United States Patent

Szucs

[15] **3,678,519**

[45] **July 25, 1972**

[54] HOSPITAL BED

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[73] Assignee: **Borg-Warner Corporation**, Chicago, Ill.

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[52] **U.S. Cl.** **5/62**, 5/64

[51] **Int. Cl.** **E03d 1/34**

[58] **Field of Search** 5/62, 66, 67, 68, 69, 63

[56] **References Cited**

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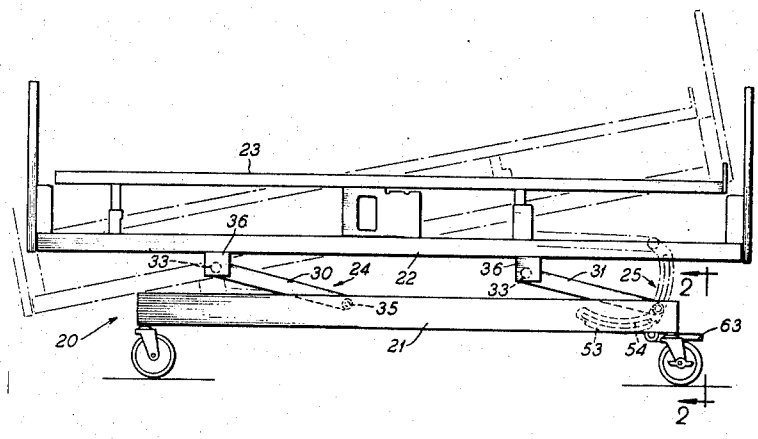
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[57] **ABSTRACT**

A hospital bed having a fixed frame and a movable frame, means for moving the movable frame in parallel relationship to the fixed frame and means for obtaining at least one Trendelenburg position of the bed regardless of the relationship of the movable frame relative to the fixed frame.

1 Claim, 9 Drawing Figures



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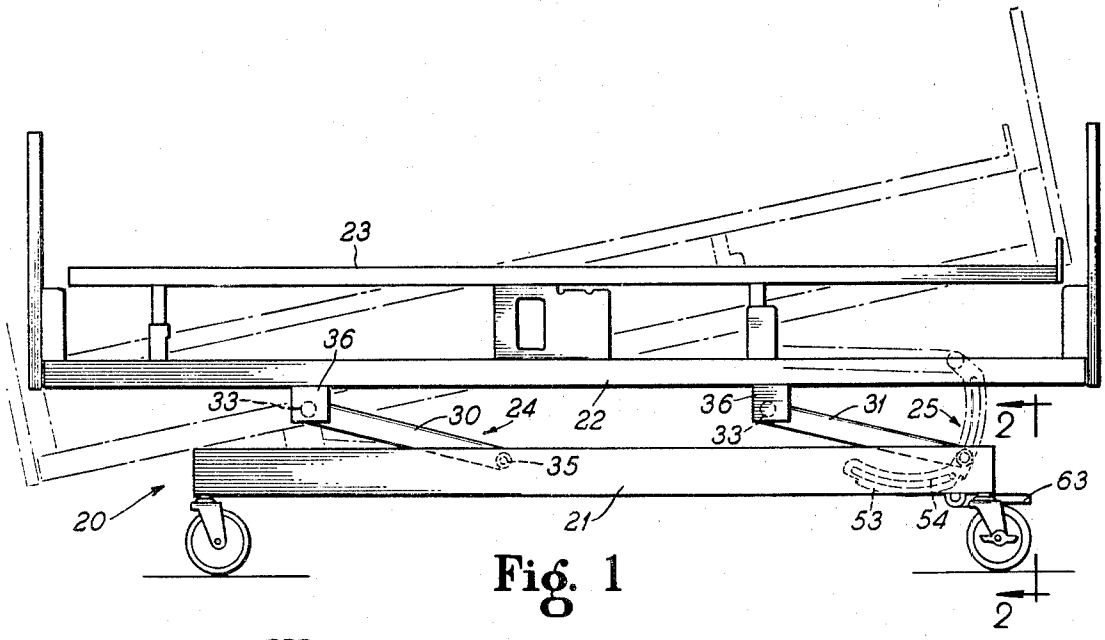


