

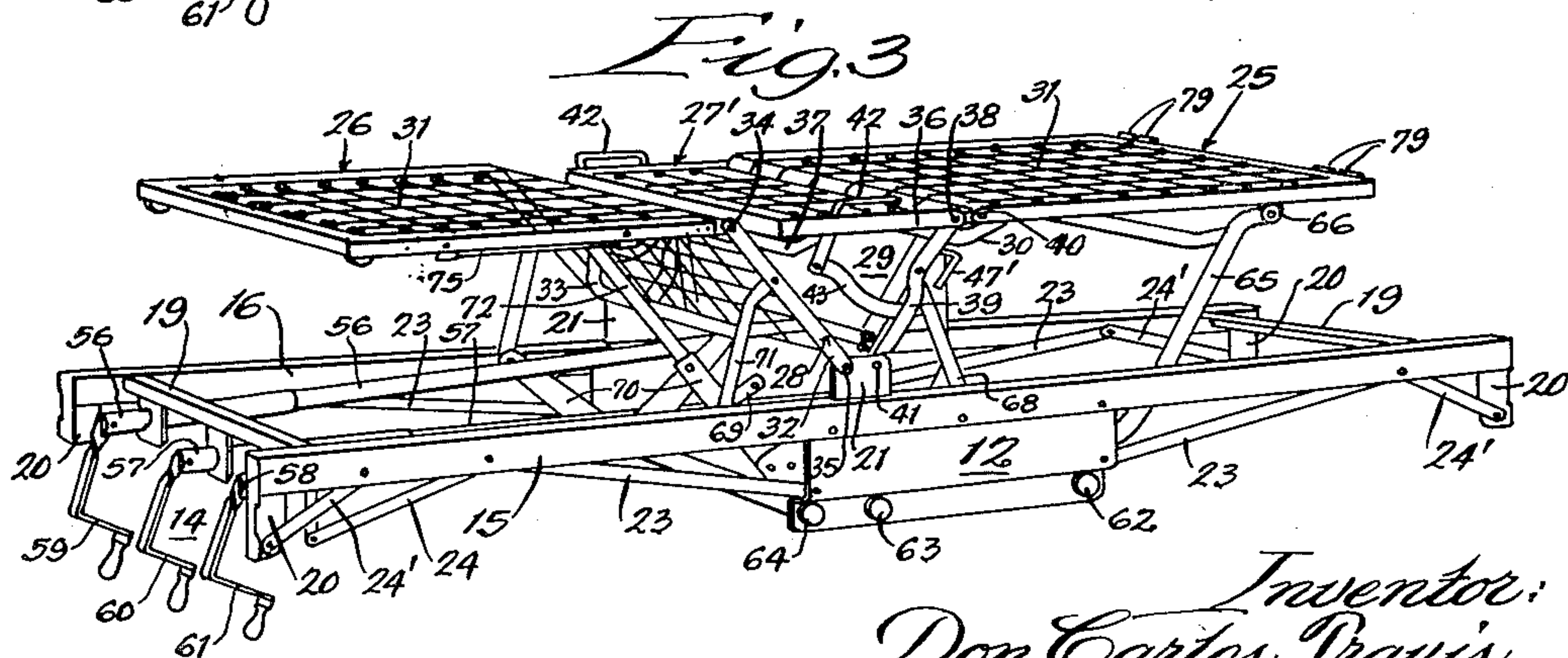
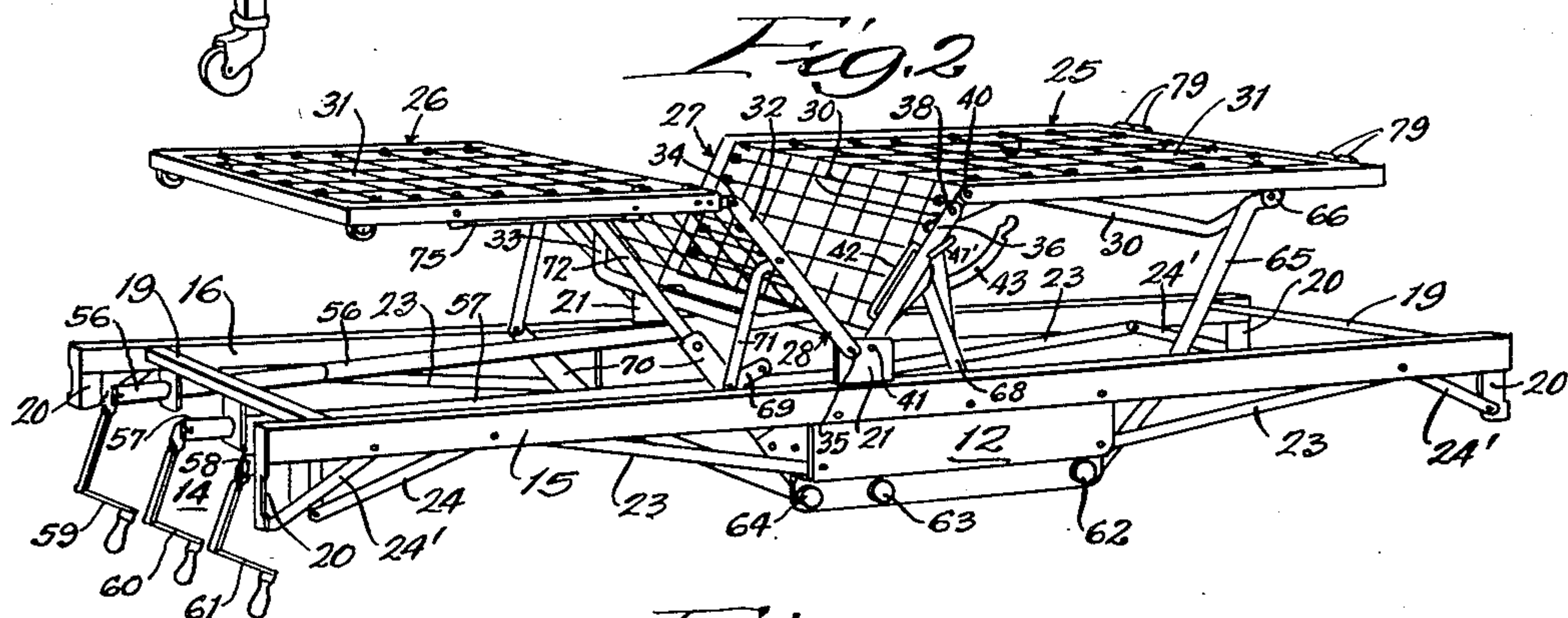
