United States Patent [19]

Benoit et al.

[11] **3,797,050**

[45] **Mar. 19, 1974**

[54] **SHOCK AND DRAINAGE MECHANISM**

[75] Inventors: **Roland A. Benoit,** Danielson; **Richard H. Duprey,** Dayville, both of Conn.

[73] Assignee: **Interroyal Corporation,** New York, N.Y.

[22] Filed: **Aug. 10, 1972**

[21] Appl. No.: **279,676**

[52] **U.S. Cl.** **5/62,** 5/67

[51] **Int. Cl.** **A61g 7/10,** A61g 7/06

[58] **Field of Search** 5/60, 61, 62, 66–68; 128/33

[56] **References Cited**

UNITED STATES PATENTS

3,478,372	11/1969	Benoit et al.	5/62 X
3,220,019	11/1965	Nelson	5/62
1,529,699	3/1925	Hawk	5/62 X
3,243,825	4/1966	Tabbert	5/62

FOREIGN PATENTS OR APPLICATIONS

851,402	9/1970	Canada	5/62

Primary Examiner—Casmir A. Nunberg

Attorney, Agent, or Firm—Arthur A. March

[57] **ABSTRACT**

A novel mechanism for positioning a hospital bed in a plurality of shock and drainage positions utilized means for rotating the base of a support parallelogram in an arc. The rotating means are a pair of roller supported arc segments with the lower pivoting points of the support parallelogram positioned at the lower extremities of the arc segments. A crank mechanism positioned on the bed frame moves the rocker arms such that the desired shock or drainage position is attained and the bed may be raised or lowered while in any shock or drainage position.

