Feb. 10, 1959 A. S. REICHERT ET AL 2,872,688

HOSPITAL BEDS

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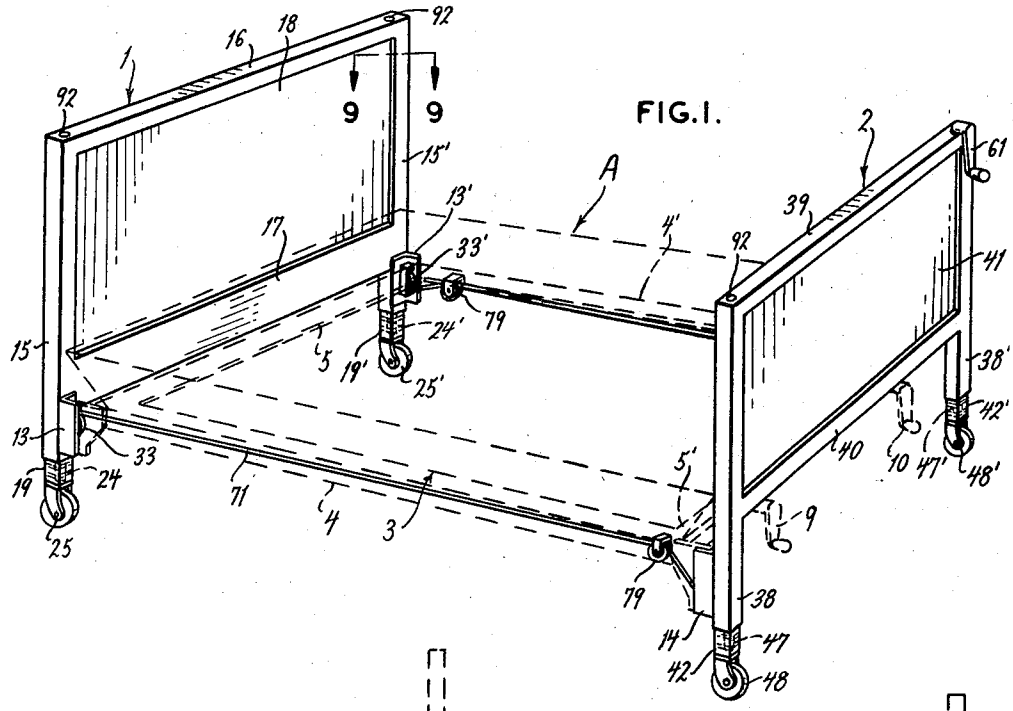


FIG. 1.

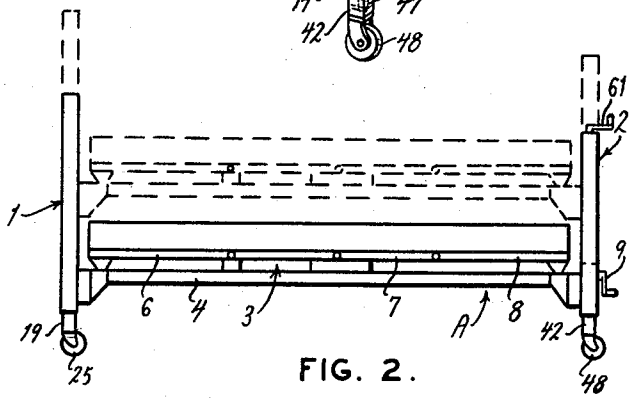


FIG. 2.

