Feb. 1, 1966 I. SHULKIN 3,231,904

RECLINING SECTIONAL BED

Filed July 29, 1963 2 Sheets-Sheet 1

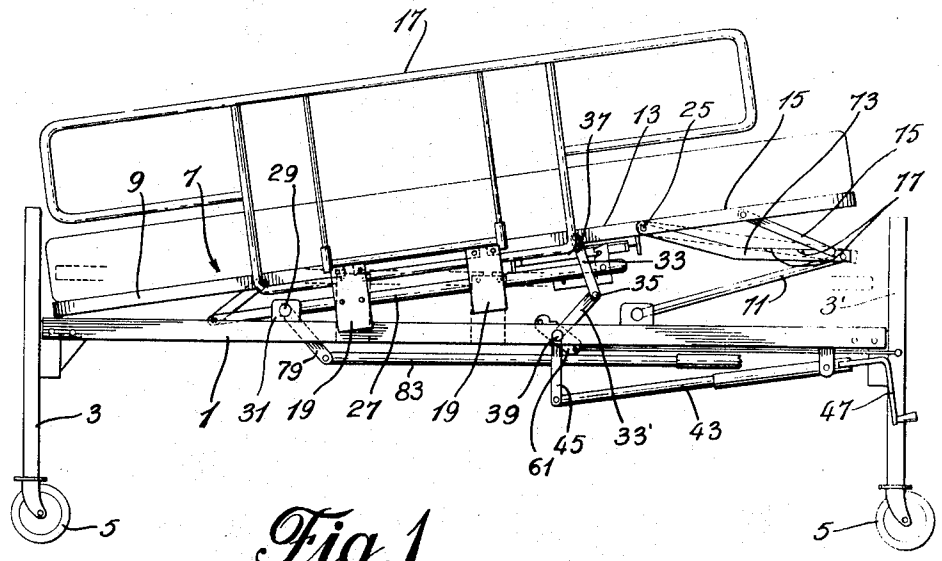


Fig. 1

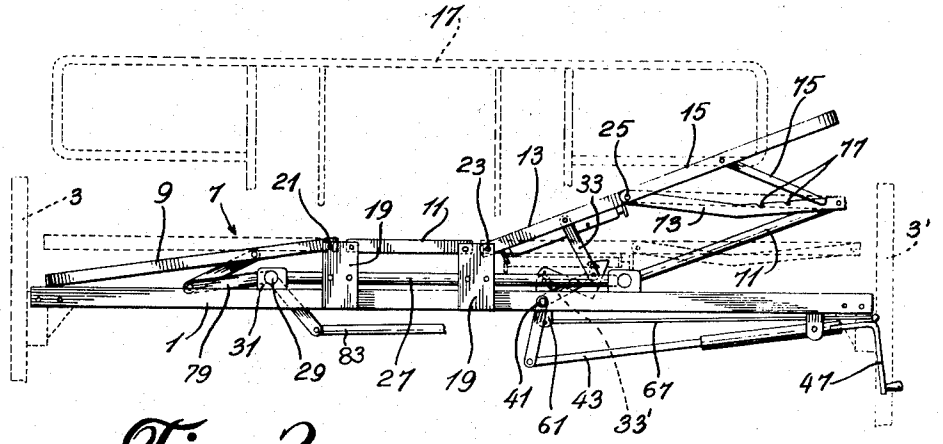


Fig. 2

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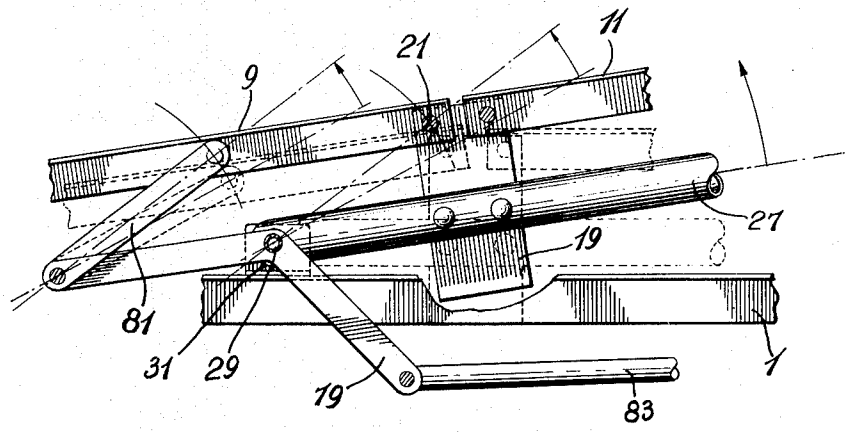


