July 29, 1958 A. M. BANK ET AL 2,844,827

PULL-OUT BEDS

Filed Sept. 26, 1955 4 Sheets-Sheet 1

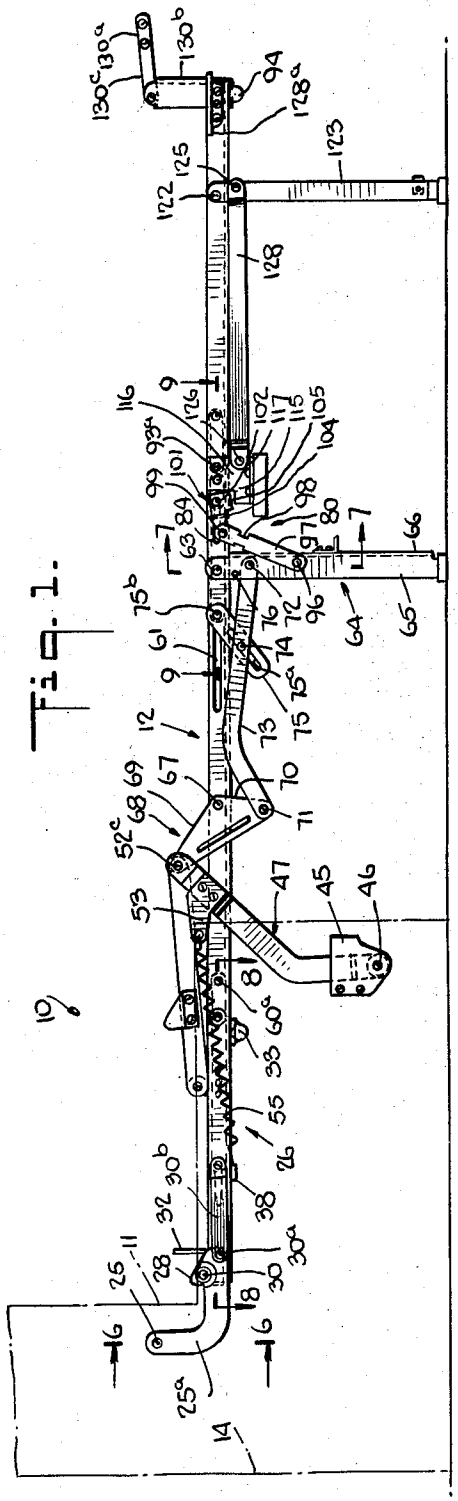


Fig. 1.

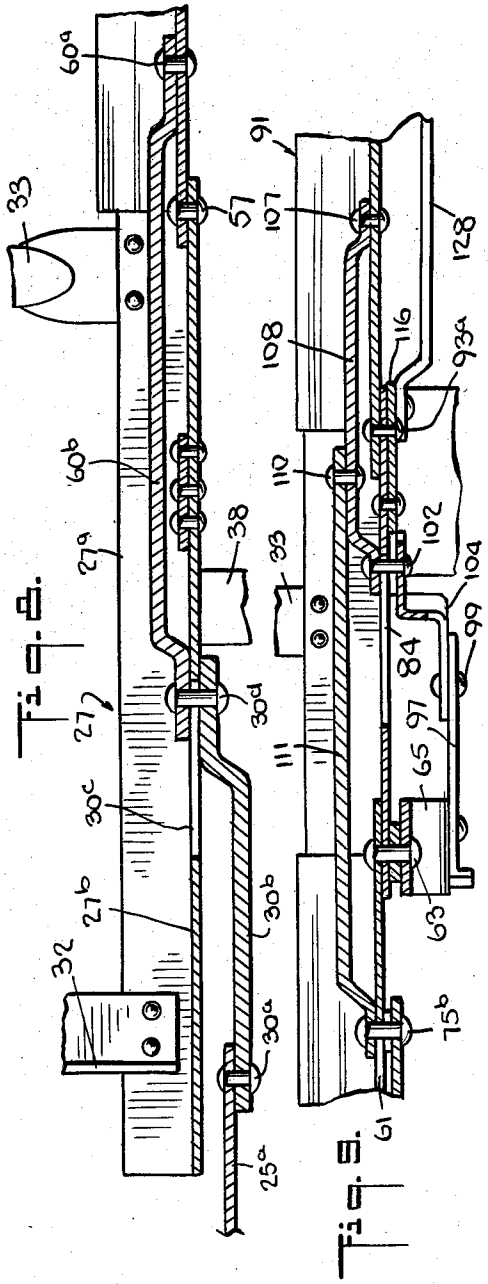


Fig. 2.

Fig. 3.

