

Jan. 27, 1942.

O. MEHR

2,271,201

HOSPITAL BED

Filed May 23, 1938

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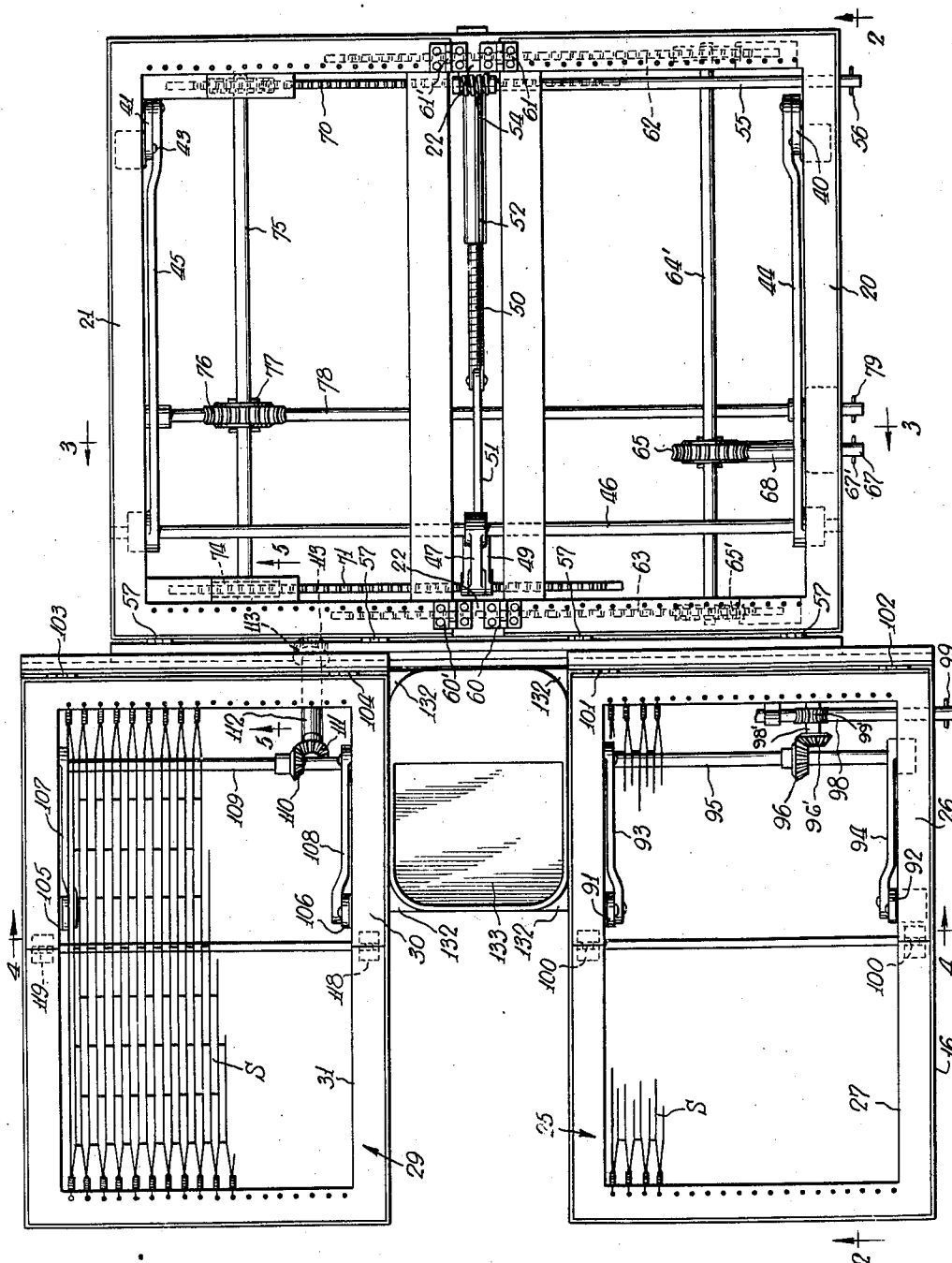


Fig. 1.

