

May 30, 1961

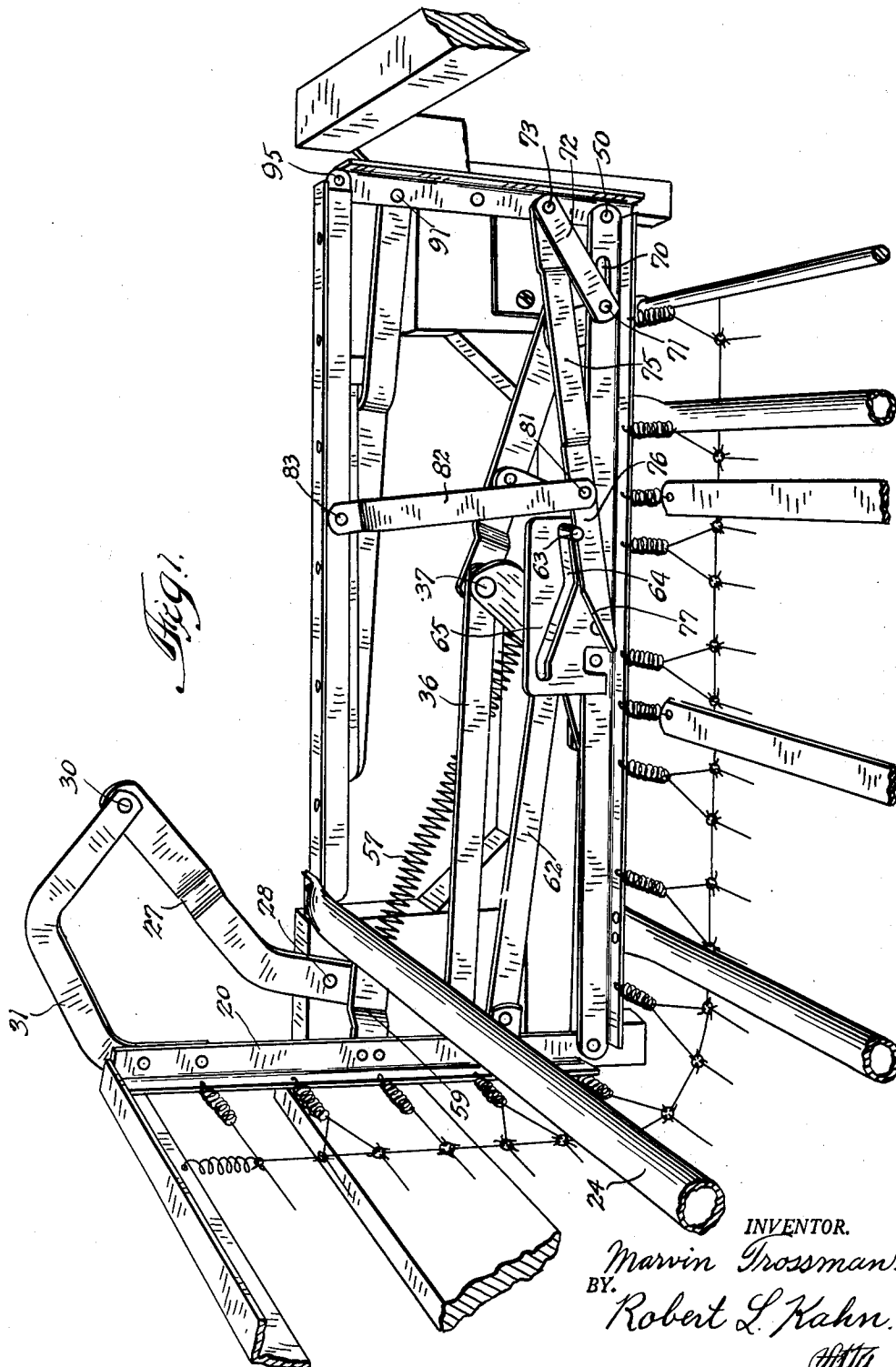
M. TROSSMAN

2,985,893

FOLDING BED

Filed July 3, 1958