Fig. 3

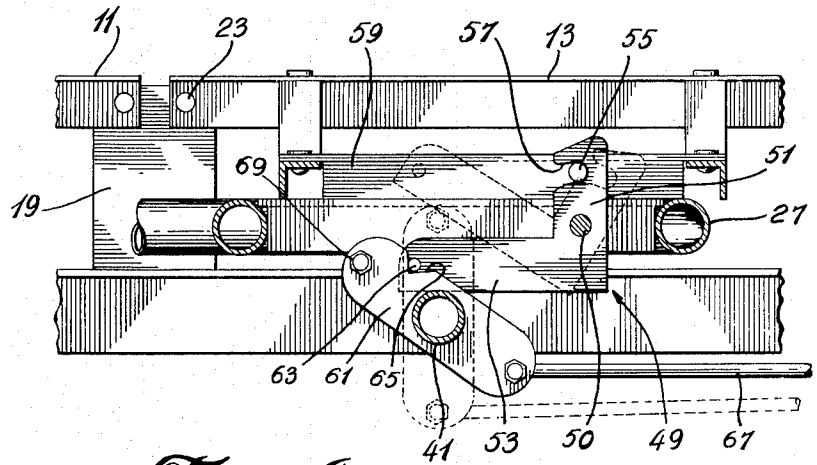


Fig. 4

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3,231,904

RECLINING SECTIONAL BED

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12 Claims. (Cl. 5—62)

The present invention relates to a hospital bed and more particularly to that type of hospital bed wherein the mattress supporting structure is formed of various sections articulated to one another.

More particularly, the invention is concerned basically with a mechanism for reclining a seat rest and a thigh rest of such a mattress supporting structure either simultaneously or independently of one another, in conjunction with separate actuating means for adjusting the angular position of the head rest and that of the leg rest of the same mattress supporting structure.

A main object of the invention resides in the provision of a hospital bed of the above mentioned type particularly suitable for obtaining Trendelenburg or shock position, that is a position of the body for medical examination or operation wherein the patient is supine on a table inclined at from 10° to 20° from the horizontal in a perfectly straight line; with the head laying lowermost and the knees and legs uppermost.

It is also an important object of the invention to provide such a hospital bed wherein the thigh rest which is articulated to the seat rest may be actuated by an elevating mechanism independently of the said seat rest and wherein both the said seat rest and thigh rest may be raised into inclined position simultaneously and in in-line relationship by the same elevating mechanism.

It is also within the scope of the invention to provide a hosiptal bed wherein separate and individual elevating mechanisms are used for lifting the head section, articulated to the seat section, and the leg section, articulated to the thigh section.

The above mentioned objects may be attained with a reclining hospital bed made according to the invention which comprises: a horizontal bed frame adapted to support the mattress supporting structure above the floor, this structure including a seat rest with supporting means for holding it in spaced relationship with the bed frame in one particular position of the bed; an underframe secured to the supporting means below the seat rest and articulated at the forward end thereof to the bed frame; the mattress supporting structure also including a thigh rest articulated, at one end, to the rearward end of the seat rest and provided with elevating means interconnecting it with the bed frame, rearwardly of the articulated end of the thigh rest and finally locking means for locking the underframe to the thigh rest when the latter is in alignment with the feet rest whereby in locked condition, the elevating means will rotate the seat rest and the thigh rest in unison about the articulated means of the underframe, and, when unlocked, will rotate the thigh rest about its articulated end.

In a preferred form of the invention, the elevating means comprises a pair of operating levers on at least one side of the bed frame, the levers being articulated together at one of their ends and being articulated, at the other ends, to the thigh rest and to rotatable shaft mounted transversely of the bed frame, respectively; actuating means being provided for causing rotation of the transverse shaft thus articulating the levers to raise or lower the thigh rest.

Again, in accordance with a preferred embodiment of the invention, the locking means comprises: an L-shaped arm pivoted intermediate the ends thereof on the underframe and having a light and a heavy branch

whereby the resulting unbalance tends to cause rotation in a predetermined direction; a locking pin on the thigh rest; a hook, formed in the light branch, adapted to receive the pin when the thigh rest and the seat rest are in alignment; and means for releasing the hook from the pin and maintaining it out of engagement therewith.