Fig. 1

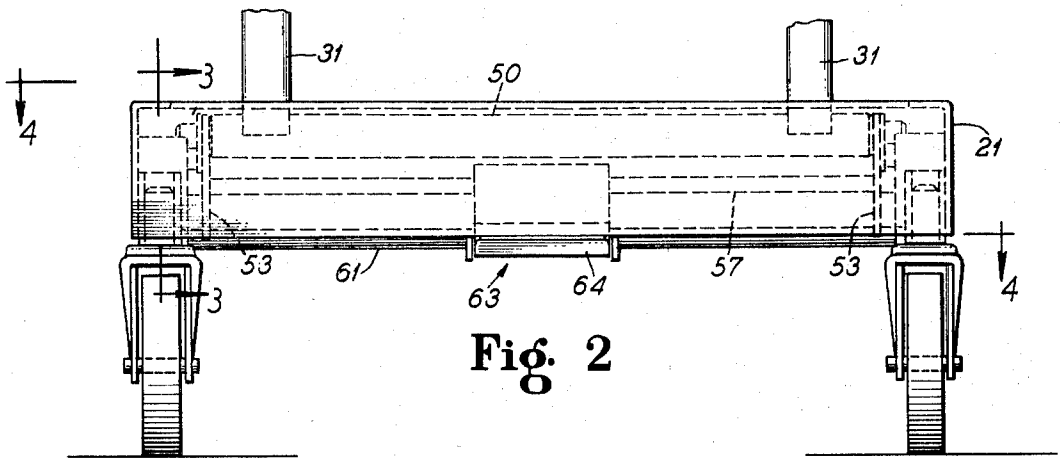


Fig. 2

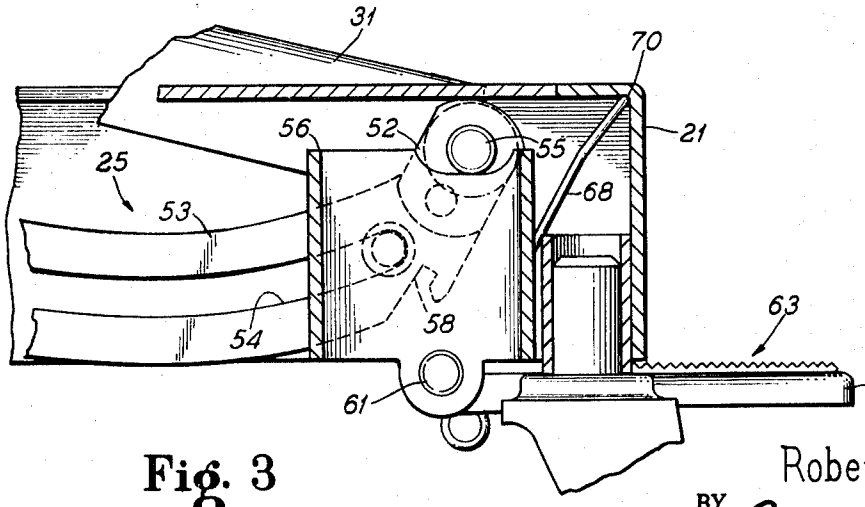


