Oct. 25, 1932. M. F. BAYER 1,883,867

FOLDING BED OR LIKE STRUCTURE

Filed June 25, 1927 4 Sheets-Sheet 1

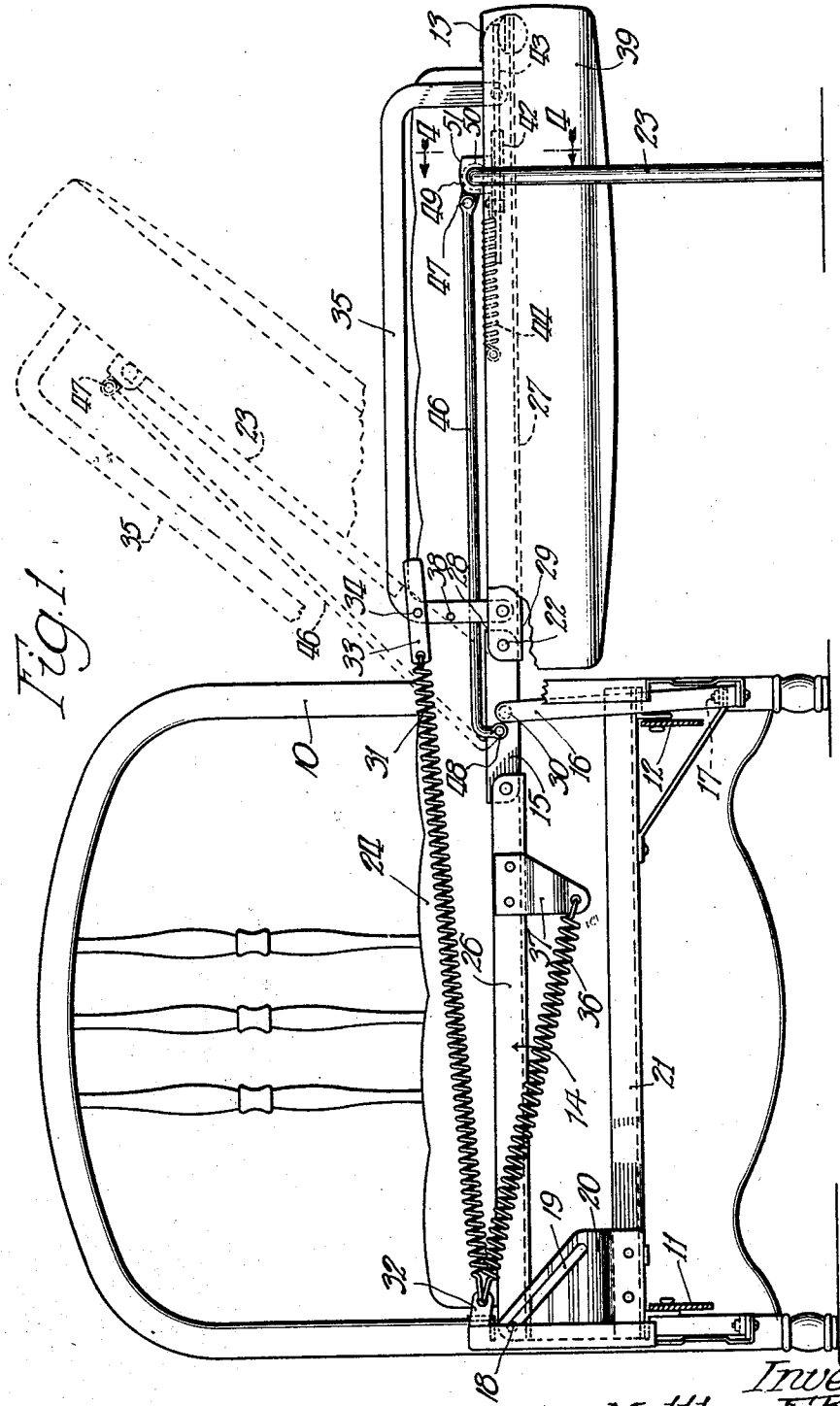


Fig. 1.

Inventor
Matthew F. Bayer
By: Fisher, Fowle, Clapp & Sears Attys.

