

Oct. 11, 1966

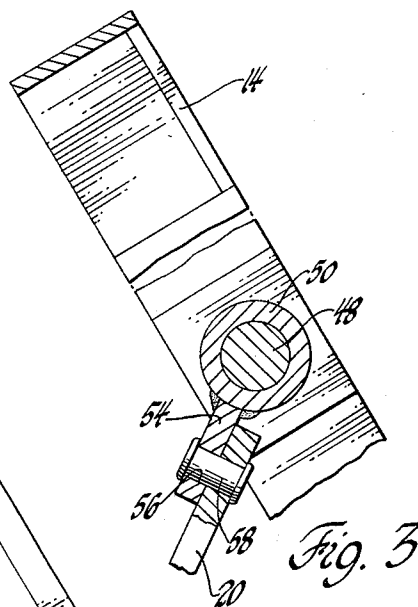
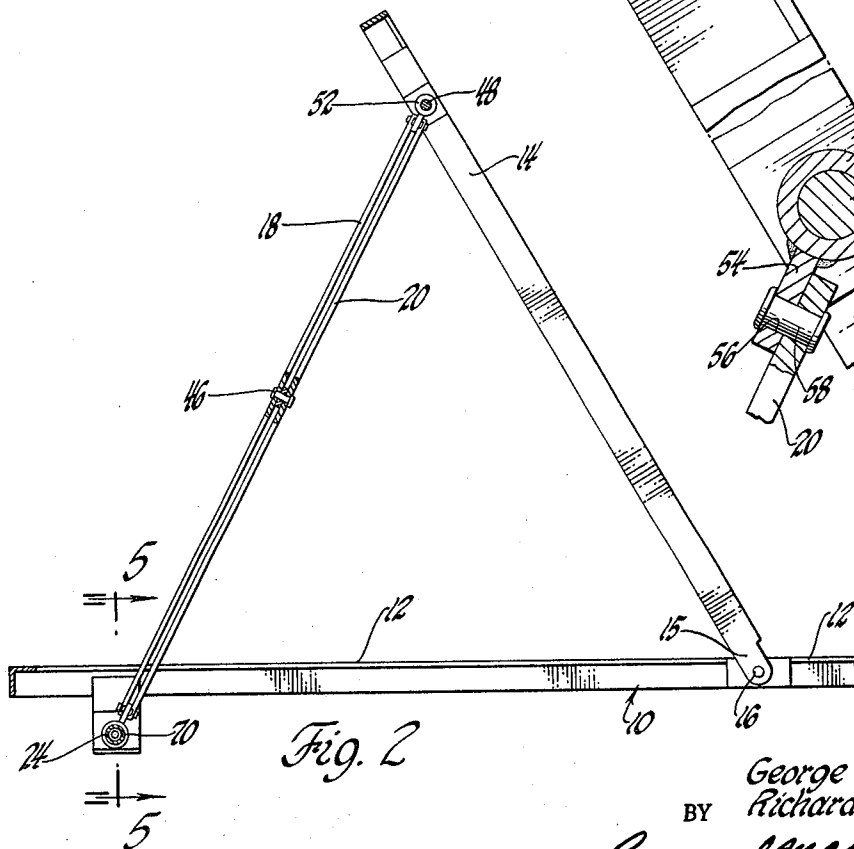
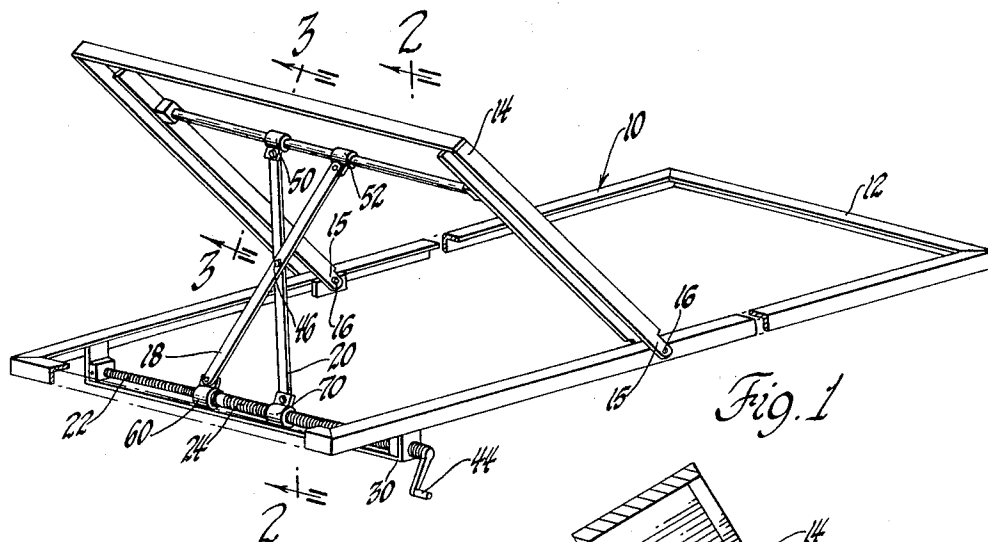
G. E. FRISZ ET AL

3,277,501

BED ASSEMBLY

Filed March 22, 1965

3 Sheets-Sheet 1



INVENTORS
George E. Frisz, &
Richard P. Frisz
BY
Bernard M. Flynn & Leising
ATTORNEYS

