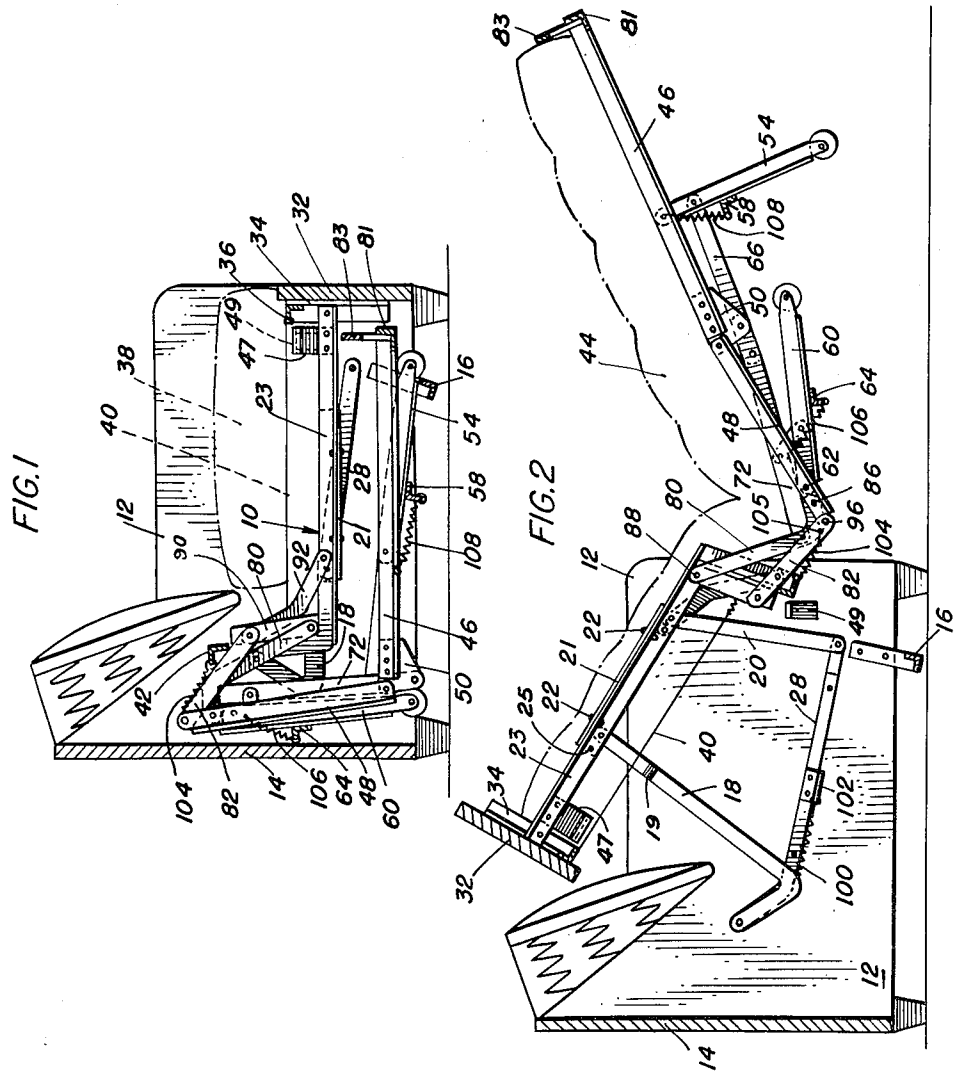
July 24, 1956 J. R. THOMAS 2,755,486

DAVENPORT BED

Filed May 31, 1952 2 Sheets-Sheet 1



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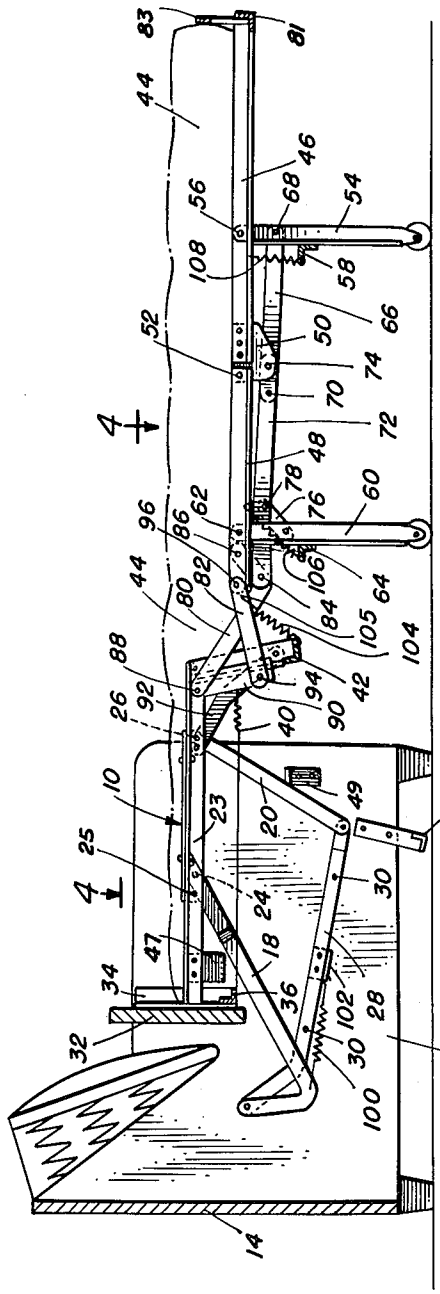

FIG. 3

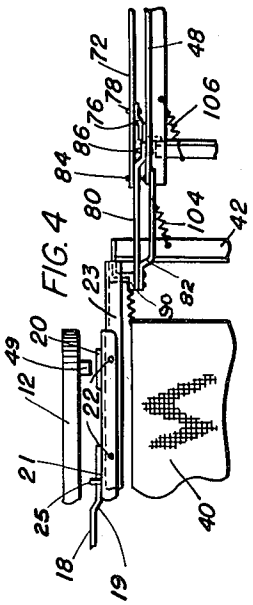

FIG. 4

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DAVENPORT BED

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3 Claims. (Cl. 5—12)

This invention relates in general to a davenport bed having connected foldable sections and more particularly to resilient means at one of the junctions between the sections for assisting particularly in the folding action of the sections in converting the structure from bed to seat position.

In folding bed structures having a plurality of pivotally connected sections in which the movements of the sections are coordinated for joint action, it is desirable to provide spring means for cushioning the unfolding of the sections when the structure is changed from a seat to a bed, and also to assist the folding action of the structure when the sections are converted from an extended or bed position to a seat position.

The present invention provides spring means connecting the sections and the folding parts for insuring that the folding and unfolding actions of the sections are assisted and cushioned during the operating movements of the sections and particularly at an intermediate point during which some of the sections are moved together.

An important object of the invention is to provide resilient means for connecting the sections and folding parts to cushion them in their unfolding action to form a bed and for assisting the folding action when the structure is converted from a bed to a seat.

A further object of the invention is to resiliently draw certain of the bed sections together at their joint during the folding action and when the sections are moved toward each other prior to the inversion of the seat from its extended or bed position.

A still further object of the invention is to provide a folding davenport bed construction with coordinating means for automatically folding and unfolding the sections and in assisting the folding movement of the bed sections at an intermediate point of their movement to squeeze the accompanying mattress or bed clothes into the joint between the sections and to insure that the sections are folded together in the intended and proper manner.

Other objects of the invention will appear in the specification and will be apparent from the accompanying drawings in which,

Fig. 1 is a side elevation of a folding davenport construction in accordance with this invention, mounted in a frame and in folded or seat position.

Fig. 2 is a side elevation of the structure shown in Fig. 1 in a partially open or partially closed position.

Fig. 3 is a side elevation of the structure of Fig. 1 in an extended or bed position; and

Fig. 4 is a segmental plan view of one side of the folding structure as taken on the line 4—4 of Fig. 3.

