

Sept. 12, 1950

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2,522,018

BED

Filed Nov. 6, 1948

2 Sheets-Sheet 1

FIG. 1.

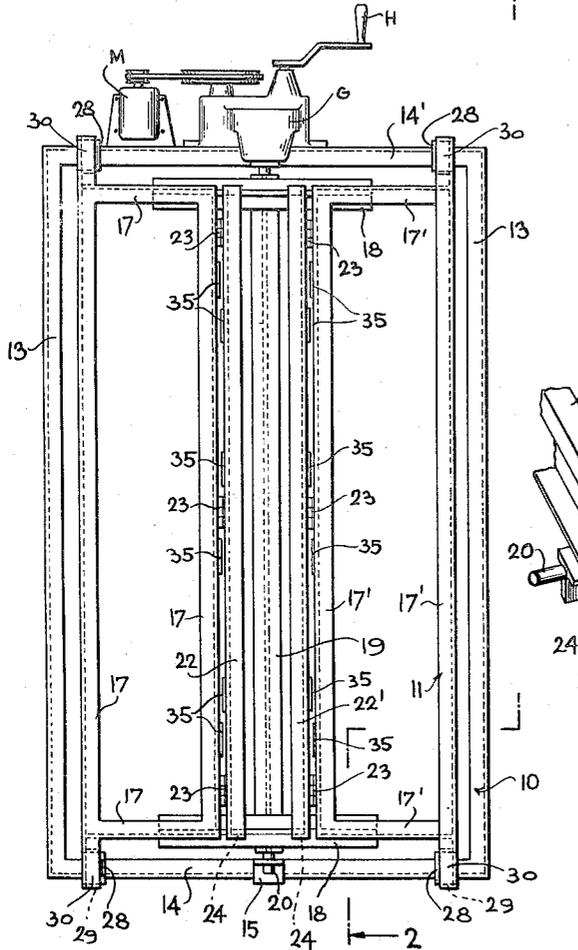


FIG. 5.

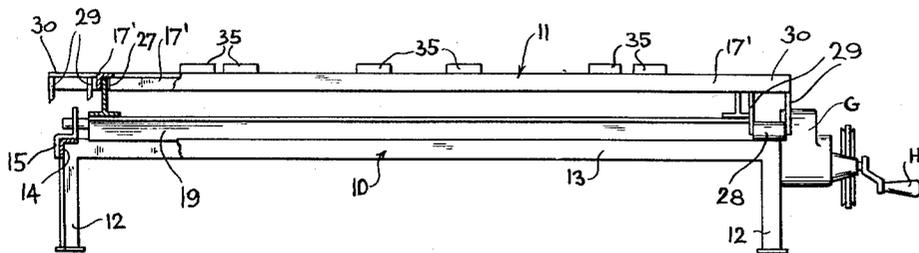
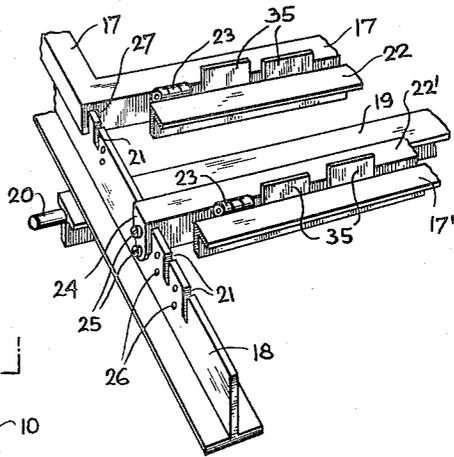


FIG. 2.

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2 Sheets-Sheet 2

FIG. 3.