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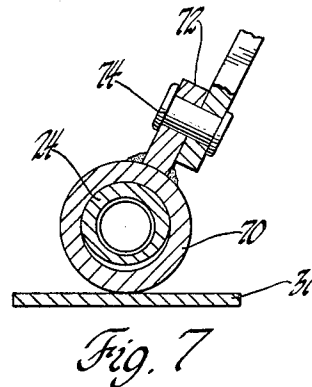
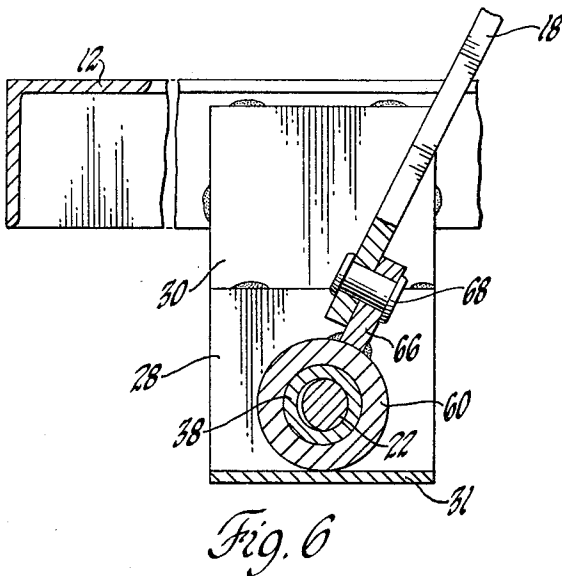
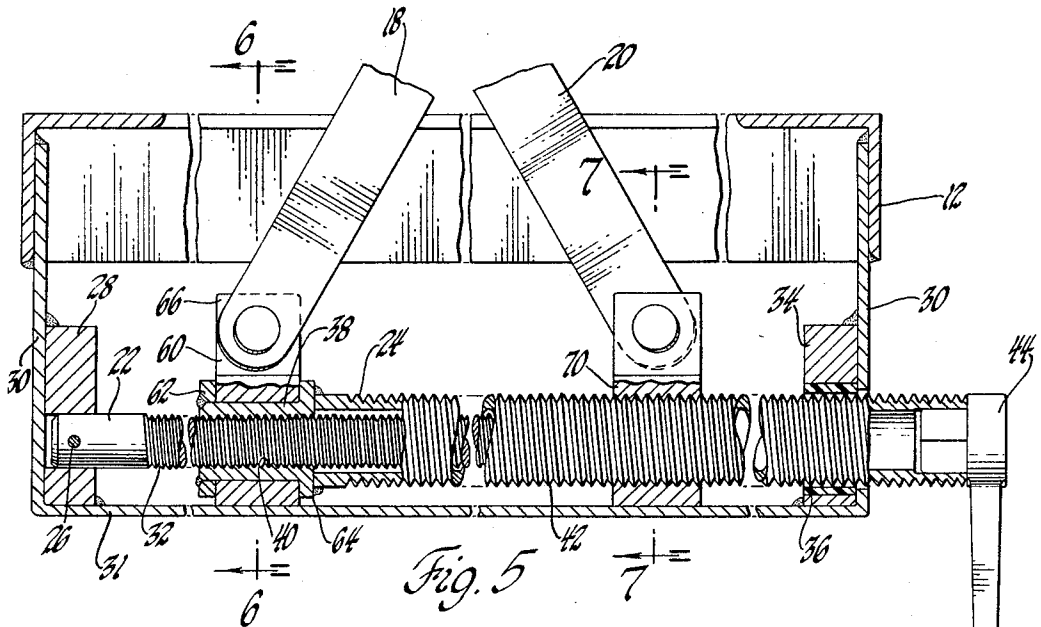
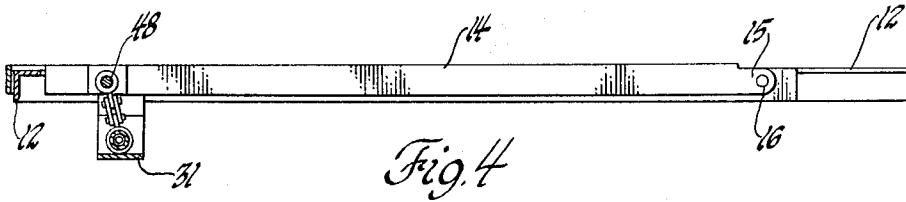
G. E. FRISZ ET AL