4 Sheets-Sheet 1



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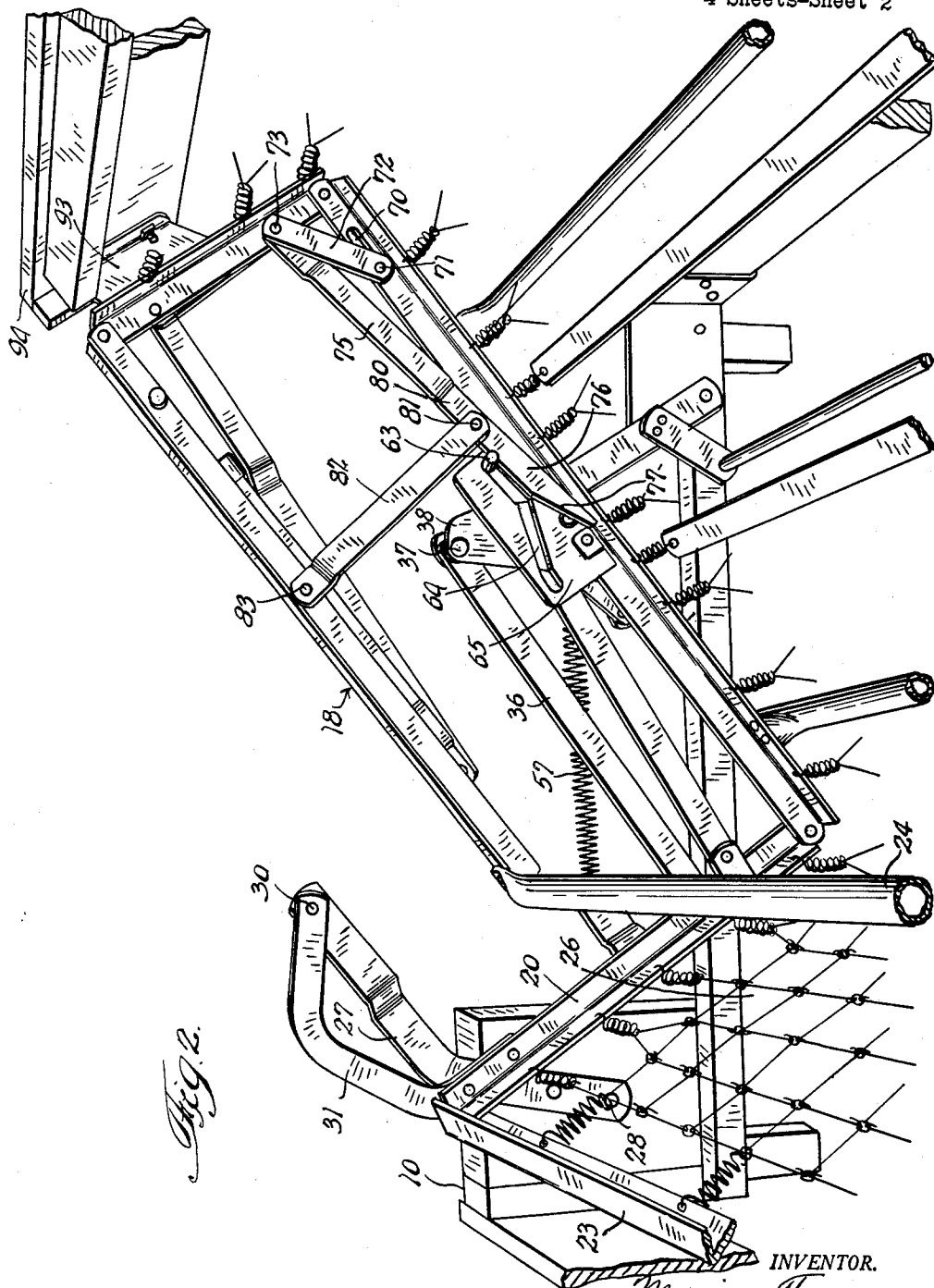


Fig. 2.