Fig. 3

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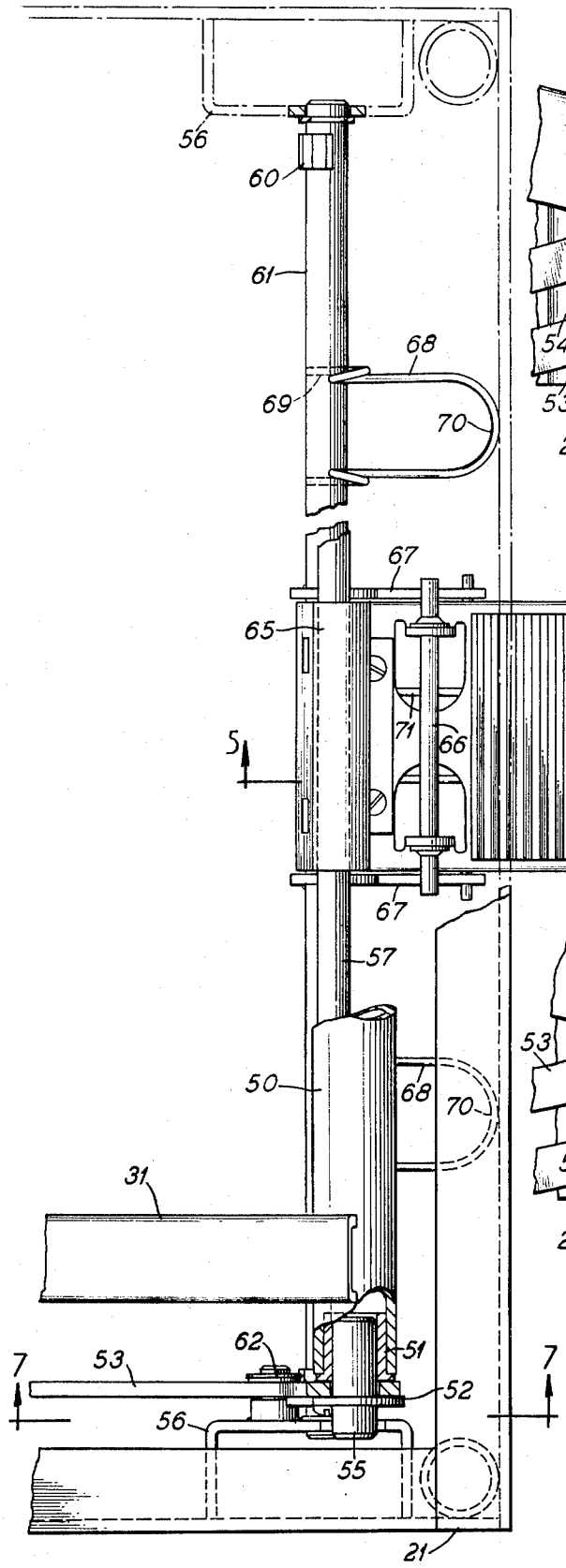