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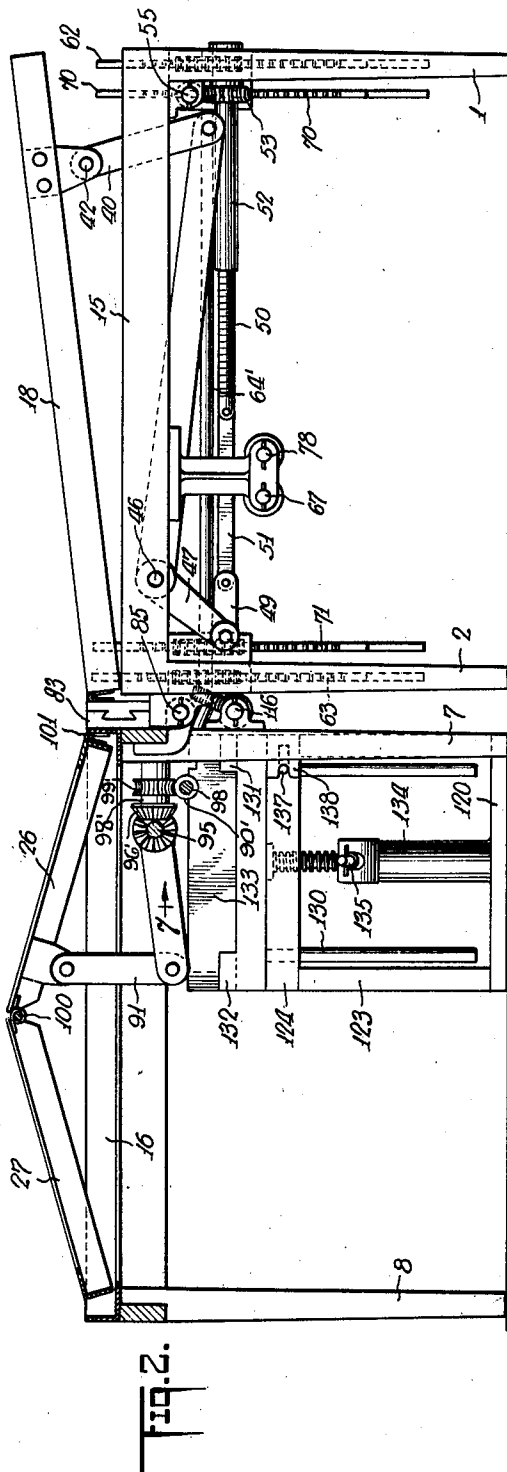
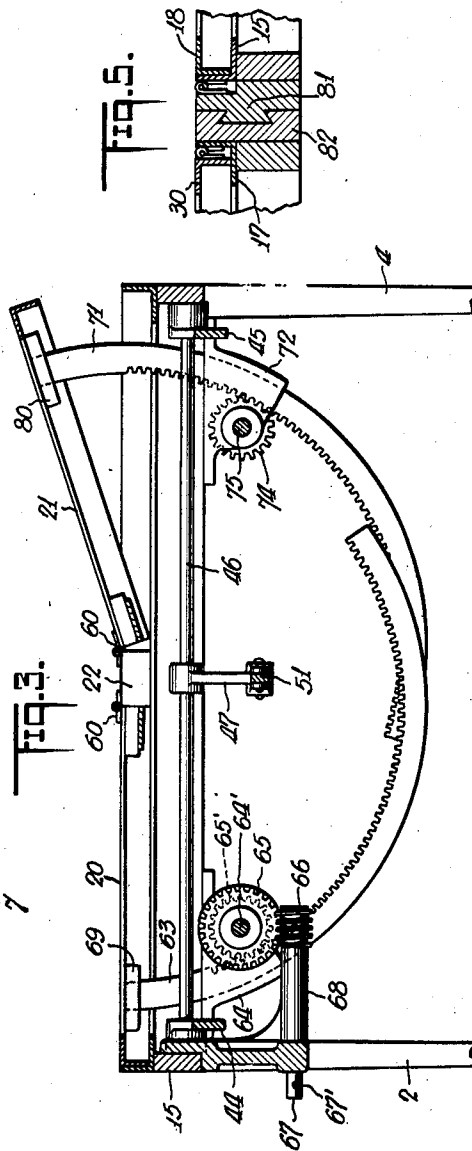
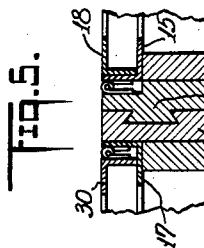
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FIG. 4.