INVENTOR.
ALBERT M. BANK
BY ALEX J. KATZ
J. B. Felsher
ATTORNEY

July 29, 1958 A. M. BANK ET AL 2,844,827

PULL-OUT BEDS

Filed Sept. 26, 1955 4 Sheets-Sheet 2

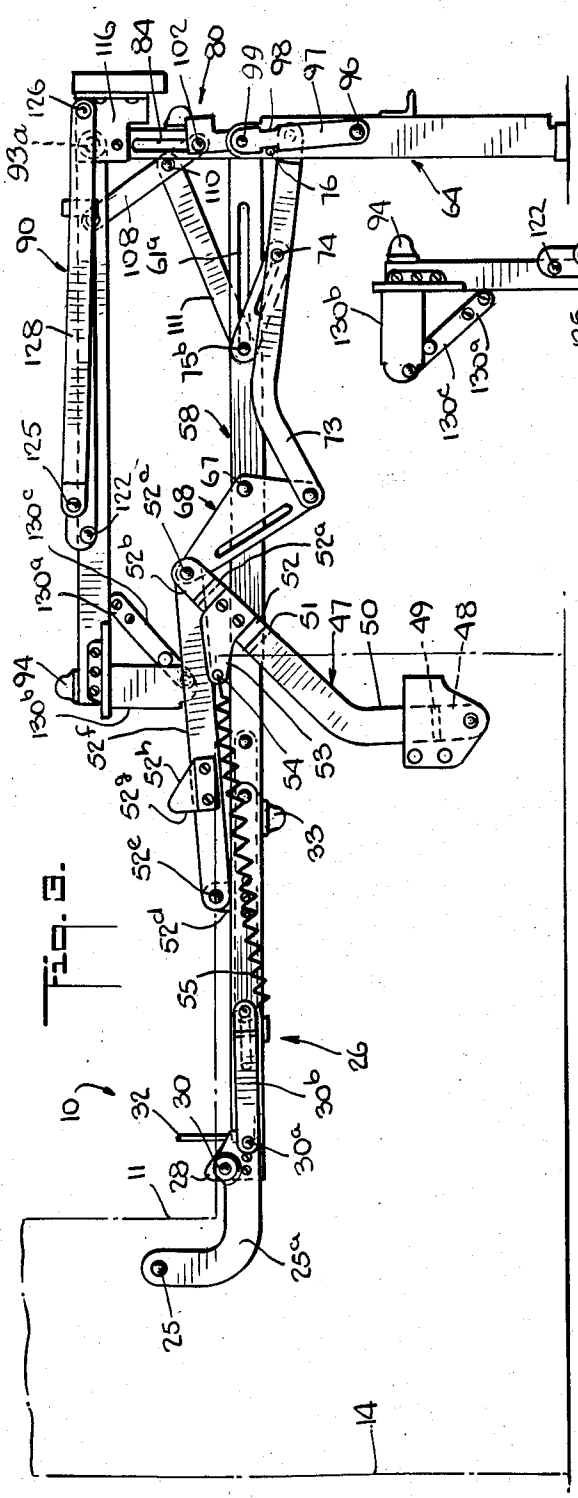


Fig. 3.

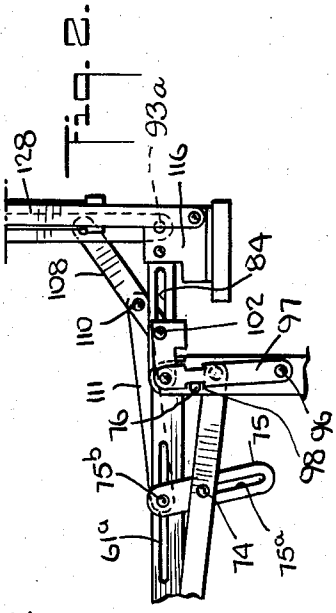


Fig. 2.

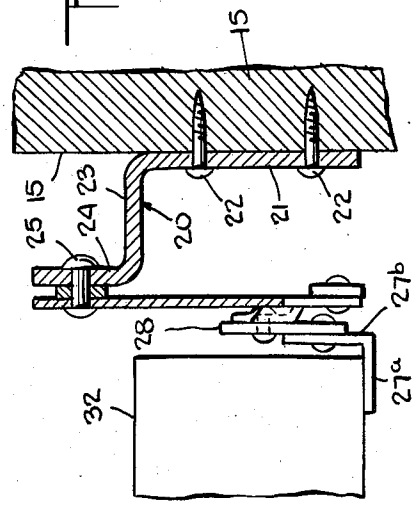


Fig. 6.

INVENTOR.
ALBERT M. BANK
BY ALEX J. KATZ
J. B. Felsher
ATTORNEY

July 29, 1958 A. M. BANK ET AL 2,844,827

PULL-OUT BEDS

Filed Sept. 26, 1955 4 Sheets-Sheet 3

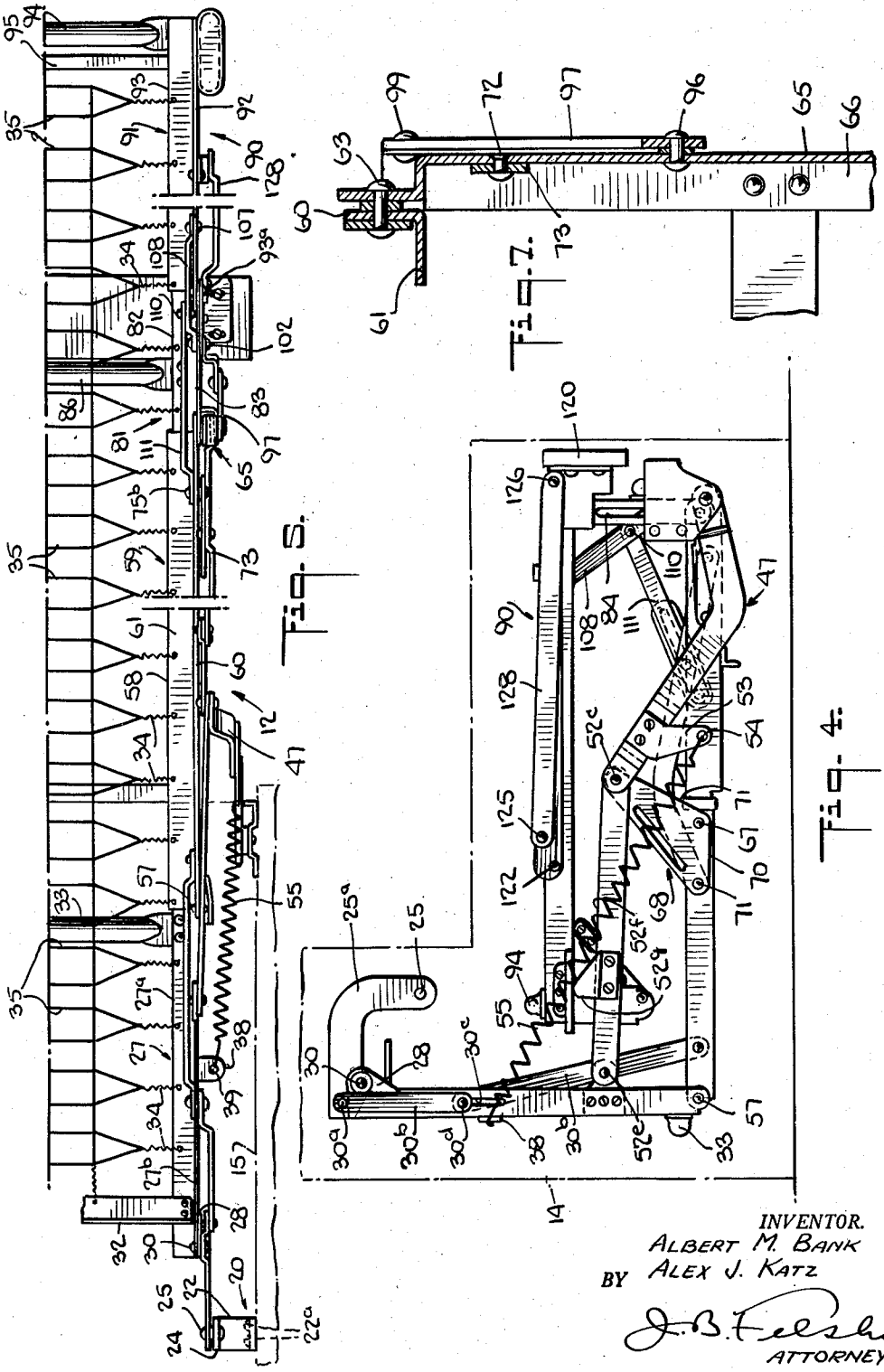


Fig. 5.