Fig. 4

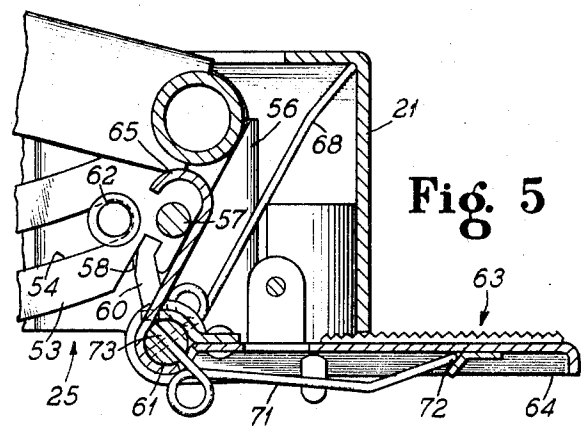


Fig. 5

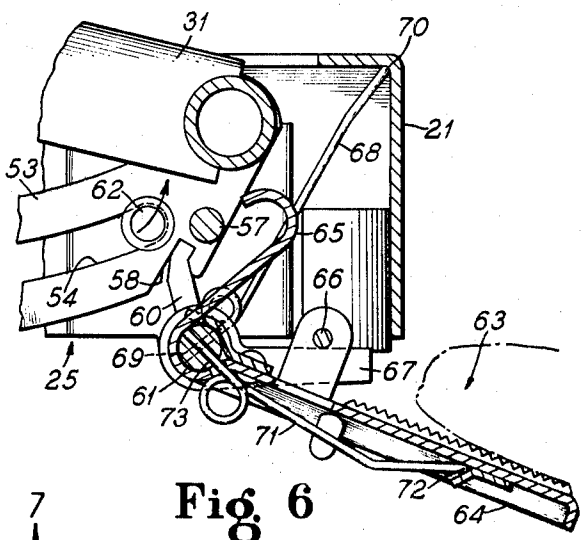


Fig. 6

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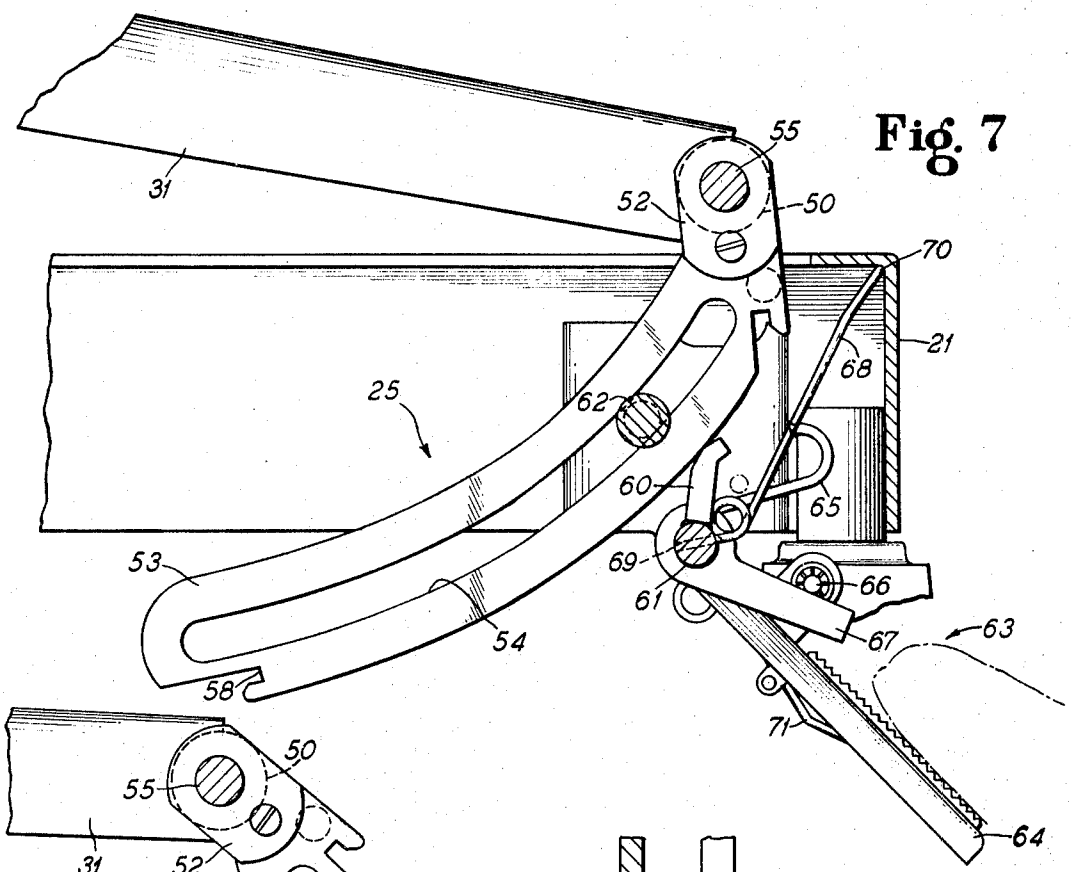