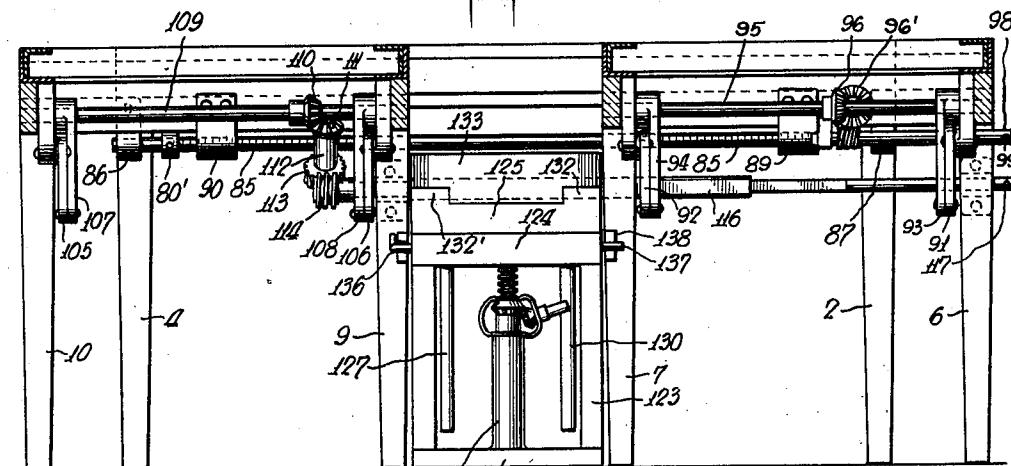


FIG. 5.

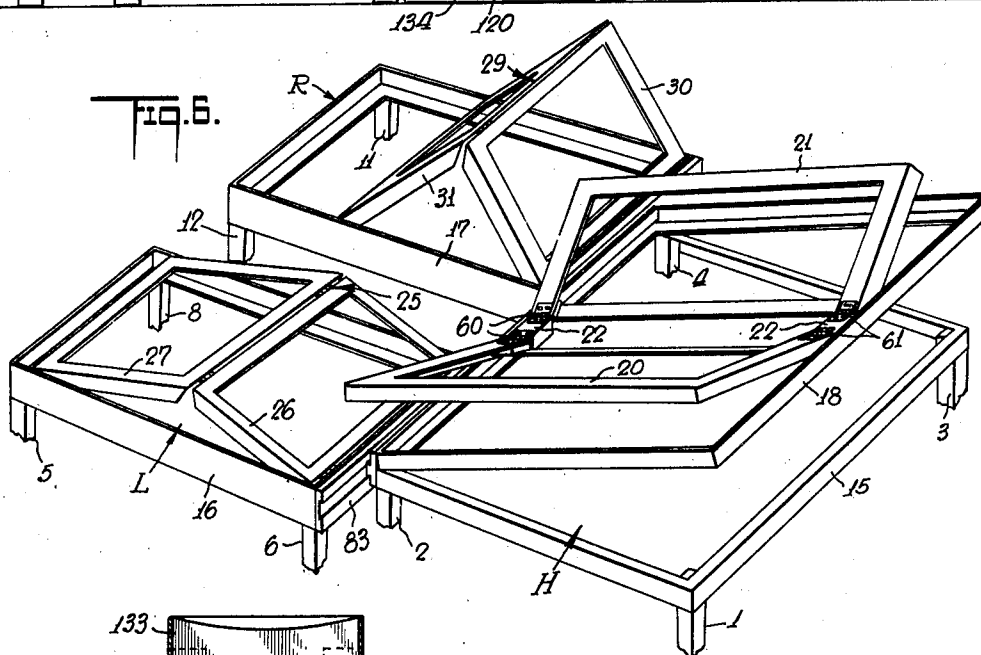
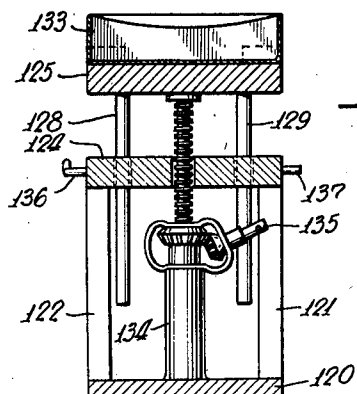


FIG. 7.