In a sectional folding davenport construction of this kind, it is desirable that the connected sections are easily movable from one position to another; that the movement of the sections is coordinated for continuous movement in one direction; that the operating structure is simple and not likely to get out of order; and that when the sections are moved into the seat or bed position, they will tend to remain in that position until they are positively moved to the other position.

Referring now more particularly to the drawings, this invention is described as it applies to a folding bed structure of the overturning seat type in which a seat section 10 is connected for movement in a davenport frame having end pieces or arms 12 connected by a fixed back 14 and the forward or free ends of the arms connected by an angle iron cross piece 16, the ends of which are turned upwardly and secured to the inner sides of the arms.

The bed section 10 has two mounting links 18 and 20 at each end pivotally connected at their upper ends to an angle bar 21, one web of which is connected by fastening bolts 22 with the adjacent side bar 23 so that the web of the angle bar 21 is spaced from the side bar 23 a sufficient distance to pivotally connect the link 18 thereto at one side of the web by a pivot 24 and to connect the other link 20 at the same side of the web by a rivet 26. One of the links, as 18, may be offset at 19 to prevent them from engaging each other. The links 18 and 20 are pivotally connected at their lower ends to a mounting strip 28 secured to the inner side of the corresponding arm 10, by fastening screws 30.

Projecting outwardly from each side of the seat frame and preferably from the angle bar 21 is a stop 25 adapted to engage the edge of the lever 18 adjacent its pivot and to provide an arresting stop therefor when the seat is in inverted position as shown in Fig. 3. This limits the forward movement of the seat section in the unfolding direction. With this mounting construction, the seat section may be inverted in the frame from the seat position shown in Fig. 1 to the extended or bed position shown in Fig. 3.

At the front of the seat section in its seat position is a front board 32 secured to the front of the seat section by angle bars 34 and 36 at right angles to each other, the latter forming a cross piece extending between the arms 12. This front board closes the space between the bottom of the side frame and the lower edge of the seat which may be represented by a loose cushion 38 which rests upon a flexible mattress support 40 secured to the cross bar 36.

The rear of the seat section in seat position has an angle bar cross brace 42 having bent ends secured to the side bars 23 and the cross piece extending above the mattress support 40 and being located a substantial distance below the mattress support in the inverted position of the seat as shown by Fig. 3 so that it will provide plenty of space for a depression of the sleeping surface or a mattress 44 thereon before the cross piece is engaged. An outer folding section 46 and an intermediate folding section 48 are joined for relative pivotal movement by a plate 50 at each side secured to the end of the outer section 46 and having a pivot 52 forming a connection for the side frame of the intermediate section 48.

Projecting upwardly from each side bar 23 of the seat section in its seat position is an outwardly extending support 47 secured to the bar by rivets or other suitable means and in this position it engages a bracket 49 secured to the inner side of the adjacent end piece 12 and preferably having a projecting ledge which extends inwardly to engage the support 47 limiting the movement of the seat section in this direction.

A supporting leg 54 has a pivot 56 at its upper end connecting it to the side frame of the outer section 46 and a cross piece 58 intermediate the ends of the leg connecting the legs on opposite sides of this section. Likewise, a leg 60 is connected by a pivot 62 with one of the side frames of the intermediate sections 48 at a distance from the pivot 52 and the two legs 60 on opposite sides of the section are joined by a cross piece 64. A link 66 at each end of the sections is connected by a pivot 68 adjacent the top of the leg 54 and by a pivot 70 with a lever 72 near one end thereof, the extremity of the lever being connected by a pivot 74 with the side plate 50. This

lever 72 extends past the leg 60 for the intermediate section 48 and it is connected thereto by a short link 76 pivoted at one end adjacent the top of the leg 60 and at the other end by means of a pivot 78 with the lever 72 at a point between the legs 54 and 60 but closely adjacent the legs 60. The joint between the seat section and the intermediate section comprises a lever 80 and a link 82. The lever is preferably in the form of a bell crank, the angle of which is connected by a pivot 84 with the adjacent extremity of the leg operating lever 72. The short arm of the bell crank has its extremity connected to the side of the intermediate section 48 near the free end thereof by a pivot 86. The other end of the lever 80 is connected by a pivot 88 with an angle bar 90 also secured to the side frame of the section 10 and the adjacent portion of the angle bar cross brace 42. The cross brace may be strengthened and held in fixed position by a bracing bar 92 secured at one end to the cross brace 42 and secured at the other end to the side bar 23 of the seat section.