Oct. 25, 1932. M. F. BAYER 1,883,867

FOLDING BED OR LIKE STRUCTURE

Filed June 25, 1927 4 Sheets-Sheet 2

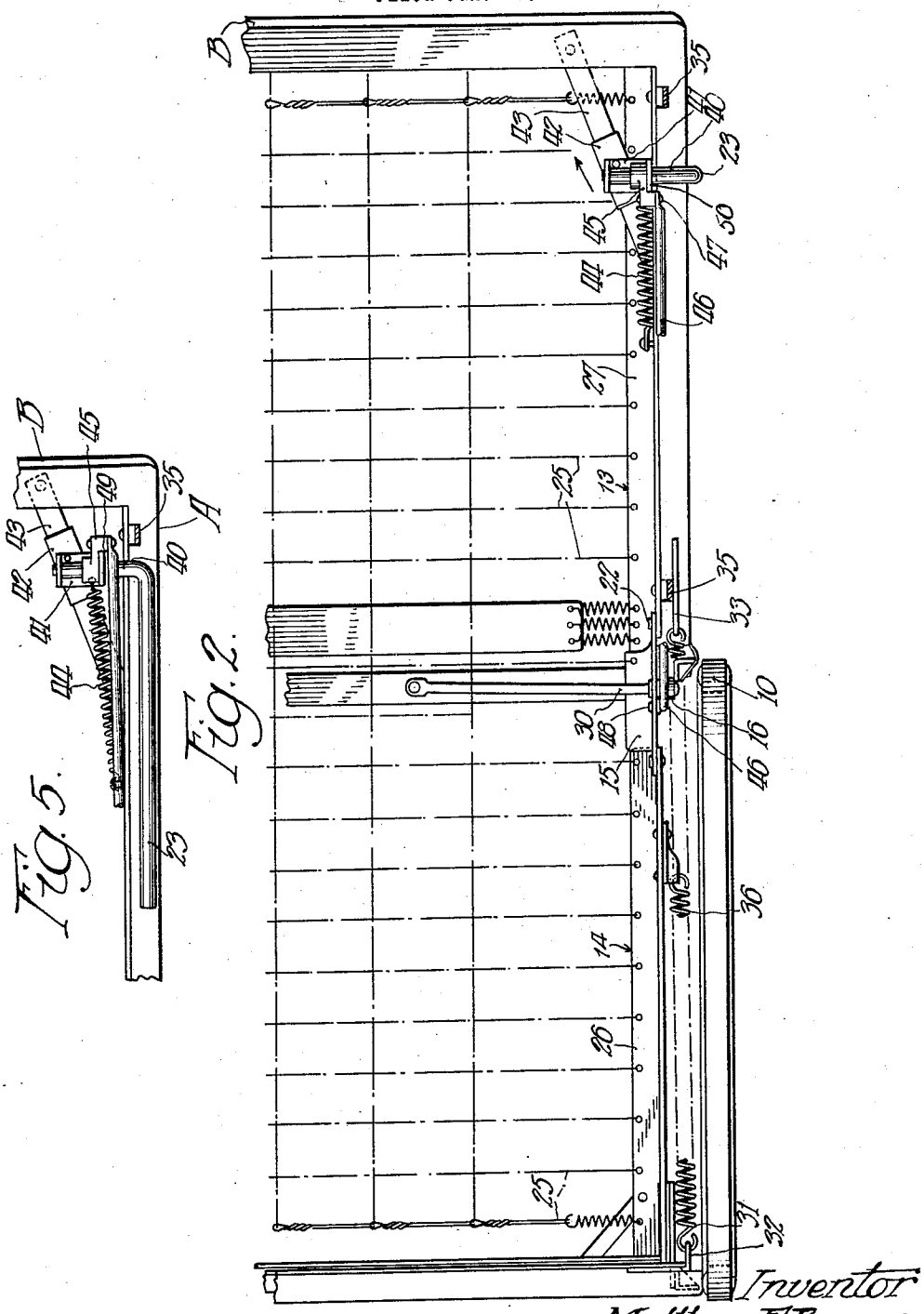


Fig. 2.

Fig. 5.

Inventor
Matthew F. Bayer

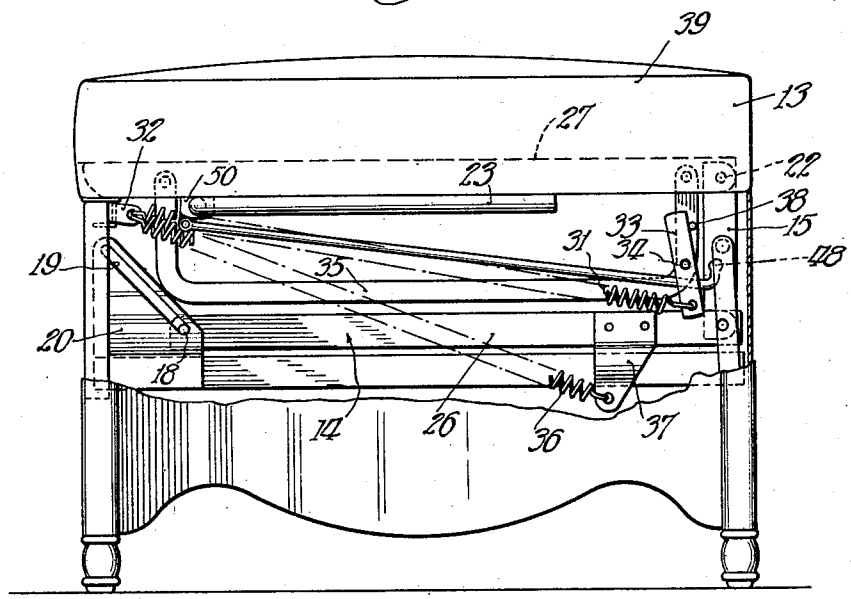
By: Fisher, Towle, Clapp & Sears Attys.