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Filed March 22, 1965

3 Sheets-Sheet 2



INVENTORS

*George E. Frisz, &
Richard P. Frisz*

BY

Richard P. Frisz

Barnard, McHymn & Rising
ATTORNEYS

ATTORNEYS

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G. E. FRISZ ETAL

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BED ASSEMBLY

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3 Sheets-Sheet 3

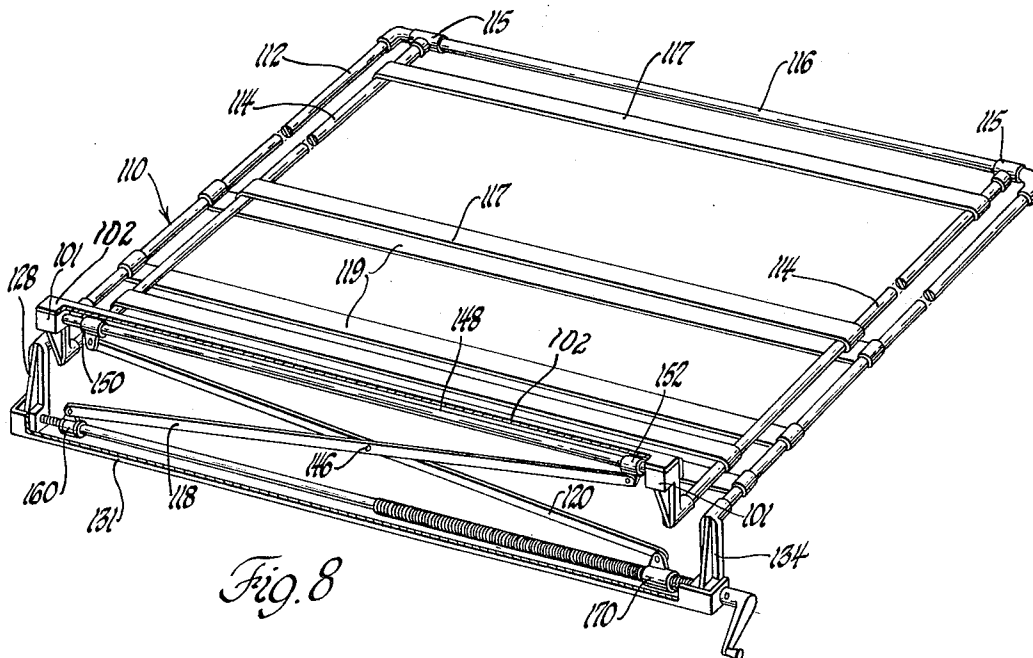


Fig. 8

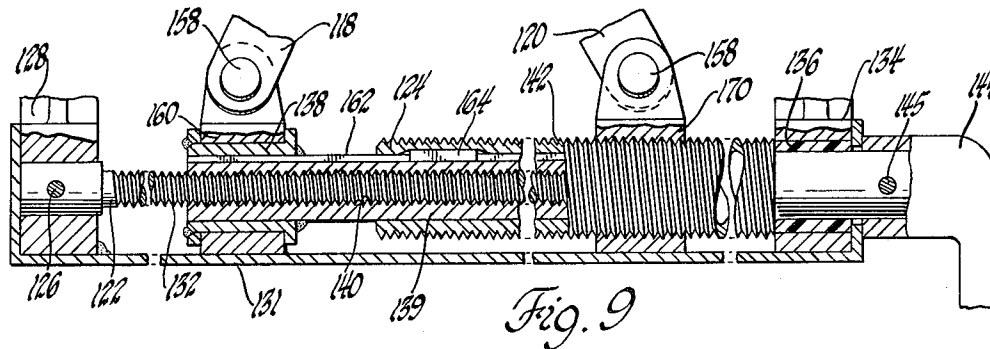


Fig. 9

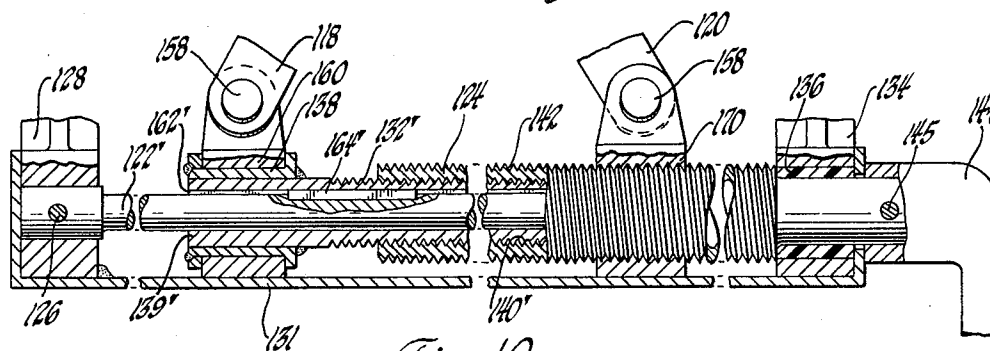


Fig. 10

INVENTORS
George E. Frisz, &
Richard P. Frisz
BY *Barnard, McEwen & Leasing*
ATTORNEYS

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3,277,501

BED ASSEMBLY

George E. Frisz and Richard P. Frisz, both of
26385 Humber, Huntington Woods, Mich.

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16 Claims. (Cl. 5—66)

This invention relates to an improved bed assembly, and more particularly, to a main frame having an auxiliary frame pivotally connected thereto, first and second links pivotally connected together in scissors-like fashion with means operatively connecting a first end of each of the links to the auxiliary frame, and an improved actuation mechanism mounted on the main frame and operatively connected to the second end of each of the links to move the second ends of the links toward or away from one another thereby to pivot the auxiliary frame relative to the main frame.

One of the principal problems associated with devices for raising and lowering an auxiliary frame or a portion of a bed or the like has been that they have not been capable of raising the auxiliary frame to a height sufficient for a person to assume a nearly normal sitting position. There are instances when a person would like to assume a nearly sitting position such as to eat or to write, but the auxiliary frame portion of the bed cannot be raised to a sufficient height to assume such a position. Normally, what is done is that a number of pillows are placed between the person's back and the auxiliary frame of the bed so that the person may sit in the desired position.

Another problem associated with heretofore known devices for raising an auxiliary frame portion of a bed is concerned with the support of the auxiliary frame portion of the bed. Normally, a screw having oppositely threaded portions on the respective ends thereof is disposed on the main frame of the bed and rotated by a crank so that oppositely threaded nuts on the respective threaded portions of the screw are moved toward each other or away from each other so that links connected thereto raise and lower the auxiliary frame portion of the bed. The weight or other forces applied to the auxiliary frame portion is transmitted through the links to the screw. The screw, therefore, must be made of strong material and be large enough to possess sufficient strength to support the forces applied thereto by the links to prevent bending of the screw along its length, since bending of the screw would bind the threaded nuts to prevent them from moving along the screw.

Accordingly, it is an object and general feature of this invention to provide an improved actuating mechanism suitable for transforming rotary motion into linear motion and adaptable to pivot an auxiliary frame relative to the main frame of a bed so that an individual may rest his back against the auxiliary frame while in a comfortable substantially upright sitting position.

Another object and general feature of the present invention is to provide an improved positioning mechanism for use with a bed having a main frame, and an auxiliary frame pivotally connected to the main frame so that forces applied to the auxiliary frame are transmitted to the main frame rather than to the actuation mechanism for pivoting the auxiliary frame relative to the main frame.

Yet another object and general feature of this invention is to provide an improved bed assembly having an auxiliary frame pivotally connected to a main frame and a pair of links pivotally connected together in a scissors-like fashion with means operatively connecting a first end of each of the links to the auxiliary frame at a position remote from the pivotal connection thereof to the

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main frame to allow the first ends of the links to move along an axis toward and away from each other and to allow the first end of each of the links to pivot about the axis, and including means disposed on the main frame for moving the second ends of the respective links toward and away from each other whereby the auxiliary frame is pivoted relative to the main frame.