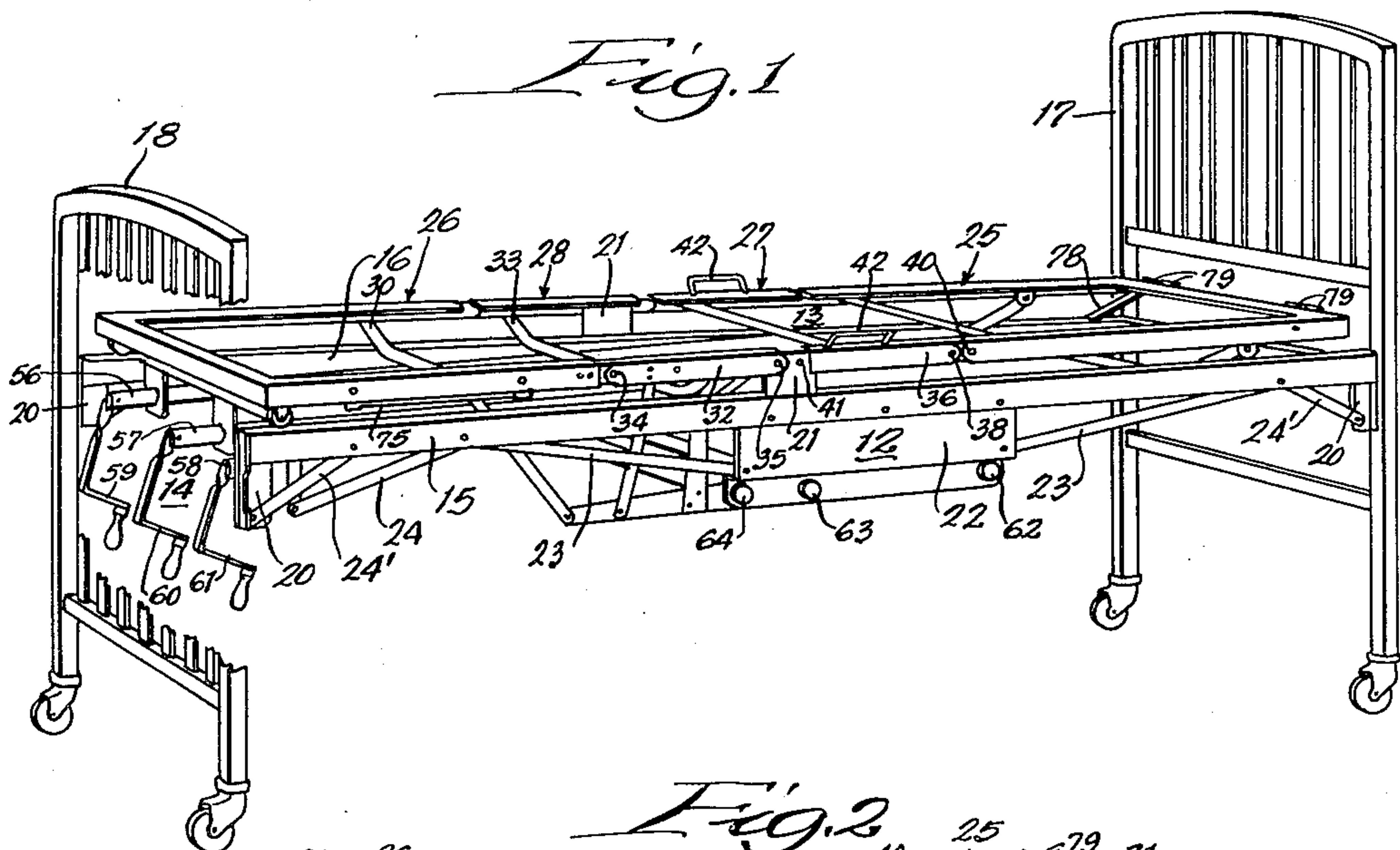
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D. C. TRAVIS  
HOSPITAL BED