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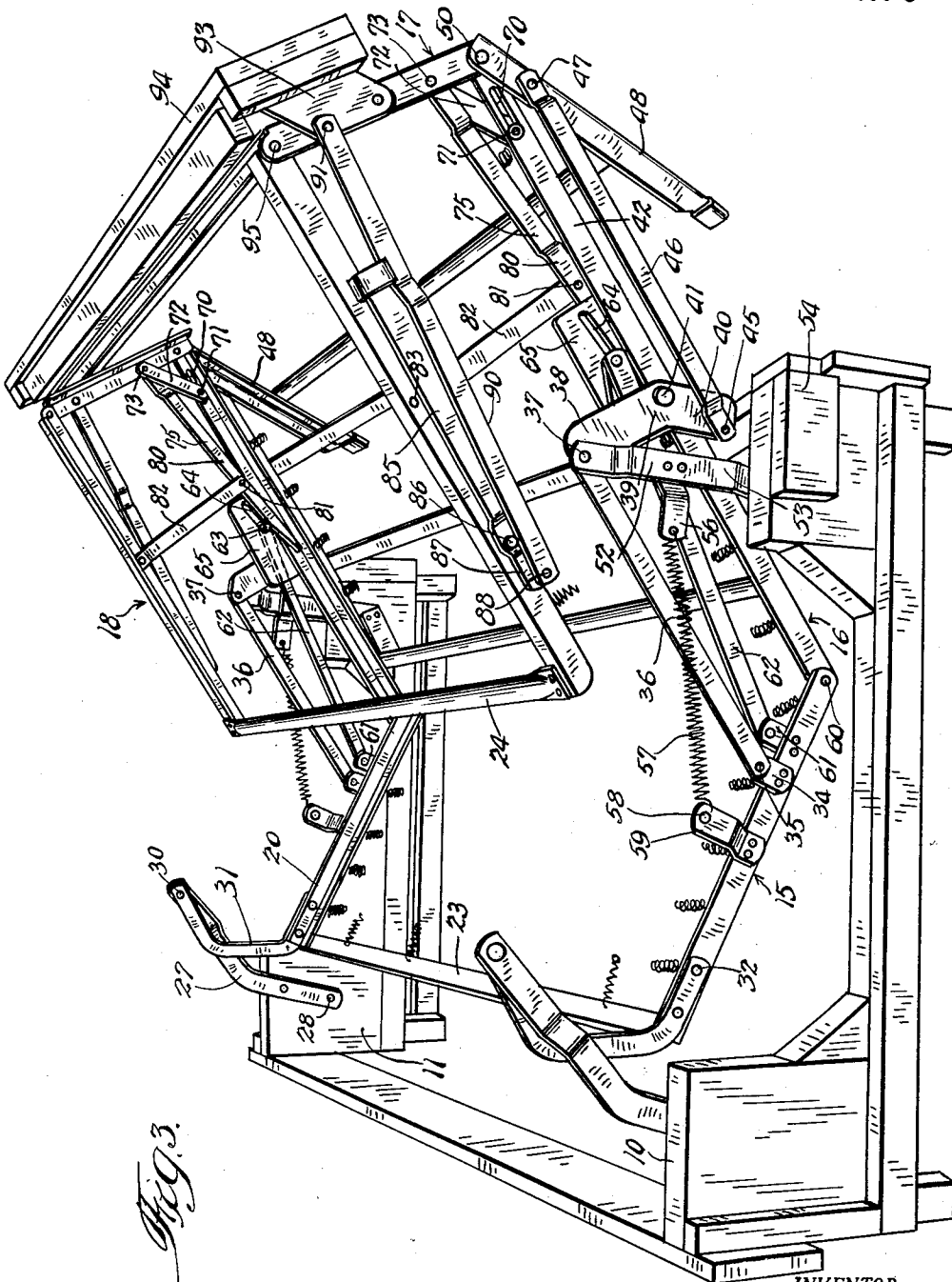


Fig. 3.