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HOSPITAL BED

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4 Claims. (Cl. 5—66)

This invention relates to a bed suitable for the use of an invalid and is of the kind which is commonly known as a hospital bed.

An object of the invention is to produce a bed of this general character which possesses such features of design that a doctor, nurse or attendant may have access to the occupant of the bed to examine, treat or care for said patient with the least discomfort and inconvenience to the patient and with the least effort and strain on the part of the doctor or nurse.

The bed disclosed herein is so constructed that the lower part thereof is divided longitudinally so that the parts on each side of the dividing line may be separated one from the other sufficiently far to enable a doctor or nurse to have access to the patient by placing themselves between the two divided portions of the lower part of the bed.

Another object of the device is to produce a bed of this general character wherein the upper portion may be raised or lowered about a transversely disposed hinge or pivot positioned substantially midway of the length of the bed so that the patient may be raised to a sitting position or may be placed in any position between a sitting position and a horizontal position.

Another advantage incorporated in this structure is that provision is made for assisting the nurse or doctor to turn the patient over on his or her side either to the right or the left, and, if need be, hold the patient in any intermediate position. This is accomplished by dividing the upper part of the bed longitudinally and hinging both sides along this longitudinal middle line and providing means for raising each side separately to a vertical position.

Still another object of the invention is to provide means for raising the middle portion of each lower part of the bed along a division line extending transversely of the part about half way between the middle of the bed and the lower end, which adjustment enables the patient's knees to be raised, and is often used to place the patient in a comfortable position when a flat or horizontal position is not the most comfortable or desirable one.

Still a further object of the device is to provide means for supplying a commode, bed pan or similar utensil to the patient with the least inconvenience to the nurse or the patient, and to do this in a sanitary way which will accomplish the desired purpose as expeditiously as possible.

Another object of the invention is to provide means for supporting a bed pan or similar utensil

and elevating it to a point where it can most conveniently be used by the patient.

These and other objects will be apparent to those skilled in the art upon further study of the disclosure which follows.

The figures of the drawings are as follows:

Fig. 1 is a plan view of the bed with the various mattress supporting surfaces disposed in a horizontal plane and the two leg supporting portions separated;

Fig. 2 is a section through 2—2 of Fig. 1;

Fig. 3 is a section through 3—3 of Fig. 1;

Fig. 4 is a section through 4—4 of Fig. 1;

Fig. 5 is a section through 5—5 of Fig. 1;

Fig. 6 is a perspective view of the frame members of the bed without any operating mechanism, to illustrate the adjustable features of the various mattress supporting portions of the bed;

Fig. 7 is a section through 7—7 of Fig. 2.

In describing this bed the top and bottom or head and foot of the bed will be used to designate the ends commonly occupied by the head and the feet of an occupant and the left and right sides correspond with the left and right hands of an occupant lying on his back in the bed.

The bed comprises three main sections (see Fig. 6), a head section H, a left lower section L normally used to support the left leg and a right lower section R normally used to support the right leg. In the construction shown, each section rests on four legs. The legs supporting section H are numbered 1, 2, 3 and 4, the legs supporting section L are shown at 5, 6, 7 and 8, and the legs supporting section R are shown at 9, 10, 11 and 12. The main frame of each section is of generally rectangular shape and ties the four supporting legs together at the tops thereof to form the supporting or stationary framework of the section. Such a frame for section H is shown at 15, for section L at 16, and section R at 17. Section H is equipped with an auxiliary frame 18 of the same general shape and dimensions as the main frame 15 hinged to the main frame 15 along the edge to which the sections L and R are joined, which is a line running transversely of the bed about midway between the top and bottom thereof. This auxiliary frame 18 can be raised and lowered on hinges which attach it to the main frame 15 and is shown in Figs. 2 and 6 as partly raised.

Auxiliary frame 18, in turn, is equipped with right and left hand portions formed by left hand framework 20 and right hand framework 21 which are hinged to the auxiliary frame 18 along

a line running longitudinally thereof substantially midway between the right and left sides of the bed. A pair of blocks 22, to which elements 20 and 21 are hinged, are attached to frame 18 and form a support upon which the members 20 and 21 may be hinged. These members 20 and 21 may be raised and lowered and are shown in partially raised position in Fig. 6.