9 Claims, 6 Drawing Figures

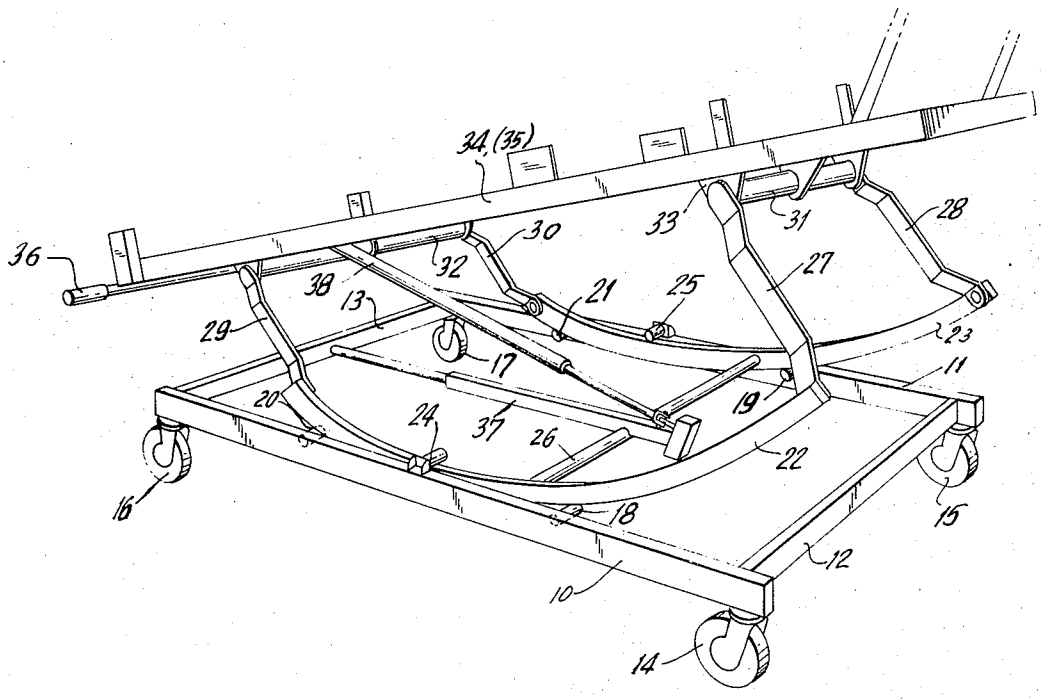


FIG. 1

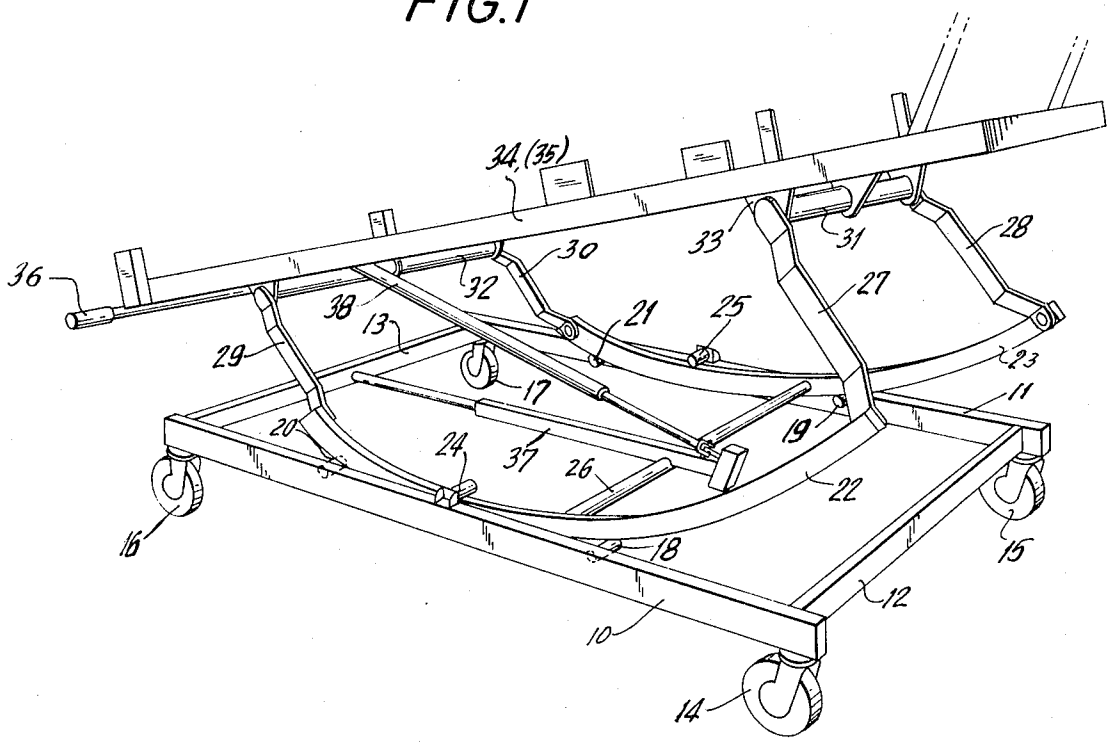
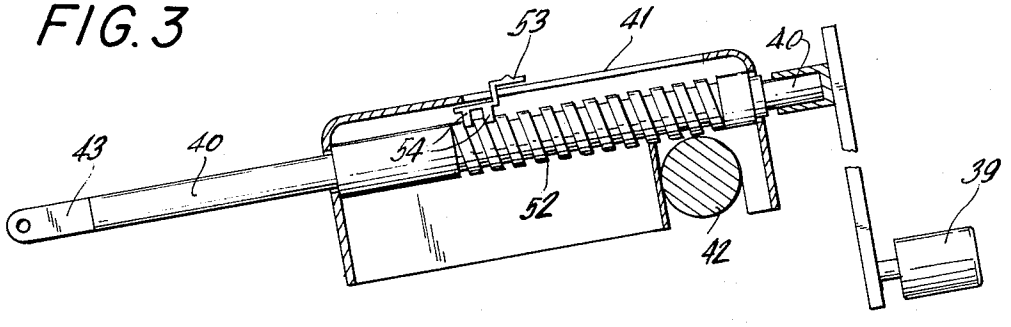