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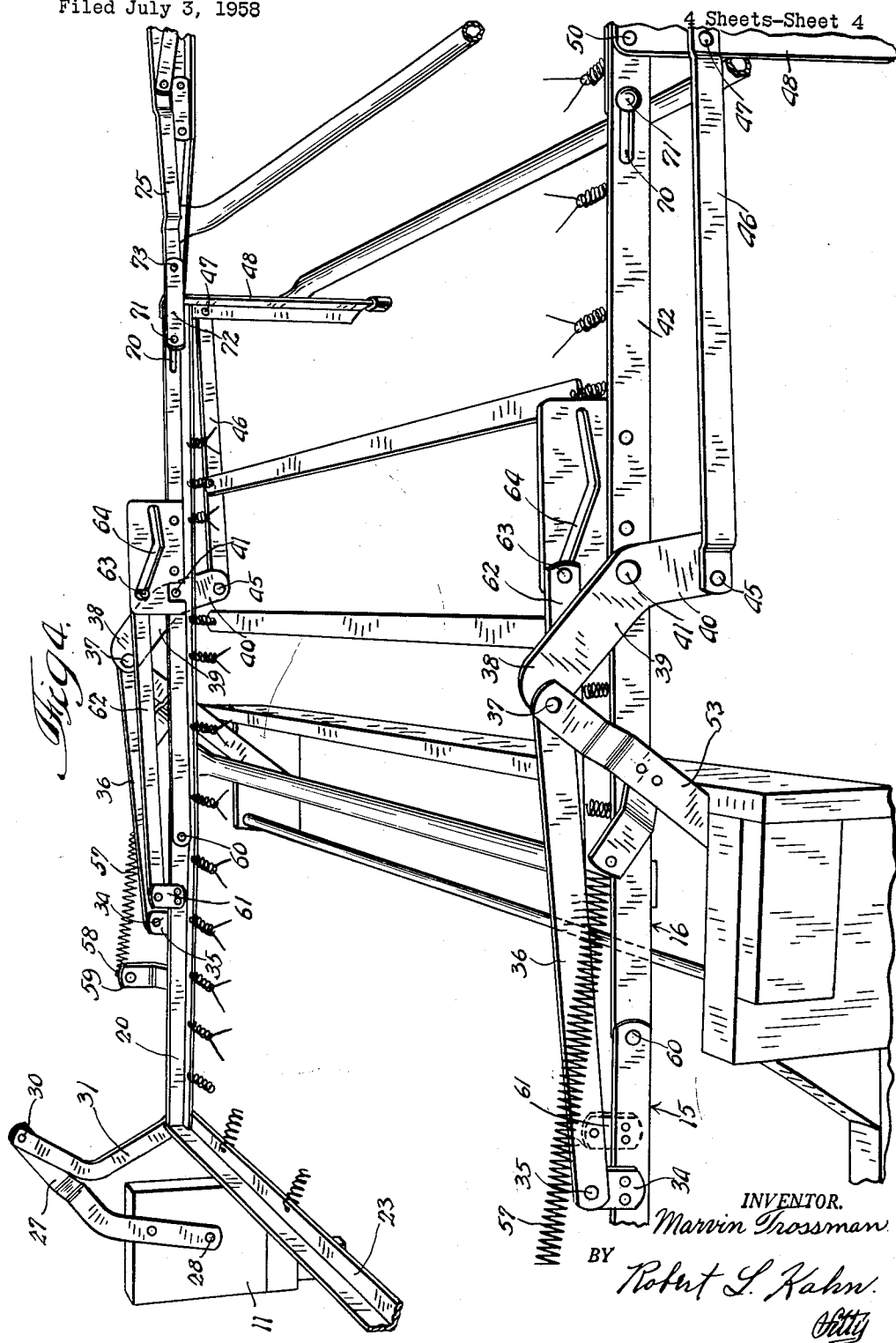
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FOLDING BED

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4 Claims. (Cl. 5—13)

This invention relates to a folding bed and more particularly to a davenport which is adapted to be unfolded into a bed.

The construction embodying the present invention is simple and provides a firm lock for the plurality of bed sections for the purpose of insuring correct folding into a davenport.

For a thorough understanding of the invention, reference will be made to the drawings in which:

Figure 1 is a longitudinal section of a construction embodying the present construction, this view showing the mechanism folded in a normal seat position.