Further objects and other advantages of the invention will become apparent as the following description proceeds of a preferred embodiment of the invention and in relation with the appended drawings wherein:

FIG. 1 is a view in elevation showing the mattress supporting structure in Trendelenburg or shock position;

FIG. 2 is a side elevation view similar to that of FIG. 1 but showing the various sections of the bed supporting structure in out of line position;

FIG. 3 is an enlarged partial side elevation view intended to particularly illustrate the articulating means of the underframe and the head rest;

FIG. 4 is also an enlarged side elevation partial view of the locking means for joining together the underframe and the leg rest;

As illustrated in FIG. 1, the hospital bed made according to the invention generally comprises a horizontal bed frame **1** supported, as is known, forwardly and rearwardly by upward head and foot frames **3**, **3'**, respectively, provided with suitable casters **5** for moving about the floor.

Over horizontal bed frame **1** is mounted a mattress supporting frame **7** formed of head rest **9**, seat rest **11**, thigh rest **13** and leg rest **15**. Supporting frame **7** also includes the usual side railings **17** for protecting the patient, particularly in transit.

As seen particularly in FIGS. 1 and 2, seat rest **11** is secured on either side thereof, to the top portion of supporting brackets or legs **19**. Legs **19** are provided with suitable means, not shown, for retaining seat rest **11** in spaced parallel relationship with horizontal bed frame **1** in the particular position shown in FIG. 2.

Head rest **9** is articulated to the forward brackets **19** as by an articulation axle **21**, similarly thigh rest **13** is articulated, at one end thereof, to the rear pair of brackets or legs **19** by means of the articulated axle **23** and has the other end thereof articulated to one end of the leg rest **15** through articulation axle **25**.

An underframe **27** consisting mainly of a tubular structure is fastened to the brackets **19** so as to be constantly parallel to the seat rest **11**. Underframe **27** is articulated, at the forward end thereof, through an articulation axle mounted on brackets **31** solidly fixed on the frame **1** on each side of the horizontal bed frame **1** forming the articulation means of the underframe.

Rearwardly of the seat rest **11** is a locking means (to be described in more detail later) adapted to join together the underframe **27** and the thigh rest **13**. Also, an elevating means (again to be more fully described later) is provided which interconnects the horizontal bed frame and the thigh rest **13**. Thus, when the locking means locks together the underframe **27** and the thigh rest **13**, the situation is that illustrated in FIG. 1 whereby when the elevating means is operated, both the seat rest and the thigh rest are raised in unison. Similarly, a linkage mechanism joins the articulated axle **25** between thigh and leg rests **13** and **15** to bed frame **1** and is provided with suitable means for holding the said leg rest into inclined position as shown in FIGS. 1 and 2.

The elevating means for thigh rest **13** (as well as for seat rest **11** through underframe **27** as will be seen later) comprises an angular lever **33'–45** and an arm on at least one side of said frame **11**. The lever **33'–45** forms a fixed angle between two arms **33'** and **45**. The lever and the arm **33** are articulated together at one of their ends by

means of an articulated pin 35 or the like and the arm 33 is articulated at its other ends 37 to thigh rest 13. The apex of lever 33'–45 is mounted onto a rotatable shaft 41 (see FIG. 4) transversely of bed frame 1. An actuating means is provided for causing rotation of the lever 33'–45 whereby causing articulation of the arm 33 to thus raise or lower thigh rest 13. As said previously, actuation of this actuating means in the case where thigh rest 13 is locked with underframe 27 when it is in alignment with seat rest 11 will cause the two rests to move in unison, as illustrated in FIG. 1.

The actuating means for elevating thigh rest 13 comprises an elevating means 43 generally composed of a threaded rod receivable into a cylinder having a threaded bore. The cylinder, as will be understood, is rotatable by means of a handle 47 to thereby cause the threaded rod to move in or out of the threaded cylinder thus forcing oscillation of the lever 33'–45 and articulation of arm 33 with consequent raising or lowering of thigh rest 13.

In conjunction with this elevating means, is a locking means for joining together the thigh rest 13 and the seat rest 11 when the two are in alignment as shown in FIGS. 1 and 4.