2,538,993

Filed June 2, 1947

3 Sheets-Sheet 1



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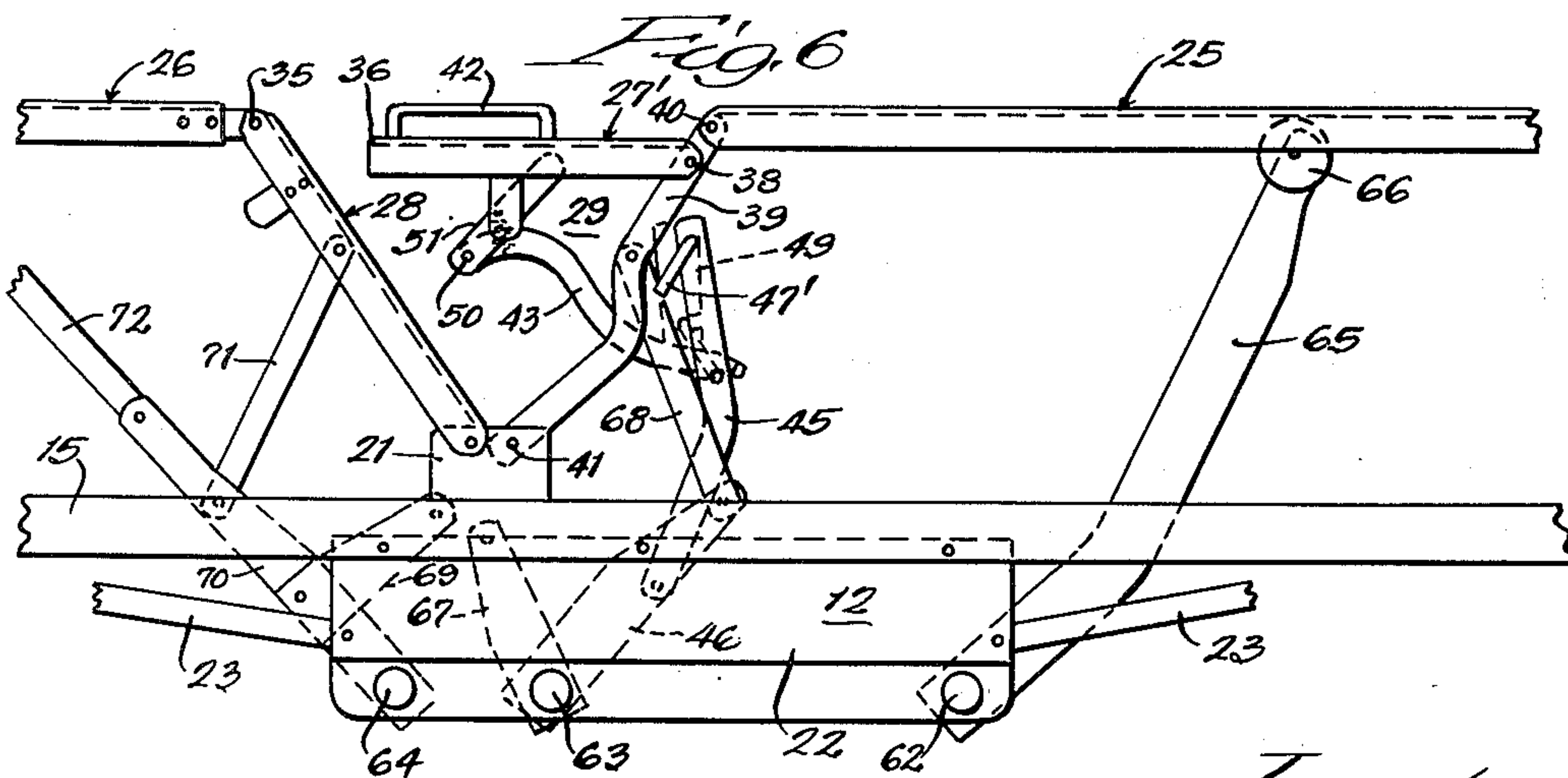
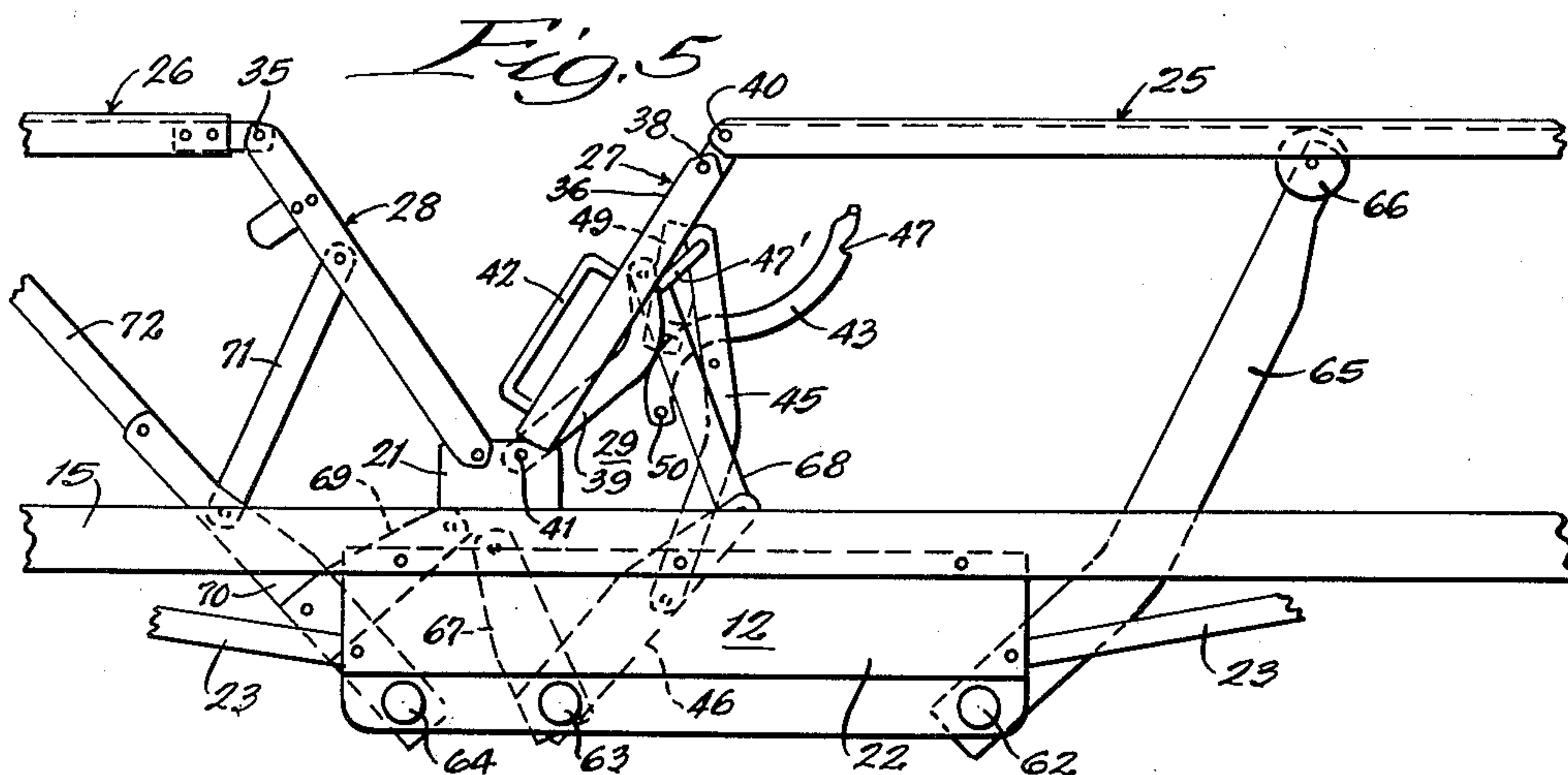
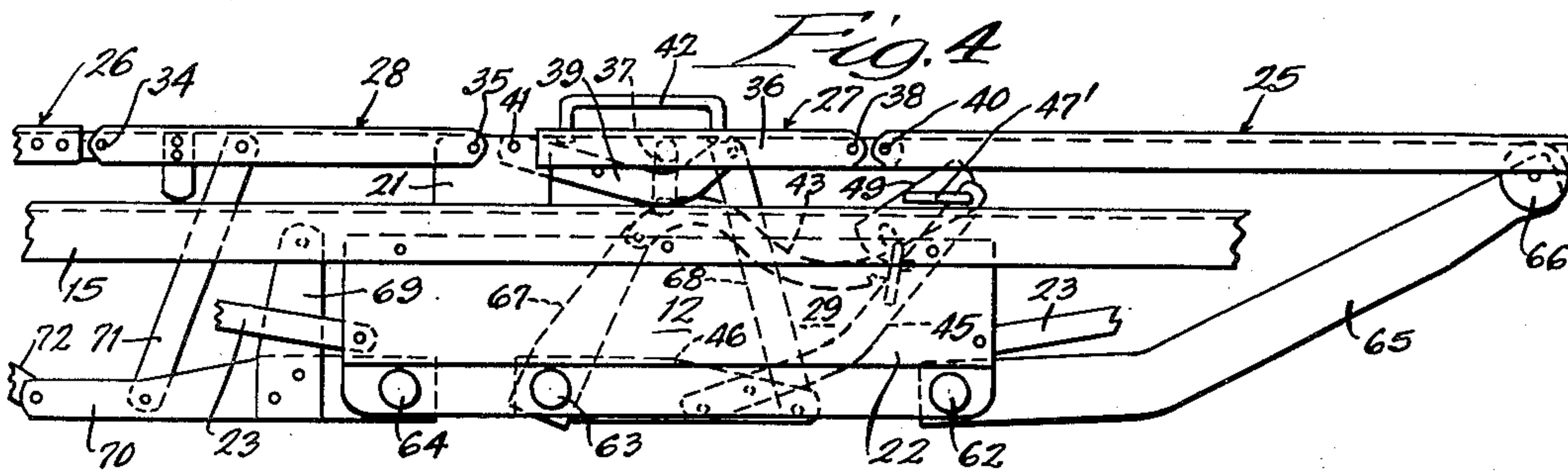
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3 Sheets-Sheet 2