Oct. 25, 1932. M. F. BAYER 1,883,867

FOLDING BED OR LIKE STRUCTURE

Filed June 25, 1927 4 Sheets-Sheet 3

Fig. 3.



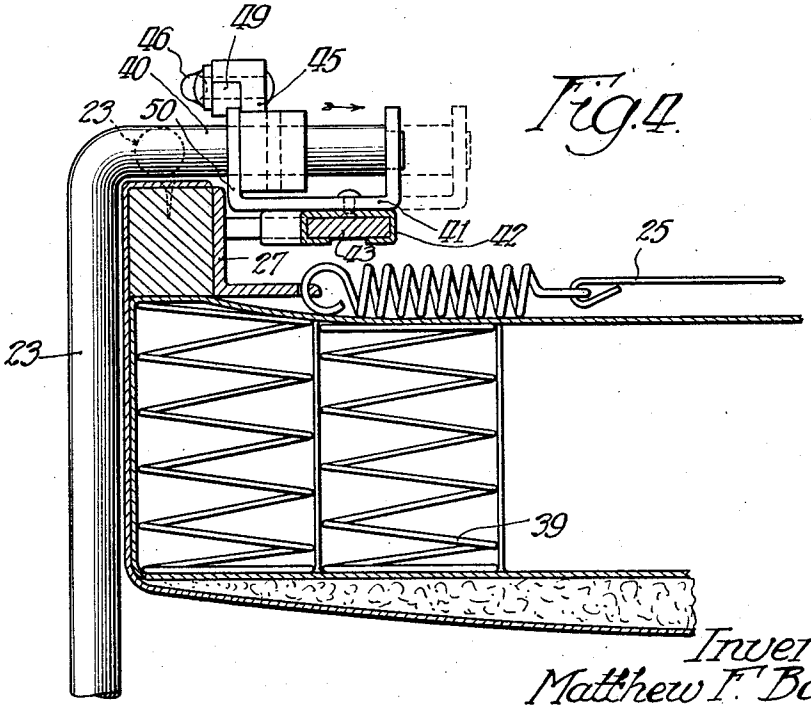


Fig. 4.

Inventor
Matthew F. Bayer.
By: Fisher, Jawls, Clapp & Soans Attys.

Oct. 25, 1932. M. F. BAYER 1,883,867

FOLDING BED OR LIKE STRUCTURE

Filed June 25, 1927 4 Sheets-Sheet 4

Fig. 6.

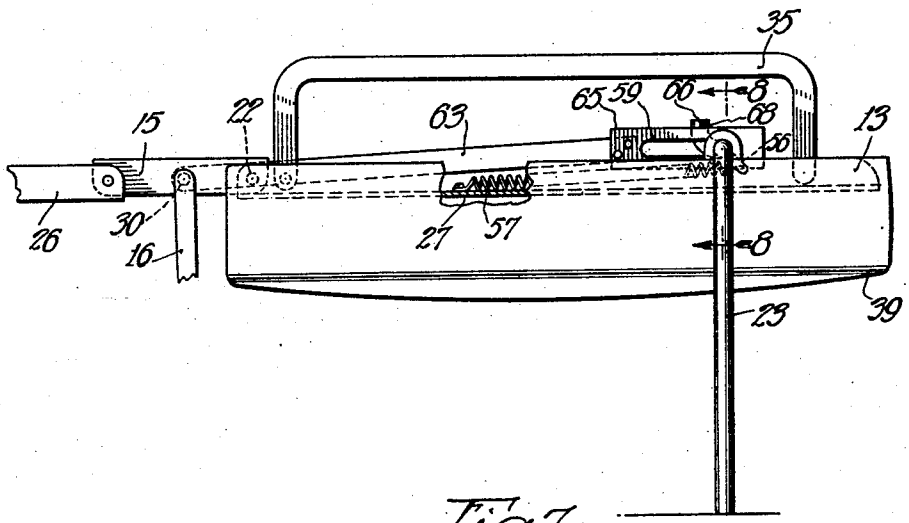


Fig. 7.