Fig. 7.

Fig. 4.

INVENTOR.
ALBERT M. BANK
BY ALEX J. KATZ

J. B. Felshin
ATTORNEY

July 29, 1958 A. M. BANK ET AL 2,844,827

PULL-OUT BEDS

Filed Sept. 26, 1955 4 Sheets-Sheet 4

Fig. 10.

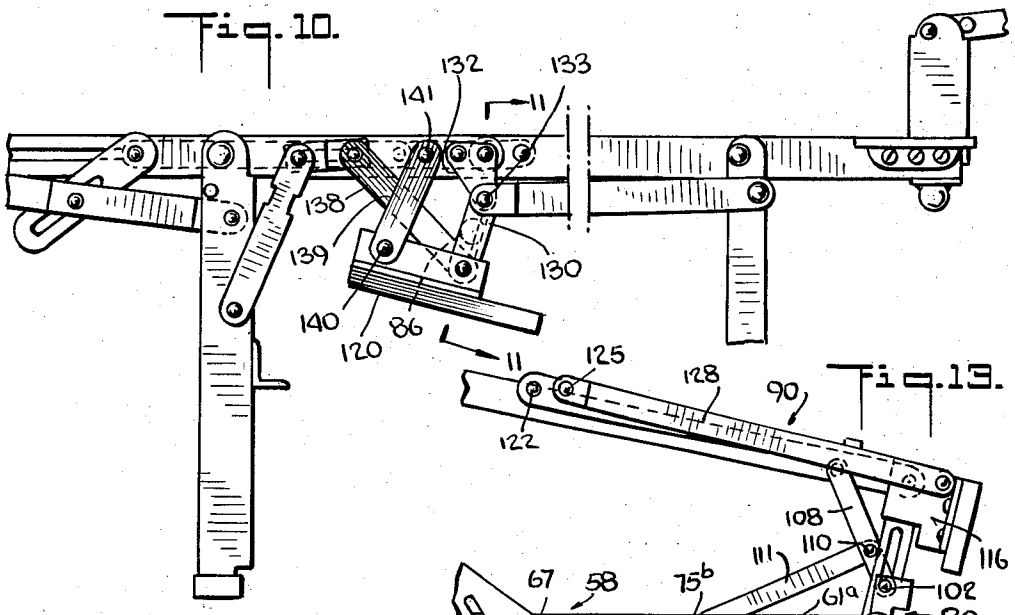
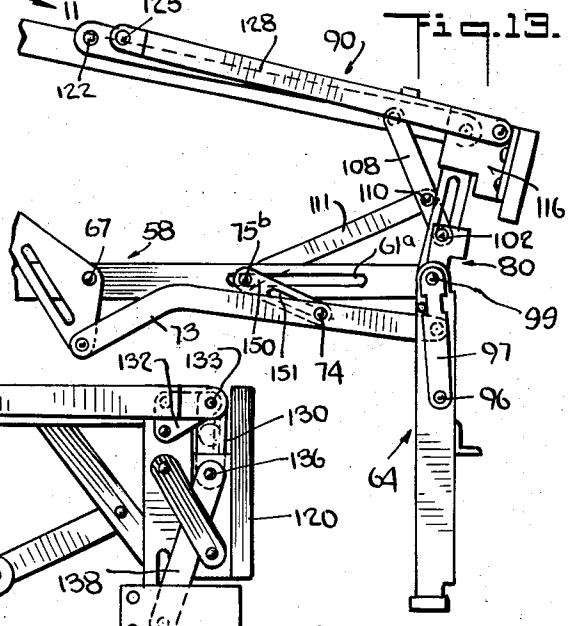


Fig. 13.



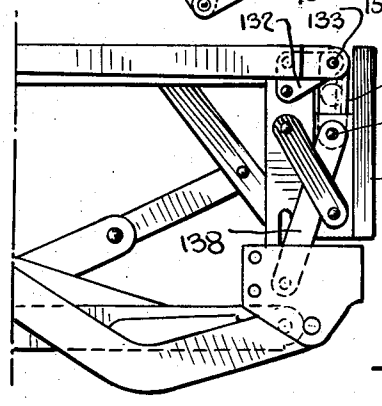


Fig. 12.

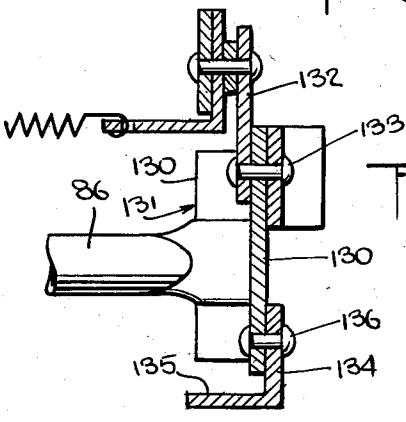


Fig. 11.

INVENTOR.
ALBERT M. BANK
BY ALEX J. KATZ
J. B. Felsher
ATTORNEY

United States Patent Office 2,844,827 Patented July 29, 1958

2,844,827

PULL-OUT BEDS

Albert M. Bank, Jersey City, and Alex J. Katz, Belleville, N. J., assignors to Super Sagless Spring Company, Hoboken, N. J., a partnership composed of Albert M. Bank and Sylvia Bank

Application September 26, 1955, Serial No. 536,506

7 Claims. (Cl. 5—13)

This invention relates to convertible or pull-out beds and is directed particularly to improvements in the pull-out mechanism for such beds. Pull-out beds of the type contemplated by the invention comprise a head section pivoted to a bed, couch or sofa frame, an intermediate or main section pivoted to the forward end of the head section, a fold section pivoted to the intermediate section, and a foot section pivoted to the fold section, said sections being foldable or fully collapsible into the frame.

One difficulty with the pull-out beds of the type herein considered has been that the mattress which has to be folded with the folding sections when the bed is collapsed or folded has a tendency to open up the folded bed. Accordingly, one object of the present invention is to provide a highly improved locking means for holding the folded foot and fold sections in closed relation with respect to the intermediate or main section when the bed is collapsed so that the compressed mattress will not have any tendency to open the folded bed. Another object of this invention is to provide a bed of the type described which embodies improved folding mechanism whereby the bed can be folded into a sofa or couch frame of lesser depth than heretofore possible.

Another object of this invention is to provide a convertible bed of the character described wherein the folding mechanism is located beneath the mattress when the bed is in extended position so as not to interfere with comfortable sitting on the bed when extended.