Fig. 7

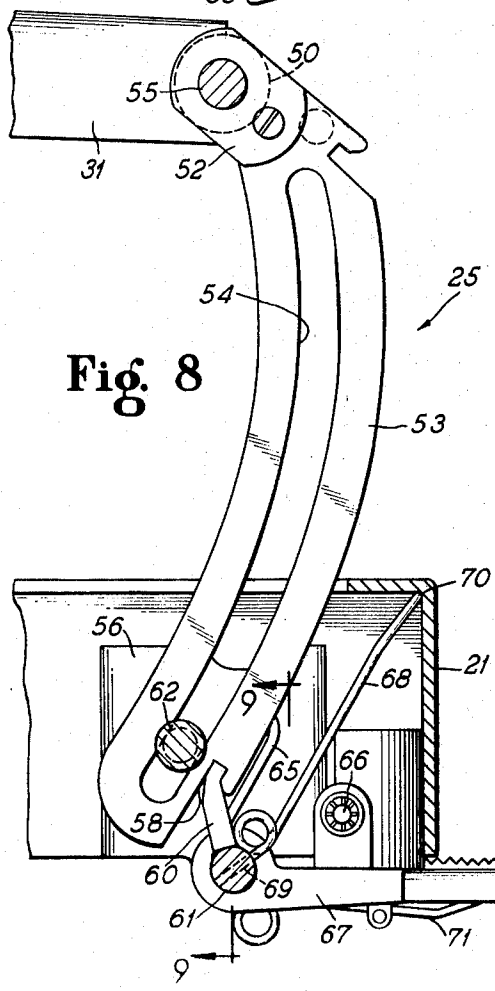


Fig. 8

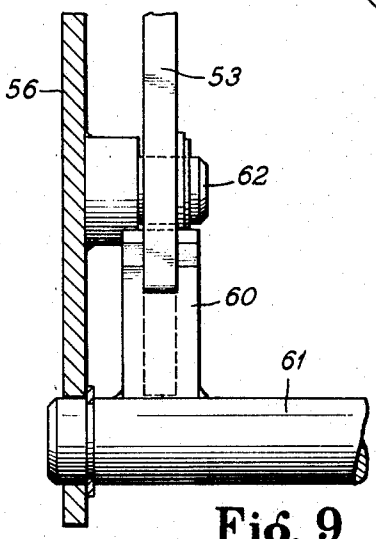


Fig. 9

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HOSPITAL BED

BACKGROUND OF THE INVENTION

Hospital beds constructed for Trendelenburg positions are generally known in the art. Usually, these beds are constructed of an assembly of rather complicated linkage systems for hand or motor operation. When so constructed, the adjustment of the bed to any desired Trendelenburg position is rather slow.

Another known bed is manually operated; however, the degree of adjustment is limited by its construction. In this bed, a linkage to provide Trendelenburg positions forms part of the linkage for adjusting the parallel relationship between the fixed and movable frame. When the movable frame is in its maximum raised location, the only way to obtain Trendelenburg positions is to lower the head of the bed. This places a severe limitation on the use of the bed.

THE INVENTION

According to this invention, a hospital bed is constructed with a linkage system permitting movement of a movable frame in parallel relationship to a fixed frame, and also with a retractable linkage system permitting instant manual selection of a Trendelenburg position provided by the retractable linkage system at any parallel position of the movable frame relative to the fixed frame. In other words, the linkage system for obtaining a Trendelenburg position is in addition to the usual linkage system permitting raising and lowering of the movable frame relative to the fixed frame. A dual latching arrangement is associated with the Trendelenburg linkage system which is conveniently operated by a foot pedal, although the movable frame is manually moved to the Trendelenburg position. The linkage system for raising or lowering the movable frame in parallel relationship with respect to the fixed frame can be operated either by suitable motors or by manual means.

THE DRAWINGS

FIG. 1 is a side view of a bed constructed according to this invention with parts in broken lines to illustrate structure and positions;

FIG. 2 is a view of a portion of the bed taken on line 2—2 of FIG. 1;

FIG. 3 is a partial, enlarged view of a portion taken on line 3—3 of FIG. 2;

FIG. 4 is an enlarged partial plan view taken on line 4—4 of FIG. 2;

FIG. 5 is a view taken on line 5—5 of FIG. 4;

FIG. 6 is a view similar to FIG. 5, but showing a depressed position of the foot pedal and indicating by an arrow the path of movement of part of the bed;

FIG. 7 is a view showing an intermediate position of linkage means in obtaining a Trendelenburg position;

FIG. 8 is a view similar to FIG. 7 showing the fully raised position of the linkage means; and

FIG. 9 is a view taken on line 9—9 of FIG. 8

THE PREFERRED EMBODIMENT

An adjustable bed of this invention is shown in the drawings and is designated generally by the numeral 20. The bed 20 includes generally a relatively stationary base or fixed frame 21, a movable frame 22, a mattress support frame 23, and adjustable linkage assembly 24, which adjustably interconnects and supports the movable frame 22 with respect to the stationary base 21, and a linkage assembly 25 which permits obtaining instant Trendelenburg positions of the movable frame 22. The bed is conventionally supported on wheels attached to the fixed frame 21.

The adjustable linkage assembly 24 provided for permitting raising and lowering the movable frame relative to the fixed frame comprises a pair of head elevation links 30 and a pair of foot elevation links 31. The head and foot links 30 and 31, respectively, are at one end each rigidly secured to spaced

tube shafts 33. The head links 30 are at the opposite ends, rigidly secured to a tube shaft 35. The spaced tube shafts 33 are pivotally mounted on the movable frame 22; the head tube shaft 35 is pivotally mounted on the stationary frame 21. The links 30 and 31 are provided with upper extensions 36 that are rigidly secured to the shafts 33.