A further object and general feature of this invention is to provide an improved portable bed assembly adapted to be placed over a portion of the length of a bed frame to raise and lower a portion of a mattress or the like and which includes a main frame and an auxiliary frame pivotally connected at a first end thereof to a first end of the main frame with means interconnecting the main frame and the auxiliary frame to pivot the auxiliary frame relative to the main frame whereby a portion of the mattress may be raised and lowered.

Still another object and general feature of this invention is to provide an improved bed assembly having an auxiliary frame pivotally connected to a main frame, a threaded shaft mounted on the main frame, an externally threaded tubular member disposed about the shaft and having internal threads for threadedly engaging the shaft, the threads on the shaft having a pitch equal to one-half the pitch of the external threads on the tubular member, means operatively connecting one end of the tubular member to the auxiliary frame and operatively connecting the external threads of the tubular member to the auxiliary frame, and including means to rotate the tubular member whereby the auxiliary frame is pivoted relative to the main frame.

In general, these and other objects may be carried out by an apparatus constructed in accordance with the instant invention including an auxiliary frame pivotally connected to a main frame, first and second links pivotally connected together in a scissors-like fashion, a rod connected at each end thereof to the auxiliary frame, and a pair of sleeves rotatably and slidably disposed on the rod such that each link is pivotally connected at a first end thereof to one of the sleeves. In a first preferred embodiment of the actuation mechanism a threaded shaft is mounted on the main frame in a substantially parallel relationship to the rod. An externally threaded tubular member is disposed about the shaft and in threaded engagement with the shaft. The tubular member has external threads circumferentially thereabout which have twice the pitch of the threads on the shaft. The tubular member is mounted on the main frame for rotational movement and movement parallel to the longitudinal axis thereof along the shaft. A first collar is secured to one end of the tubular member for rotational movement circumferentially about the tubular member. The second end of the first link is pivotally connected to the first collar. An internally threaded collar is disposed about the tubular member in threaded engagement with the external threads thereof. The second end of the second link is pivotally connected to the second collar. A crank means is connected to the tubular member for rotating the same. In a second preferred embodiment of the actuation mechanism a shaft is mounted on the main frame with a tubular member rotatably mounted on the main frame coaxially with the shaft. A sleeve-like means is disposed intermediate the shaft and the tubular member for movement axially of the shaft and the tubular member. The sleeve-like means is in threaded engagement with either the shaft or the tubular member and it is keyed against rotation relative to the other of the shaft and the tubular member. The tubular member has external threads thereabout to receive an internally threaded collar. Another collar is secured to one end of the sleeve-like means for rotational movement circumferentially there-

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about. The second end of the first link is pivotally connected to the collar secured to the sleeve-like means and the second end of the second link is pivotally connected to the internally threaded collar disposed about the tubular member. A crank means is operatively connected to the tubular member for rotating the same. In both embodiments of the actuation mechanism, a bearing means is disposed along the shaft and tubular member for engaging the respective collars to receive loads transmitted to the collars by the links.

Other objects and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIGURE 1 is an isometric view of a preferred embodiment of the present invention;

FIGURE 2 is an enlarged cross-sectional view of a portion of the apparatus shown in FIGURE 1 taken substantially along line 2—2;

FIGURE 3 is an enlarged cross-sectional view of a portion of the apparatus of FIGURE 1 taken substantially along line 3—3;

FIGURE 4 is an enlarged cross-sectional view of a portion of the apparatus shown in FIGURE 1 with the auxiliary frame in the lowered position;

FIGURE 5 is an enlarged cross-sectional view partly broken away taken substantially along line 5—5 of FIGURE 2;

FIGURE 6 is a cross-sectional view of a portion of the device shown in FIGURE 5 taken substantially along line 6—6;

FIGURE 7 is a cross-sectional view of a portion of the device shown in FIGURE 5 taken substantially along line 7—7;

FIGURE 8 is an isometric view of another preferred embodiment of the present invention;

FIGURE 9 is an enlarged cross-sectional view partly broken away of the alternative embodiment of the actuation mechanism shown in FIGURE 8; and

FIGURE 10 is an enlarged cross-sectional view partly broken away of a variation of the actuation mechanism shown in FIGURE 9.

Referring now to the figures, wherein like reference characters indicate like or corresponding parts throughout the several views, there is shown, generally at 10 in FIGURES 1 through 7, an apparatus adapted for use with a bed including an actuation mechanism suitable for transforming rotary motion into linear motion.

There is included a main frame 12 and an auxiliary frame 14. A pivotal connection connects, for relative pivotal movement, the main frame 12 and the auxiliary frame 14. The pivotal connection comprises flanges 15 on the auxiliary frame 14 with a pin 16 extending through the flanges 15 and the main frame 12.

A means disposed on the main frame 12 for pivoting the auxiliary frame 14 relative to the main frame 12 and includes a threaded shaft 22 and a tubular member 24. The shaft 22 is mounted on the main frame 12 by a pin 26 and a support member 28. The support member 28 is welded, brazed, or secured in any other appropriate manner to the structural member 30 which in turn is welded, brazed, or secured in any other appropriate manner to the main frame 12. The shaft 22 has threads 32 thereabout. The shaft 22 is also substantially parallel to the rod 48 which will be described more fully hereinafter. The tubular member 24 is mounted on the main frame 12 by the support member 34 and the structural member 30. The support member 34 is welded or brazed or secured in any other appropriate manner to the structural member 30 and has a bushing 36 so that the tubular member 24 is supported for rotational movement and movement parallel to the longitudinal axis thereof along the shaft 22. That is to say, the tubular

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member 24 may be rotated within the bushing 36 and may move through the bushing 36.

The tubular member 24 may be a unitary member with internal threads to engage the threads 32 of the shaft 22; however, as illustrated, an internally threaded element 38 is connected to one end of the tubular member 24 for threadedly engaging the shaft 22. The internally threaded element 38 may be secured to the tubular member 24 in any appropriate manner such as welding or brazing or the like. The internally threaded element 38 has threads 40 to engage the threads 32 of the shaft 22. The tubular member also has external threads 42 thereabout. For reasons which will become more clear hereinafter, the threads 32 on the shaft 22 and the threads 40 of the internally threaded element 38 have a pitch less than the pitch of the external threads 42 on the tubular member 24. Preferably, the pitch of the threads 32 and 40 is one-half of the pitch of the threads 42. A means is provided to rotate the tubular member 24 and includes a crank 44. The crank 44 may be secured to the tubular member by welding, brazing, by a spline connection, or in any other appropriate manner.