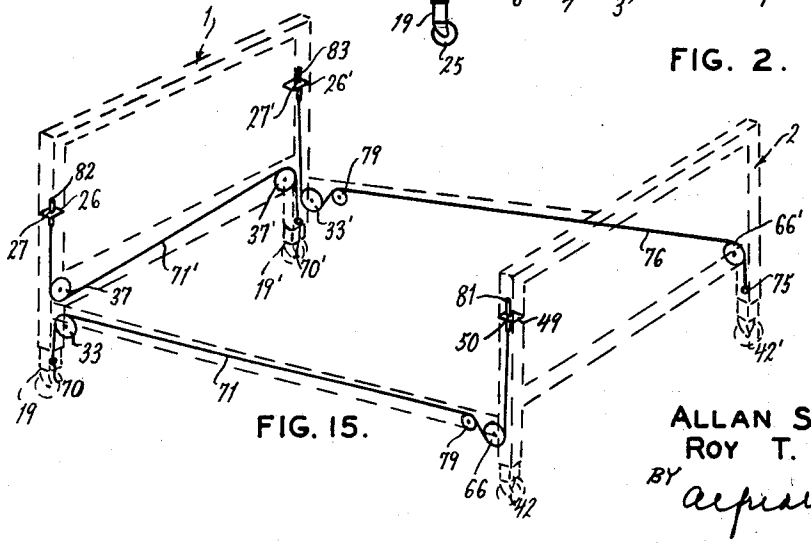


FIG. 15.

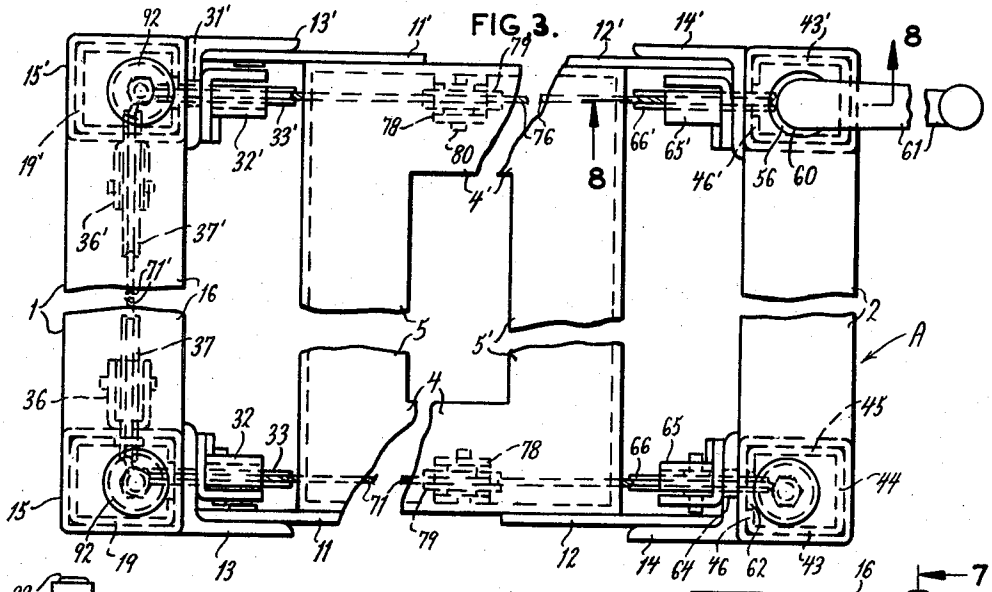
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HOSPITAL BEDS

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FIG. 3.