Another object of this invention is to provide a pull-out bed which is so constructed that when the foot section is swung upwardly it will pivot about the front end of the fold section, means being provided to prevent the fold section from swinging upwardly relatively to the foot end of the intermediate or main section until the foot section is at a predetermined angle relative to the fold section. At such time both the foot section and the fold section must be swung together relative to the front end of the intermediate or main section to a position where the fold section is at right angles to said intermediate or main section, said foot section then being above the main or intermediate section and pitched somewhat downwardly to provide a correct angle for a seat pillow placed on said foot section after the bed is fully folded into the couch or sofa frame.

Another object of this invention is to provide a folding bed of the character described having means to prevent the downwardly pitched foot from being swung upwardly relative to the fold section in an unfolding direction, the construction being such that said downwardly pitched foot section and the fold section will unfold together by swinging with respect to the outer end of the fold section.

A further object of this invention is to provide a folding bed of the character described having means permitting the head section to be swung downwardly and backwardly about its pivot point to the couch or sofa frame, thereby moving the main or intermediate section with the fold and foot sections over the footboard

at the front of the frame and deep into said frame, highly improved locking means being provided to lock the folded fold and foot sections to the intermediate or main section during such movement into the frame.

Still another object of this invention is to provide an improved pull-out bed which is easy to operate and which has positive locking action for locking the folded foot and fold sections to the main or intermediate section when the bed is fully collapsed or folded into its couch or sofa frame.

Another object of the invention is to provide folding bed mechanism of the character described having a transverse bracing bar structure connecting each side of the short fold section which, when the bed is in extended or pulled-out condition, is located sufficiently below the bed spring and mattress so as not to obstruct downward movement of the spring and mattress when a person sits over the fold section.

Still other objects of this invention are to provide a convertible couch or sofa bed of the character described which shall be inexpensive to manufacture, easy to manipulate and which shall be practical and efficient to a high degree and use.

Other objects of this invention will in part be obvious and in part hereinbelow pointed out.

The invention accordingly consists in the features of construction combinations of elements and arrangement of parts which will be exemplified in a construction hereinafter described, and of which the scope of the invention will be indicated in the appended claims. In the accompanying drawings, wherein like reference numerals denote corresponding parts throughout the several views;

Fig. 1 is a side view of a pull-out bed embodying the invention and illustrating the same in fully extended or unfolded position;

Fig. 2 is a partial side view of the structure shown in Fig. 1 illustrating the foot section in raised position;

Fig. 3 is a view similar to Fig. 1 showing the fold section and folded foot section folded relative to the intermediate or main section;

Fig. 4 is a view similar to Fig. 3 showing the bed fully collapsed or folded;

Fig. 5 is a top plan view of the structure shown in Fig. 1;

Fig. 6 is a vertical cross-sectional view taken along the line 6—6 of Fig. 1.

Fig. 7 is a vertical cross-sectional view taken along the line 7—7 of Fig. 1 in the direction of the arrows;

Fig. 8 is a horiontal cross-sectional view taken along the line 8—8 of Fig. 1 in the direction of the arrows;

Fig. 9 is a horiontal cross-sectional view taken along the line 9—9 of Fig. 1 in the direction of the arrows;

Fig. 10 is a partial side view of a modification of the structure illustrated in Fig. 1 providing mechanism for lowering the transverse bracing bar between the short fold section sides when the bed is in extended position;

Fig. 11 is a vertical cross-sectional view taken along the line 11—11 in Fig. 10 in the direction of the arrows;

Fig. 12 is a side view illustrating how the modified mechanism shown in Fig. 10 folds when the bed is in folded or collapsed condition; and

Fig. 13 is a partial view similar to Fig. 12 and illustrating a modification thereof.

Referring now in detail to the drawings, 10 designates a pull-out or sofa bed embodying the invention. The same comprises a sofa or couch frame 11 and a collapsible or foldable bed 12 mounted thereon and collapsible or foldable thereinto. The couch or sofa frame 11 may be made of wood or any other suitable material, and comprises a rear wall 14 and side walls 15 forming an enclosure within which the bed folds when in folded condition.

Fixed to the inside of the side walls **15** are brackets **20**. Each bracket **20** is Z-shaped and has a flange **21** attached as by bolts **22** to wall **15**. Extending from flange **21** is a web portion **23** from which extends upwardly a flange **24** parallel to wall **15** and spaced inwardly therefrom. Said flange **24** carries a pivot pin **25**. Pivoted on the pivot pin **25** is one end of a right angular side member **25***a*. The other end of said side member is pivoted to the head section of the folding mechanism, indicated generally by the numeral **26**, as hereinbelow described. It will be noted that only one side of the bed is illustrated, since both sides are symmetrical.

The head section **26** comprises a pair of similar symmetrical side members **27** of angle iron, each comprising a flange **27***a* and a flange **27***b* at right angles thereto and in a vertical plane. Each member **27** has secured thereto an upwardly-extending rear bracket **28**, to which said other end of side member **25***a* is pivoted as by pivot pin **30**. Located forwardly and downwardly of the pivot pin **30** in side member **25***a*, is a pin **30***a* to which is pivoted one end of a link member **30***b*. The rear ends of flanges **27***a* are interconnected by a transverse member **32** of angle-shaped cross section riveted thereto. The forward ends of members **27** are interconnected by a transverse tube **33** flattened at its ends and riveted to the flange portion **27***a* thereof. The flanges **27***a* are formed with openings in which are hooked ends of coil tension springs **34** connected by wires **35** in the usual manner to form a spring.

The flanges **27***b* are provided with slots **30***c* through which pins **30***d*, secured to the outer end of link members **30***b* extend.

Riveted or otherwise secured against the outer side of each flange **27***a* is an outwardly-extending lug **38** formed with an opening **39** for the purpose hereinafter described.

Attached to the inner side of the front lower portion of each side wall **15** is a plate **45**. Pivoted to each plate **45** as at **46** is a bent bar **47**. Bar **47** extends upwardly and forwardly when the bed is extended. The bar **47** has a lower portion **48** contacting plate **45**. At the upper end of portion **48** is an inwardly offset portion **49** from which extends a portion **50** parallel to and spaced inwardly of portion **48**. Near the upper end of each bar **47** is an inwardly offset portion **51** from which extends upwardly a portion **52** offset inwardly from portion **50**. Attached to portion **52** and extending rearwardly thereof is a bracket **53** formed with an opening **54**. At the end of portion **52** is another inwardly offset portion **52***a* from which extends upwardly a portion **52***b* parallel with portion **52**.

Interconnecting bracket **53** with portion **41** of member **38** is a coil tension spring **55** having hooked ends received in openings **39** and **54**, respectively.