Means is provided to operatively connect the tubular member 24 to the auxiliary frame 14 and includes the links 18 and 20, and means operatively connecting a first end of each of the links 18 and 20 respectively to the auxiliary frame 14 at a position remote from the pivotal connection for allowing each of the links 18 and 20 to pivot relative to the auxiliary frame 14. Also included is connection means connecting the other or second end of the respective links 18 and 20 to the tubular member 24 so that the second ends of the links 18 and 20 are moved toward and away from each other to pivot the auxiliary frame 14 relative to the main frame 12.

The links 18 and 20 are pivotally connected together by a pin 46 in a scissors-like fashion at a point intermediate the respective ends of each link.

The means operatively connecting the first end of each of the links 18 and 20 to the auxiliary frame 14 to allow the first ends of the links to move along an axis toward and away from each other and to allow the first ends of the respective links to pivot about the axis includes a rod 48 and a pair of sleeves 50 and 52. The rod 48 is connected at each end thereof to the auxiliary frame 14. The rod 48 is connected to the auxiliary frame 14 at each end thereof at a position remote from the pivotal connection provided by the pin 16. The sleeves 50 and 52 are rotatably and slidably disposed on the rod 48 so that they may move toward and away from each other along the axis of the rod and rotate about the axis of the rod. Each of the links 18 and 20 is pivotally connected at a first end thereof to one of the sleeves 50 or 52. As is more clearly shown in FIGURE 3, each sleeve has a flange 54 secured thereto, such as by welding, brazing, or the like. The flange 54 has a hole 56 there-through to accommodate a pin 58 which pivotally attaches the first end of a respective link 18 or 20 to a respective sleeve 50 or 52. The pivotal connection of the first end of each of the links 18 and 20 to the sleeves 50 and 52 respectively, therefore, allows the end of the links 18 and 20 to move toward and away from each other along the rod 48 and to rotate about the longitudinal axis of the rod 48.

The connection means for connecting the rod ends of the respective links 18 and 20 to the tubular member 24 includes means operatively connecting the second end of the link 18 to one end of the tubular member 24 for rotational movement circumferentially about the tubular member 24 and for movement along the shaft 22 with the tubular member 24, and means operatively connecting the second end of the link 20 in threaded engagement with the external threads 42 for allowing the second end of the link 20 to move along the tubular member 24 and for allowing the second link to rotate circumferentially about the tubular member 24.

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The means for connecting the second end of the link 18 to the end of the tubular member 24 includes a collar 60, which is disposed on the internally threaded member 38 for rotational movement circumferentially about the longitudinal axis of the tubular member 24. The internally threaded element 38 has a pair of flanges 62 and 64 for preventing the movement of the collar 60 along the tubular member 24. The collar 60 has a flange 66 with a pin 68 therethrough to pivotally connect the second end of the link 18 to the collar 60. The flange 66 may be secured to the collar 60 in any appropriate manner such as by welding or brazing.

The means for connecting the second end of the link 20 to the tubular member 24 includes an internally threaded collar 70 disposed about the tubular member 24 in threaded engagement with the external threads 42. The collar 70 has a flange 72 secured thereto by welding, brazing, or the like. The flange 72 has a hole therethrough for receiving the pin 74 to pivotally attach the link 20 to the collar 70.

A bearing means is also included and is mounted on the main frame 12 adjacent the shaft 22 and the tubular member 24 for sliding engagement with the collars 60 and 70 to receive loads transmitted to the collars 60 and 70 by the links 18 and 20. As mentioned hereinbefore, the structural member 30 supports the shaft 22 and the tubular member 24; however, it is to be noted that the structural member 30 is U-shaped so that it has a cross member portion 31 adjacent the shaft 22 and the tubular member 24. The cross member 31 is disposed so that the collars 60 and 70 are in sliding engagement therewith. By so disposing the bearing means comprising the cross member 31 of the U-shaped structural member 30, loads transmitted through the links 18 and 20 will be received by the structural member 30 and therefore the main frame 12. The shaft 22 and the tubular member 24 are, therefore, substantially free of radial loads.

In operation, the crank 44 rotates the tubular member 24 so that the tubular member 24 will move along the shaft 22 due to the engagement of the threads 32 and 40. At the same time, the collar 70 will move along the tubular member 24 due to its threaded engagement therewith. Preferably, the threads 32 and 40 have one-half the pitch of the threads 42 and are disposed so that as the tubular member is rotated, the collar 60 will move toward or away from the collar 70 depending upon the direction of rotation of the tubular member 24. That is to say, if the tubular member 24 is rotated in one direction, the collars 60 and 70 will move toward each other, but if the tubular member 24 is rotated in the opposite direction, the collars 60 and 70 will move away from each other. When the pitch of the threads 32 is one-half the pitch of the threads 42, the collars 60 and 70 will move relative to the main frame 12 at the same speed but in opposite directions. The collar 60 will move along the shaft 22 the distance between adjacent threads 32 upon one revolution of the tubular member 24. However, the collar 70 will move along the tubular member the distance between adjacent threads 42 upon one revolution of the tubular member 24. Upon one revolution of the tubular member 24, the collar 60 moves relative to the shaft 22 one-half the distance that the collar 70 moves relative to the tubular member 24, but in reality, the collar 60 and the collar 70 both move the same distance relative to the frame 12 or the shaft 22 since the collar 70 moves along the tubular member 24 as the tubular member 24 moves along the shaft 22. Therefore, the threads 42 must have twice the pitch as the threads 32 so that the collar 70 moves the same distance but in an opposite direction as the collar 60 moves relative to the main frame 12 upon one revolution of the tubular member 24.