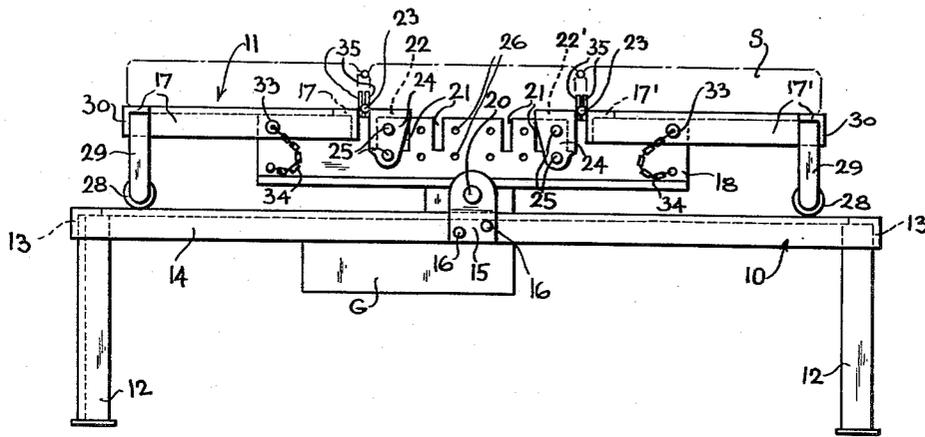
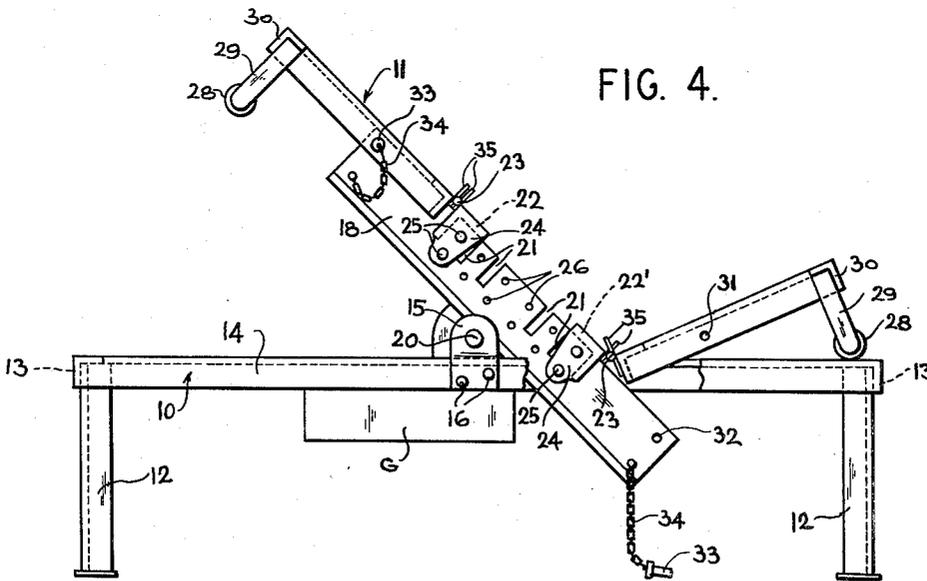


FIG. 4.



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# UNITED STATES PATENT OFFICE

2,522,018

BED

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Application November 6, 1948, Serial No. 58,746

13 Claims. (Cl. 5-62)

1

My invention relates to improvements in beds, and has particular relation to a hospital bed divided into longitudinal sections which may be mechanically tilted and by means of which a patient may be turned from side to side.

Bed-ridden patients who are unable to move or assist themselves have presented serious problems in medical care. Such patients are constantly in danger of contracting fatal complications such as hypostatic pneumonia, blood clotting, gangrenous bed sores, or the like, caused by immobility in one position for extended lengths of time. This danger has made it imperative to assign a special nurse or attendant to change the position of the patient manually at frequent periodic intervals, normally every two hours. Obviously, this manual method is time consuming, tedious, and physically difficult.

Another problem in the case of a bed-ridden patient lies in the necessity for rolling over the patient for daily general medical or nursing duties such as making up the bed, bathing, administering back care, and similar duties. The task of manually turning a patient requires an undue expenditure of effort and exertion, especially in the case of a large or heavy patient.

It is also necessary, in many instances, to maintain a patient in a fixed position on his side, as is often required post-operatively to facilitate vomiting after the administration of ether or other anesthetic gases, and also after chest operations such as pneumothorax.

It is the principal object of my invention, therefore, to provide a hospital bed divided into a number of longitudinal sections, each of which may be tilted upwardly to allow the patient to be moved from side to side or rolled over.