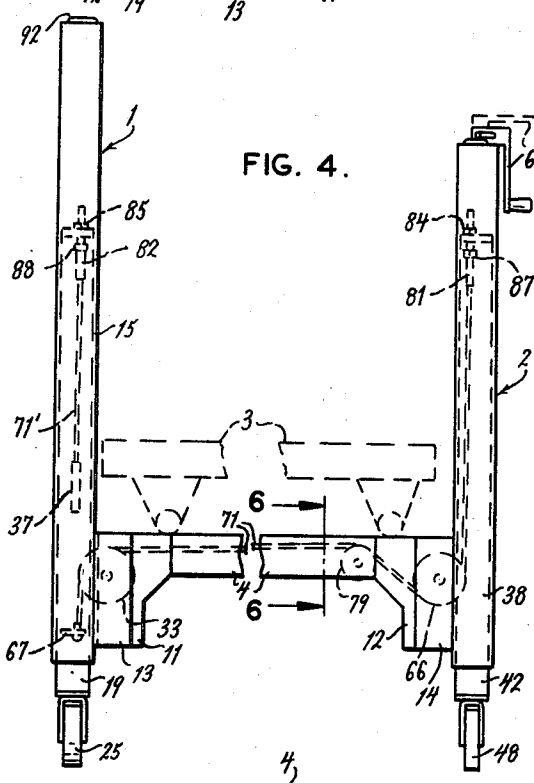


FIG. 4.

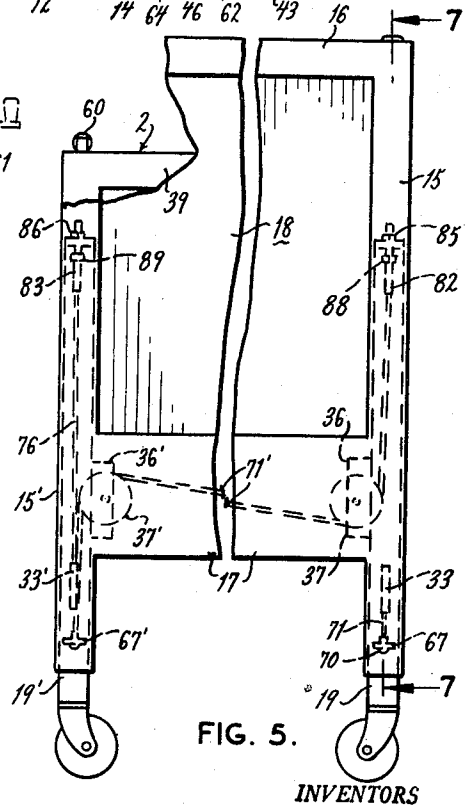


FIG. 5.

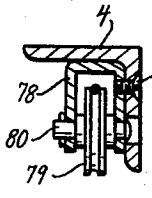


FIG. 6.