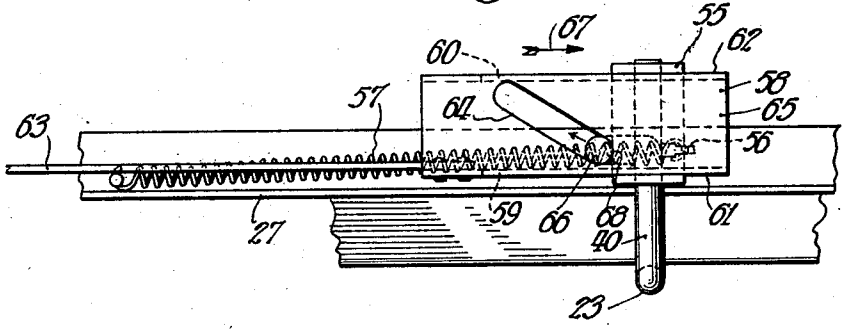
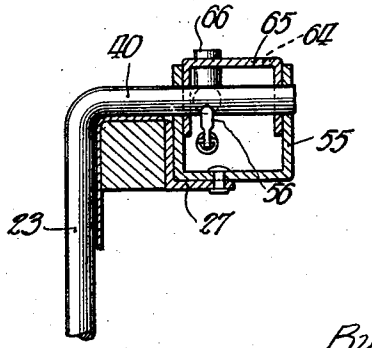


Fig. 8.



Inventor
Matthew F. Bayer.

By: Fisher, Jowle, Cliff & Sears Attys.

Patented Oct. 25, 1932 1,883,867

UNITED STATES PATENT OFFICE

MATTHEW F. BAYER, OF KENOSHA, WISCONSIN, ASSIGNOR TO SIMMONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

FOLDING BED OR LIKE STRUCTURE

Application filed June 25, 1927. Serial No. 201,463.

This invention relates to folding beds or like structures, and more particularly to a folding leg structure for supporting the folding bed section when in its extended or bed position.

In folding beds or folding couches, it is desirable that the end frames or other supporting frame be arranged as close as possible to the sides or ends of the bed section when in folded position, and it is therefore desirable to avoid any parts or mechanism which project beyond the outer edges of the folding bed section when in its said folded position. In common practice it has been the custom to mount a supporting leg on the movable or folding section so that the leg can be swung from operative position, i. e., a position in which it is effective to support the extended bed section, to a folded position alongside of and substantially in the plane of the bed section. It will be understood that the leg lying alongside the bed section necessitates the provision of a certain amount of space between the edge of the folding section and adjacent portion of the supporting frame, in which space the leg will be positioned when the bed section is folded.

The principal object of the present invention is to provide means for mounting a supporting leg on a movable bed section so that the same will be movable from its operative position to a position substantially in the plane of the bed section and inwardly of the adjacent edge thereof. Another object is to provide means for effecting said movement of the leg automatically as an incident to the folding movement of the bed section and also to provide such automatic means which will be operable to effect such folding movement of the leg in two steps, first, swinging the leg from its operative position to a position substantially in the plane of the bed section and second to move the leg inwardly of the adjacent edge of the bed section.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings wherein I have illustrated a folding couch embodying one application of my invention and also a modified arrangement thereof.

In the drawings:

Fig. 1 is an end elevation of a folding couch embodying a preferred form of the invention, certain parts of the bed frame being broken away to facilitate illustration of the features of the invention.

Fig. 2 is a plan of the mechanism shown in Fig. 1.

Fig. 3 is an end elevation of the couch in folded position and illustrating the position of the folding leg when the couch is in this position.

Fig. 4 is a section on an enlarged scale on the line 4—4 of Fig. 1.

Fig. 5 is a plan similar to a portion of Fig. 2, but showing the position of the leg relative to the folding bed section when the section is in folded position as shown in Fig. 3.

Figs. 6 and 7 are side and plan views respectively, of a modified form of the invention, and

Fig. 8 is a section on the line 8—8 of Fig. 6.

Referring now to the drawings, I have indicated a main supporting frame comprising an end frame member 10 which is connected to a similar end frame member (not shown) by means of side rails 11 and 12. The side rails and end frames may of course, be connected either permanently or by means of a separable connection as desired. In the present illustration of my invention wherein I have shown the features thereof embodied in a folding couch, the folding section is indicated at 13 and a floating section at 14 connected together by means of an interposed link 15. The link 15 is pivotally mounted on a bracket 16 which is secured as indicated at 17 to the supporting frame and it will be seen that the adjacent end of the floating section which is connected to the link 15, is thereby supported by the main frame. The opposite side of the floating section is supported by means of a pin or stud 18 which projects therefrom and into a cam slot 19 provided in a cam plate 20, which is rigidly secured to the crossbar 21, which constitutes a part of the supporting frame.