34, (35)
36
30
33
31
28
38
32
27
13
21
25
29
23
17
11
20
24
37
19
26
22
16
18
15
12
10
14

FIG. 3


53
41
40
43
40
54
52
42
39

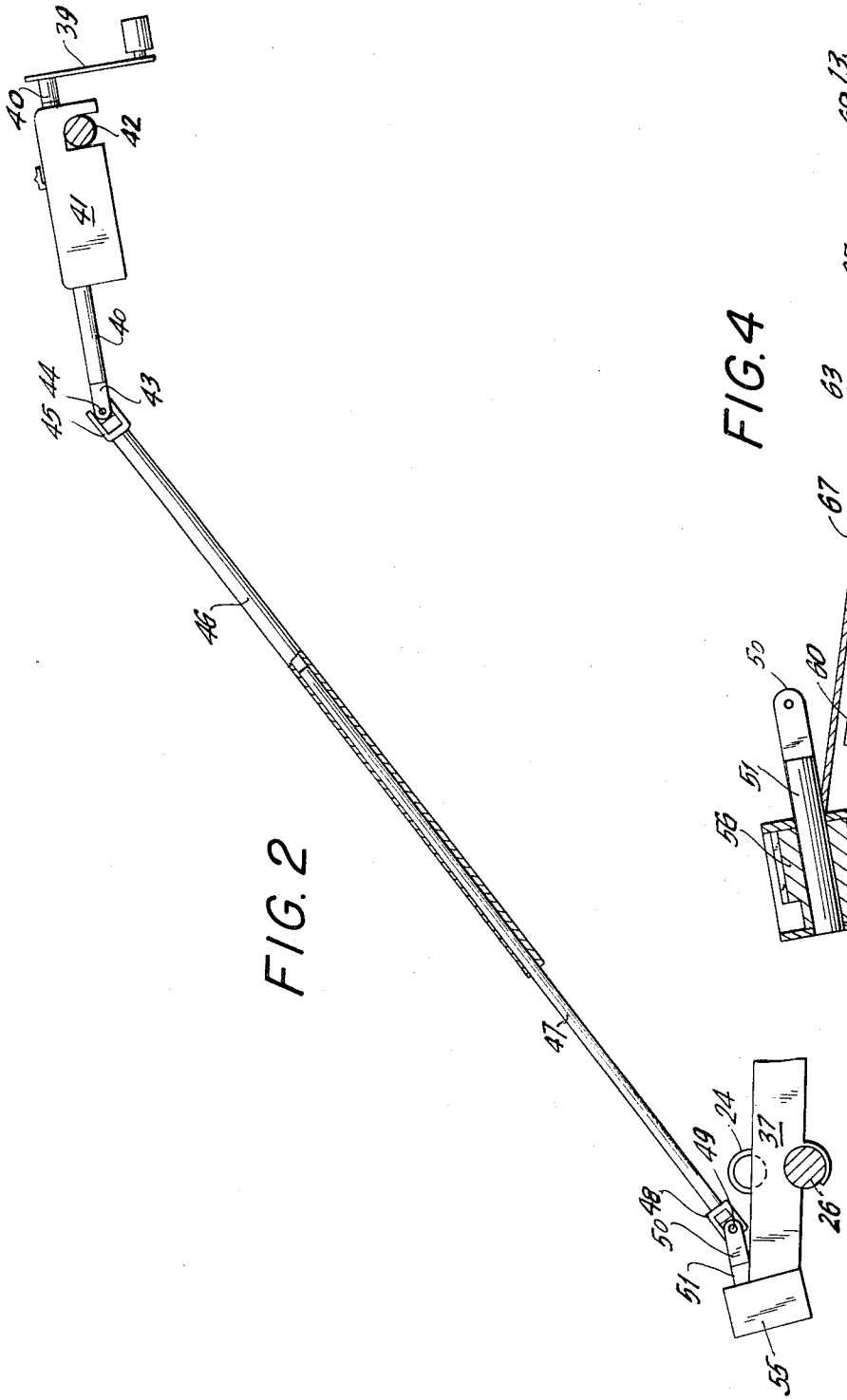

39
40
42
41
40
44
45
43
46
47
49
24
37
48
50
51
26'
55

FIG. 2

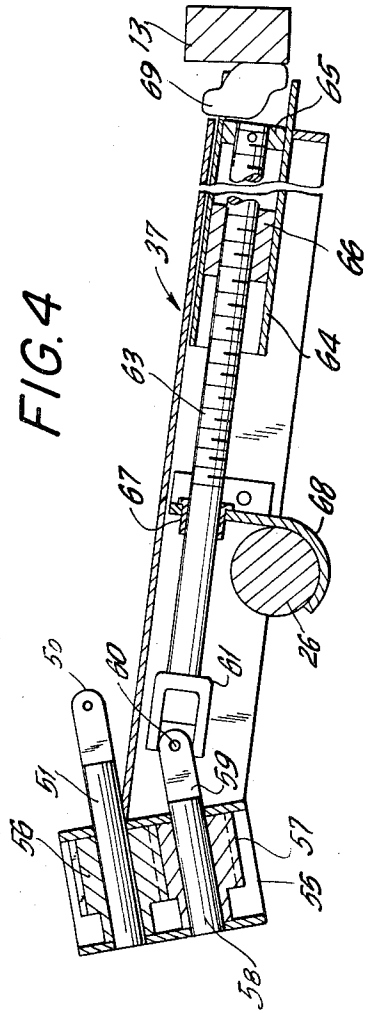

13
69
65
37
66
64
63
67
68
26
50
60
61
59
51
58
57
55
58

FIG. 4

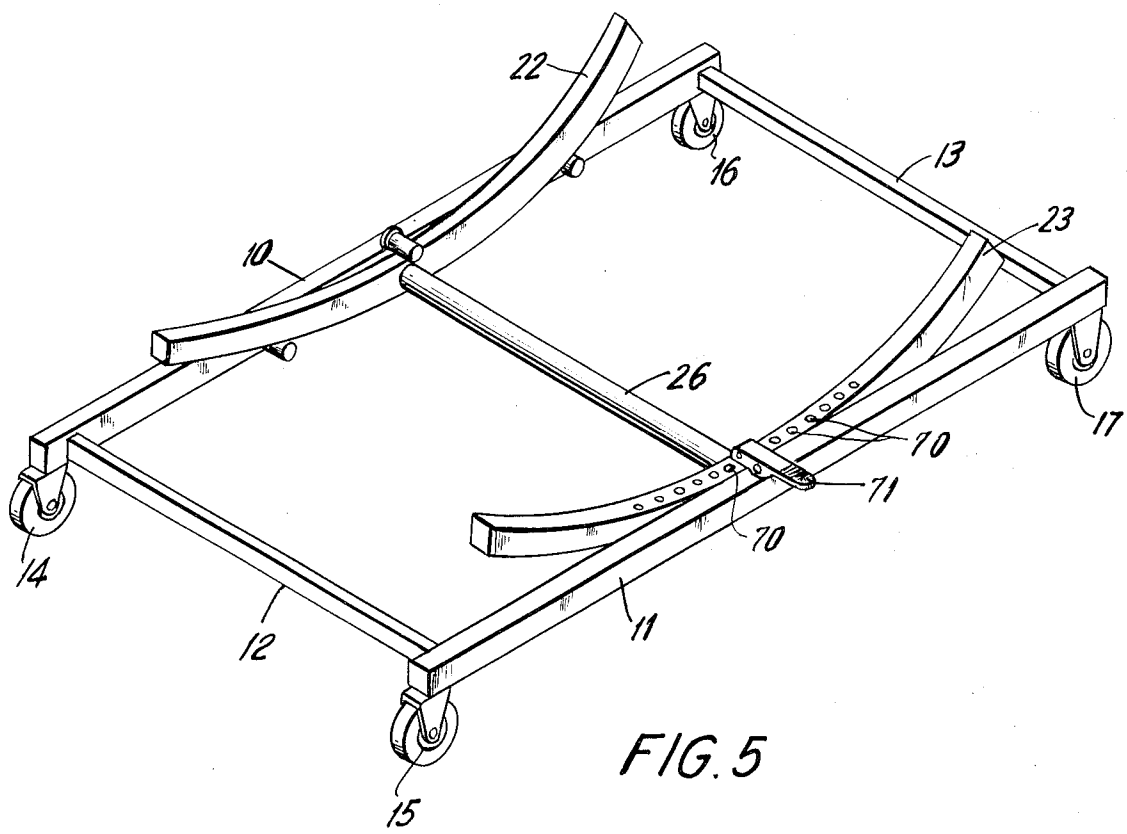


FIG. 5

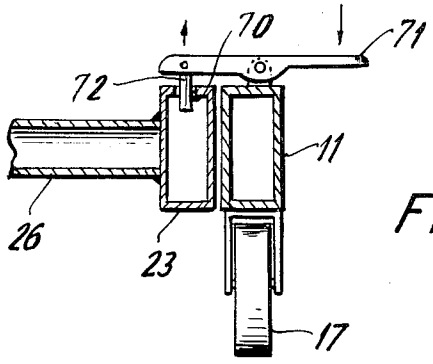


FIG. 6

SHOCK AND DRAINAGE MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to hospital beds and the like and particularly to hospital beds which may be placed in either of the shock or drainage positions, that is to say, in a position wherein either the head or foot portion is elevated.

The elevational positions which are commonly known as the shock or drainage (Trendelenberg or Reverse Trendelenberg positions are favored by some doctors for treatment of patients with certain circulatory or respiratory conditions. Prior art hospital beds have been designed to furnish either head or foot elevation. Normally a hospital bed is also equipped with a mechanical structure which permits its raising and lowering, called "hi-lo" positioning. Raising or lowering the head or foot end of the bed when it is in an elevated position normally requires a very complicated mechanism and prior art beds so adapted are very expensive.

