of the mattress-supporting portion 28 of the intermediate section 26, are such as to constitute a toggle joint, and when the handle 67 is swung counter-clockwise, the link 65 exerts a thrust upon the extension 66 of link 57, rotating the link 57 in a clockwise direction about its pivot 58. This movement of the link 57 places the pin 61 into the offset 62 of the slot 60. The dimensions of the U-shaped rod 64 and the link 65 are such that the pin 61 is engaged with the bottom of the offset 62 before the pivots of the link 65 to the extension 66 and to the rod 64 become aligned with the pivots of the rod 64 to the side rails 28a of the mattress-supporting portion 28. Further lifting of the handle 67 will therefore cause the U-shaped rod 64 to be resiliently bowed as the pivotal connection of the link 65 to the rod 64 passes "over center" to the locked-in position shown in Figure 2, at which the rod 64 is stopped by its abutment with the extension 66, the rod 64 preferably remaining resiliently bowed in this position to provide a positive force tending to maintain the pin 61 at the bottom of the offset 62.

Thus, when the pin 61 is disposed in the offset 62, and the arm 56 is rocked by the shaft 20, the mattress-supporting portion 28 of the intermediate section 26 is moved relative to the arms 26a, the lengths of the arms 54 and 56, and the lengths of the links 55 and 57 and the placement of their pivotal attachments respectively to the arms 26a and the mattress-supporting portion 28, being such as to maintain the mattress-supporting portion 28 in a horizonal position (Figs. 5 and 6) when the arms 26a are swung relative to the frame 10.

When the load is removed from the mattress-supporting portion 28, as for example, when the latter is lifted by means of the handles 36, the U-shaped rod 64 may be shifted from the position of Figure 2 to the position of Figure 4, during which movement the link 65 causes the link 57 to rotate counter-clockwise to displace the pin 61 from the offset 62, and if the arm 56 is thereafter rocked, the pin 61 moves freely in the slot 60. This permits the mattress-supporting portion 28 of the intermediate section 26 to retain the position with respect to the arms 26a of the intermediate section 26, as shown in Figs. 2 and 7, even though the arms 26a be shifted into an angular position with respect to the supporting frame 10, Fig. 8.

The extensible element 43 is connected to an arm 68 rigidly secured to the tubular reinforc-

ing strut 38 for the intermediate bed-bottom section 27, whereby said bed-bottom section may be shifted angularly of the supporting frame 10.

The angular position of the foot wing 25 with regard to the supporting frame 10, and the intermediate section 27, to which it is hinged, is determined by the co-action of bars 69 and struts 70. The bars 69 are pivotally supported at their upper ends by the hinge connections 39 of the sections 25 and 27. The lower ends of the bars 69 mount rollers 71 which operate in the slots 23 of the frame angle bars 22.

The struts 70 are of L-shape form and at their upper ends are pivoted at 72 to the sides of the foot wing 25. At their lower ends the struts 70 support pins 73 which are adapted to rest in notches 74 formed in the bars 69. A rod 75 connects the struts 70 so as to maintain them in proper spaced relationship to insure proper positioning of the pins 73 in the notches 74.

For the lowermost angular position of the foot wing 25 relative to the notched bar 69, one leg of the L-shaped strut 70 bears against the underside of the angle iron side bar of the foot wing to which the strut is pivoted, and the strut supports the foot wing 25 at a point farther out from the hinge 39 than the pivot 72 of the strut. Hence in this position, the effective bracing length of the strut 70 is not only foreshortened, but the foot wing 25 is more firmly braced than would be the case if the struts 70 were straight.

It will be obvious that the shifting of the intermediate section 27 draws the bars 69 upwardly and rearwardly, thus elevating the inner end of the foot wing 25. The angular position of the wing 25, otherwise with respect to the intermediate section 27 or the frame 10, will depend upon which of the notches 74 are engaged by the pins 73.

The operation of this improved bed is as follows.