Sections L and R may be moved toward and away from each other by a suitable mechanism which will be described hereafter. They are shown in their separated position in Figs. 1, 4 and 6. Each of these sections L and R is equipped with auxiliary frame members equipped with springs to support a mattress, and are so constructed that the middle portion thereof may be raised.

The auxiliary frame member for portion L is illustrated at 25 and comprises an upper and lower section. The upper section is shown at 26 and the lower section at 27. These sections are hinged together where they join each other and the section 26 is hinged to the main frame 16 at the upper edge thereof. In like manner, the portion R, including main frame 17, is equipped with an auxiliary frame, shown at 29, which frame is made up of an upper section 30 and a lower section 31 hinged together along the line which joins the two. The upper section 30 is hinged to main frame 17 along the upper edge thereof.

This is a brief and general description of the adjustable framework of the bed, which enables the head of the bed to be raised and the leg supporting surfaces of the bed to be separated so as to form an aisle therebetween. The auxiliary framework of the lower sections can be raised, as illustrated, at their mid points to form a support for the bent legs of the patient, and they are so designed that they are raised at a point just about under the knees of a normal person. In addition, the upper portion of the bed is equipped with right and left hinged mattress supporting surfaces so that the right or left side of this upper portion may be raised to assist a patient in turning over or to support a patient on his side, if that is desirable or necessary. The mechanisms for accomplishing these various adjustments will now be described in detail.

The auxiliary frame 18 is supported on a pair of links 40 and 41, which links are connected at their upper ends to the auxiliary frame 18 through a pin connection shown at 42 and 43. The lower ends of links 40 and 41 are attached to longitudinally disposed levers 44 and 45 which are keyed to a cross shaft 46 at their lower ends. A downwardly disposed crank lever 47 is keyed to shaft 46 near the middle thereof. To the lower end of crank 47 is attached a connecting rod made up of three portions pinned together. The lower portion 49 is attached to the crank 47, the upper portion 50 is screw threaded, as shown, and the middle portion 51 joins the upper and lower portions together through pin connections, as shown in Fig. 2. The screw portion 50 of the connecting link is threaded into an internally threaded sleeve 52 which is adapted to rotate freely in the framework 15. A worm wheel 53 is mounted on the outside of sleeve 52. This is adapted to be rotated by a suitable worm 54 which is mounted on a transverse shaft 55 supported in the frame 15 and extending outwardly to the left side of the bed, terminating in a head equipped with a cross pin, as shown at 56, and

adapted to receive a suitable crank socket so that the shaft 55 may be rotated.

Upon rotation of shaft 55, through the worm and wheel the sleeve 52 is turned and this serves to move the portion 50 of the connecting link in or out of the sleeve and, through the crank 47, rotate the transverse shaft 46 which, in turn, raises or lowers the levers 44 and 45 which are connected by links 40 and 41 to the auxiliary framework 18 near the head thereof so as to raise or lower the head end of this framework about the hinges 57.

Framework 20 is connected to the blocks 22 near the center of the bed by suitable hinges, as shown at 60 and 61. The outside edge of framework 20 is supported on the ends by a pair of arcuate members equipped with gear teeth. The member near the upper end of the bed is shown at 62 and the member nearer to the lower end of the bed is shown at 63. These arcuate members are adapted to be supported by and move through suitable supporting members, one of which is shown in Fig. 3 at 64. This same supporting member is adapted to support a pinion adjacent to and contacting with the gear teeth cut on the inside of the arcuate members. Such pinion for member 63 is shown at 65 in Fig. 3. Each arcuate member is equipped with such a pinion to move it up and down. The pinions for operating the arcuate members 62 and 63 are mounted on a common shaft 66 running longitudinally of the framework. Upon this shaft is mounted a worm wheel 65 and adapted to cooperate with it is a worm 66 (Fig. 3) attached to a shaft 67 mounted in a bushing 68 supported on framework 15. The end of shaft 67 is equipped with a cross pin 67' to receive a suitable crank, and upon rotation of shaft 67 through the worm and wheel, the shaft 64' is turned and this, in turn, operates the pinions mounted near the ends thereof, one of which is shown at 65', they are in mesh with the teeth of the arcuate members 62 and 63 and serve to raise and lower said members. The upper portion of these members are adapted to recess in a suitable pair of seats mounted on the underside of framework 20, one of which is shown in Fig. 3 at 69. The upper portion of the arcuate members are not attached to these seats, but are loosely recessed in them.