Figure 2 is a longitudinal sectional view of the mechanism embodying the present invention in the initial stages of unfolding.

Figure 3 is a perspective view of the entire mechanism embodying the entire invention in a more advanced stage of unfolding.

Figure 4 is a perspective view with certain parts broken away showing the mechanism in a completely unfolded position.

The mechanism embodying the present invention is adapted to be attached to a conventional davenport frame 10 usually of wood. Inasmuch as such davenport frames are well known no detailed explanation will be given except insofar as is necessary for the proper understanding of the invention.

Davenport frame 10 has side support blocks 11 on which is supported one end of the frame construction embodying the present invention. Since the two longitudinal sides of the frame are the same, the description will for the most part be concerned with one or the other side of the frame with the understanding that the parts are duplicated except as otherwise noted.

The entire frame consists of four articulated sections ranging from rear or head section 15 through body section 16 and intermediate section 17 to front or foot section 18. The various sections are provided with suitable linkages to be described for accomplishing the desired result.

Each of the four articulated sections includes side angle bars which in head section are indicated by 20, the remaining sections being provided with corresponding angle irons. Transverse cross members between the angle irons are provided such as, for example, 23 and 24, at the two ends respectively, of the entire frame. Supported between the angle irons and end members is a suitable wire and spring assembly 26 upon which a mattress or padding will be disposed.

The head end of the frame is supported by curved arm 27 rigidly bolted or attached at 28 to frame support block 11. Curved arm 27 has pivotally attached thereto at 30, curved swinging arm 31 which is bolted or riveted at 32 to the angle iron side rail of head section 15. Curved arm 27 has the lower portion laterally offset outwardly with reference to each frame side so that swinging arm 31 can clear arm 27 and operate freely.

Angle iron 20 has plate 34 rigidly attached thereto,

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said plate extending upwardly from the angle iron. Pivotally attached to plate 34 at pivot pin 35 is link 36 whose forward end is pivotally secured at 37 to arm 38 of a modified bell crank generally indicated by 39. As here illustrated, bell crank 39 has two arms 38 and 40 which have an obtuse angle between them rather than a right angle as in a conventional bell crank. Bell crank 39 is pivotally secured at 41 to side angle iron 42 of body section 16. Bell crank 39 has arm 40 pivotally secured at 45 to link 46 whose forward end is pivotally secured at 47 to intermediate leg 48. Intermediate leg 48 is pivotally secured at 50 to the pivot point between body section 16 and intermediate section 17.

Pivot point 37 of bell crank arm 38 has pivotally secured thereto T-shaped bracket 52 whose bottom end portion 53 is pivotally secured to block 54 at the forward part of the davenport frame. Bracket 52 has a body portion suitably offset outwardly to clear the other parts and the body portion of bracket 52 carries apertured piece 56 to which is anchored one end of tension coil spring 57. Spring 57 has its other end anchored at 58 to plate 59 carried by the angle iron side of head section 15. Spring 57 tends to fold sections 15 and 16 about pivot 60.

Referring to head section 15, forwardly disposed of plate 34 is plate 61 carried by the side rail of section 15. Plate 61 has pivotally secured thereto arm 62 carrying pin 63 at the forward end thereof. Pin 63 extends inwardly of the frame side and rides in cam slot 64 of guide plate 65. Guide plate 65 is rigidly secured to rail 42 of body section 16. The guide plate extends perpendicularly to the side rail and in both the fully unfolded and fully folded positions extends vertically. Cam slot 64 is shaped as shown, this being generally in the form of a broken line. The shape of the cam slot will control the amount of locking action and will be explained in detail later.

Referring to rail 42 of body section 16, well toward the front of this section and near pivot point 50 is longitudinal slot 70. Riding in this slot is pin 71 at the end of link 72. Link 72 has its other end pivotally secured at 73 to the angle iron rail forming the side of intermediate section 17. Pivotally secured at 73 is link 75 which has its free pointed end portion 76 provided with cam edge 77. End portion 76, as seen from the side, tapers down to a point, the top edge functioning as a cam edge for cooperation with pin 63.