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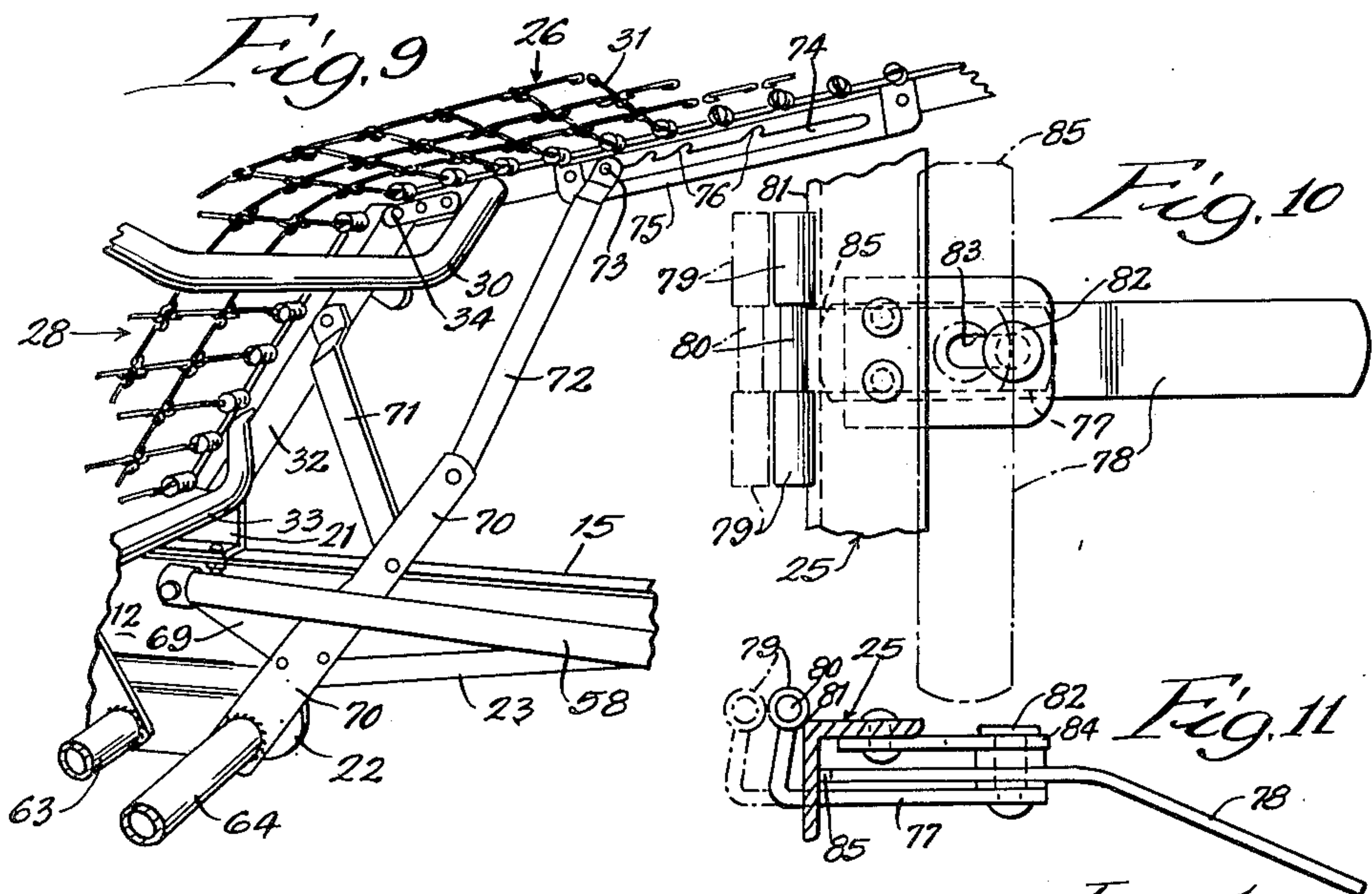
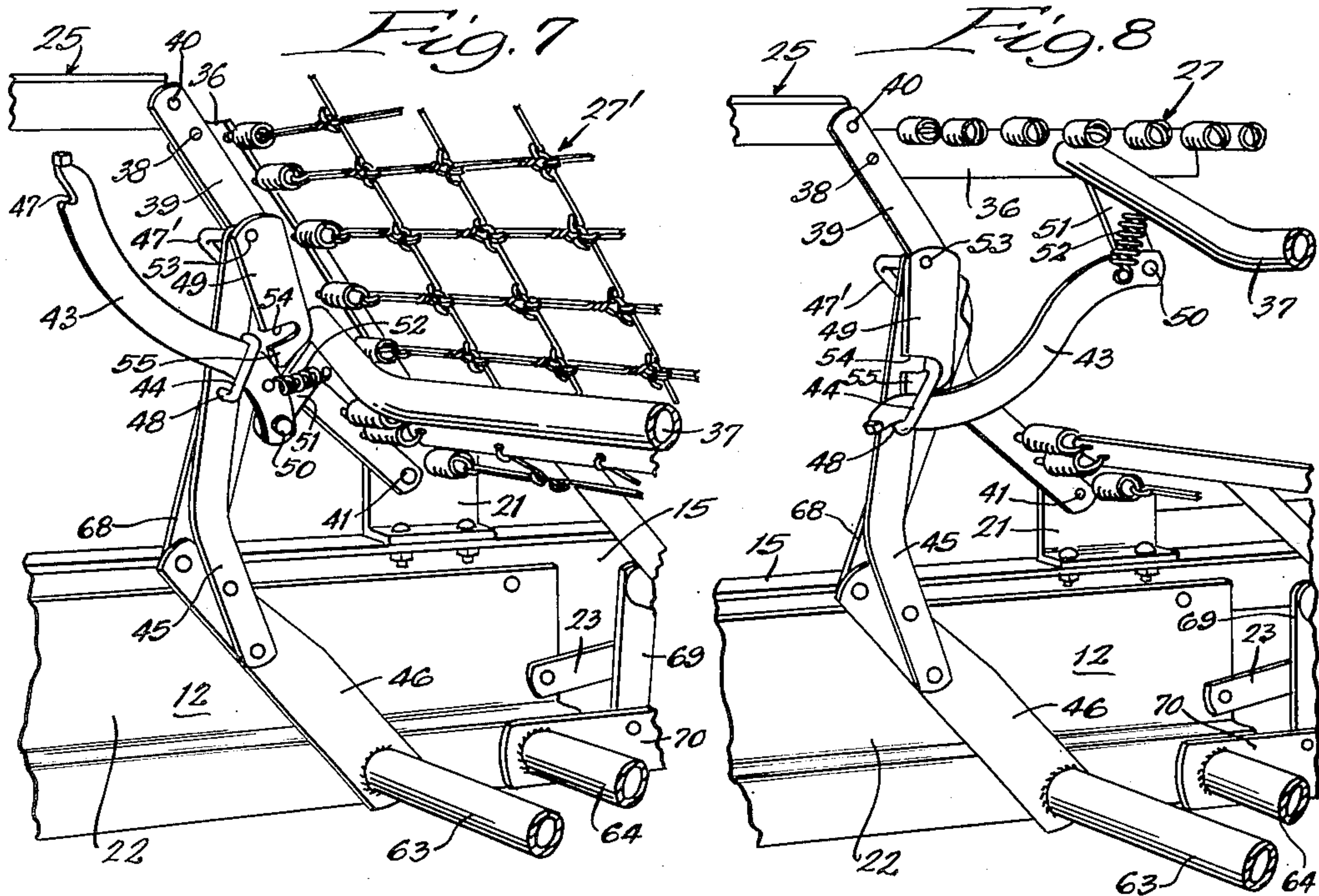
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,538,993