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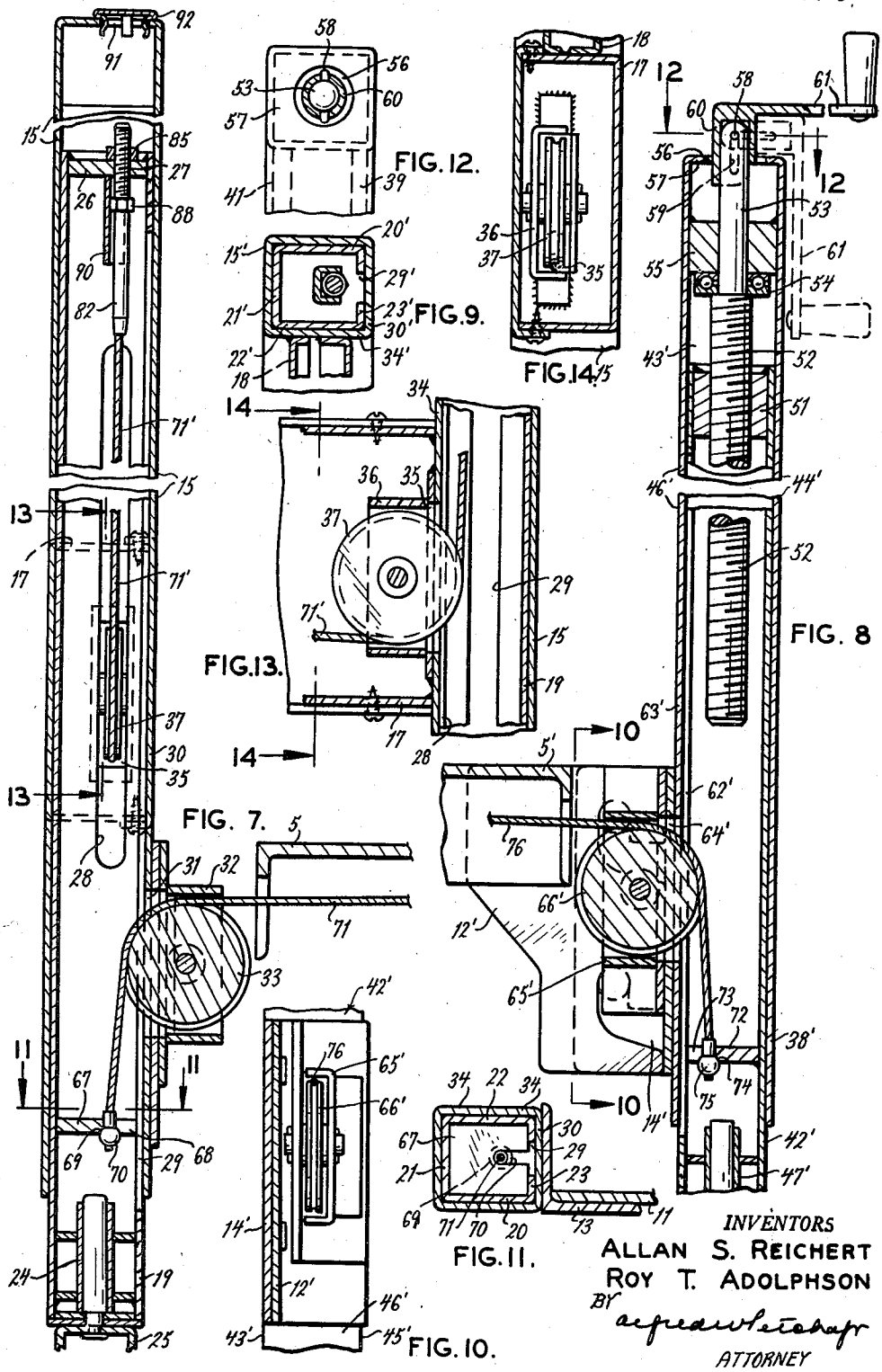


FIG. 7.

FIG. 8

FIG. 9.

FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

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HOSPITAL BEDS

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Application February 15, 1954, Serial No. 410,214

5 Claims. (Cl. 5—63)

This invention relates in general to sick-room furniture and more particularly hospital beds.

For many years, hospital beds have been constructed in such a manner that the spring and mattress are located at a relatively high level horizontally above the floor as compared with conventional types of beds, so as to be convenient for the nurses, doctors and attendants in administering to the patient. Recent consideration of sick-room procedures, however, has indicated that a patient will recover or convalesce more rapidly and more comfortably if the physical surroundings in the hospital room are less forbidding and resemble as nearly as possible the appearance of a normal dwelling room. It has been found that the type of bed used in one of the most significant phychological aspects of the problem since practically all patients are accustomed to sleeping in beds of conventional height above the floor and are subconsciously disturbed by the necessity of sleeping at a greatly increased height when confined to a hospital bed of the usual type. Closely related to the psychological aspects of the problem is the further matter of patient convenience during the ambulatory stages of convalescence. Once a patient is sufficiently recovered to care for many of his personal needs such as going to the bathroom for washing, bathing, and other functions, the difficulties and hazards encountered in getting out of and back into a high bed are substantial and serious.

It is, therefore, the primary object of the present invention to provide a hospital bed which can be adjusted to various horizontal levels so that the patient can sleep or recline at any desired height above the floor within selected limits.

It is also an object of the present invention to provide a hospital bed of the type stated which when in its lowermost position of adjustment will closely simulate a conventional domestic bed.

It is a further object of the present invention to provide a hospital bed which can be manipulated by the nurse or attendant easily, conveniently and with a minimum of physical effort and which during movement from one position to another will operate smoothly without jarring the patient.