The auxiliary frame 14 is shown in the lowered position in FIGURE 4. As shown in FIGURE 4, the links 18 and 20 are collapsed and extend transversely across

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the width of the main frame 12. In this position, the collars 60 and 70 are disposed adjacent the supporting members 28 and 34 respectively. Upon rotation of the tubular member 24 by the crank 44, the collar 60 moves toward the middle of the main frame 12 and the collar 70 moves toward the middle of the main frame 12 such that the second ends of the links 18 and 20 are moved together so that the links pivot relative to one another. As the links 18 and 20 pivot relative to one another about the pivotal connection 46, the first ends of the links 18 and 20 move closer together and in so doing move the sleeves 50 and 52 along the rod 48 and circumferentially about the rod 48.

It will be readily clear to those skilled in the art that the improved bed assembly, generally shown at 10 in FIGURES 1 through 7, is adaptable to be placed upon a bed frame to support a mattress or may serve as a bed frame itself by attaching supporting means such as legs to the main frame 12.

However, it is often desirable that the bed assembly be as light as possible and portable in order to afford easy transfer from one bed to another. Accordingly, an improved bed assembly adapted to be placed over a portion of the length of a bed frame, such as one-half of the length of the bed frame, is shown generally at 110 in FIGURE 8. The improved bed assembly 110 is preferably made of light weight material such as aluminum so that the assembly can be easily moved from place to place to be used with different beds.

The improved bed assembly 110 includes a main frame 112 and an auxiliary frame 114. The auxiliary frame 114 is pivotally connected at a first end thereof to a first end of the main frame 112 through the T connections 115. The T connections 115 are welded, brazed, or secured in any other appropriate manner to the auxiliary frame 114 and are disposed on the cross member 116 of the main frame 112 for rotational movement thereabout. The straps 117 extend transversely of the auxiliary frame 114 and are suitable for supporting a mattress or the like and may be made of metal, plastic, leather, or any other appropriate material. In a like manner, the straps 119 are disposed transversely of the main frame 112. Since the straps 119 may rest on the main frame of a bed or the like, and do not support a mattress, they are preferably made of metal to provide structural rigidity and support of the main frame 112.

The auxiliary frame 114 has a pair of structural members 101 secured thereto by brazing, welding, or the like. A structural brace 102 interconnects the members 101 by being brazed, welded, or the like, to the respective members 101. The members 101 extend upwardly from the assembly so that a mattress or the like may abut the structural member 102. A rod 148 is attached to and extends between the members 101. The sleeves 150 and 152 are rotatably and slidably disposed on the rod 148 so that they move toward or away from each other along the axis of the rod and rotate about the axis of the rod 148. The sleeves 150 and 152 are the same as the sleeves 50 and 52 discussed hereinabove.

A pair of links 118 and 120 are connected together in a scissors-like fashion by the bolt 126 intermediate the respective ends of each of the links. Each of the links 118 and 120 are pivotally connected to one of the respective sleeves 150 and 152.

A pair of support members 128 and 134 are secured by brazing, welding, or the like to the main frame 112. A member 131 is attached to each respective support member 128 and 134 for the collars 160 and 170, to be more fully described hereinafter, to bear against. The second ends of the links 118 and 120 are pivotally connected respectively to the collars 160 and 170 by the respective pins 158. The collars 160 and 170 are moved toward and away from each other by the actuation mechanism disposed between the support members 128 and 134.

The actuating mechanism utilized with the improved bed assembly of FIGURE 8 is generally disclosed in FIGURES 9 and 10 with the embodiment of FIGURE 9 being the actuation mechanism specifically disclosed in FIGURE 8.

Referring now to FIGURE 9, there is disclosed a shaft 122 mounted on the main frame 12 by a pin 126 and the support member 128. The shaft 122 has threads 132 thereabout. The shaft 122 is also substantially parallel to the rod 148. A tubular member 124 is mounted on the main frame 12 by the support member 134. The support member 134 has a bushing 136 for rotatably supporting the tubular member 124. That is to say, the tubular member 124 may be rotated within the bushing 136 but is prevented from moving axially through the bushing 136.

The tubular member 124 has external threads 142 thereabout. A collar 170 similar to the collar 70 shown in FIGURES 1 through 7 threadedly engages the external threads 142 on the tubular member 124. A crank 144 is secured by the pin 145 to the tubular member 124 so that the tubular member 124 may be rotated.

A sleeve-like means 139 is disposed intermediate the shaft 122 and the tubular member 124 for movement axially of the shaft 122 and the tubular member 124. A flanged member 138 is secured to one end of the sleeve-like member 139 by welding, brazing, or the like. A collar 160 similar to the collar 60 disclosed in FIGURES 1 through 7 is disposed on the flanged member 138 for movement circumferentially about the sleeve-like member 139. The sleeve-like member 139 has threads 140 internally thereof which coact with the threads 132 of the shaft 122. The sleeve-like member 139 also has a slot 162 therealong. A key 164 is secured in a recess in the tubular member 124 so as to slide along the slot 162 as the sleeve-like member 139 moves.

In the operation of the actuation mechanism disclosed in FIGURE 9, the crank 144 is rotated to rotate the tubular member 124 which in turn moves the threaded collar 170 along the tubular member 124. At the same time, the sleeve-like member 139 is rotated due to the keyed interconnection 162 and 164 so that the sleeve-like member 139 coacts with the threads 132 of the shaft 122 so that the sleeve-like member moves axially of the tubular member 124 and of the shaft 122. Upon rotation of the tubular member 124, therefore, the collars 160 and 170 will move toward or away from each other, depending upon the direction of rotation of the crank 144. At the same time, the member 131 is in sliding engagement with the collars 160 and 170 respectively so that forces transmitted to the collars 160 and 170 by the links 118 and 120 will be transmitted through the member 131 and support members 128 and 134 to the main frame 112.