One such prior art bed is described in Canadian Patent No. 851,402. The bed described by this patent has the drawback that there are provided but three positions by the arcuate mechanism; namely, at one end of arcuate movement, at the opposite end, and the central or horizontal configuration. The design of this bed also requires manual shifting of the bed to the desired position, also an undesirable feature. Furthermore, the bed could only be raised or lowered with the movable frame substantially parallel to the base.

The present invention relates to a simple and efficient mechanism for elevating either the head or foot end of a hospital bed and for attaining any of the various high and low positions mechanism. Crank means are provided so that any position may be obtained in the range from shock to drainage positions.

BRIEF DESCRIPTION OF THE INVENTION

Briefly stated the novel mechanism of this invention comprises a pair of opposed rocker arms or arc segments which serve to rotate the base of a bed support mechanism in an arc, the rocker arms being supported by roller assembly of the bed. A crank mechanism is provided to move rocker arms in relation to the bed frame so that a plurality of positions may be obtained. The outer extremities of the arc segments pivotally support the base portion of a support parallelogram which may be designed to furnish a hi-lo feature, if desired. Means are provided whereby the bed may be raised or lowered while in any shock or drainage position.

SPECIFIC DESCRIPTION OF THE INVENTION

The invention will be more clearly explained by reference to the attached drawings in which:

FIG. 1 is a perspective view of a lower support bed frame and the upper frame showing the novel shock or drainage positioning mechanism of this invention;

FIG. 2 is a perspective view of a lower support bed showing in more detail the mechanism for actuating the arc segments;

FIG. 3 is a detailed view, partly in cross section, of the cranking device showing the indicator device; and

FIG. 4 is a detailed view, partly in cross section, showing the operational segment of the actuating mechanism.

FIG. 5 is a perspective view of the arc segment of the bed of the present invention adapted for manual operation.