Another object of my invention is the provision of a hospital bed of the type described in which the sections may be tilted quickly and easily by hand-operable mechanical means, or, in the alternative, may be slowly and imperceptively tilted by automatic action of an electric motor.

Still another object of my invention is the provision of a hospital bed of the aforementioned type in which a patient may be conveniently maintained in a fixed position on his side.

These and other objects of my invention will be readily apparent in the course of the following specification when taken in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view of the bed of my invention shown in its normal operative position.

Fig. 2 is a side elevation of the bed of Fig. 1, shown partially in section as along line 2-2 of Fig. 1.

2

Fig. 3 is a front elevation of the bed shown in normal operative position, with a mattress inserted thereon shown in phantom.

Fig. 4 is a front elevation similar to Fig. 3, the upper section being shown rotated in a clockwise direction, and a portion of the lower base frame being broken away for clarity of illustration.

Fig. 5 is a fragmentary perspective view of the upper section of the bed, shown disassembled from the lower frame, with portions thereof broken away to more clearly reveal the construction thereof.

Referring in detail to the drawings, the bed of my invention comprises a conventional lower bed frame designated generally by reference numeral 10, and an upper section 11 mounted thereon, one side of which may be rotated upwardly while the other side is maintained in a substantially horizontal position.

The lower bed frame is of simple construction comprising a horizontal, rectangular frame provided with fixed, upright legs 12. The horizontal frame is constructed from a pair of side angle irons 13 and a pair of front and rear transverse angle irons 14, 14'. The said angle irons are preferably made of cast iron or other sturdy material, and may be cast integrally, or cast separately and secured together by welding, riveting or similar means of attachment. A pair of upright bracket members 15 are centrally located on the front and rear transverse angle irons 14, 14' and are secured thereto, preferably by means of rivets 16.

The remainder of the bed, comprising all of the movable parts, is designated the upper section thereof. Said upper section 11 comprises a pair of spaced, rectangular, longitudinally extending side frames 17 and 17', a pair of lifting elements 18, a rotatable bar 19, and means for rotating said bar 19.

The bar 19 is T-shaped in cross-section and extends longitudinally through the center of the bed. Said bar 19 has an integral cylindrical rod 20 at either end thereof, which extends through the bracket members 15 on the front and rear transverse angle irons 14, 14', and thus rotatably mounts said bar 19 upon the lower bed frame 10.

The cylindrical rod 20 which extends through the bracket member 15 on the rear transverse angle iron 14', extends further into a gear box G which is mounted on the rear of the bed. The free end of said rod 20 may be provided with a gear which meshes with the gears within the gear box G or may be attached to the gears in any other conventional and suitable manner. The gear assembly contained in the gear box G

3

may be manually rotated in either direction by turning a handle H, or may be driven by a motor M. The motor and gear assembly may be of any well-known construction, and are not shown in detail, since the construction thereof forms no part of the present invention.

The operation of the gear assembly by means of handle H will cause bar 19 to rotate in either a clockwise or counterclockwise direction, depending upon the preference of the operator. The motor M may be used instead of the handle H. Said motor is preferably electric and of the type which will automatically reverse its direction at pre-set intervals. The gear assembly connected to motor M is preferably of the reduction type, so that operation of motor M will rotate bar 19 at a slow or almost imperceptible rate. It is obvious that in place of the preferred motor, a unidirectional motor may be conveniently employed, with the reversing of the direction of rotation of bar 19 being accomplished by a cam gear within the gear box. Instead of a motor or handle, any other well-known means for imparting rotary motion may be used.

The lifting elements 18 are preferably two in number and are laterally disposed adjacent the front and rear ends of the bed. Said lifting elements 18 are shown in the drawings as being in the form of inverted T-bars, this construction being preferred because of the stability and strength afforded. It is obvious, however, that the lifting elements 18 may be of any desired construction such as of flat or cylindrical shape. In addition, any number of such elements may be conveniently employed, or a single element may be used.