The folding section 13 of the couch is piv-

otally connected at 22 at one side to the adjacent end of the link 15, and this side of the folding section is consequently supported by the main frame 10 through the agency of the link 15 and supporting bracket 16. The outer side of the section is supported in extended or bed position as shown in Fig. 1 by means of a folding leg 23 which is mounted on the folding section so as to be movable into substantially the plane of the bed section when the latter is moved to folded position as shown in Fig. 3. A mattress 24 is supported on suitable bed fabric 25 which is stretched between the opposite end rails 26 and 27 of the floating and folding sections respectively.

It will be understood that when the couch is to be folded from the position shown in Fig. 1 to that shown in Fig. 3, the folding section is swung upwardly at its outer end as indicated in dotted lines in Fig. 1, about its pivotal connection 22 with the link 15. Such folding movement continues until the end 28 of the link engages the inside of the flange 29 of the end rail 27 after which the folding section 13 and link 15 will swing as a unit about the pivotal connection 30 of the link with the supporting bracket 16. Such continued unitary movement of the folding section 13 and link 15 causes the floating section 14 to be lowered into the position shown in Fig. 3 and the mattress 24 will be folded upon itself and disposed between the folding and floating section in accordance with the usual practice. Suitable cushion structure 39 may be provided on the top side of the folding section when in its folded position, and this cushion structure will be disposed underneath the folding section when in bed position, as shown in Fig. 1. In order to assist such folding movement of the folding section, I prefer to provide a spring member 31 which is tensioned between a bracket 32 on the supporting frame and an arm 33 which is pivoted at 34 intermediate its ends to an end frame 35 which is secured to the end rail 27 of the folding section. It will be apparent that the spring 31 will tend to swing the folding section about its pivotal connection 22 with the link, and also to swing the folding section and link as a unit about the pivotal connection 30 of the link with the supporting bracket 16. Another spring 36 is tensioned between the bracket 32 on the main frame and a bracket 37 which is secured to the end rail 26 of the floating section and this spring serves to prevent jarring of the folding section against the floating section under the influence of the spring 31 and also gravity. The spring 36 also tends to assist in unfolding the couch by tending to pull the floating section upwardly and to the left as viewed in Figs. 1 and 3.

I have also provided means whereby the spring 31 which assists to fold the couch is effective to assist the spring 36 in unfolding the couch. This means consists of the arm 33 which is pivoted at 34 intermediate its ends to the end frame 35 of the bed section and a stop pin 38 which is secured to the said end frame 35. It will be understood by reference to Fig. 3 that when the folding section is folded into the position of Fig. 3, the arm 33 will be caused to assume the position shown in Fig. 3, with its outer end engaging the stop pin 38, being forced thereagainst by the tension of the spring 31. It will be apparent that since the arm 33 cannot turn on its pivot 34 under the influence of the spring 31, the force of the spring will tend to swing the folding bed section upwardly about its pivotal connection 22 with the link 15. It is of course to be understood that there will be no relative movement between the folding bed section 13 and the link 15 until the floating section 14 has been elevated to its normal bed position under the influence of the spring 36 at which time the link 15 will be in a position substantially coplanar with the floating section as shown in Fig. 1. Suitable locking means may be provided for maintaining the couch in folded position against the action of the springs 31 and 36 but since such mechanism forms no part of the present invention, it is not disclosed in the present application.

In order that the end frames 10 of the bed structure may be disposed relatively close to the end of the folding bed section when in folded position, I provide a mounting for the leg 23 which will permit swinging of the leg into substantially the plane of the bed section and movement of the leg inwardly thereof, and also mechanism for effecting such movement automatically as an incident to the folding of the folding bed section. Since it is desirable to have the leg 23 disposed very closely adjacent the end of the folding bed section, it will be apparent that it is necessary to swing the leg into the plane of the bed section or slightly thereover and then move the leg inwardly of the bed section in a subsequent independent movement. In order to accomplish this action, I provide the leg 23 with an inwardly extending pivot portion 40 which is journaled in suitable bearing apertures in the upwardly extending legs of a U-shaped bracket member 41. The bracket member 41 is secured to a slide member 42 which is slidably mounted on a cam bar 43, and the cam bar is rigidly secured as best shown in Figs. 2 and 5, at an angle across the adjacent corner of the folding bed section.