At the outer end of the section 46 is a connecting cross bar 81 which strengthens this portion of the frame and provides a cross rail which may be manually engaged as soon as the front board 32 is raised in the unfolding position. A short yoke 83 or a plurality of such yokes may be attached to the cross rail 81 to provide a mattress stop and also to afford additional means for grasping the outermost section in its folding and unfolding movements.

The link 82 connects the seat section and the intermediate section for pivotal movement by means of a pivot 94 at one end of the link engaged with the angle bar 90 of the seat section and by a pivot 96 at the other end connected to the adjacent extremity of the side frame of the intermediate section 48. The relation of the lever 80 and the link 82 to each other is that they are crossed intermediate their ends as shown in Fig. 3, open position, and thus they react oppositely upon the parts to which they are connected.

The operation of the construction thus described produces a coordinating action of all of the sections when one of them is moved. In the seat position, the raising of the front board 32 will cause the outer and intermediate sections which are folded at right angles to each other in their closed or seat position as shown in Fig. 1, to swing outwardly and upwardly with the seat until the seat is partially overturned into a position somewhat as shown in Fig. 2, the outer section being moved progressively outward as the seat is overturned to this position, and the outer and intermediate sections unfolding in a well known manner. This unfolding movement of the sections is controlled by the coordination of the cross lever 80 and the link 82 and the connection of the lever 72 with the lever 80 and the connection of the lever 72 and the links 66 and 76 with the legs 60 and 54 as above described.

To cushion the unfolding movement of the sections and to assist the folding movement of the sections, a spring 100 which is partially extended, is connected at one end to the lever 18 adjacent its connection with the mounting strip 28 and at the other end it is connected to a plate 102 secured to the mounting strip 28 intermediate the ends thereof. This spring is in less tension when the seat section is in an intermediate position than when it is in either of its terminal positions as a seat or as a part of the bed structure. The plate 102 also serves as a stop for engaging the link 20 in its folded position (Fig. 1).

Another spring 104 is connected at each side of the sections, one end being connected to the cross brace 42 and the other end being connected to link 82 at a point 105 closely adjacent its pivot 96 by which it is connected to the intermediate section 48. This spring is extended when the sections are moved to bed positions as in Fig. 3 and tends to draw the parts to which it is connected together. A spring 106 is connected at one end to the cross brace 64 and at the other end to the adjacent side rail of the section 48 at a point forward from leg pivot 62 tending to move the legs 60 to closed position. There is one of these springs at each side of the section 48. Another spring 108 is connected to the cross bar 58 for the legs 54 and the other end of the spring is connected to a side rail of the section 46 in a direction tending to move this leg to open extended position.

The angle bar cross brace 42 and the angle bars 90 are both held in fixed relation to the side bars 23 of the seat bed section 10 so that they are in effect a rigid arm the free end of which extends beyond the pivot 94 of the link 82 and the spring 104 is connected at one end to the outer free end of said arm and preferably in the cross portion of the cross brace 42, as shown more clearly in Figs. 3 and 4.

All of these springs 100, 104, 106 and 108 operate together, springs 104 and 106 in particular tending to draw the parts from their extended position to their folded position as soon as the coordinating locking arrangement of the levers 80, 72 and 66 is broken by manually raising the outer side of the outer section 46. When the bed is opened or moved to extended position, the above mentioned levers move into locking position, extending the legs to their supporting positions and holding them locked in place until the outer end of the outer bed section is lifted breaking this lock. As soon as the lock is broken, the springs 104 at the opposite sides tend to close the angle between the two adjacent sections, that is, the end of the seat section and the inner end of the intermediate section so that they tend to move together as shown in Fig. 2. This has the effect of tending to pinch them together and to crease or squeeze the mattress 44 between the sections at this joint as represented in Fig. 2.