## HOSPITAL BED

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Application June 2, 1947, Serial No. 751,789

12 Claims. (Cl. 5—66)

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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 selectively shifted from normal horizontal alignment into and out of various angularly-disposed positions with regard to the bed-bottom supporting frame; to provide an improved construction of one of the middle sections of a bed bottom of this kind which permits the mattress-supporting portion of said one section to be releasably locked in an elevated horizontal position after said one section has been shifted to an angular position relative to the supporting frame; to provide improved means for automatically and manually determining the angular relationship of one of the main, end, bed-bottom sections to the adjusted angular position of the intermediate section to which said one end section is hinged; and to provide improved means for holding a mattress on said bed-bottom sections against displacement as otherwise would occur as a result of the shifting of said sections.

In the accompanying drawings,

Fig. 1 is a perspective view of a preferred form of hospital bed embodying this invention, the bed-bottom sections being shown in their horizontally-aligned positions on the frame. The foot is broken away so as to more clearly indicate the cranks for the bed-bottom operating mechanism. Also the mattress-supporting fabric for the bed-bottom sections is omitted so as to permit the construction and connections of the frame to be indicated more clearly;

Fig. 2 is a similar view showing the bed-bottom sections in one of their several adjusted angular relationships; the mattress-supporting fabric being shown attached, but the bed ends being omitted;

Fig. 3 is a view similar to Fig. 2 showing a further adjustment of the mattress-supporting portion of one of the intermediate bed-bottom sections;

Fig. 4 is an enlarged fragmentary side elevation showing the intermediate bed-bottom sections in their normally aligned horizontal positions and detailing in dotted outline the mechanism whereby one of the intermediate bed-bottom sections may have its mattress-supporting portion releasably retained in an elevated horizontal position, as shown in Fig. 6, when said one intermediate section is shifted into an angular position with regard to the bed-bottom supporting frame;

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Fig. 5 is a similar view but showing the two intermediate bed-bottom sections angularly disposed with regard to the supporting frame, prior to shifting the mattress-supporting section of one of said bed-bottom sections to the horizontal position shown in Fig. 6;

Fig. 6 shows the parts in the same relationship as in Fig. 5 except that the mattress-supporting portion of one of said intermediate sections is releasably locked in its elevated horizontal position;

Figs. 7 and 8 are enlarged, fragmentary, underside views of the bed showing the means whereby the mattress-supporting portion of one of said intermediate bed-bottom sections may be held in its elevated horizontal position when such intermediate bed-bottom section is disposed angularly to the supporting frame. Fig. 7 shows the position of this mechanism when the mattress-supporting portion of the intermediate section is in its normally retracted position on the respective bed-bottom section. Fig. 8 shows the position of this mechanism for retaining the mattress-supporting portion of such bed-bottom section in its elevated horizontal position;

Fig. 9 is an underside fragmentary view of the bed showing the arrangement of that part of the operating mechanism by means of which one of the main bed-bottom sections is shifted into an elevated horizontal position when the intermediate section, to which said main section is hinged, is shifted into its angular position with respect to the supporting frame; and

Figs. 10 and 11 are plan and cross-sectional views, respectively, of one of the two mattress clamps which are provided to secure the mattress against unwanted shifting on the bed-bottom sections as a result of their being adjusted into and out of their various angular positions. Fig. 10 shows in full and dotted outlines the operating handle in its locking and released positions.