Link 75 has intermediate portion 80 to which is pivotally secured at 81 link 82. Link 82 has its other end 83 pivotally secured to the side rail of foot section 18.

Foot section 18 is provided with front legs 85 pivotally secured at 86 to the side rail of foot section 18. Front leg 85 has portion 87 projecting beyond pivot point 86 and this portion 87 has its free end pivotally secured at 88 to link 90. Link 90 has end 91 pivotally secured to the angle iron rail member of intermediate section 17. The intermediate section rails carry brackets 93 upon which is secured front board 94. Foot section 18 can rock around pivot 95.

The operation of the mechanism will now be described. It will be simpler to consider first the operation of folding the bed into the divan. In the unfolded or bed position illustrated in Figure 4, the front and intermediate legs extend straight down. Pin 63 is at the rear end of slot 64. Links 75 and 82 are extended in a generally straight line with rear position 76 of link 75 well forward of guide plate 65.

If cross member 24 is grasped and the forward end of the bed raised, the following occurs. Link 90 is operated and folds front leg 85, pivot pin 88 moving so that the bottom of leg 85 is folded toward the head of the bed. At the same time, links 75 and 82 break the straight line and pivot point 81 moves upwardly and rearwardly. When front leg 85 is in line with the side rail of the foot

section, the free end of leg 85 hits against an offset on link 90 and stops further rearward movement of the foot section around the intermediate section. Then further pressure upon the foot section causes the intermediate section to rock about pivot 50. The mechanism is almost in the position illustrated in Figure 3.

It will be noted in Figure 3 that pointed end portion 76 of link 75 has been moved downwardly and rearwardly to slip below pin 63 which is still at the rear end of slot 64. The pointed tip cannot move below the side rail of the body section because of the rail flange. In practice, a mattress and bedding will prevent the foot section going low enough for the pointed tip of link 75 to engage the rail flange. So long as the link tip enters below pin 63 the mechanism will close satisfactorily. At any rate, the pointed tip of link 75 will be stopped thus limiting the roll of foot and intermediate sections around pivot 50.

Further pressure on the foot section, now causes the three sections 16, 17 and 18, to rock around pivot 60. When this occurs, link 36 rocks bell crank 39 clockwise as seen in Figure 3. Link 46 is operated to fold intermediate leg 48. Coil spring 57 which is tensioned in the unfolded bed position aids in folding. The mechanism now goes from the position illustrated in Figure 3 to the position illustrated in Figure 2. It will be noted that as body section 16 is rocked around pivot 60 link 62 will move pin 63 forwardly in slot 64. At the same time pointed portion 76 of link 75 moves in further under pin 63. The shape of cam slot 64 and cam edge 77 are such that as the sections are moved toward folding position, the foot and intermediate sections are pressed down against body section 16. At the same time head section 15 is rocked on pivot 30 to move rearwardly and upwardly to the position shown in Figure 1. The davenport will have a pocket behind the upholstery of the davenport back for accommodating head section 15. The remaining sections 16 to 18 inclusive will now be tightly folded in a position with the foot section upside down and horizontal.

The reverse action occurs on unfolding.

What is claimed is:

1. In a convertible bed of the type described, the combination of a stationary frame, a four section bed mechanism consisting of head section, body section, intermediate section and foot section connected successively for relative pivotal movement, means for supporting the free end of said head section in said frame so that said head section may move from a horizontal bed position to a generally vertical position when said mechanism is folded, said body section being horizontal both in the folded and unfolded position but being displaced toward the frame in the folded bed position, said intermediate section being generally vertical in the folded position, said foot section being turned over but generally horizontal in the folded bed position, a guide plate carried by said body section, said body section including an angle iron having horizontal and vertical webs, said guide plate being attached to the vertical web portion of said body section and disposed in a generally vertical plane and extending longitudinally of the bed, said plate having a cam slot extending generally longitudinally of the bed, a pin disposed in said cam slot and having a portion extending beyond the guide plate, a first lever pivotally supported on said head section and extending toward said guide plate and carrying said pin at the end thereof, a pair of arms pivotally supported on said foot and intermediate sections respectively, said arms meeting at a pivot point to form a toggle, one of said arms having an extension beyond the toggle pivot, said extension having an edge functioning as a cam surface and cooperating with the projecting portion of said pin, said extension during folding lying in a generally vertical plane with the bottom edge being in proximity to the horizontal web of said body section, said cam surface of said pro-

jecting portion being shaped to compact the foot section toward the body section during folding, said extension during folding lying between the projecting portion of said pin and the horizontal web of said body section.