It is an additional object of the present invention to provide a hospital bed of the type stated which employs any standard type of articulated or adjustable bed-spring currently in use in present day hospitals and to this end it is a related object of the present invention to provide a pair of bed-ends which can be simply and readily connected to any such bed-spring to form a variable height bed.

With the above and other objects in view, our invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (three sheets):

Figure 1 is a perspective view of a variable-height hospital bed, the bed ends and associated operative elements being shown in full lines and the typical standard bed spring supported thereby being shown in dotted lines;

Figure 2 is a side elevational view of the hospital bed of the present invention;

Figure 3 is a fragmentary top plan view of the hospital bed;

Figure 4 and 5 are fragmentary side and rear-end elevational views of the hospital bed;

Figure 6 is a fragmentary sectional view taken approximately along line 6—6 of Figure 4;

Figure 7 is a fragmentary sectional view taken approximately along line 7—7 of Figure 5;

Figure 8 is a fragmentary sectional view taken approximately along line 8—8 of Figure 3;

Figure 9 is a fragmentary sectional view taken approximately along line 9—9 of Figure 1;

Figure 10 is a fragmentary sectional view taken approximately along line 10—10 of Figure 8;

Figure 11 is a fragmentary sectional view taken approximately along line 11—11 of Figure 7;

Figure 12 is a fragmentary sectional view taken approximately along line 12—12 of Figure 8;

Figure 13 is a fragmentary sectional view taken approximately along line 13—13 of Figure 7;

Figure 14 is a fragmentary sectional view taken approximately along line 14—14 of Figure 13; and

Figure 15 is a diagrammatic view illustrating the cable and pulley system forming a part of the present invention.

Referring now in more detail and by reference characters to the drawings which illustrate a practical embodiment of the present invention, A designates a hospital bed comprising a head-board 1 and a foot-board 2 structurally interconnected in bed-forming relationship by a substantially conventional adjustable bed-spring 3 including side rails 4, 4' cross-connected by end rails 5, 5' to form a base-frame upon which mattress-supported spring-elements 6, 7, 8, are hingedly mounted. Operatively associated with the spring-elements 6, 7 and 8 are actuator-cranks 9, 10, by which the spring-elements 6, 7, 8 can be swung into various relatively inclined positions for the comfort of the patient. As has been above pointed out, the bed spring is conventional and, therefore, is not described or illustrated in extensive detail, it being merely sufficient for present purposes to point out that the side rails 4, 4' are preferably provided with hook-plates 11, 12 and 11', 12', respectively, for conventional engagement with complementary fittings 13, 13', 14, 14' of the head-board 1 and foot-board 2 whereby the bed A is held in upright or operative position as shown in Figures 1 and 2. Other types of conventional bed-rail hardware can be employed equally well.

The head-board 1 comprises a pair of tubular open-bottomed stiles 15, 15' cross-connected by a hollow top rail 16 and a hollow bottom rail 17, all of rectangular cross-sectional shape and forming a frame for a relatively thin panel 18 which may be of any desired decorative surface appearance. Operatively disposed in snug-fitting slidable relation within the stiles 15, 15' are tubular leg members 19, 19', respectively, each integrally including four walls 20, 21, 22, 23 and 20', 21', 22', and 23'. The leg members 19, 19' are respectively provided adjacent their lower ends with rigidly welded caster-sockets 24, 24' for operatively receiving swiveling casters 25, 25'. The leg members 19, 19' are also respectively provided at their upper ends with rigidly welded top-plates 26, 26' having centrally located apertures 27, 27'. Finally, the inwardly and forwardly presented faces 22, 23, 22', 23' of the leg members 19, 19' are respectively provided with elongated closed-ended slots 28, 29, 28', 29'. The forwardly presented faces 30, 30' of the stiles 15, 15',

respectively, are provided with short slots 31, 31' which are aligned with the slots 29, 29', and welded to the faces 30, 30' in line with the slots 31, 31' thereof are short forwardly projecting tubular sleeves 32, 32' for operatively housing pulleys 33, 33', respectively, as best seen in Figure 7. Similarly, the inwardly presented faces 34, 34' of the stiles 15, 15' respectively, are provided with short slots 35, 35', which are aligned with the slots 29, 29' and welded to the faces 34, 34' in line with the slots 35, 35' are short inwardly projecting tubular sleeves 36, 36' for operatively housing pulleys 37, 37'.