A bed constructed in accordance with this invention comprises a main frame 12 supporting an articulated multi-section bed bottom 13 which, by means of an operating mechanism 14, is adapted to be 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 12 is of conventional construction for beds of this kind. A pair of side rails 15 and 16 are attached to a head section 17 and a foot section 18 by suitable connection locks not herein detailed. The side rails are preferably formed of angle bars connected by transverse reinforcing struts 19 and mounting at their ends brackets 20 whereon are formed



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the connection locks which detachably secure the side rails 15 and 16 to the head and foot sections 17 and 18, respectively. Intermediate the ends of each side rail 15 and 16 is mounted an upstanding bracket 21 and a depending panel 22. The brackets 21 have the intermediate sections of the bed-bottom 13 hinged thereto, whereas the panels 22 provide support for the rocker arm shafts which constitute a part of the operating mechanism 14, as will appear more fully hereinafter. Pairs of braces 23, 24, and 24' extend between intermediate points on the side rails 15 and 16 and the panel 22, the brackets 20, and the bearing plates for the operating mechanism 14, respectively, which braces serve to increase the rigidity of the supporting frame 12.

The bed bottom 13 comprises a pair of main or end sections 25 and 26 to which are hinged connected intermediate sections 27 and 28 respectively, in turn pivotally attached to the supporting-frame brackets 21. By means of the operating mechanism 14 these bed-bottom sections may be selectively shifted into and out of various angular relationships. The intermediate section 27 has its mattress-supporting portion 27' swingably mounted so as to be shifted to and held in an elevated horizontal position by means of a releasable locking mechanism 29, after said intermediate section 27 has been shifted into an angular position with respect to the supporting frame 12.

The main bed-bottom sections 25 and 26, generally referred to as the head-wing and foot-wing respectively, are of the usual construction. For each an angle bar is bent to U form and reinforced by transverse tubular struts 30, welded at their ends to said bar and depending from the underside of the sections. The mattress-supporting fabric 31 is supported on these U-shaped angle frames in the conventional manner.

The intermediate bed-bottom section 28 is formed of a pair of angle bars 32 connected by a reinforcing strut 33 and hinged at 34 to the inner ends of the foot wing 26 and at 35 to the brackets 21. Between these angle bars 32 is supported a continuation of the mattress-supporting fabric 31 which is supported on the foot wing 26.

The intermediate section 27 has the mattress-supporting portion 27' thereof formed of a pair of auxiliary angle bars 36 connected by a reinforcing strut 37 and pivoted at 38 to the main side bars 39, which in turn are pivoted at 40 to the inner end of the head wing 25, and at 41 to the brackets 21. Between the auxiliary angle bars 36 is supported a continuation of the mattress-supporting fabric 31 which is supported on the head wing 25. Handles 42 are secured to each of the auxiliary side bars 36 by means of which the mattress-supporting portion 27' may be adjusted relative to the main side bars 39.

The releasable locking mechanism 29, whereby the mattress-supporting portion 27' of the intermediate section 27 is held in its elevated horizontal position, comprises an arm 43 pivotally connected to one of the auxiliary side bars 36, of the mattress-supporting portion 27', and slidably received in a guide rod 44 fixed on an extension 45 of one of a pair of rocker arms 46 forming a part of the bed-bottom operating mechanism 14, as will appear more fully hereinafter. The arm 43 has formed on the outer end thereof a shoulder 47 which is adapted to be held in interlocking engagement with a shoulder

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48, formed by the guide rod 44, by means of a retractable pawl 49, when the mattress-supporting portion 27' of the intermediate bed-bottom section 27 is in its elevated horizontal position, as shown in Figs. 3 and 6.

The arm 43 is pivoted at 50 on a finger 51 rigidly secured to an auxiliary side bar 36 and is normally urged by a spring 52 into a position that would normally disengage the shoulders 47 and 48 unless they were retained in interlocking engagement by means of the pawl 49.

The pawl 49 is pivoted at 53 to the upper end of the rocker-arm extension 45 so that a recess 54, formed in the lower end of said pawl, will receive a transverse part of the U-shaped rod 44 when the arm 43 is shifted to locate the shoulders 47 and 48 in engaging relationship. Thereupon the end 55 of the pawl 49 is interposed between the arm 43 and said transverse part of the U-shaped guiding element 44 and depresses the arm 43 so as to retain the shoulders 47 and 48 in interlocking engagement.

The operating mechanism 14, of a conventional nature, comprises three extensible elements 56, 57, and 58 operated by folding, non-detachable cranks 59, 60, and 61 and connected to rocker arm shafts 62, 63, and 64 journaled on the panels 22. These extensible elements comprise telescoping steel screws and nuts enclosed in dust-tight, lubrication-retaining tubular housings. As will presently appear, the rocker-arm shafts 62, 63, and 64 mount rocker arms connected respectively to the head wing bed-bottom section 25 and the intermediate bed-bottom sections 27 and 28.

The crank-operated extensible element 56 is connected by a suitable rocker arm (not shown) to the shaft 62 which mounts a rocker arm 65 adjacent each end thereof, the upper ends of which are equipped with rollers 66 engaging the underside of the side bars of the head-wing bed-bottom section 25. By means of this extensible element 56 the head-wing section 25 may be adjusted to any angular position with regard to the supporting frame 12, between a lowered horizontal position in alignment with all the other bed-bottom sections, as shown in Fig. 1, and an elevated horizontal position as shown in Figs. 2, 3, 5, and 6.

The crank-operated extensible element 57 is connected to operate the rocker arm shaft 63 by means of a rocker arm 67. The rocker arms 46 are secured adjacent the ends of the shaft 63 and connected by links 68 to the respective main side bars 39 of the intermediate bed-bottom section 27. Thus, rotation of the shaft 63 will shift the intermediate bed-bottom section 27 between a horizontal position, such as shown in Figs. 1 and 4, and an angular position with respect to the supporting frame 12, as shown in Figs. 2, 3, 5, 6, 7 and 8.