It will be apparent from the drawings and the foregoing description that the head wing section 24 and the intermediate sections 27 and 26 are independently adjustable through the turning of the cranks 44, 45, and 46, respectively. By means of these three cranks, these three sections may be arranged in various angular relationships between their horizontal alined position, as shown in Figs. 1, 2, and 7, and various angular positions exemplified in Figs. 5, 6, and 8.

If the latch means 63 is shifted into the position shown in Fig. 2, any swinging of the intermediate section 26, to dispose the arms 26*a* of that section at an angle to the supporting frame 10, as shown in Figs. 5 and 6, will result in the mattress-supporting portion 28 being maintained horizontal and consequently disposed at an angle to the arms 26*a*, as shown in said figure.

If, on the other hand, the latch means 63 is released, as shown in Fig. 4, the arm 56 and the link 57 will be permitted to move relative of each other, the pivot pin 61 slipping out of the offset 62 and moving along the slot 60. In that case the mattress-supporting portion 28 of the intermediate section 26 will be disposed in the same angular position with respect to the supporting frame 10 as the arms 26*a*, as shown in Fig. 8.

When desired, the previously-locked latch means 63 may be released after the intermediate section 26 has been elevated. The mattress-supporting portion 28 then may be lowered into the same angular position (relative to the frame 10) as that occupied by the side arms 26*a*. If the latch mechanism 63 is released prior to the shifting of the intermediate section 26 into an angular position with respect to the frame 10, the mattress-supporting portion 28 subsequently may be elevated into a horizontal position angularly of the side arms 26*a* of the intermediate section 26 and the latch means shifted to lock the mattress-supporting portion 28 in such elevated position.

Variations and modifications in the details of structure and arrangement of the parts may be resorted to within the spirit and coverage of the appended claims.

I claim:

1. In a bed of the class described, the combination of a supporting frame, a carrier member hinged to said frame, a bed-bottom section overlying said carrier member and hingedly connected therewith remotely from the hinged connection of said carrier member to said frame, said bed bottom section being swingable with and relative to said carrier member, means for swinging said carrier member relative to said frame, a link fixedly pivoted to said bed-bottom section and slidably pivoted to said swinging means, and locking means for securing said second pivot against sliding relationship to said swinging means whereby said bed-bottom section is angularly adjustable relative to said carrier member during swinging of said carrier member relative to said frame, thereby to maintain a substantially constant angular relation between said bed-bottom section and said frame, said bed-bottom section resting upon and being swingable with said carrier member when said locking means is disabled.

2. In a bed of the class described, the combination of a supporting frame, a carrier member hinged to said frame, a bed-bottom section overlying said carrier member and hingedly connected therewith remotely from the hinged connection of said carrier member to said frame, said bed bottom section being swingable with and relative to said carrier member, a rock shaft on said frame, means for actuating said rock shaft, a pair of arms on said rock shaft, a link connecting one of said arms with said carrier member and a second link connecting the other of said arms with said bed-bottom section whereby actuation of said rock shaft to swing said carrier member relative to said supporting frame simultaneously effects an angular adjustment of said bed-bottom section with respect to said carrier member.

3. In a bed of the class described, the combination of a supporting frame, a carrier member hinged to said frame, a bed-bottom section overlying said carrier member and hingedly connected therewith remotely from the hinged connection of said carrier member to said frame so as to be swingable with and relative to said carrier member, a rock shaft on said frame, means for actuating said rock shaft, a pair of arms secured to said shaft, a link connecting one of said arms with said carrier member and a second link connecting the other of said arms with said bed-bottom section, whereby actuation of said rock shaft to swing said carrier member relative to said supporting frame simultaneously swings said bed-bottom section relative to said carrier member, and means for disabling the connection between said second link and said other arm to permit said bed-bottom section to rest upon and swing with said carrier member.