The frame portion 21, which corresponds to portion 20 and forms the right hand side of the upper portion of the bed, is raised and lowered with a similar mechanism. The geared arcuate members are shown at 70 and 71. They operate in suitable guiding and supporting members, one of which is shown at 72 in Fig. 3. Suitable operating pinions are supported in these supporting and guiding members, one of which is shown at 74. This serves to cooperate with the arcuate member 71 to raise and lower it. These pinions are connected to a longitudinally disposed shaft 75 equipped with a worm wheel 76 which is operated by a suitable worm 77 attached to a transverse shaft 78 which is mounted in the framework 15. The end of shaft 78 is equipped with a pin connection 79 to receive a suitable crank. Upon rotation of the shaft 73 by the crank, the shaft 75 is rotated through the medium of the worm and wheel and this, in turn, rotates the pinions, one of which is shown at 74, and these operate the arcuate members 70 and 71 to raise and lower them. The upper end of these members are recessed in suitable seats, one of which

is shown at 80. The arcuate members are not attached to these seats, but merely contact them when moved upwardly. By means of these mechanisms, the outside edges of the auxiliary frame members 20 and 21 may be raised or lowered when auxiliary frame 18 is in a horizontal position.

The sections L and R are connected to the section H by a suitable rabbeted track shown in cross-section in Fig. 5 and comprising the portion 81 attached to the section H and the portion 82 attached to the section R. Section L is equipped with a similar track, shown at 83, adapted to cooperate with the track 81. By this arrangement, the sections L and R may slide toward and away from each other, but may not be moved away longitudinally from the section H. For moving the sections L and R toward and away from each other, the lower edge of section H is equipped with a screw threaded shaft 85 mounted to revolve freely in suitable bearings 86 and 87 on frame 15. This threaded shaft may be conveniently disposed immediately under the rabbeted track. Section L is equipped with a nut 89 and section R with a similar nut 90 through which the threaded shaft 85 passes. These nuts are rigidly attached to the sections L and R and upon rotation of the shaft 85 will move longitudinally thereof and carry the sections L and R toward or away from each other. The outward movement of these sections is limited by collars 89' and 81'. The right hand outer end of shaft 85, as viewed in Fig. 4, is equipped with a suitable pin 90 for the attachment of a crank. Through this mechanism, the sections L and R may be brought together so that with the section H they will form a continuous mattress supporting surface of the general shape and configuration of an ordinary bed, but when it is desired, these portions may be moved apart to form an aisleway therebetween. It has been found in practice that it is sufficient to move them apart about twelve or fifteen inches.

The auxiliary frame 25, which is hinged at 101 and 102 to frame 16 of the section L, is divided into an upper and lower section 26 and 27 hinged together at approximately the midpoint of the section L. This mid point may be raised or lowered vertically. The upper portion 26 of this movable framework of section L is supported on a pair of links 91 and 92. The lower end of these links are connected to a pair of cranks 93 and 94 which are keyed to a transverse shaft 95. Shaft 95 is equipped with a worm level gear 96 adapted to mesh with a bevel gear 96' mounted on a stub shaft 98' supported in frame 16. Also mounted on stub shaft 98' and keyed thereto is a worm wheel 99' adapted to cooperate with a worm 90' on shaft 98. Shaft 98 is mounted on frame 16. The outer end of shaft 98 is equipped with a cross pin 99 to receive a crank. Upon rotation of shaft 98 through the medium of worm and wheel 90' and 99' and bevel gears 96 and 96', the shaft 95 is turned to raise or lower the cranks 93 and 94 which, in turn, are connected through links 91 and 92 to the frame 26 so that the lower end thereof will be raised or lowered. Because of the hinged connection of this portion 26 to the portion 27, which hinges are shown at 100, the central portion of this auxiliary frame 25 may be raised or lowered to support the legs of the patient when the legs are either bent or straight. The auxiliary frame member 29 of the portion R can likewise be raised and lowered through a similar mechanism. The