At the upper end of each bar **47** is a pivot **52***c*. Fixed to each member **27** is a lug **52***d* projecting thereabove and carrying a pivot **52***e*. Connecting pivots **52***c* and **52***e* at each side of the bed is a link **52***f*. A bumper member **52***g* having an outwardly offset and upwardly-extending portion with an inclined edge **52***h* is fixed against the side of each of links **52***f* for the purpose hereinafter appearing.

Pivoted to the front ends of members **27** as at **57**, are the rear ends of an intermediate section **58**. The intermediate section **58** comprises angular side members **59** having vertical flanges **60** and horizontal flanges **61**. Flanges **61** of the side members **59** are likewise interconnected by coil tension springs **34** and wires **35** to form the base or spring of the bed. The flanges **60** are formed with elongated slots **61***a* near their front ends for the purpose hereinafter appearing.

Each flange **60** is provided with a pin **60***a* to which a link member **60***b* is pivoted at one end against the inside of its respective flange. The other end of each link member **60***b* is pivoted to respective ones of the pivot pins **30***d*.

At the forward end of each member **59** is a pivot **63**. Pivoted thereto and extending down therefrom is an intermediate leg **64**. The leg **64** is preferably of angular cross section and has an outer flange **65** and a transverse flange **66**. Flange **60** of each member **59** carries a pivot pin **67** located forwardly of the upper end of bent bar **47** when the bed is extended. Pivoted on said pivot pin **67** is a lever **68**. Said lever **68** has an arm **69** projecting upwardly and rearwardly and pivoted to the pivot pin **52***c*. Said lever **68** has a downwardly and forwardly projecting arm **70** carrying a pivot pin **71** at its lower end.

The outer flange **65** of leg **64** carries pivot pin **72** below the pivot pin **63**. Interconnecting the pivot pins **71** and **72** on each side of the bed, is an angular link **73**. Fixed to said link and projecting inwardly therefrom is a pin **74** which rides in a longitudinal groove **75***a* in one end of a link member **75** comprising part of a locking mechanism hereinbelow more fully described. The other end of link member **75** is secured to a pin **75***b* which rides in the slot **61**. When the bed is extended the pin **74** is disposed below and substantially centrally located with respect to the slot **61**, and the pin **74** is approximately centrally located in the slot **75***a*.

Fixed to the outer flange **65** of leg **64** and projecting outwardly therefrom is a stop pin **76**. Stop pin **76** is located below the pivot **63** and above the pivot **72**.

At the front end of the intermediate or main section **58** is a short fold section **80**. Section **80** comprises a pair of angle shaped members **81**, one on each side of the bed. Each member **81** has a horizontal flange **82** from which extends upwardly a vertical flange **83**. The rear end of each flange **83** is pivoted to the pivot pin **63**. Each flange **83** is furthermore formed with a short slot **84**, for the purpose hereinafter appearing. Connecting to the flanges **82** are coil tension springs **34** interconnected by wires **35** forming part of the spring base of the bed. The flanges **82** of members **81** at opposite sides of the bed are interconnected by a cross brace bar **86**.

At the front end of the short fold section **80** is the foot section **90**. Said foot section **90** comprises a pair of similar symmetrical angle shaped members **91** one at each side of the bed. Each member **91** has a vertical flange **92** and a horizontal flange **93**. The rear end of each flange **93** is pivoted to the front end of flange **83** of member **81** by pivot pin **93***a*. The front ends of flanges **93** are interconnected by a transverse interconnecting member **94**. Said flanges are further interconnected by a transverse member **95** disposed somewhat rearwardly of the transverse member **94**. Member **95** is secured below the flanges **93**.

Pivoted to the outer flange **65** of each leg **64** as at **96** is a stop arm **97** projecting upwardly and inclined forwardly when the bed is extended. The arm **97** may have a notch **98** on one side edge thereof (or on both side edges so that the left and right bars may be interchanged). The purpose for the notch **98** will be explained hereinafter.

At the upper end of arm **97** is a pivot pin **99**. Pivoted to the pivot pin **99** is one arm **100** of a bell crank **101**. Carried by the intermediate portion of the bell crank **101** is a pivot pin **102** which passes through the slot **84**. Said bell crank **101** further comprises a downwardly and forwardly projecting arm **104** formed at its underside with an inwardly turned flange **105** disposed below the flange **82** of member **81**. The pivot pin **102** is at the forward end of slot **84** when the bed is fully extended.

Flange **92** of member **91** carries a pivot pin **107** located forwardly of the pivot pin **93***a*. Pivot pin **102** is connected to said pivot **107** by link **108** located at the inside of flange **92**. Carried by the link **108** adjacent to but spaced from the pivot pin **102** is a pivot pin **110**. Interconnecting the pivot pins **75***b* and **110** is a link **111** located

at the inside of the flanges **60** and **83** and said link **108**. Attached to the outer side of flange **83** and adjacent the pivot pin **93***a* is an angle shaped bracket **115** comprising a vertical wall **116** from which extends outwardly a horizontal flange **117**. Flange **116** is fixed to said flange **83**. The flanges **117** of members **115** at opposite sides of the bed are interconnected by a board **120** adapted to rest edgewise on the top edge of the usual front board when the bed is fully collapsed, as will be explained hereinafter.

Connected to the flange **93** are also a plurality of members **34** interconnected by wires **35** and forming a continuation of the bed springs. Pivoted to the flanges **92** of members **91** rearwardly of the cross brace **95** as on pivot **122**, is a foot leg **123**. Said foot leg carries a pivot pin **125** just below pivot **122**. Fixed to the flange **83** and wall **116** of member **115** is a pivot pin **126**. Pivot pins **126** and **125** are interconnected by link **128** which is substantialy horizontal when the bed is fully extended.

It will be understood that a mattress (not shown) is placed on the wires **35** and over the cross springs **34**. When the bed is collapsed in the manner hereinafter explained, the mattress is folded with the bed. It will be noted that the portions of the bed forwardly of the bell crank or lever **69** have no obstructions or projections extending above the side members **58, 81** and **91**. This portion of the bed is generally referred to as the sitting portion of the bed and the fact that there are no obstructions at that location is an advantage, as it allows people to sit on the bed in comfort.

The outer ends of the side flanges **92** of the members **91** each have secured thereto a bumper member **128***a* adapted to abut the respective bumper members **52***g* when the bed is in folded condition as will be apparent from the following description. A transverse foot bar **130***a* is located between the upper ends of upwardly extending members **130***b* fixed against the outer ends of the members **91**. The foot bar **130***a* is secured to side arms **130***c* having outer ends pivoted to the members **130***b* so as to be foldable inwardly against the mattress when the bed is folded up, as illustrated in Fig. 4.