The actuation mechanism shown in FIGURE 10 is a variation of the actuation mechanism shown in FIGURE 9 and differs therefrom only in that the sleeve-like member 139' threadedly engages the tubular member 124 instead of the shaft 122'. The sleeve-like member 139' has threads 132' thereabout which engage threads 140' internally of the tubular member 124. The sleeve-like member 139' also has a slot 162' therein which slides a key 164' so that the sleeve-like member 139' is prevented from rotating relative to the shaft 122' but is free to move axially along the shaft 122'.

In the operation of the actuation mechanism of FIGURE 10, the crank 144 is rotated to rotate the tubular member 124 so that the internally threaded collar 170 moves along the tubular member 124. At the same time, the sleeve-like member 139', and consequently the collar 160, is moved along the shaft 122' through the interaction of the threads 132' and 140'. Therefore, upon rotation of the tubular member 124, the collars 160 and 170 move toward or away from each other depending upon the direction of rotation of the tubular member 124.

The utilization of an actuation mechanism of the type described with links which are pivotally connected together in a scissors-like fashion provides the capability for the auxiliary frame to be pivoted through a large arc relative to the main frame. This is so since the full length of the links may be utilized. Although it is not normally necessary, the tubular member may be rotated so that the collars are very close together so that the links are disposed substantially perpendicular to the tubular member and the rod. In this manner substantially the full length of the links may be utilized to attain maximum pivotal movement of the auxiliary frame.

It is also within the scope of this invention to utilize an appropriate means such as an electric motor to rotate the tubular member.

The invention has been described in an illustrative manner and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

We claim:

1. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said frame and said auxiliary frame; a rod connected at each end thereof to said auxiliary frame at a position remote from said pivotal connection; a pair of sleeves rotatably and slidably disposed on said rod; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; each link being pivotally connected at a first end thereof to one of said sleeves; and means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame.

2. A bed assembly as set forth in claim 1 including a bearing means connected to said frame and disposed adjacent said last-mentioned means for receiving loads transmitted to said last-mentioned means by said links.

3. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said main frame and said auxiliary frame; a threaded shaft mounted on said main frame; means threadedly engaging said shaft for movement along said shaft upon rotation of said means; said means having external threads with a greater pitch than said threaded shaft; first connection means disposed on said means for moving along said shaft with said means; second connection means in threaded engagement with said external threads of said means; means for rotating said first-mentioned means so that said first connection means moves toward and away from said second connection means depending upon the direction of rotation; and said first and second connection means being operably connected to said auxiliary frame for pivoting said auxiliary frame upon movement of said first and second connection means.

4. A bed assembly as set forth in claim 3 including a bearing means connected to said main frame and disposed adjacent said shaft and said means having external threads for receiving loads transmitted thereto by said first and second connection means.

5. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said main frame and said auxiliary frame; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; means operatively connecting a first end of each of said links to said auxiliary frame at a position remote from said pivotal connection for allowing said first ends of said links to move along an axis toward and away from each other and to allow said first end of each of said links to pivot about said axis; means disposed on said main

frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame including, a threaded shaft mounted on said main frame, a tubular member disposed about said shaft and having internal threads for threadedly engaging said threaded shaft, said tubular member having external threads disposed circumferentially thereof, said threads on said shaft and said internal threads of said tubular member having one-half the pitch of said external threads disposed on said tubular member, said tubular member being mounted on said main frame for rotational movement and movement parallel to the longitudinal axis thereof along said shaft, means operatively connecting said second end of said first link to one end of said tubular member for rotational movement circumferentially about said tubular member and for movement along said shaft with said tubular member; means operatively connecting said second end of said second link in threaded engagement with said external threads of said tubular member for allowing said second end of said second link to move along said tubular member and for allowing said second link to rotate circumferentially about said tubular member, and means operatively connected to said tubular member for rotating same so that upon rotation of said tubular member by said means, said tubular member will move along said shaft and said second end of said second link will move along said tubular member as said tubular member moves along said shaft whereby the distance between said second ends of said links will decrease or increase depending upon the direction of rotation of said tubular member to change the pivotal disposition of said first link relative to said second link to change the distance between said first ends of said links thereby to pivot said auxiliary frame relative to said main frame.

6. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said main frame and said auxiliary frame; a rod connected at each end thereof to said auxiliary frame at a position remote from said pivotal connection; a pair of sleeves rotatably and slidably disposed on said rod; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; each link being pivotally connected at a first end thereof to one of said sleeves; means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame including, a shaft having threads mounted on said main frame in a substantially parallel relationship to said rod, a tubular member disposed about said shaft for movement along said shaft, an internally threaded element connected to a first end of said tubular member for threadedly engaging said shaft, said tubular member having external threads thereabout, said threads on said shaft having one-half the pitch of said external threads on said tubular member, said tubular member being mounted on said main frame for rotational movement and movement parallel to the longitudinal axis thereof along said shaft, a first collar secured to said internally threaded element for rotational movement circumferentially about said element, means for preventing movement of said first collar along said element, said second end of said first link being pivotally connected to said first collar, an internally threaded second collar disposed about said tubular member in threaded engagement with said external threads on said tubular member, said second end of said second link being pivotally connected to said second collar, a bearing means mounted on said main frame and disposed adjacent said shaft and tubular member for sliding engagement with said collars to receive loads transmitted to said collars by said links, and a crank means operatively connected to said tubular member for rotating same so that upon rotation of said

tubular member by said crank means, said tubular member will move along said shaft and said second collar will move along said tubular member as said tubular member moves along said shaft whereby the distance between said collars will decrease or increase depending upon the direction of rotation of said tubular member to change the pivotal disposition of said first link relative to said second link to change the distance between said sleeves thereby to pivot said auxiliary frame relative to said main frame.