The foot-board 2 is of substantially similar construction to the head-board 1 and comprises a pair of tubular open bottom stiles 38, 38' cross-connected by a hollow top rail 39 and a hollow bottom rail 40, all of rectangular cross-sectional shape and forming a frame for a relatively thin panel 41 which is decorated to match the panel 18. It should be noted in this connection that the lower horizontal margin of the bottom rail 40 is located in upwardly spaced relationship to the fittings 14, 14' and the spring rail 5' so that the actuator-cranks 9, 10 will project outwardly in convenient free-turning relation directly beneath the bottom of the foot-board 2, substantially as shown in Figure 1. Furthermore, the over-all height of the foot-board 2 is preferably shorter than the over-all height of the head-board 1 so that the two ends of the bed will assume visual appearance which is more or less conventional, that is to say, substantially similar to the proportions and dimensions of the head-board and foot-board of a domestic type of bed.

Operatively disposed in snug-fitting slidable relation within the stiles 38, 38' are tubular leg members 42, 42' respectively, each integrally including four walls 43, 44, 45, 46 and 43', 44', 45' and 46'. The leg members 42, 42' are respectively provided adjacent their lower ends with rigidly welded caster-sockets 47, 47' for operatively receiving swiveling casters 48, 48'. The leg member 42 is provided at its upper end with a rigidly welded top plate 49 having a centrally located aperture 50 and the upper end of the leg member 42' is similarly provided at its upper end with a rigidly welded internally threaded sleeve 51 adapted for operatively receiving the lower end of a jack screw 52 which projects vertically therethrough and is turned down at its upper end in the provision of a shaft-like section 53 which is, in turn, operatively provided with a ball-thrust bearing 54 fitted against the under face of a thrust block 55 welded in the upper end of the stile 38'. The shaft-like portion 53 of the jack screw 52 projects upwardly through and beyond a relatively large opening 56 formed in the horizontal top wall 57 of the stile 38' and is provided with a diametrally projecting stationary pin 58 which projects at its opposite ends and slidably fits within an elongated slot 59 formed in the side walls of a tubular socket 60 intergally forming the inner end portion of a crank handle 61. The crank handle can be swung from the inoperative position shown in dotted lines to the operative position shown in full lines in Figure 8, and in such latter position affords means by which the jack screw 52 may be manually rotated for purposes more fully appearing.

The rearwardly presented faces 46 and 46' of the leg members 42, 42' are respectively provided with elongated closed-ended slots 62, 62' and the rearwardly presented faces 63, 63' of the stiles 38, 38', respectively, are provided with short slots 64, 64' which are respectively aligned with the slots 62, 62'. Welded to the rearwardly presented faces 63, 63' in line with the slots 62, 62' are short rearwardly projecting tubular sleeves 65, 65' for operatively housing pulleys 66, 66', respectively, as best seen in Figure 8.

Welded rigidly within the leg members 19, 19' respectively are horizontal catch plates 67, 67' located adjacent to but in upwardly spaced relation to the lower

ends of the slots 29, 29' and being provided centrally of their forwardly presented edges with inwardly extending slots 68, 68', and the plates 67, 67' are, furthermore, provided on their under faces with circular indentations 69, 69', respectively, located at the inner ends of the slots 68, 68' in the provision of a socket for retentively engaging the enlarged end of ball fittings 70, 70' which are securely and tightly fastened to the ends of strong braided steel wire cables 71, 71'. The forward leg member 42' is similarly provided with a catch plate 72 which is identical in all respects to the previously described catch plates 67, 67' and is likewise provided with a slot 73 having a recess 74 for retentive engagement with the ball fitting 75 which is, in turn, rigidly fastened to the end of the braided steel wire cable 76.