The crank-operated extensible element 58 is connected to a finger 69 on one of a pair of rocker arms 70 secured to the rocker shaft 64. The rocker arms 70 are secured by links 71 to the intermediate bed-bottom section 28 whereby said section may be shifted between a horizontal position on said supporting frame 12, as shown in Figs. 1 and 4, and an angular position, as shown in Figs. 2, 3, 5, 6, and 9.

One of the rocker arms 70 is also connected by a link 72 to the foot-wing section 26 whereby, during the shifting of the intermediate section 28 between a horizontal position and an angular position, said foot-wing section 26 is normally maintained in a horizontal position. The link 72



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is connected to the end-wing section frame by means of a shiftable pivot constituted of a pin 73, on the end of said link 72, slidable in a slot 74 formed in a plate 75, secured to the inner side of the angle-bar frame of said end-wing section 28. The plate 75 has a plurality of notches or recesses 76 formed along the upper edge of that part of the plate which bounds the slot 74. These recesses are adapted to receive the pin 73 so as to locate the end-wing section 26 in various angular positions with regard to the intermediate section 28 when said intermediate section is in its angularly-disposed position with respect to the supporting frame 12.

Obviously, unless means are provided for securing a mattress to one of these bed-bottom sections, the shifting thereof into and out of the several angular positions might sooner or later cause an unwanted displacement of the mattress on the bed bottom. In order to avoid such possibility the head-wing section 25 is provided with a pair of mattress clamps the form of which is most clearly shown in Figs. 10 and 11. This clamp comprises a plate 77 slidably mounted at the end of the head-wing section 25 and operated by a handle 78 so as to shift the friction pads 79 on the pin 80 toward and away from the edge 81 of the frame of said head-wing section 25. The plate 77 is connected to the handle 78 by means of a pin 82 slidably mounted in a slot 83 on a lug 84 riveted to the frame of the head wing 25. The outer end of the arm 78 is curved at 85 so that when the arm 78 is swung to a position perpendicular to the end of the head-wing frame said curved end 85 engages the depending flange of the frame of the head-wing section 25 and serves to cam the plate 77 to move the friction pads toward the edge 81 of the head-wing section frame so as to clamp the edge of the mattress between said pads and frame edge 81. With the mattress thus held at one end to the head wing 25, any movement of the bed-bottom sections will not displace it on the head-wing section 25, even though it has to adjust itself to the other sections of the bed bottom as they are moved into and out of their various relative angular positions.

The operation of this improved bed is as follows:

It will be obvious from the drawings, and the foregoing description, that the head-wing section 25 and the intermediate sections 27 and 28 are independently adjustable through the turning of the cranks 59, 60, and 61, respectively. By means of these three cranks these three sections may be arranged in various angular relationships between the horizontally-alined position as shown in Fig. 1 and the position shown in Figs. 2 and 3.

By virtue of the link 72, with its connection to the rocker arm 70, and the fact that the pin 73 is normally in the most inward notch 76 in the plate 75, the foot-wing section will normally maintain a horizontal position for any angular position into which the intermediate section 28 may be shifted. If, after the intermediate section 28 has been shifted into the required angular position, it is desired to dispose the foot-wing section 26 at an angle thereto other than in a horizontal plane, it is only necessary to manually shift the link 72 to retract the pin 73 from the most inward notch 76 and allow the pin to move along the slot 74 into one of the other notches 76, or into the end of the slot 74.

A bed of this construction, therefore, may have the bed-bottom sections shifted into any of the

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various angular positions shown in the aforesaid Deckert patent.

This improved bed construction has a further advantage over the aforesaid Deckert construction in that the mattress-supporting portion 27' of the intermediate section 27 may be shifted into and temporarily locked in an elevated horizontal position when said intermediate section 27 is disposed in an angular position with respect to the supporting frame 12, as shown in Figs. 3, 6, and 8. To effect such horizontal elevation of the mattress-supporting portion 27' it is only necessary to use the handles 42 to elevate said mattress-supporting portion 27'.

The shifting of the mattress-supporting portion 27' moves the arm 43 through the guide bar 44 until the shoulder 47 at the end of the arm comes into position to engage the shoulder 48 on the guide bar 44. However, the spring 52 holds the shoulder 47 out of engagement with the shoulder 48 of the guide bar 44. The pawl 49 may be actuated by the handle 47' so that the upper transverse part of the guide rod 44 is received in the slot 54 and the tongue 55 of the pawl 49 cams the arm 43 downwardly to bring the shoulder 47 into interlocking engagement with the shoulder 48. The shoulders will remain in such interlocking engagement so long as the pawl 49 is allowed to remain in such shifted position.

When it is desired to lower the mattress-supporting portion 27' of the intermediate section 27, to the position shown in Figs. 1, 2, and 7, the handle 47' may be shifted to retract the pawl 49. Thereupon the shoulders 47 and 48 will be disengaged through the action of the spring 52 and the mattress-supporting portion 27' may be pressed down against the main side bars 39.

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 bed-bottom section hinged to said frame and swingable into and out of an angular position with respect to said frame, said section having the mattress-supporting portion thereof swingable upwardly into an angular patient-supporting position with respect to said section when said section is in its angular position with respect to said frame, and means for releasably locking said mattress-supporting portion of said section in its angular position with respect to said angularly-disposed section.

2. In a bed of the class described, the combination of a supporting frame, an articulated multi-section bed bottom having one section hinged to said frame and swingable into and out of an angular position with respect to said frame for determining the posture of a patient, said one section having the mattress-supporting portion thereof swingable forwardly upward into an elevated horizontal position after said section has been swung into said angular position so as to alter the posture of the patient, and means for releasably locking said mattress-supporting portion in its elevated horizontal position.

3. In a bed of the class described, the combination of a supporting frame, a mattress-supporting bed bottom comprising a pair of main sections and a pair of intermediate sections, the latter of which are hinged to said main sections and to said frame to permit the relative shifting



of said sections out of normal horizontal alignment into various relative angular positions, manually-actuated means for swinging one of said intermediate sections into and out of its said angular position, pivots connecting the mattress-supporting portion of said one intermediate section to the portion thereof to which said swinging means is attached whereby said mattress-supporting portion may be swung into an elevated horizontal position after said swinging means has disposed said one intermediate section in its angular position, and means for releasably locking said portion in its elevated horizontal position.