A spring 44 is secured at one end to the slide member 42 and at its other end to the end rail 27 of the folding section. The spring 44 is normally under tension and tends to pull the slide member 42 and parts carried thereby to the left as seen in Figs. 1, 2 and 5. A rock arm 45 is secured to the pivot portion

40 of the leg 23 between the said upwardly extending legs of the U-shaped bracket 41 and the rod or link 46 is pivotally connected at one end as shown at 47 to the outer end of the rock arm 45 and at its other end as shown at 48 to a point on the link 15 or other part of the supporting frame which is spaced from the connection between the folding section 13 and link 15 and which is relatively stationary during at least a portion of the folding movement of the folding section.

By reference to Fig. 1, it will be readily understood that when the folding section 13 is swung upwardly about its pivotal connection 22 with the link 15, the rod 46 will be caused to move transversely of the folding section because of the spaced pivots on which the rod and folding sections swing and it will be apparent that such transverse movement of the link will be effective, through the rock arm connection 45, to swing the leg 23 on its pivot portion.

The rock arm 45 is provided with a shoulder 49 which overhangs the upper edge of the upwardly extending leg 50 of the U-shaped bracket member 41, and this overhanging shoulder 49 is adapted to engage a portion 51 of the said upwardly extending leg 50 to limit pivotal movement of the leg 23. When the shoulder 49 engages the portion 51, continued folding movement of the folding section will cause the link 46 to push the slide member 42 outwardly along the cam bar 43, which movement will of course, cause the slide member 42, bracket 41 and leg 23 to be moved inwardly of the outer edge of the folding section into the position shown in Fig. 5. In the said Fig. 5, the slide member 42 is shown in substantially its extreme outer position with respect to the outer edge B of the bed section and in its extreme inner position with respect to the edge A of the bed section. In this position the leg 23 is disposed entirely within the said edge A of the bed section and thus avoids the necessity of providing space between the said edge A of the folding bed section and the inner face of the bed frame 10 for accommodating the leg.

On reverse movement of the folding section, i. e., from folded position to extended or bed position, the action is the reverse of that just described. Relative movement of the rod 46 and folding section 13 will first permit the spring 44 to pull the sliding member 42 along the cam bar 43 until the limit of movement is reached, at which time the leg will have been moved outwardly sufficient to clear the outer edge 51 of the bed section, and subsequently the rod 46 will swing the leg 23 on its pivot portion into operative position as shown in Fig. 1. Any suitable means may be provided for limiting the above described return movement of the sliding member 42. For instance, I may depend entirely on engagement between the upwardly extending leg 50 of the U-shaped bracket member 41 with the inner face of the transverse member 27 as best shown in Fig. 4, or I may provide suitable stop means on the cam bar 43 for engaging the sliding member 42.

In Figs. 6, 7 and 8, I have illustrated a modified form of the invention, and in this form the leg 23 is pivotally mounted in a substantially U-shaped bracket 55, which is fixedly mounted by riveting or otherwise on the transverse member 27 of the folding bed section. The leg 23 is provided, as in the previously described construction, with an inwardly projecting pivot portion 40 which is journaled in the said U-shaped bracket 55. The inwardly projecting pivot portion 40 in this form is provided with a radially projecting pin 56 which extends downwardly therefrom and to the outer end of which is connected a spring 57, which at its other end is secured to the transverse member 27.

An inverted U-shaped cam member 58 is slidably mounted on the inwardly projecting pivot portion 40 of the leg by means of slots 59 and 60 in its depending legs 61 and 62 respectively, and the cam member 58 is pivotally connected by means of a link or rod 63 to the pivotal connection 30 between the link 15 and supporting bracket 16. The link or rod 63 may be rigidly secured to the depending leg 61 of the cam member 58. The cam member 58 is provided with an inclined slot 64 in its top wall 65, which slot receives a cam pin 66 which is secured to the pivot portion 40 of the leg 23. The cam pin 66 is preferably arcuate in form, as best shown in Fig. 6.

The operation of the above described modified structure is as follows: The spring 57 normally tends to swing the leg 23 on its pivot portion 40 into substantially the plane of the bed section, but such swinging of the leg is prevented by engagement of the cam pin 66 with the end of the cam slot 64 as clearly shown in Fig. 7. Upward swinging movement of the folding section about its pivotal connection 22 with the link 15 is effective to cause the link 63 and cam member 58 to move in the direction of the arrow 67, (Fig. 7) because of the spaced centers about which the parts swing, and such movement of the cam member 58 will initially permit the spring 57 to effect swinging of the leg on its pivot. It will be understood that as the cam member 58 moves in the direction of the arrow 67, the end of the cam slot 64 moves in the same direction and permits the arcuate cam pin 66 to move therewith. Since the cam pin moves in unison with the cam slot, there will, of course, be no cam effect on the cam pin. Such movement will continue until the leg 23 assumes a position substantially parallel with the bed section at which time the side face part 68 of the arcuate cam pin will engage the top wall 65 of the cam mem-