Removably mounted by means of screws 77 to each of the bed-spring side rails 4, 4' adjacent the forward and rearward ends thereof, respectively, are pulley brackets 78 for rotatably supporting idler pulleys 79 which are rotatably journaled upon pulley spindles 80 and serve to support the cables 71, 71' and 76 in substantially horizontal and concealed position along the inside faces of the bed-spring side rails 4, 4', as best seen in Figure 1.

The cables 71, 71' and 76 are operatively trained over the various pulleys in the manner schematically shown in Figure 15 and are end-wise securely fastened within externally threaded terminal sleeves 81, 82, 83 which respectively project upwardly through the apertures 50, 27, 27' and are provided with nuts 84, 85, 86 by which the vertical position of the sleeves 81, 82, 83 may be adjusted. In order to facilitate vertical adjustment the sleeves 81, 82, 83 are integrally provided at their lower ends with diametrally enlarged hexagonal collar sections 87, 88, 89 which are slidably fitted within slide channels 90 welded upon and projecting downwardly from the under sides of the top plates 26, 26' and 49 substantially in the manner shown in Figures 7 and 9. Finally, each of the stiles 15, 15' and 38 are provided in their top walls with identical apertures 91 which are provided with conventional snap-fitted closure plugs 92. The latter may be manually removed and an elongated socket wrench inserted through the apertures 91 to engage the nuts 84, 85, 86, whereby the vertical position of the sleeves 81, 82, 83 may be accordingly adjusted so that the several cables 71, 71', 76 will all be equally taut and the relative vertical positions of the legs 19, 19' and 42 will be adjusted in relation to the leg 42' so that the head-board 1 and foot-board 2 will be substantially upright and the bed-spring 3 will be substantially horizontal when the entire structure is assembled for use.

Assuming that the variable height bed A when assembled for use is in its lowermost position, it may be very quickly and conveniently shifted upwardly by swinging the handle 61 from its inoperative position to the position shown in full lines in Figure 8. Thereupon, the jack screw 52 may be rotated driving the leg member 42' relatively downward with respect to the foot-board 2 pulling with it the cable 76. The movement of the cable 76 thus transmits downward relative movement to the leg 19' which in turn moves relatively downward with respect to the head-board 1 pulling with it the cable 71' which extends crosswise of the bed through the hollow interior of the bottom rail 17 and accordingly transmits downward relative movement to the leg member 19. The leg member 19 thus moves relatively downward with respect to the head-board 1 pulling with it the cable 71 which thereby transmits relative downward movement to the leg member 42. Since the cables 71, 71' and 76 are all taut and have been adjusted as above described, the four legs 19, 19', 42, 42' will all move simultaneously. It will, of course,

be understood in this connection that the above-mentioned downward relative movement of the leg members 19, 19', 42, 42' is actually translated into upward movement of the head-board 1, foot-board 2 and bed-spring 3 as a unit, since the casters 25, 25', 48, 48' rest upon the floor and the leg members 19, 19', 42, 42' are actually stationary.

The bed A can, of course, be shifted to its uppermost position, in which it is at a so-called "hospital height" for the convenience of the nurses or doctor in handling the patient. If desired, the bed A can be stopped at any intermediate position and can be returned to its lowermost position when the patient is merely resting or sleeping.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the hospital bed may be made and substituted for those herein shown and described without departing from the nature and principle of our invention.