4. In a bed of the class described, the combination of a supporting frame, a mattress-supporting bed bottom comprising a pair of main sections and a pair of intermediate sections, the side bars of said latter sections being hinged at their inner ends to said frame and at their outer ends to the side rails of the respective main sections, all of said sections except one intermediate section having the mattress-supporting fabric attached to the side bars thereof, auxiliary side bars swingably mounted on the first-mentioned side bars for said one intermediate section and having the mattress-supporting fabric attached thereto, means for swinging said intermediate section bars into positions angular to said frame, and other means for releasably holding said auxiliary side bars in an elevated horizontal position when said one intermediate section has been shifted into an angular position with respect to said frame.

5. In a bed of the class described, the combination of a supporting frame, a mattress-supporting bed bottom comprising a pair of main sections and a pair of intermediate sections, the side bars of said latter sections being hinged at their inner ends to said frame and at their outer ends to the side rails of the respective main sections, all of said sections except one intermediate section having the mattress-supporting fabric attached to the side bars thereof, auxiliary side bars swingably mounted on the first-mentioned side bars for said one intermediate section and having the mattress-supporting fabric attached thereto, means for swinging said intermediate section bars into positions angular to said frame, other means for releasably holding said auxiliary side bars in an elevated horizontal position when said one intermediate section has been shifted into an angular position with respect to said frame, and manually-shiftable means for locking said other means in position for supporting said auxiliary side bars in their elevated horizontal positions.

6. In a bed of the class described, the combination of a supporting frame, a multi-section mattress-supporting bed bottom, one of which sections has the main side bars thereof hinged to another section and to said frame, rocker arms journaled on said frame and connected to the respective main side bars of said one bed-bottom section whereby said main side bars may be shifted into and out of angular relationship to said frame, operating means for actuating said rocker arms, fabric-supporting auxiliary side bars pivoted on said main side bars, a positioning arm pivoted on one of said auxiliary side bars and extending through a guide element on one of said rocker arms, and co-acting shoulders on said arms engageable to hold said fabric-supporting auxiliary bars in an elevated horizontal position when said main side bars are angularly disposed to said frame.

7. In a bed of the class described, the combination of a supporting frame, a multi-section mattress-supporting bed bottom, one of which sections has the main side bars thereof hinged to another section and to said frame, rocker arms journaled on said frame and connected to the respective main side bars of said one bed-bottom section whereby said main side bars may be shifted into and out of angular relationship to said frame, operating means for actuating said rocker arms, fabric-supporting auxiliary side bars pivoted on said main side bars, a positioning arm pivoted on one of said auxiliary side bars and extending through a guide element on one of said rocker arms, co-acting shoulders on said arms engageable to hold said fabric-supporting auxiliary bars in an elevated horizontal position when said main side bars are angularly disposed to said frame, and a pawl shiftable on said one rocker arm to engage said positioning arm to lock said shoulders in their engaged positions.

8. In a bed of the class described, the combination of a supporting frame, a multi-section mattress-supporting bed bottom, one of which sections has the main side bars thereof hinged to another section and to said frame, rocker arms journaled on said frame and connected to the respective main side bars of said one bed-bottom section whereby said main side bars may be shifted into and out of angular relationship to said frame, operating means for actuating said rocker arms, fabric-supporting auxiliary side bars pivoted on said main side bars, a positioning arm pivoted on one of said auxiliary side bars and extending through a guide element on one of said rocker arms, co-acting shoulders on said arms engageable to hold said fabric-supporting auxiliary bars in an elevated horizontal position when said main side bars are angularly disposed to said frame, a spring actuating said positioning arm to normally disengage said shoulders, and a pawl shiftable on said rocker arm to engage said positioning arm and lock said shoulders in their engaged positions.

9. In a bed of the class described, the combination of a supporting frame, an articulated multi-section bed bottom having one section hinged to said frame and swingable into and out of an angular position with respect to said frame, a rocker arm journaled on said frame and connected to shift said one bed-bottom section, a link hingedly connected to said rocker arm and to the other bed-bottom section to which said one section is articulated whereby the rocking of said rocker arm to shift said one section angularly of said frame will maintain said other section in a predetermined angular position relative to said one section, and means for rocking said rocker arm.

10. In a bed of the class described, the combination of a supporting frame, an articulated multi-section bed bottom having one section hinged to said frame and swingable into and out of an angular position with respect to said frame, a rocker arm journaled on said frame and connected to shift said one bed-bottom section, a link hingedly connected to said rocker arm and to the other bed-bottom section to which said one section is articulated whereby the rocking of said rocker arm to shift said one section angularly of said frame will maintain said other section in a predetermined angular position relative to said one section, and means for rocking said rocker arm, the pivotal connection of said



link to said other section being shiftable lengthwise thereof so as to alter the angularity of said other section relative to said one section when the latter section is angularly disposed relative to said frame.

11. In a bed of the class described, the combination of a supporting frame, an articulated multi-section bed bottom having one section hinged to said frame and swingable into and out of an angular position with respect to said frame, a rocker arm journaled on said frame and connected to shift said one bed-bottom section, a link hingedly connected to said rocker arm and to the other bed-bottom section to which said one section is articulated whereby the rocking of said rocker arm to shift said one section angularly of said frame will maintain said other section in a predetermined angular position relative to said one section, means for rocking said rocker arm, other means on said other bed-bottom section providing a slot extending longitudinally of said section, said other means having a plurality of recesses formed therein along the upper boundary of said slot, and a pin on said link shiftable in said slot and selectively engageable with said recesses for altering the angularity of said other section relative to said one section when the latter is angularly-disposed to said frame.

12. In a bed of the class described, the combination of a supporting frame, a mattress-supporting bed bottom comprising a pair of main sections and a pair of intermediate sections the latter of which are hinged to said main sections

and to said frame to permit the relative shifting of said sections out of normal horizontal alignment into various relative angular positions, a rocker arm journaled on said frame and connected to shift one of said intermediate sections, a link hingedly connected to said rocker arm and to the main bed-bottom section to which said one bed-bottom section is hinged whereby the rocking of said rocker arm to shift said one section angularly of said frame will maintain said other section in a predetermined angular position relative to said one section, extensible means on said frame for rocking said rocker arm, and other extensible means on said frame operatively connected respectively to said other intermediate section and to said other main bed-bottom section for angularly adjusting said sections with regard to said frame and to each other.

DON CARLOS TRAVIS.

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