2. In a convertible bed of the type described, the combination of a stationary frame, a four section bed mechanism consisting of head section, body section, intermediate section and foot section connected successively for relative pivotal movement, means for supporting the free end of said head section in said frame so that said head section may move from a horizontal bed position to a generally vertical position when said mechanism is folded, said body section being horizontal both in the folded and unfolded position but being displaced toward the frame in the folded bed position, said intermediate section being generally vertical in the folded position, said foot section being turned over but generally horizontal in the folded bed position, a guide plate carried by said body section, said body section having an angle iron portion provided with horizontal and vertical webs, said guide plate lying in a generally vertical plane longitudinally of the bed, said plate having a cam slot extending generally longitudinally of the bed, a first lever supported on said head section and extending toward said guide plate and having a pin engaging said cam slot, an arm pivotally carried by said intermediate section and having a free end and having a cam surface adjacent said free end for cooperating with said pin, said arm being flat and lying in a generally vertical plane and having the cam surface along the top edge thereof during folding and having the bottom edge disposed above said horizontal web of said body section, means for limiting the movement of said intermediate section during folding and an arm joining said foot section to said first arm whereby said first arm will pull down the foot section into folded position as a result of the cam action thereon, said arm lying between said pin and said horizontal web during folding.

3. In a convertible bed of the type described, the combination of a stationary frame, a four section bed mechanism consisting of head section, body section, intermediate section and foot section connected successively for relative pivotal movement, means for supporting the free end of said head section in said frame so that said head section may move from a horizontal bed position to a generally vertical position when said mechanism is folded, said body section being horizontal both in the folded and unfolded position but being displaced toward the frame in the folded bed position, said intermediate section being generally vertical in the folded position, said foot section being turned over but generally horizontal in the folded bed position, a guide plate carried by said body section and disposed in a generally vertical plane and extending longitudinally of the bed, said plate having a cam slot extending generally longitudinally of the bed, a pin disposed in said cam slot and having a portion extending beyond the guide plate, a first lever pivotally supported on said head section and extending toward said guide plate and carrying said pin at the end thereof, a pair of arms pivotally supported on said foot and intermediate sections respectively, said arms meeting at a pivot point to form a toggle, the arm from the intermediate section being straight and extending beyond the toggle pivot and having an edge functioning as a cam surface and cooperating with the projecting portion of said pin, said cam surface of said projecting portion being shaped to compact the foot section toward the body section during folding.

4. In a convertible bed of the type described, the combination of a stationary frame, a four section bed mechanism consisting of head section, body section, intermediate section and foot section connected successively for relative pivotal movement, means for supporting the free end of said head section in said frame so that said head section may move from a horizontal bed position

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to a generally vertical position when said mechanism is folded, said body section being horizontal both in the folded and unfolded position but being displaced toward the frame in the folded bed position, said intermediate section being generally vertical in the folded position, said foot section being turned over but generally horizontal in the folded bed position, a guide plate carried by said body section and disposed in a generally vertical plane and extending longitudinally of the bed, said plate having a cam slot extending generally longitudinally of the bed, a pin disposed in said cam slot and having a portion extending beyond the guide plate, a first lever pivotally supported on said head section and extending toward said guide plate and carrying said pin at the end thereof, said cam slot being just long enough to limit the folding movements of said head and body sections, a pair of arms pivotally supported on said foot

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and intermediate sections respectively, said arms meeting at a pivot point to form a toggle, said intermediate section arm having an extension beyond the toggle pivot, said extension consisting of a flat bar having an edge functioning as a cam surface and cooperating with the projecting portion of said pin, said cam surface of said projecting portion being shaped to compact the foot section toward the body section during folding.

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