The upper ends of the head and foot link extensions can be pivotally interconnected by a suitable link and pivot pins as taught in U.S. Pat. No. 3,267,493, issued Aug. 23, 1966 to Pruim et al. The head and foot links 30 and 31 are of such configuration and are so positioned that when they are pivoted, the movable frame 22 is moved substantially vertically and in parallel relationship to the stationary frame 21.

The actuating mechanism for vertically moving the movable frame 22 relative to the fixed frame 21 may include a crank and a pulley arrangement as described in the aforesaid Pruim et al. U.S. patent. Other equivalent structure may be used for this purpose without departing from the spirit of the invention.

The linkage system 25 for obtaining at least one Trendelenburg position comprises a shaft 50 connected to the ends of the links 31. The shaft 50 corresponds, generally, to the shaft 35, previously described. End bearings 51 (see especially FIG. 4) associated with the ends of the shaft 50 are engaged by pivots 52 for spaced arcuate links 53 each of which is provided with an arcuate slot 54. The pivots 52 are provided with outwardly extending lugs 55 which are rotatably cradled in supports 56 affixed to the frame member 21. The arcuate links 53 are spaced by a connecting and locking rod 57 and are each provided with one or more latching notches 58 to be engaged by latch pins 60 affixed to a latch and pedal rod 61. The rod 61 is pivotally attached at its opposite ends to the supports 56 affixed to the frame 21 and generally below the cradle for the lugs 55. Guide pins or lugs 62, also affixed to the supports 56 engage the slots 54 of the links 53 and thus the slots with the guide pins define a limited path of movement of the links 53.

A foot pedal assembly 63 which includes a foot pedal 64 is rotatably connected to the latch and pedal rod 61. The pedal 64 is provided with a latch portion 65 which, when the pedal is in its inactive position, engages the rod 57 and locks the linkage 25 in its inactive position wherein the moveable frame 22 can only move parallel to the fixed frame 21. The foot pedal 64 is also provided with an engagement rod 66 which, after the foot pedal 64 is depressed to disengage the latch portion 65 from the rod 57, engages projections 67 affixed to the rod 61, causing the rod 61 to then rotate about its axis. The rod 61 is resiliently urged to its inactive position by spaced roller-type latch springs 68, each having end projections 69 engaging the rod 61 and end portions 70 held by tension against the frame 21. The springs 68 are tensioned to urge the rod 61 to return to its inactive position.

Another roller-type spring 71 is positioned to urge the foot pedal 64 to its inactive position; one end 72 of the spring 71 engages the pedal 64; the end projections 73 engage the rod 61.

In operation, the bed operator presses downwardly on the foot pedal 64 and releases the latch 65 from the rod 57 which permits the linkage assembly 25 to be operative. After a short travel of the pedal 64, the engagement rod 66 engages the projections 67 causing the rod 61 to rotate. The rotation of the rod 61 coupled with an upward lift of the foot of the bed disengages pins 60 from their respective notches 58 in the links 53. Release of the foot pedal 64 permits the rod to rotate in the opposite direction by the tension of the springs 68, such that the pins 60 are positioned to engage another notch 58 in the links 53. In all cases, disengagement of a latch pin 60 from a notch 58 requires the operator to raise, however, slightly, the foot of the bed. This must be done when the foot of the bed is raised or when returned to its normal, substantially horizontal position.

What is claimed is:

1. An adjustable hospital bed comprising:

a movable upper horizontal frame;

a fixed lower horizontal frame having a pair of guide pins affixed thereto;

adjustable head and foot elevation linkage systems for supporting said upper frame spaced apart from said lower frame and for vertically moving said upper frame with respect to said lower frame while at the same time maintaining said frames parallel to each other;

means for effectively extending said foot linkage system to provide a greater separation between said frames at their foot ends than at their head ends and including a pair of similar arcuate links pivotally attached to said foot linkage system each having an arcuate slot for receiving a respective one of said guide pins to permit simultaneous slidable movement of said links, relative to said fixed frame, between inactive and active positions,

said links, when in their inactive positions, causing said upper frame to remain horizontal regardless of its vertical level,

whereas actuation of said links to their active positions effects tilting of said upper frame to a Trendelenburg position with the foot end of said upper frame raised relative to its head end;

latching means spring-biased to lock said links in each of their inactive and active positions;

and a manually operated release mechanism to facilitate unlocking of said latching means to permit relatively rapid manual shifting of said upper frame between its horizontal and Trendelenburg positions.

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