As shown in Figs. 1 and 5, the lower surface of the lifting elements 18 are secured to the upper surface of the rotatable bar 19, adjacent the terminal edges thereof, and are disposed at right angles to said bar 19. Said lifting elements 18 have a series of vertical cut-out slots 21 arranged in spaced relationship along the upper surface thereof. The slots 21 enable the side frames 17, 17' to be adjustably secured to the lifting elements 18, in a manner which will be presently described.

Rectangular side frames 17, 17' are pivotally attached along their longitudinal edges to a pair of longitudinal angle irons 22, 22' which are L-shaped in cross section as shown in Figs. 3 and 4. The pivotal attachment may be accomplished by means of spaced hinges 23. The longitudinal angle irons 22, 22' are arranged to fit within the slots 21 of the lifting elements 18. Each said angle iron 22, 22' is provided with a pair of integral terminal walls 24, said walls 24 abutting the outer vertical edges of lifting elements 18, and being adapted to be secured thereto by means of bolts 25, which may be inserted through holes 26, in the said lifting elements 18. The holes 26 are arranged adjacent each of the slots 21, so that the angle irons 22, 22' may be inserted into any of the slots and bolted in secured position therein. Thus the central portion of the upper section 11 which extends between the angle irons 22, 22', may be made of any convenient width to accommodate mattresses of various sizes or to allow the bed to be used for the various purposes previously set forth.

In normal position the side frames 17, 17' are disposed in the horizontal attitude illustrated in Fig. 3, the inner longitudinal edges being supported upon the upper edges of the lifting elements 18. In order for the side frames 17, 17'

4

to rest upon the upper edges of the lifting elements in parallel relation thereto, a recess 27 is cut in the inner vertical longitudinal wall of said side frames at a point adjacent the front and rear walls thereof, as shown in Fig. 5.

The outer ends of the side frames 17, 17' are supported by wheels or casters 28 which are mounted upon relatively short legs 29. The legs 29 are connected to the side frame by means of horizontal extension arms 30 (Figs. 1 and 2) which are preferably integral with said side frames 17, 17' and which enable the wheels 28 to ride upon the front and rear transverse angle irons 14, 14' of the lower bed frame 10.

In operation, when the bar 19 is rotated in a clockwise direction, the upper section 11 will assume the position shown in Fig. 4. Lifting elements 18 will rotate about the longitudinal axis of cylindrical rods 20. As the left sides of said lifting elements 18 rise, the side frame 17 is carried upwardly therewith. The right sides of lifting elements 18, moving downwardly, carry with them the attached angle iron 22', causing hinges 23 to break upwardly. Side frame 17' being left free of lifting elements 18, and being supported by wheels 28 on the front and rear bars 14, 14', tends to remain in a substantially horizontal position. Since, however, the connected angle iron 22', in describing a downwardly extending arc, pushes the side frame 17' transversely toward the outer edge of the bed, said side frame 17' rolls toward said outer edge on its wheels 28. Furthermore, angle iron 22' tends to carry downwardly the inner edge of side frame 17', causing said side frame to incline slightly toward the central longitudinal axis of the bed. It is obvious that the aforementioned inclination of the side frame 17' is caused by the height of the legs 29; consequently, if it were desired to maintain the side frames in a perpetually horizontal position, the legs would be made shorter, or the wheels mounted directly upon said side frames.

It is evident that when the bar is rotated in a counterclockwise direction from the normal position shown in Fig. 3, the upper section 11 will assume a position in every respect the reverse of that just described, the side frame 17' remaining substantially horizontal.

The front and rear walls of side frames 17 and 17' are provided with a hole or recess 31. As shown in Fig. 4, the vertical wall of the lifter elements 18 is also provided with a hole or recess 32 adjacent each end thereof. The holes 31 and 32 come into alignment when the upper section 11 is in the normal horizontal position shown in Fig. 2. A plug member 33 is attached to the lifter elements 18 adjacent each of the holes 32, by means of a chain 34. The plug 33 may be inserted into the aligned holes 31 and 32 to provide stability to the bed and prevent said bed from being accidentally moved from its normal horizontal position. The plugs may be provided at the front or rear of the bed, or at both front and rear thereof.

If it is desired to raise one of the side frames and retain it in this position to maintain the patient on his side, any conventional means for locking the gears in the gear box G may be used.