The locking means comprises an L-shaped arm 49 pivoted at 50 intermediate the ends thereof on underframe 27 and having a light branch 51 as well as a heavy branch 53 whereby resulting in an unbalance which tends to cause rotation of the lever or arm in a predetermined direction. The locking means also includes a locking pin 55 on thigh rest 13 and more particularly on a strut or the like stiffening member 59 provided underneath the said thigh rest 13; this pin 55 being adapted to be received in a hook 57 formed at the end of the light branch 51. Means is provided for releasing the hook from the pin and maintaining it out of engagement therewith, this releasing means comprising: a link 61 mounted on transverse shaft 41 for rotation thereon, the said link is biased in a vertical position on account of the weight or pulling means at the lower end of said link; a lug 63 secured to the free end of heavy branch 53 of L-shaped arm 49, this lug being engageable in a notch 65 formed in link 61. Nut 69 projects laterally of link 61 at one extreme end thereof. Finally, a push rod or operating rod 67 is secured to the other end of the said link. As shown in FIG. 2, push rod 67 is available adjacent handle 47 of the elevating mechanism.

The weight of rod 67 tends to keep link 61 in the vertical position particularly shown in dotted lines in FIG. 4. A nut 69 fixed to the link 61 normally maintains the L-shaped arm 49 in the tilted position shown in dotted lines in FIG. 4.

It will be understood from perusal of FIG. 4, that under the heavier weight of branch 53 of L-shaped lever 49, when rests 11 and 13 are in alignment and in the position shown in FIG. 4, hook 57 has a tendency to move over locking pin 55 to lock thigh rest 13 to underframe 27 when the nut 69 is out of the way of the arm 49, that is, when the rod 67 has been pulled and the link 61 is tilted as shown in full lines in FIG. 4. If it is intended to lock the thigh rest 13 to the underframe 27, then push rod 67 is actuated forwardly (to the right) causing an anti-clockwise rotation of link 61 and engagement of lug 63 in notch 65. In this position, the hook 57 cannot come apart from pin 55 because the pin 63 is locked in notch 65. The bed is now raised in one plane as shown in FIG. 1. The link 61 returns to its vertical position as shown in FIG. 2 by the weight of rod 67. A spring may also be used to pull the rod 67 in the direction of the foot rest. In order to unlock thigh rest 13 and the underframe 27, the handle 47 is actuated to return the bed from the inclined position (FIG. 1) to a horizontal position. Eventually, nut 69 reaches and rides along the lower edge of the heavy branch 53 as indicated in broken lines in FIG. 4 to remove lug 55 out of engagement with hook 57.

Turning back to FIGS. 1 and 2, an articulated linking means formed of a lower lever 71 and a rack bar 73 interconnected together and to bed frame 1 and articulation axle 25, respectively, is provided for retaining the leg rest 15 into inclined position, whenever desired. The articulated means also includes a bracing bar 75 pivoted at one end to leg rest 15 and having a cross bar (not shown) at the other end thereof selectively engageable into the notches 77 of rack bar 73. This way it is possible to give a positive inclination to and support to leg rest 15 as illustrated in FIGS. 1 and 2.

Finally, means is provided for articulating the head rest 9, which means is more particularly illustrated in FIG. 3 and is shown to include at least one angular lever 79 on the side of bed frame 1, pivotally mounted on axle 29, at the apex thereof, on bracket 31 fixed to the bed frame 1. The means also includes a link 81 articulated at one end to the head rest 9 and at the other end to one end of angular lever 79 while a pushing rod 83 may be used for causing oscillation of angular lever 79 to thereby vary the inclination of head rest 9 in relation to horizontal frame 1.

Althuogh a specific embodiment of the invention has just been described, it will be understood that various modifications may be made thereto without departing from the spirit of the present invention, the scope of which should only be construed from the appended claims.

I claim:

1. In a reclining sectional bed, the combination comprising:

(a) a horizontal bed frame;
(b) a seat rest;
(c) supporting means on said seat rest adapted to support said seat rest in spaced relationship with said bed frame on one position of said bed;
(d) an underframe secured to said supporting means below said seat rest;
(e) articulating means joining the forward end of said underframe to said bed frame;
(f) a thigh rest articulated, at one end, to the rearward end of said seat rest;
(g) elevating means interconnecting said thigh rest and said bed frame rearwardly of the articulated end of said thigh rest;
(h) locking means for locking said underframe and said thigh rest when the latter is in alignment with said seat rest whereby in locked condition, said elevating means will rotate said seat rest and said thigh rest in unison about said articulating means of said underframe and when unlocked will rotate said thigh rest about its articulated end.

2. In a reclining sectional bed, the combination comprising:

(a) a horizontal bed frame;
(b) a seat rest;
(c) legs depending from and solid with said seat rest and adapted to support said seat rest on said bed frame in one position of said bed;
(d) an underframe secured to said legs below said seat rest;
(e) articulating means joining the forward end of said underframe to said bed frame;
(f) a thigh rest articulated, at one end, to the rearward end of said seat rest;
(g) elevating means interconnecting said thigh rest and said bed frame rearwardly of the articulated end of said thigh rest;
(h) locking means for locking said underframe and said thigh rest when the latter is in alignment with said seat rest whereby in locked condition, said elevating means will rotate said seat rest and said thigh rest in unison about said articulating means of said underframe and when unlocked will rotate said thigh rest about its articulated end.