7. An improved bed assembly adapted to be placed over approximately one-half the length of a bed frame for raising and lowering one end of the mattress, said assembly comprising: a main frame; an auxiliary frame which is substantially coextensive with said main frame; said auxiliary frame being pivotally connected at a first end thereof to a first end of said main frame; first and second links pivotally connected in a scissors-like fashion intermediate the respective ends of each link, means operatively connecting a first end of each of said links to said auxiliary frame adjacent the second end thereof for allowing said first end of said links to move along an axis toward and away from each other and to allow said first end of each of said links to pivot about said axis; and means disposed on said main frame adjacent the second end thereof for moving the second ends of the respective links toward and away from each other whereby said auxiliary frame may be pivoted relative to said main frame.

8. An improved bed assembly as set forth in claim 7 including a bearing means disposed adjacent said last-mentioned means for receiving loads transmitted to said last-mentioned means by said links.

9. An improved bed assembly adapted to be placed over the head portion of a bed frame to raise and lower a portion of a mattress or the like, said assembly comprising: a main frame; an auxiliary frame; said auxiliary frame being pivotally connected at a first end thereof to first end of said main frame; a rod connected at each end thereof to said auxiliary frame adjacent the second end of said auxiliary frame; a pair of sleeves rotatably and slidably disposed on said rod; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; each link being pivotally connected at a first end thereof to one of said sleeves; and means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame whereby a portion of the mattress may be raised and lowered.

10. An improved bed assembly as set forth in claim 9 including a bearing means connected to said main frame and disposed adjacent said last-mentioned means for receiving loads transmitted to said last-mentioned means by said links.

11. An improved bed assembly adapted to be placed over a portion of the length of a bed to raise and lower a portion of a mattress or the like, said assembly comprising: a main frame; an auxiliary frame including an upwardly extending portion disposed at a first end thereof for abutting the end of a mattress or the like, and transversely extending members for supporting a mattress or the like; said auxiliary frame being pivotally connected at the second end thereof to a first end of said main frame; said upwardly extending portion including a rod disposed transversely of said auxiliary frame; a pair of sleeves rotatably and slidably disposed on said rod; first and second links pivotally connected together in scissors-like fashion intermediate the respective ends of each link; each link being pivotally connected at a first end thereof to one of said sleeves; and means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame.

12. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said main frame and said auxiliary frame; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; means operatively connecting a first end of each of said links to said auxiliary frame at a position remote from said pivotal connection for allowing said first ends of said links to move along an axis toward and away from each other and to allow said first end of each of said links to pivot about said axis; means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame including, a shaft mounted on said main frame, a tubular member rotatably mounted on said main frame coaxially with said shaft, sleeve-like means disposed intermediate said shaft and said tubular member for movement axially of said shaft and said tubular member, said sleeve-like means being in threaded engagement with one of said shaft and said tubular member, said sleeve-like means being keyed against rotation relative to the other one of said shaft and said tubular member, said tubular member having external threads thereabout, means operatively connecting said second end of said first link to said sleeve-like means for rotational movement circumferentially about said sleeve-like means and for movement along said shaft with said sleeve-like means, means operatively connecting said second end of said second link in threaded engagement with said external threads of said tubular member for allowing said second end of said second link to move along said tubular member and for allowing said second link to rotate circumferentially about said tubular member, and means operatively connected to said tubular member for rotating same so that upon rotation of said tubular member, said sleeve-like means will move along said shaft and said second end of said second link will move along said tubular member whereby the distance between said second ends of said links will decrease or increase depending upon the direction of rotation of said tubular member to change the pivotal disposition of said first link relative to said second link to change the distance between said first ends of said links thereby to pivot said auxiliary frame relative to said main frame.

13. An improved bed assembly comprising: a main frame; an auxiliary frame; a pivotal connection between said main frame and said auxiliary frame; first and second links pivotally connected together in a scissors-like fashion intermediate the respective ends of each link; means operatively connecting a first end of each of said links to said auxiliary frame for allowing said first ends to move along an axis toward and away from each other and to allow said first end of each link to pivot about said axis including, a rod connected at each end thereof to said auxiliary frame at a position remote from said pivotal connection, a pair of sleeves rotatably and slidably disposed on said rod, each link being pivotally connected at said first end thereof to one of said sleeves; means disposed on said main frame for moving the second ends of the respective links toward and away from each other to pivot said auxiliary frame relative to said main frame including, a shaft mounted on said main

frame, a tubular member rotatably mounted on said main frame coaxially with said shaft, sleeve-like means disposed intermediate said shaft and said tubular member for movement axially of said shaft and said tubular member, said sleeve-like means being in threaded engagement with one of said shaft and said tubular member, said sleeve-like means being keyed against rotation relative to the other one of said shaft and said tubular member, said tubular member having external threads thereabout, a first collar secured to one end of said sleeve-like means for rotational movement circumferentially about said sleeve-like means, means on said sleeve-like means for preventing movement of said first collar along said sleeve-like means, said second end of said first link being pivotally connected to said first collar, an internally threaded second collar disposed about said tubular member in threaded engagement with said external threads, said second end of said second link being pivotally connected to said second collar, crank means operatively connected to said tubular member for rotating same so that upon rotation of said tubular member by said crank means, said sleeve-like means will move along said shaft and said second collar will move along said tubular member whereby the distance between said collars will be decreased or increased depending upon the direction of rotation of said tubular member to change the pivotal disposition of said first link relative to said second link to change the distance between said sleeves thereby to pivot said auxiliary frame relative to said main frame.

14. A bed assembly as set forth in claim 13 including a bearing means connected to said main frame and disposed adjacent said shaft, said sleeve-like means, and said tubular member and in sliding contact with said first and second collars for receiving loads transmitted to said first and second collars by said links.

15. A bed assembly as set forth in claim 13 wherein said sleeve-like means threadedly engages said shaft and is keyed to said tubular member against rotation relative to said tubular member while free to move axially along said shaft.

16. A bed assembly as set forth in claim 13 wherein said sleeve-like means is keyed to said shaft against rotation relative to said shaft while allowed to move axially along said shaft and is in threaded engagement with said tubular member internally thereof.

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FRANK B. SHERRY, *Primary Examiner.*

CASIMIR A. NUNBERG, *Examiner.*