In the use of the bed of my invention, a mattress S (Fig. 3) may be provided. Said mattress S is shown in broken line as it forms no part of the present invention. The mattress S is divided into longitudinal sections of sufficient width to correspond to the section formed by the side frames 17, 17' and the longitudinal angle

iron 22, 22'. Each of the sections may be joined by hinges to enable the said sections to be tilted with relation to the others.

In order to hold a mattress of the type described in place upon the upper section 11 when the bed is operated, a plurality of vertical detent members 35 are affixed in spaced relation along the lengths of the inner longitudinal walls of the side frames 17, 17' and the angle irons 22, 22'. The detent members 35 are of sufficient height to abut and hold the lower edges of the mattress. In addition, if desired, a bracket (not shown) may be placed in each outer corner of the side frames 17, 17', to further secure said mattress. To hold the mattress horizontally, springs may be provided to extend horizontally across side frames 17, 17'.

It can be readily seen that when a patient is placed on the mattress in the center of the bed, and the motor is started, the lifting elements 18 will begin a slow, almost imperceptible rotation in one direction, and the patient will be slowly turned over. When the limit is reached, the motor will automatically reverse its direction and slowly turn the patient in the other direction. Thus the position of the patient will be automatically and continually changed.

When it is desired to roll the patient over for medical care or other reasons, the handle is rotated manually, and by a similar operation, the patient may be quickly and easily turned.

While a preferred embodiment of my invention has been shown and described, it is obvious that numerous alterations, omissions and additions may be made in the invention without departing from the spirit and scope thereof. It should particularly be noted that the upper section of the bed may be made in two sections instead of the three shown in the drawings, or may be made in more than three sections if desired.

I claim:

1. A hospital bed comprising a fixed lower frame assembly, a movable upper frame assembly pivotally attached thereto, said upper frame assembly comprising a central section and at least one side frame hinged along its inner longitudinal edge to said central section, and normally disposed substantially parallel to the lower bed frame, and means for pivoting said central section relative to said bed frame and away from said side frame whereby said side frame is raised from said normal position.

2. A hospital bed comprising a stationary lower frame assembly, a movable upper frame assembly, and mechanical means for moving said upper frame assembly; said upper frame assembly comprising a longitudinally extending central portion, a pair of rectangular frames pivotally attached to each side of said portion, at least one rotatable lifting arm located beneath said central portion and said rectangular frames and so connected to said mechanical means as to receive rotary motion therefrom, each rectangular frame being normally disposed in a substantially horizontal position.

3. A hospital bed comprising a stationary lower frame assembly, a movable upper frame assembly, and mechanical means for moving said upper frame assembly; said upper frame assembly comprising a longitudinally extending central portion, a pair of rectangular frames pivotally attached to each side of said central portion, at least one transverse rotatable lifting arm located beneath said central portion and said rectangular frames and connected to said mechanical

means, each rectangular frame being normally disposed in a substantially horizontal position and being positioned to extend over one side of said lifting arm so as to be raised when that side of said lifting arm rises on rotation thereof.

4. A hospital bed comprising a stationary lower frame assembly, a movable upper frame assembly, and mechanical means for moving said upper frame assembly; said upper frame assembly comprising a longitudinally-extending central portion, a pair of rectangular frames pivotally attached to each side of said central portion, a pair of spaced transverse, rotatable lifting arms located beneath said central portion at either end thereof and connected to said mechanical means, each rectangular frame being normally disposed in a substantially horizontal position and normally abutting one side of said lifting arms so as to be raised when the abutting side of said lifting arms rises on rotation thereof.

5. A hospital bed according to claim 4, in which the central portion comprises a pair of spaced longitudinally extending bars, adjustably secured to said transverse lifting arms.

6. A hospital bed comprising a stationary base frame and an upper section mounted thereupon; said upper section comprising a central portion rotatably mounted upon said base frame, a pair of rectangular side frames pivotally attached along the longitudinal edges thereof to said central portion, and mechanical means for rotating said central portion, each of said side frames normally resting upon said base frame and upon said central portion, said side frames also being positioned to be raised by the side of said central portion which rises on rotation thereof, and to separate from that side of said central portion which lowers on rotation, remaining in juxtaposition with said base frame.