3. A combination as claimed in claim 2, wherein said elevating means comprises: a pair of operating levers on

at least one side of said bed frame; said levers being articulated together at one of their ends and articulated, at their other ends, to said thigh rest and to a rotatable shaft mounted transversely of said bed frame, respectively; actuating means for causing rotation of said transverse shaft and articulation of said levers to raise or lower said thigh rest.

4. A combination as claimed in claim 3, wherein said locking means comprises: an L-shaped arm pivoted intermediate the ends thereof on said underframe and having a light and a heavy branch whereby the resulting unbalance will tend to cause rotation in a predetermined direction; a locking pin on said thigh rest; a hook formed in said light branch adapted to receive said pin where said thigh rest and seat rest are in alignment; means for releasing said hook from said pin and maintaining it out of engagement therewith.

5. In a reclining sectional bed, the combination comprising:

(a) a horizontal bed frame;

(b) a seat rest;

(c) legs depending from and solid with said seat rest and adapted to support said seat rest on said bed frame in one position of said bed;

(d) an underframe secured to said legs below said seat rest;

(e) articulating means joining the forward end of said underframe to said bed frame;

(f) a thigh rest articuated, at one end, to the rearward end of said seat rest;

(g) elevating means interconnecting said thigh rest and said bed frame rearwardly of the articulated end of said thigh rest;

(h) locking means for locking said underframe and said thigh rest when the latter is in alignment with said seat rest whereby in locked condition, said elevating means will rotate said seat rest and said thigh rest in unison about said articulating means of said underframe and when unlocked will rotate said thigh rest about its articulated end;

(i) a head rest articulated at one end to the forward end of said seat rest;

(j) means for articulating said head rest independently of said elevating means;

(k) a leg rest articulated at one end to the rearward end of said thigh rest;

(l) articulated linking means joining said bed frame and the articulation between said thigh and leg rests; said linking means including a rack bar, and

(m) a bracing bar pivoted at one end to said leg rest and selectively engageable, at the other end, into the notches of said rack bar to fix said leg rest into desired position.

6. A combination as claimed in claim 5, wherein said means for articulating said head rest includes at least one angular lever rotatively mounted, at the apex thereof, on said fed frame, a link articulated at one end to said head rest and at the other end to one end of said angular lever and means for causing rotation of said angular lever to raise or lower said head rest.

7. A combination as claimed in claim 5, wherein said elevating means comprises: a pair of operating levers on at least one side of said bed frame; said levers being articulated together at one of their ends and articulated, at their other ends, to said thigh rest and to a rotatable shaft mounted transversely of said bed frame, respectively; actuating means for causing rotation of said transverse shaft and articulation of said levers to raise or lower said thigh rest.

8. A combination as claimed in claim 7, wherein said locking means comprises: an L-shaped arm pivoted intermediate the ends thereof on said underframe and having a light and a heavy branch whereby the resulting unbalance will tend to cause rotation in a predetermined direction; a locking pin on said thigh rest; a hook, formed in said light branch adapted to receive said pin when said thigh rest and seat rest are in alignment; means for releasing said hook from said pin and maintaining it out of engagement therewith.

9. A combination as claimed in claim 4, wherein said releasing means comprises: a link mounted on said transverse shaft and biased towards a vertical position; a projection on the side of the said link and located at the upper end of said link, said projection being in the plane of the heavy branch of the L-shaped arm and adapted to raise the said arm when the latter is lowered over the said projection.

10. A combination as claimed in claim 9, wherein the locking means further includes a lug on the free end of the said heavy branch engageable in a notch in said link, the combination of said lug in said notch adapted to prevent the hook from disengaging the said pin.

11. A combination as claimed in claim 8, wherein said releasing means comprises: a link mounted on said transverse shaft and biased towards a vertical position; a projection on the side of the said link and located at the upper end of said link, said projection being in the plane of the heavy branch of the L-shaped arm and adapted to raise the said arm when the latter is lowered over the said projection.

12. A combination as claimed in claim 11, wherein the locking means further includes a lug on the free end of the said heavy branch engageable in a notch in said link, the combination of the said lug in said notch adapted to prevent the hook from disengaging the said pin.

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