It will be noted that when the bed is fully extended, an upward lift at the foot of the bed will not cause the short fold section **80** to fold upwardly relative to the front end of the main or intermediate section because of the engagement of the flanges **105** of bell crank **101** with the undersides of the flanges **82** of members **81** of said short fold section. The reason for this is that when the bed is fully extended the flanges **105** contact the undersides of flanges **81**. In fully extended position the arms **97** are inclined forwardly and upwardly, but the angle which these arms makes with a vertical line passing through the pivot **96** is less than the angle formed by a line passing through the pivot pins **63** and **99** and a vertical line passing through pivot pin **96**. For this reason if the short fold section was to spring upwardly about the pivot pin **63** from the fully extended position of the bed, arms **97** would have to move in a clockwise direction, whereas the bell crank **101** would have to move in a counterclockwise direction. But the bell crank cannot move in a counterclockwise direction because of the engagement of the flanges **105** with the underside of the flanges **82**. For this reason an upward pull on the front end of the foot section would result in only the foot section moving upwardly from the position shown in Fig. 1 to the position shown in Fig. 2 and during such movement the short fold section remains in horizontal position.

As the foot section **90** is swung upwardly, members **91** pivot upwardly about the pivot pin **93***a*. During such action the foot leg **123** swings in a clockwise direction against the underside of the foot section. Such action is caused by the link **128**. Furthermore as said foot section is swung upwardly, the pivot pin **102** on which bell crank **101** rotates, and which is connected also to the link **108**, slides to the left in slot **84**. At the same time arm **97** swings in a counterclockwise direction until the notch edge of said arm contacts the stop pin **76** and brings the pivot pin **99** in direct axial alignment with the pivot **63**. Thus the distance of the center of pivot pin **96** from the center of pivot pin **99** is exactly equal to the distance between the pivot pin **96** and the pivot pin **63**. As the foot section is swung upwardly, furthermore, links **108** will swing upwardly about pivot pins **102**. When the pivot pin **102** is at the left end of the slot **84**, members **91** of the foot section **90** will have swung slightly past the vertical. Since the link **108** swings in a counterclockwise direction about the pivot pin **102**, the pivot pin **110** will be raised and the pivot pin **75***b* together with link member **75** will travel to the left in slot **61**, but only about half way through said slot. The link member **75** will thus be caused to swing counterclockwise and downwardly with respect to pin **74**, so that pin **74** is disposed in the upper end of slot **75***a* as illustrated in Fig. 2. At this time, further swinging movement of the foot section will cause the short fold section **80** to swing upwardly therewith about the co-aligned pivot pins **63, 99**. Now the short fold section can swing upwardly about pivot **63** because the bell crank **101** can swing about the axis of the pivot pin **63**. Thus the foot section **90** of the short fold section **80** can be swung from the position shown in Fig. 2 to the position shown in Fig. 3.

It will be noted that when the foot section has been swung upwardly and the bell crank **101** has slidably moved to the left to bring the pivot pin **102** from the right end of slot **84** to the left end of said slot, said bell crank will swing in a clockwise direction, thus moving the flange **105** away from the underside of the flange **82** of member **81**.

When the foot section **90** is swung from the position of Fig. 2 to the position of Fig. 3 the bell crank **101** will swing upwardly about the pivot pins **99** to bring the arms **100** of said bell cranks substantially in alignment with the arms **97**. During such motion, furthermore, the pivot pin **110** moves upwardly while the pivot pin **75***b* slides all the way to the left end in slot **61** and the link **111** rotates in a counterclockwise direction. Such movement rotates the link member **75** counterclockwisely to such an extent that the end of its slot **75***a* contacts the pin **74**. The fact that the pivot pin **102** is at the left end of the slot **84** prevents the foot section from further rotating relative to the short fold section in a counterclockwise direction.

It will be noted, furthermore, that in the position of Fig. 3 the foot section **90** cannot be raised relative to the short fold section **80** because to do so pivot pin **102** would have to ride up in the slot **84**. But that cannot be done, because arm **100** of bell crank **101** is in alignment with the arm **97** and said arms cannot be extended. It will be noted that a mattress placed on the extended bed will have its foot end folded upwardly with the foot section of the bed and then said foot end of the mattress will be folded over the intermediate portion of the mattress as the bed is folded from the position of Fig. 2 to the position of Fig. 3, so that two layers of mattress are then between sections **58** and **90** of the bed.

To now complete the final phase of the full collapsing of the bed, the board **120** may be grasped and the front end of the bed pulled up somewhat and then pushed rearwardly, causing the bed to move from the position of Fig. 3 to the fully collapsed position of Fig. 4. During such movement the head section **26** will swing 90° in a clockwise direction about the pivot pins **30** in right angular side members **25***a*, and said side members will at the same time swing clockwisely 180° about their pivot pins **25**. Said head section will thus swing through a resultant angular movement of 90°, bringing the head section to a vertical position extending downwardly from the end of right angular side members **25** and bringing

the pivot pin **57** which connects the head section with the intermediate or main section down to the lower rear end of the frame **11**. During such action the links **52***f* which interconnect the pivot pins **52***e* with the pivot pins **52***c* at the upper ends of the bent bars **47** will cause said bars to swing in a counterclockwise direction from the position of Fig. 3 to the position of Fig. 4. Such rotation of the bars **47** will cause rotation of the lever **68** about pivot pin **67**. Actually the levers **68** rotate in a clockwise direction about pivot pin **67**. Members **59** of the intermediate section **58** move to a substantial horizontal position aligned with the pivot pin **57** so as to lie rearwardly of the front board of the frame. Swinging movement of the lever **68** causes the angular links **73** to be pulled to the left thereby causing the intermediate leg **64** to rotate in a clockwise direction about the pivot pins **63**. During such movement the links **73** will be moved rearwardly and toward the level of members **58**. The angular links **73** will move upwardly and forwardly so that their pins **74** are at rear positions in the slots **75***a* in link members **75**, thereby blocking movement and press them towards the front of the link **111** and preventing the opening up of the bed in its collapsed condition. Thus, when the pins **74** are in their rearmost positions in their slots **75***a*, it is not possible to swing the short fold section relative to the intermediate or main section, nor is it possible to swing the foot section upwardly relative to the short fold sections. Swinging of the short fold section clockwise relative to the main or intermediate section in the position of Fig. 4, is prevented by reason of the fact that to do so would require the pin **75***b* to slide to the right in the slot **61**, and this is not possible because of engagement of the pin **74** with the inner end of its slot **75***a* in link member **75**. The foot section cannot be swung upwardly, furthermore, because to do so would require the pivot pin **102** to ride up in the slot **84** and that is not possible because said pivot pin is connected by the bell crank **101** with the pivot pin **99** disposed directly therebelow.