This folding action is also exerted by springs 106 at each side of the bed and because of its connection to the side rail 48 at a distance forward (to the right) of the pivot 62 of its leg 60, it draws the leg close and thereby helps the lever 72 in folding the sections.

In the unfolding or extending movement of the bed sections, the springs 100 tend to assist the overturning movement of the seat section, and the spring 104 tends to maintain the seat section and the intermediate section 48 in their pinched or angular position as shown in Fig. 2 until the unfolding action is continued and all of the bed sections are in alignment. The springs 108 tend to withdraw the legs 54 from their folded position when the unfolding sections are in intermediate position as shown by Fig. 2 but the legs 60 are not moved to extend in position until the unfolding sections pass outwardly beyond the position shown in Fig. 2 because the section 48 is inclined to the outer section 46 as shown in Fig. 2 to which position it is additionally drawn by the springs 104 which tend to maintain the links 82 and the sides of the intermediate sections 48 to which they are connected in an angular relation as shown in Fig. 2 until the sections are straightened into alignment by their coordinating connections with the levers 72, 80 and links 66.

With the bed sections unfolded in their extended positions, there is no tendency for the structure to fold or to move into the folded position because of the weight of the sections and the substantially locking arrangement of the coordinating means including the linkage consisting of the levers 80 and 72 and the links 66 and the links 82.

While the preferred construction has been described in some detail, it should be regarded as an illustration or an example rather than as a limitation or restriction of the invention, since various changes in the construction, combination, and arrangement of the parts may be made without departing from the spirit and scope of the invention.

I claim:

1. A folding bed structure comprising hingedly connected seat, intermediate and outer sections, the seat section being invertible rearwardly from a seat position to form a bed with the other sections, the seat and inter-

mediate sections being hinged and spaced apart by a pair of connecting members, the sections being foldable into a seat position where the seat section forms a support for a seat cushion and the adjacent intermediate section extends upwardly above and behind the rear end of said seat section substantially at right angles thereto in folded position, an arm fixed to and having a free end depending in seat position from each end of the seat section, the arms being parallel to the intermediate section but spaced therefrom in folded position by said connecting members, a cross piece extending between the outer free ends of the arms on opposite sides of the bed, one of the said pair of connecting members being pivoted at one end to the adjacent end of the intermediate section and pivoted at its other end intermediate the ends of the fixed arm at each end of the seat section, and the other of said pair of connecting members being pivoted at one end near the hinged end of the seat section and extending in bed position across the said one of said pair of members with its other extremity pivotally connected to the intermediate section at a short distance from the said adjacent end thereof, and spring means connected at one end to the first of said connecting members adjacent its pivotal connection with the intermediate section and the other end connected to the cross piece adjacent the free end of said fixed arm outwardly from the pivotal connection of the member to which it is connected, to assist in drawing said member toward the cross rail and to draw the end of the intermediate section also toward the cross rail but spaced therefrom by the said pair of connected members and thereby tending to aid in drawing said seat and intermediate sections toward each other into an angular pinching relation at the joint when the structure is folded.

2. A folding bed structure in accordance with claim 1 in which the said other connecting member is in the form of a bell crank lever which crosses the first of said connecting members when the sections are unfolded to form a bed so that the seat and intermediate sections are spaced apart by the said pair of connecting members at the outer ends of the fixed arms and opposite the cross pieces to form a reduced angular space between said sections to squeeze a mattress and bed clothes into said angular space at the joint during the folding action and in the seat position.

3. A folding bed structure in accordance with claim 2 including a mattress adapted to rest upon the bed sections in bed position and to be folded between them as they are folded together, an intermediate portion of the mattress being engaged and angularly folded at the joint between the seat and intermediate sections when they are folded and this folded portion of the mattress being received in the angular space between the members so that this portion of the mattress is engaged and squeezed in the joint between the sections as they are drawn together by said spring.

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