ber to prevent further swinging movement of the leg. Hence further movement of the cam will necessarily move the cam pin inwardly of the bed section. Continued movement of the cam member will then be effective to cause the cam slot 64 to act on the pivot pin 66 to thereby move the leg 23 inwardly of the bed section. During the initial part of the leg folding movement, the leg is not moved inwardly towards the end of the bed section because of the fact that the cam slot and cam pin move together in the same direction so that the cam slot is inactive during such initial folding leg movement. It will be understood that when the couch is folded and the folding section is moved to bed position, the leg folding movement will be the reverse of that just described, that is, the leg will first be moved outwardly and thereafter swung on its pivot to supporting position.

It will be observed that in both of the described embodiments of my invention, I make use of a lost motion connection for effecting the described two-step movement of the leg 23. In the first described form, the lost motion occurs during the initial swinging movement of the leg between the start of such pivotal leg movement and the time at which the overhanging shoulder 49 on the rock arm 45 engages the portion 51 of the U-shaped bracket. The operative connection between the actuating rod 46 and the bracket part 50 of the mechanism for effecting inward movement, may accordingly be termed a lost motion connection between those parts. In the second described form such lost motion occurs during the initial swinging movement of the leg during the time between the starting of movement and the time at which the inner face 68 of the cam pin 66 engages the top 65 of the cam member 58. Hence, the connection between the link or rod 63 and the cam pin 66 of the leg, may be termed a lost motion connection therebetween. By this means I obtain the desired two-step leg folding action.

The described details of construction being merely illustrative of a single phase of the invention, it will be understood that the scope of the same should be determined by reference to the following claims, which should be construed as broadly as possible consistent with the state of the art.

I claim as my invention:

1. In a folding bed or like structure, the combination of a supporting frame, a folding bed section supported by said frame, normally disposed in folded position relative thereto and adapted to be moved into extended or bed position, a leg for supporting said section when in bed position, said leg, when in operative position, being disposed adjacent one edge of the section outwardly thereof and extending downwardly therefrom, a bracket for mounting said leg on said section and permitting pivotal movement of the leg into substantially the plane of the bed section, said bracket being mounted so as to be movable inwardly of the section, means for effecting pivotal movement of the leg as an incident to an initial portion of the folding movement of said bed section, and means operative as an incident to continued folding movement of said bed section and subsequent to said initial portion, for effecting inward movement as a whole, of said bracket and the leg carried thereby.

2. In a folding bed or the like, a supporting frame, a folding bed section mounted on said frame so as to be movable from normal folded position to extended or bed position, a leg for supporting said section when in bed position, said leg, when in operative position, being disposed outwardly of and adjacent one edge of said section, extending downwardly therefrom, and having an inwardly projecting pivot portion at its upper end, a rock arm secured to said pivot portion, a bracket for receiving said pivot portion whereby the leg is pivotally movable relative thereto, means for mounting said bracket so as to permit inward movement thereof relative to the adjacent edge of the bed section, a rod pivotally connected at one end to said supporting frame and at its other end to said rock arm, said rod being effective to swing said rock arm and leg on said leg pivot portion during an initial portion of the folding movement of said bed section, and means for limiting said pivotal movement and causing said rod to subsequently move said bracket inwardly of the bed section, thereby to move said leg inwardly of the adjacent edge of the bed section.

3. In a folding bed or like structure, the combination of a supporting frame, a folding bed section movably connected to said frame, normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg for supporting said section when in extended position, means for mounting said folding leg on said section including a pivot part extending inwardly from said leg, a cam carried by said folding-bed section for moving said leg inwardly of said folding section, cam engaging means on said pivot part, means for effecting relative movement between said cam and cam engaging means and for swinging said leg on its pivot, and means whereby said cam is moved relative to said cam engaging means subsequent to the swinging movement of said leg and thereby to effect movement of the leg inwardly of said folding bed section.

4. In a folding bed, the combination of a supporting frame, a folding bed section pivotally connected to said supporting frame

and adapted to be selectively positioned in folded or extending position, a leg for supporting said folding section when in extended position, means for mounting said leg on said folding section comprising a bracket having a bearing aperture therein for receiving a portion of said leg whereby the latter is pivotally movable relative to the section, means for mounting said bracket on said section comprising a cam bar secured to said section, said cam bar extending inwardly of the adjacent edge of said bed section at an angle to said edge and said bracket being slidably mounted on said cam bar, a rod for effecting pivotal movement of said leg as an incident to an initial portion of the folding movement of said folding section, and means whereby said rod is effective to move said bracket and sliding member along said cam bar subsequent to said initial folding movement and consequent pivotal leg movement, thereby to move said leg inwardly of the folding bed section.