Fig. 6 is a view taken along the lines 6—6 of FIG. 5.

Turning now to the drawings, and with particular reference to FIG. 1, there is shown a lower support frame for a bed formed from side members 10 and 11 and spreader or cross members 12 and 13. The frame rests upon wheels 14, 15, 16 and 17 fastened to the side rails in a manner known to the art.

Positioned on the inside of each of the side members 10 and 11 are a pair of roller members 18, 19, 20 and 21. These rollers are preferably of nylon with raised edges, such as for example an empty thread spool, and are mounted on the side rails on journalled bearings by known methods.

Positioned upon rollers 18 through 21 are a pair of arc segments 22 and 23 adapted to be rotated or "rocked" thereon. The arc segments or shock and drainage rocker arms, are held in position against vertical movement, each by a single roller member 24 and 25.

The arc segments are held in fixed relation to each other by a spreader bar 26 which is preferably welded to the inside of the arc segments 22 and 23, but which may be fastened thereto by other known means.

At each extremity of arc segments 22 and 23 there is pivotally attached support arms 27, 28, 29 and 30, with the upper opposite ends of the support arms being held in fixed relation to each other by spreaders 31 and 32. The spreaders are rotatably attached by means of suitable bearings in bearing flanges, one of which is indicated at 33, to an upper support frame consisting of side rails 34 and 35 and the usual spreader bars, one of which is indicated by dotted lines at 36.

Upon the upper support frame there is supported the usual mattress support, in a manner known to the art.

Positioned within the lower frame members and adapted between the arc segment spreader bar 26 and the end rail of the lower support frame 13 is a telescoping screw mechanism 37, to be more specifically described below. The operational linkage for the screw mechanism is shown generally at 38.

Turning now to FIG. 2, reference numeral 39 indicates a hand crank which is affixed to crank shaft 40 which extends through journal vox 41. The journal as shown, is adapted to rest upon and be supported by cross member 42 which is an integral part of the bed frame. The inner end of crank shaft 40 terminates in a fork member 43 which is connected by means of pin 44 to a companion fork member 45 which is positioned on the upper end of extension arm 46. Thus fork members 43 and 45 coact in effect as a universal joint. Operating within arm 46 is arm 47 and which is in telescoping relation thereto. At the lower end of arm 47 is fork member 48, connected through pin 49 to fork member 50, again forming a universal joint. Fork 50 is fixed to the gear shaft.

The upper crank mechanism is more clearly shown by reference to FIG. 3. In this view the journal box 41 is broken away to show that shaft 40 is geared as at 52. An indicator 53 is positioned in a slot in the top of box 41 and has several threads 54 which match gear 52 and ride in the grooves of the gear. Thus, as crank 39 rotates shaft 40, indicator 53 rides in the grooves of the gear and indicates the position of the rocker arms.

In FIG. 4, there is shown, in more detail, screw mechanism 37. Fork 50 is attached to gear shaft which is which is journalled in gear case 55. Affixed to gear shaft is spun gear 56 which communicates with another gear 57, affixed to a gear shaft 58, also suitably journalled in gear case 55.

Gear shaft 58 terminates in a fork 59, which is connected by a connector pin 60 to a companion fork 61. Fork 61 is fixed to an acme screw 63, which is journalled at the extremity of tube 67, by sliding bearing member 65.

Acme screw operating nut 66 is fixed against movement within tube 64, and coacts with the screw threads of screw 63, in a manner known to the art. Fixedly attached to acme screw 63 by means of a fixed journal 67 is a mounting member 68, which is, in turn, rotatably attached to the arc segment spreader member 26.

The right end of tube member 64 is affixed to an end rail 13 of the lower support frame through a pivotal connection 69 so that they may arc slightly about the point of connection.