4. In a bed of the class described, the combination of a supporting frame, a carrier member hinged on said frame, a bed-bottom section overlying said carrier member and hingedly con-

nected therewith remotely from the hinged connection of said carrier member to said frame so as to be swingable with and relative to said carrier member, a rock shaft on said frame, a pair of arms connected to said rock shaft, a link pivoted to one of said arms and to said carrier member, a second link pivoted to said bed-bottom section and having formed therein a slot, a pin on the other of said arms slidably engaging said slot, said slot having an offset portion at the end thereof remote from the pivot of said second link to said bed-bottom section, said other arm and said second link being operatively connected only when said pin is disposed in said offset slot portion, thereby to effect a swinging of said bed-bottom section relative to said carrier member when said carrier member is swung relative to said supporting frame and said pin is in said offset slot portion, and manually operable latch means for shifting said second link to displace said pin from said offset slot portion thereby to disable the operative connection of said other arm and said second link and to permit said bed-bottom section to rest upon and swing as a unit with said carrier member.

5. In a bed of the class described, the combination of a supporting frame, a bed-bottom section hingedly connected with said frame whereby said section is swingable relative to said frame, and an angularly bent strut pivoted at one end to the side of said section at a point remote from the hinge of said section, a series of abutments supported on said frame and being selectively engageable by the other end of said strut to support said section in various angular positions relative to said frame, said strut at its bend portion being engageable with the underside of said section at a point more remote from the bed-bottom section hinge than the strut pivot when said section occupies its lowermost position relative to said frame, whereby said section is more securely braced in said position and the effective bracing length of said strut in said position is foreshortened.

6. In a bed of the class described, the combination of a supporting frame, an articulated bed-bottom having two hingedly interconnected sections, one of which is hinged to said frame whereby said sections are swingable relative to each other and to said frame, means for positioning said one section relative to said frame, a notched bar hinged at one end to said bed-bottom and slidably supported at its other end on said frame, and an L-shaped strut pivoted at one end to the other of said bed-bottom sections and selectively engageable at its other end with one or another of the notches of said bar to alter the relative angularity of said other section and said notched bar, said strut at its bend portion being engageable with the underside of said other section at a point more remote than the strut pivot from the hinge connection of said sections to one another when said other section occupies its lowermost position relative to said notched bar whereby said other section is more firmly braced in said position and the effective bracing length of said strut is foreshortened.

7. In invalid equipment of the class described, the combination of a supporting frame, a carrier member hinged to said frame for swinging movement thereon, a bed bottom section overlying said carrier member and hinged thereto remotely from the hinged connection of the carrier member to said frame, said bed bottom section being swingable with and relative to said carrier member, adjusting means connected between said frame and said carrier member for sustaining said carrier member in various angular positions relative to said frame, and a connection between said bed bottom section and said frame whereby the swinging of said carrier member relative to said frame is effective to swing said bed bottom section relative to said carrier member.

8. In invalid equipment of the class described, the combination of a supporting frame, a carrier member hinged to said frame for swinging movement thereon, a bed bottom section overlying said carrier member and hinged thereto remotely from the hinged connection of the carrier member to said frame, said bed bottom section being swingable with and relative to said carrier member, adjusting means connected between said frame and said carrier member for sustaining said carrier member in various angular positions relative to said frame, a connection between said bed bottom section and said frame whereby the swinging of said carrier member relative to said frame is effective to swing said bed bottom section relative to said carrier member, and means operable to disable the connection between said bed bottom section and said frame in order to permit said bed bottom section to rest upon and swing with said carrier member.

9. In invalid equipment of the class described, the combination of a supporting frame, a carrier member hinged on said frame for swinging movement thereon, a bed bottom section overlying said carrier member and hinged thereto remotely from the hinged connection of said carrier member to said frame, said bed bottom section being swingable with and relative to said carrier member, adjusting means connected between said frame and said carrier member for sustaining said carrier member in various angular positions relative to said frame, a link pivoted to said frame and having a slidable pivotal connection to said bed bottom section to normally permit the said bed bottom section to rest upon and swing with said carrier member, and means selectively operable to prevent the sliding of said last mentioned pivot whereby said link is effective to swing said bed bottom section relative to said carrier member simultaneously with the swinging of said carrier member relative to said frame.

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