5. In a folding bed, the combination of a supporting frame, a folding bed section pivotally connected to said supporting frame and adapted to be selectively positioned in folded or extended position, a leg for supporting said folding section when in extended position, means for mounting said leg on said folding section comprising a bracket having a bearing aperture therein for receiving a portion of said leg whereby the latter is pivotally movable relative to the section, means for mounting said bracket on said section comprising a cam bar secured to said section, said cam bar extending inwardly of the adjacent edge of said bed section at an angle to said edge, a sliding member secured to said bracket and slidably mounted on said cam bar, a rod for effecting pivotal movement of said leg as an incident to an initial portion of the folding movement of said folding section, and means whereby said rod is effective to move said bracket and sliding member along said cam bar subsequent to said initial folding movement and consequent pivotal leg movement, thereby to move said leg inwardly of the folding bed section.

6. In a folding bed or like structure, the combination of a supporting frame, a folding bed section movably connected to said frame, normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg mounted on said section for supporting the section when in extended position, said leg being adapted, as an incident to the folding movement of said bed section, to be folded on its pivot into substantially the plane of the bed section and moved inwardly thereof, means for effecting said leg folding movement as an incident to an initial portion of the folding movement of the bed section, means for effecting said inward movement comprising a cam member and a part connected to said leg and engaging said cam member, said means being operatively connected to said leg folding means so as to be moved thereby as an incident to continued folding movement of the bed section subsequent to said initial folding movement.

7. In a folding bed or like structure, the combination of a supporting frame, a folding bed section movably connected to said frame normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg for supporting said section when in extended position, means for effecting inward movement of said leg comprising a member pivotally connected to said leg and a cam member slidably connected to said first-mentioned member, one of said members being secured to said section for supporting the same through said leg, means for effecting rotation of said leg including an actuating rod pivoted at one end to said frame and connected to the slidable one of said members for imparting translatory motion thereto as an incident to the folding and unfolding of said section, said actuating member operating on the closing of said section first to effect rotation of said leg into a plane adjacent to that of said section and then, by means of said cam member, to move said leg inwardly of the outer edge of said section.

8. In a folding bed or like structure, the combination of a supporting frame, a folding bed section movably connected to said frame normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg for supporting said section when in extended position, means for effecting inward movement of said leg comprising a member pivotally connected to said leg and a cam member slidably connected to said first-mentioned member, one of said members being secured to said section for supporting the same through said leg, means for effecting rotation of said leg including an actuating rod pivoted at one end to said frame and connected to the slidable one of said members for imparting translatory motion thereto as an incident to the folding and unfolding of said section, said actuating member operating on the closing of said section first to effect rotation of said leg into a plane adjacent to that of said section and then, by means of said cam member, to move said leg inwardly of the outer edge of said section, and resilient means acting during a portion of the movement of said section to effect movement of said leg.

9. In a folding bed or like structure, the combination of a supporting frame, a folding-bed section movably connected to said frame normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg for supporting said section when in extended position, a

member mounted on said section and pivotally carrying said leg, a cam member fixed to said section at an angle to an edge thereof and slidably engaging said last-mentioned member, an actuating rod pivoted at one end to said frame and connected at its other end to said leg, and resilient means connected to the slidable one of said members, said actuating rod operating upon the initial movement of the closing of said section against the action of said resilient means to rotate said leg to a plane adjacent that of said section and then by means of said cam moving said leg inwardly of the outer edge of said section, and said resilient means, acting on the initial movement of the opening of said bed, to actuate said slidable member so as to move said leg outwardly of said bed edge.

10. In a folding bed or like structure, the combination of a supporting frame, a folding-bed section movably connected to said frame normally disposed in folded position and adapted to be unfolded to extended or bed position, a folding leg for supporting said section when in extended position, a member mounted on said folding section and pivotally carrying said leg, a cam member slidable relative to said last-mentioned member and having a guide portion therein, means on said leg engageable with said guide portion, resilient means for retaining said last-mentioned means in engagement with said guide portion for limiting the rotation of said leg, and an actuating rod pivoted to said frame and connected to said cam member for reciprocating the same as an incident to the folding or unfolding of said section, whereby, on the folding thereof, said resilient member will first be permitted to rotate said leg to a plane adjacent that of said bed section and the guide portion of said cam member will thence be actuated by said rod to move the leg inwardly of the edge of said folding-bed section.

MATTHEW F. BAYER.