7. A hospital bed comprising a stationary base frame and a movable upper frame assembly mounted thereupon; said upper frame assembly comprising a longitudinally-disposed rod rotatably mounted on said base frame, a pair of spaced transverse bars secured to said rod at right angles thereto, a rectangular, horizontally-disposed frame longitudinally and pivotally attached to each of said transverse bars, and mechanical means for rotating said rod, one end of said rectangular frames normally resting upon said transverse bars, the other end of said rectangular frames normally resting upon said base frame, each of said side frames being positioned to be lifted from said base frame by said transverse bars when said transverse bars are rotated in the direction of said side frame, and to pivot away from said bars and remain resting upon said base frame when said bars are rotated away from said side frame.

8. A hospital bed comprising a stationary lower frame assembly and a movable upper frame assembly pivotally attached thereto, said upper frame assembly being divided into a plurality of longitudinal sections, a transverse rotating member normally abutting said longitudinal sections, and mechanical means for rotating said transverse member, said longitudinal sections comprising a center section formed of a plurality of longitudinal bars and secured to said transverse rotating member, and at least one side section hinged along its longitudinal wall to one of said longitudinal bars, said side section being positioned to normally rest upon said lower frame assembly.

9. A hospital bed comprising a lower frame

assembly, a movable upper frame assembly, and mechanical means for operating said upper frame assembly; said upper frame assembly comprising a longitudinal rod rotatably mounted at either end to the front and rear of the lower frame assembly and connected to said mechanical means, a pair of transverse arms attached adjacent either end of said longitudinal rod, a pair of longitudinal bars secured to said transverse arms, and a rectangular side frame pivotally attached along one longitudinal wall thereof to each of said longitudinal bars, said side frames being normally disposed in a horizontal position, said side frames also having wheels on the outer corners thereof which wheels normally rest upon the front end rear upper surfaces of said lower frame assembly.

10. A hospital bed comprising a lower frame assembly and a movable upper frame assembly; said upper frame assembly comprising a rotatable longitudinal rod pivotally mounted at each end on the front and rear of the bed frame, at least one transverse arm secured at right angles to said longitudinal rod, a plurality of longitudinally-extending bars adjustably secured to said transverse arm, a side frame pivotally secured to each of said longitudinally-extending bars along the inner longitudinal edges thereof, said frames being positioned normally to rest upon the upper surface of said transverse arm, the outer corners of said side frames bearing wheels which normally rest upon the front and rear edges of the lower frame assembly, and mechanical means for rotating the longitudinal rod.

11. A hospital bed comprising a lower frame assembly, an upper frame assembly mounted thereupon, said upper frame assembly comprising a longitudinally-disposed central section, and a pair of side sections pivotally secured to said central section along their longitudinal edges by upwardly-breaking hinges, said central section being turnable along its longitudinal axis relative to said lower frame assembly, said side sec-

tions normally resting upon said lower frame assembly, and means to turn said central section.

12. A hospital bed comprising a lower frame assembly, an upper frame assembly mounted thereupon, said upper frame assembly comprising a longitudinally disposed central section, and a pair of side sections pivotally secured to said central section along their longitudinal edges by upwardly breaking hinges, said central section being turnable along its longitudinal axis relative to said lower frame assembly, said side sections normally resting upon said lower frame assembly in substantially parallel relationship thereto, and means to turn said central section, said central section being adapted to raise one of said side sections when said central section is turned toward said side section, and to cause the hinges of the other side section to break upwardly, leaving said other side section resting upon said lower frame assembly.

13. A hospital bed comprising a base frame and an upper section mounted thereupon; said upper section comprising a central portion rotatably mounted upon said base frame, a pair of rectangular side frames pivotally attached along their longitudinal edges to said central portion, and means for rotating said central portion, each of said side frames normally resting upon said base frame, said side frames being positioned to be raised by the side of said central portion which rises on rotation thereof, and to pivot relative to that side of the central portion which lowers on rotation, remaining in juxtaposition with said base frame.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

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