The springs **55** are stretched during the full collapsing of the bed so as to aid in extending the bed or moving the bed back from the position of Fig. 4 to the position of Fig. 3. In the fully collapsed position the board **120** comes down on the top edge of the front board of the frame.

During the movement of the bed from the position of Fig. 3 to the position of Fig. 4, the intermediate or main section **58** first tilts downwardly and rearwardly as the leg **64** moves up against the underside of said main section, and it is during this movement of said main section together with the fold section **80** and the foot section **90** down into the frame **11**, that the pin **74** gradually moves upwardly and backwardly in the slot **74***a* to lock pivot pin **75***b* against the forward end of the slot **61**.

It will further be noted that when the bed is in folded condition, it will not be possible when unfolding the bed, to move the main section counterclockwisely relative to the head section because of the pin **30***d*. The inner end of the link member **30***b* is moved all the way up in its slot **30***c* so that its pin **30***d* abuts the end thereof.

As can be seen in Fig. 4, when the bed is in folded condition the bumper member **128** will rest against its cooperative bumper member **52***g* so as to provide a firm support for a cushion and to minimize the possibility of any harm being done to the folding mechanism during hard usage of the convertible bed as a sofa or couch.

Figs. 10, 11 and 12 illustrate a modification of the bed folding mechanism illustrated in Figs. 1 through 9 wherein the cross brace bar **86**, instead of being connected directly between the flanges **82** of members **81** of the short fold section **80**, is instead interconnected between flange portions **130** of an angle iron link member **131** extending downwardly of said short fold section when the bed is in extended condition. By means of such lowering of the cross brace bar **86**, the possibility of it interfering with the lowering of the bed springs when sitting over the short fold section is eliminated. The modified construction differs from the mechanism described above in connection with Figs. 1 through 9 in that the board **120**, instead of being fixed with respect to the short fold section **80**, is interconnected therewith by means of a downwardly-extending bracket member **132** fixed against the flanges **83** of members **81**, the link member **130** pivoted at one end to said flange member by a pivot pin **133**, and an angle member **134** having a flange **135** to which the other end of link member **131** is pivoted as by a pivot pin **136**. The board **120** is fastened between flanges **137** of the angle members **134** at each side of the bed. The cross brace bar **86**, being connected between the flange portions **130** of the angle iron link members **131**, is thus located far enough below the bed springs so as not to interfere with comfortable sitting over the short fold section.

Parallel guide mechanism is also provided for drawing in the mechanism supporting the board **120** together with the cross brace bar **86** when the bed is folded, as is illustrated in Fig. 12. Said mechanism comprises a link member **138** having one end pivoted to the pivot pin **136** and having its other end pivoted to pin **102** which, as described above, slides rearwardly in slot **84** when the foot section is moved upwardly with respect to the short fold section when the bed is being folded. Another link member **139** interconnects the rear end of angle member **134** with the flange **83** of the short fold section, being pivoted to said members as by pivot pins **140, 141**.

As can be seen in Fig. 12, when the bed is folded, the movement of the link member **138** rearwardly as described above, will result in the board **120** being drawn in closely parallel to the short fold section framework, and the link member **131** will be rotated to extend parallel with the side member **81** of the short fold section. The cross brace bar **86** will thus also be drawn up close to springs of the short fold section when the bed is folded, to provide a compact structure having the board **120** vertically aligned with the front board of the sofa frame.

It will be noted that the foot section **90** and short fold section **80** become fully locked to the intermediate section **58** about half-way from the position of Fig. 3 to the position of Fig. 4 (as the bed is being collapsed and moved towards its fully collapsed position). The locking takes place when the pin **74** reaches the left end of slot **75***a*, and link **75** swings in a counterclockwise direction, looking at Fig. 3, to a position where said pin **74** is horizontally aligned with pin **75***b*. The advantage of this locking action in advance of full collapse, is that the foot section is held down and prevented from hitting the upholstered back of the sofa, and also the foot section is prevented from being pushed open by the mattress which is folded between the foot and intermediate sections.

In Fig. 13, there is illustrated a modified construction. The bed, as shown in Fig. 13, is the same as the bed shown in Figs. 1 to 12, with the exception that the link **75** is replaced by a link **150** formed with a slot **151** which corresponds to the slot **75***a* of said link **75**. The slot **151** is shorter than the slot **75***a* at the end remote from the pivot pin **75***b*. By shortening said slot, the movement of the bed from fully collapsed position of Fig. 4 to the position of Fig. 3 will serve to lift the foot section, because the pin **74** pushes the link **150** down and to the right, causing pin **75***b* to move to the right in slot **61***a*; thereby moving link **111** up and to the right; thereby swinging link **108** up, tending to rotate it in a clockwise direction and hence to lift the foot section **90** to an inclined position. The advantage of this opening up or lifting of the foot section when the bed is moved from fully collapsed position to a position corresponding to Fig. 4 is that the operator would not have to lean all the way over to pick up the foot

section for swinging the foot and fold sections to fully opened up position. However, the opening up of the foot section **90** should not be too great since if it were allowed to open up too much, it might hit the upholstered back of the sofa.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth, as shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention in some detail, what we claim as new and desire to protect by Letters Patent of the United States, is:

1. A pull out bed comprising a bed frame, a collapsible bed comprising a head section, means to connect said head section at its rear end to the frame, an intermediate section pivoted at its rear end to the front end of the head section, a fold section pivoted at its rear end to the front end of the intermediate section, a foot section pivoted at its rear end to the front end of the fold section, a leg pivoted to the pivotal connection between the intermediate section and fold section, a lever pivoted mediately the ends thereof to the intermediate section, a first link connecting one arm of the lever with the leg, a member pivoted to the bed frame at one end, and connected at its other end to the other arm of the lever, a second link connecting said other end of said member to the head section, said intermediate section being formed with a longitudinal slot, a pin passing through said slot, a third link pivoted about the axis of said pin, and being formed with a longitudinal slot, a pin on an intermediate portion of the second link passing through the slot in the third link, said fold section being formed with a longitudinal slot, an arm pivoted at one end to said leg, a second member pivoted at one end to the other end of said last arm, said second member carrying a pin adjacent its other end received within the slot in the fold section, a fourth link connecting said last mentioned pin with an intermediate portion of the foot section, and a fifth link connecting the pin in the slot of the intermediate section with an intermediate portion of the fourth link.