Thus, the power train for moving arc segments 22 and 23 on supporting rollers 18, 19, 20 and 21, and thus tilting the upper support frame, and its supported mattress pan, etc., is as follows:

Rotation of crank 68 is imparted through shaft 40 positioning indicator 53, forks 43 and 45, extension arms 46, 47, forks 48 and 50, gear shaft 51, gear 56, gear 57, gear shaft 58, and forks 59 and 61 to acme screw 63. By communicating with acme screw nut 66, which is fixed to tube member 64, and thus in spaced relation to the lower support frame through end rail 13, segment spreader 26 is moved in a slight arc transversely, to the right or left as viewed in FIG. 4, by means of the fixed relation of mounting member 68 and acme screw 63. The universal joint action of forks 43 and 45, 48 and 50, and 59 and 61, the telescoping action of extension arm members 46 and 47, the pivotal attachment of mount 68 to spreader 26 enables the power train to function smoothly without binding at any position throughout its traverse.

It may be seen that the support parallelogram formed of sides 27, 22, 29 and 34, and 28, 23, 30 (35) include movable bases 22 and 23 which are driven by the rocker arm assembly 38 coacting with 37 to provide any position between shock and drainage positions. Specifically, when telescoping members 46 and 47 rotate, the bases 22 and 23 are moved by movement of spreader member 26 attached therebetween.

In accordance with this invention the bed may be manually moved to any shock or drainage position by movement of the arc segments 22 and 23. For this purpose one of the arc segments is provided with apertures 70 to accommodate a pin (not shown) which is attached to foot peddle 71 and is movable into and out of position by manual depression of the foot peddle. Thus, when the peddle is depressed the pin comes out of the aperture 70 and the bed may be manually rocked at either the foot or head portion to any predetermined position. When the desired position has been attained it is only necessary to release the foot peddle 71 whereupon the pin will become inserted in the aperture in the arc segment at that position.

It is a feature of the invention that while the bed is in such prescribed shock or drainage position it may be raised or lowered by the means herein before set forth.

It will thus be seen that the objects of the invention including those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above apparatus, without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A hospital bed comprising:
an upper frame for supporting a mattress and being tiltable between shock and drainage positions;
a lower support frame;
a pair of spaced apart arcuate members movably supported by said lower support frame;
a support parallelogram comprising linking means forming legs thereof pivotally connecting said upper frame forming the upper side thereof to the outer ends of said arcuate members, said arcuate members forming the base of said parallelogram; and
means for moving said arcuate members for moving said upper frame between said shock and drainage positions.

2. A hospital bed according to claim 1, wherein said means for moving comprises a manually mechanically movable handle means.

3. A hospital bed according to claim 2, wherein said means for moving comprises a telescoping diagonal member connected between said handle means and said arcuate member, said telescoping diagonal member moving said arcuate members in arcuate path whereby said upper support frame is movable between said shock and drainage positions.

4. A hospital bed according to claim 3, comprising a pair of guides for each of said arcuate members, one of each of said guides resting on top of said arcuate member and the other of said guides supporting the bottom of said arcuate member, said guides forming said arcuate path of movement for said arcuate members.

5. A hospital bed according to claim 3, comprising a spreader rigidly connecting said arcuate members, said spreader bar being movable when said handle means is moved.

6. A hospital bed according to claim 5, comprising a telescoping screw means, one end of said telescoping screw means being pivotally connected to said lower support frame, a mounting support carrying said spreader bar and being movable by said telescoping screw means, said telescoping screw means being driven by said handle means and causing said spreader bar to move in said arcuate path of movement.

7. A hospital bed according to claim 6, comprising a universal joint connecting said telescoping screw means to said telescoping diagonal member.

8. A hospital bed according to claim 6, wherein said telescoping screw means comprises an acme screw and an acme screw operating nut, a tube housing said screw and nut, said mounting support being maintained in fixed relationship to said screw, said mounting support being moved by said acme screw and nut assembly for carrying said spreader bar in said arcuate path.

9. A hospital bed according to claim 3, comprising a positioning indicator driven by said handle means for indicating the position of said upper frame member.

* * * * *