Having thus described my invention, what I claim and desire to secure by letters patent is:

1. A hospital bed including a headboard and a footboard, each having tubular leg-receiving elements, a leg shiftably mounted in each leg-receiving element, each leg being slidably keyed within the leg-receiving element in which it is mounted so as to be non-rotative about its longitudinal axis, spaced parallel side rails rigidly connected at their ends to the headboard and footboard, said side rails being respectively located adjacent the outer lateral margins of the bed, a pulley means operatively located adjacent to each end of each side rail, flexible cable means trained around the pulley means and connecting the several legs for simultaneous shifting movement, a jack-screw rotatably mounted in one of the leg-receiving elements, the leg in said last-named leg receiving element being provided with a nut operatively engaged with said jack-screw, and crank means for rotating the jack-screw whereby to cause the headboard and fotboard to move upwardly together.

2. A hospital bed including a headboard and a footboard, each having tubular leg-receiving elements, a leg shiftably mounted in each leg-receiving element, each leg being slidably keyed within the leg-receiving element in which it is mounted so as to be non-rotative about its longitudinal axis, spaced parallel side rails rigidly connected at their ends to the headboard and footboard, said side rails being respectively located adjacent the outer lateral margins of the bed, a pulley means operatively located adjacent to each end of each side rail, flexible cable means trained around the pulley means and connecting the several legs for simultaneous shifting movement, a jack-screw rotatably mounted in one of the leg-receiving elements, the leg in said last-named leg-receiving element being provided with a non-rotatable nut operatively engaged with said jack-screw, and crank means for rotating the jack-screw whereby to cause the headboard and footboard to move upwardly together.

3. A hospital bed having a foot-end, a head-end, and lateral margins extending therebetween, said bed including a headboard and a footboard positioned respcetively at the head-end and foot-end of the bed, said headboard and footboard each having tubular leg-receiving elements, a pair of parallel side rails connected at their ends to the headboard and footboard, said side rails being positioned adjacent to the outer lateral margins of the bed, a leg shiftably mounted in each leg-receiving element, a pulley operatively mounted adjacent to each leg-receiving element, cables trained around the pulleys, each cable being connected at its ends respectively to the upper end of one leg and the lower end of another leg, thereby connecting the several legs for simultaneous shifting movement, a jack-screw rotatably mounted in one of the leg-receiving elements, the leg in said last-named leg-receiving element being provided with a nut operatively engaged with said jack-screw, and crank means for rotating the jack-screw whereby to cause the headboard and footboard to move upwardly together.

4. A hospital bed having a foot-end, a head-end, and lateral margins extending therebetween, said bed including a headboard and a footboard positioned respectively at the head-end and foot-end of the bed, said headboard and footboard each having tubular leg-receiving elements, a leg provided at its lower end with floor-engaging means shiftably mounted in each leg-receiving element so as to be non-rotative about its longitudinal axis, spaced parallel side rails rigidly connected at their ends to the headboard and footboard, pulley means opertaively located adjacent to each leg-receiving element, a plurality of cables trained around the pulleys, each cable being connected at its ends respectively to the upper end of one shiftably mounted leg and the lower end of another shiftably mounted leg thereby operatively interconnecting the several legs in succession to form a single integrated system for simultaneously shifting said legs, and means for shifting at least one of said legs within its leg-receiving element whereby optionally to elevate and lower the bed with respect to the floor.

5. A hospital bed having a foot-end, a head-end, and lateral margins extending therebetween, said bed including a headboard and a footboard positioned respectively at the head-end and foot-end of the bed, said headboard and footboard each having tubular leg-receiving elements, a leg shiftably mounted in each leg-receiving element in such a manner so as to be non-rotative about its longitudinal axis, spaced parallel side rails rigidly connected at their ends to the headboard and footboard, said side rails being respectively located adjacent the outer lateral margins of the bed, pulley means operatively located adjacent to each side rail, flexible cable means trained around the pulley means and connecting each leg with one other leg so that the legs are thereby required to move in and out of their respective leg-receiving elements simultaneously and at the same rate, a driving member mounted in one of the leg-receiving elements and being operatively connected to the leg therein, and mans for actuating said driving member whereby to cause the headboard, footboard and connecting side rails to move upwardly and downwardly together.

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