2. A pull out bed comprising a bed frame, a head section pivoted to said frame, an intermediate section hinged to the front end of the head section, a fold section pivoted to the front end of the intermediate section, a foot section pivoted to the front end of the fold section, a bar pivoted to the frame, a link connecting said bar with the head section, a lever pivoted to the intermediate section and having one arm pivoted to said bar and link at the pivot point for said bar and link, an intermediate leg pivoted to the intermediate section, said lever having a second arm, a second link interconnecting the second arm of the lever with said intermediate leg, said fold section being formed with a longitudinal slot, a third link pivoted to said foot section, a pin on the third link slidable in the slot in the fold section, and a fourth link pivoted at one end to the third link, a pin on the fourth link slidable in the slot in the intermediate section, a fifth link pivoted at one end to said fourth link pin, a slot in said fifth link, and a locking pin on the second link slidable in the slot in said fifth link and adapted to engage the rear thereof when the bed is fully collapsed.

3. A pull out bed comprising a bed frame, a head section pivoted to said frame, an intermediate section pivoted to the head section, a fold section pivoted to the intermediate section, a foot section pivoted to the fold section, an intermediate leg pivoted to the pivotal connection between the intermediate and fold sections and extending downwardly therefrom, an angle bar pivoted to the frame and being inclined upwardly and forwardly in the extended position of the bed, a link interconnecting the upper end of the bar with the head section, a lever pivoted to the intermediate section and having one arm pivoted to the bar and link at their pivotal connection, a second link interconnecting the second arm of the lever with the intermediate leg at a point below its pivotal connection to the intermediate section, said intermediate section being formed with a slot, a pin slidable in said slot, link means connecting said pin with said fold and foot sections, a locking link pivoted at one end to said slidable pin, said locking link having a slot, and a locking pin on the second link and slidable in said locking link slot to move to the rear therein as the bed moves into fully collapsed position to prevent movement of said link means and thus prevent the fold and foot sections from swinging relative to said intermediate section.

4. A pull out bed comprising a bed frame, a head section pivoted to said frame, an intermediate section pivoted to the head section, a fold section pivoted to the intermediate section, a foot section pivoted to said fold section, an angle bar pivoted to the frame and projecting upwardly and forwardly to a point above the intermediate section when the bed is extended, a first link connecting the upper end of the bar with the head section, a lever pivoted to said intermediate section and having an arm extending upwardly and rearwardly and pivoted to the pivotal connection between said bar and link, said lever having a downwardly and forwardly inclined arm, an intermediate leg pivoted to the pivotal connection between said intermediate and fold sections, a second link connecting said downwardly and forwardly inclined arm of the lever with said intermediate leg at a point below its pivotal connection to said intermediate and fold sections, said intermediate section being formed with a longitudinal slot, said fold section being formed with a longitudinal slot, a front leg pivoted to the foot section, a third link pivoted to the fold section at one end and at its other end to said front leg at a point below its pivot in said foot section, a second bar pivoted to the intermediate leg at its lower end and carrying a pivot at its upper end aligned with the pivotal connection between said intermediate leg and said intermediate and fold sections, a bell crank having one arm pivoted to the upper end of the second bar, a pivot pin on the bell crank passing through the slot in the fold section, said bell crank having a downwardly extending arm formed with a flange disposed below said fold section, a fourth link pivoted at one end of the pivot on the bell crank which passes through the slot in the fold section, the other end of the link being pivoted to the foot section, and a fifth link pivoted at one end to the fourth link and at its other end being provided with a pin passing through the slot in the intermediate section, and lock mechanism on the second link adapted to engage said last mentioned pin when the bed is moved into fully collapsed condition and hold it at its rearward position in said slot in said intermediate section.

5. A pull out bed comprising a bed frame, a head section pivoted to said frame, an intermediate section pivoted to the front end of the head section, a fold section pivoted to the front end of the intermediate section, a foot section pivoted to the front end of the fold section, a locking pin slidably mounted on said intermediate section, an intermediate leg pivoted to said intermediate section and extending downwardly therefrom, linking means to connect said locking pin with said fold and foot sections, means to cause said intermediate leg to fold against the underside of said intermediate section as the bed is collapsed, and means comprising a slotted link member controlled by the intermediate leg to lock said locking pin against sliding movement relative to the intermediate section when said bed is in collapsed position.

6. A pull out bed comprising a bed frame, a head section pivoted to said frame, an intermediate section

pivoted to the head section, a fold section pivoted to the intermediate section, a foot section pivoted to the fold section, an angular bar pivoted to the frame, a first link connecting the bar with the head section, a lever pivoted to said intermediate section, and having an arm pivoted to the bar, an intermediate leg pivoted to said intermediate section, a second link connecting said lever with said intermediate leg, a locking pin, means to mount said locking pin on said intermediate section for sliding movement, link means connecting said locking pin with said fold and foot sections, and locking link means slidably associated with said second link and operative to prevent sliding movement of said locking pin when the bed is fully collapsed, said linking means including means to retain said fold section and foot section against movement when said locking pin is restrained by said locking link means.

7. A pull out bed comprising a frame, a head section pivoted to said frame, an intermediate section hinged to the front end of the head section, a fold section pivoted to the front end of the intermediate section, a foot section pivoted to the front end of the fold section, an angular bar pivoted to the frame, a first link connecting the bar with the head section, a lever pivoted to the intermediate section, means to pivotally connect the lever to the bar, an intermediate leg pivoted to the intermediate section, a second link connecting said lever with said

intermediate leg, said intermediate section being formed with a slot, said fold section being formed with a slot, a first pin slidable in the slot in the fold section, a third link connecting said first pin with said foot section, a second pin slidably mounted in the slot in the intermediate section, a fourth link connecting the second pin with the third link, a lock pin fixed to said second link, a fifth link having a slot in which said lock pin is slidably disposed, an end of said fifth link being pivoted to said second pin, said lock pin being movable to the inner end of said fifth link slot when said bed is fully collapsed to prevent slidable movement of said slot in said intermediate section when said bed is fully folded.

References Cited in the file of this patent

UNITED STATES PATENTS

1,115,769	Bartlett	Nov. 3, 1914
1,834,380	Cane	Dec. 1, 1931
2,370,890	Thomas	Mar. 6, 1945
2,634,428	Fox	Apr. 14, 1953
2,642,583	Bank et al.	June 23, 1953
2,729,829	Bebry	Jan. 10, 1956
2,749,559	Petersen	June 12, 1956
2,770,814	Schindler	Nov. 20, 1956
2,783,478	Bebry	Mar. 5, 1957