upper portion of this auxiliary frame, shown at 30, is hinged to the upper edge of the section R, as shown at 103 and 104. This portion 30 is supported on a pair of links 105 and 106, which, in turn, are connected at the lower ends thereof to cranks 107 and 108. At the opposite end of cranks 107 and 108 they are keyed to shaft 109 which is equipped with a bevel gear 110 adapted to cooperate with a corresponding bevel gear 111 on a stub shaft supported in sleeve 112 mounted in any suitable way (not shown) on the framework. This stub shaft is equipped at the lower end thereof with a worm wheel 113 adapted to be operated by a worm 114 mounted on shaft 116 mounted on the framework of the two lower portions of the bed. This shaft 116 is telescopic to provide for the movement of portion R relative to portion L on which the outer end of shaft 116 is mounted. This outer end is equipped with a cross pin 117 to receive a suitable crank for rotation of the shaft. Upon rotation of shaft 116 and through the medium of the worm and wheel 113 and 114 and the stub shaft contained in sleeve 112 and the bevel gears 110 and 111, the shaft 109 is rotated, and by means of cranks 107 and 108 and links 105 and 106, the portion 30 may be raised and lowered. Portion 31 is hinged to portion 30, as shown at 118 and 119, with the result that, upon the turning of shaft 117, the middle portion of auxiliary frame 29 will be raised or lowered.

Means is provided in this construction for supporting a bed pan or other utensil in a convenient position between the separated portions R and L. The support comprises a framework made up of a bed plate 120 (Fig. 7) with four uprights, two of which are shown at 121 and 122 and one of which is shown at 123. An upper plate 124 on said uprights has a movable platform 125 adapted to be moved up and down above the upper plate 124. Four guide members 127, 128, 129 and 130 are attached to the underside of plate 125 and are adapted to pass through suitable holes in plate 124 and serve to guide the plate 125 as it moves up and down in relation to the plate 124. This upper plate 125 is adapted to receive a bed pan or other utensil, shown at 133. Upper plate 125 is equipped with shoulders at the four corners thereof, three of which are shown at 131, 132 and 132'. This upper plate 125 is adapted to receive any utensils which might be of assistance to the nurse or doctor in treating or helping a patient, and in the figures is shown with a bed pan 133. The upper supporting plate 125 may be raised or lowered by a suitable jack mechanism which is shown as the conventional screw type automobile jack at 134. A long jack handle may be attached to the handle receiving shaft 135 for operation of this jack. The left side of plate 124, as viewed in Fig. 7, is equipped with a hook 136 adapted to hook around one of the legs of section R to hold the bed pan support in position. A pin 137 is adapted to recess in a notch 138 located on leg 7 of section L.

To use the utensil support, first the lower portions L and R are separated far enough to accommodate the utensil and supporting platform and then, with the aid of the long jack handle and while the utensil support is in its lowermost position, the support is positioned between the sections L and R and adjacent to the lower edge of section H, and, by means of the hook 136 and the pin 137, are loosely attached to the legs 9 and 7 of the sections R and L, respectively, and

then, upon operation of the jack handle, the upper supporting plate with the utensil thereon is raised into any desired position where it can be most conveniently used. When it is desired to remove the utensil, it is only necessary to lower it to its original position, and with the aid of the jack handle, the supporting mechanism can all be conveniently removed from underneath the bed.

In its normal position, the various sections of this bed are moved together to form a horizontal supporting surface for the mattress or the various sections of the mattress, and, to all outward appearances, it then resembles an ordinary bed. When it is desired to adjust any part of the bed, any such adjustment can be made from the left side of the bed. The auxiliary frame 18 may be raised or lowered by turning shaft 15. The sections L and R can be separated by turning shaft 85. The auxiliary frame members 25 and 29 of the sections L and R, respectively, can be raised at the center portions thereof to accommodate the patient's legs when they are bent at the knees by operation of the shafts 98 and 116, respectively.

When it is desired to turn the patient over or to have the patient lie on his side with some support for his back, the auxiliary frame members 20 and 21 attached to the frame member 13 may be raised. This can be accomplished only when the frame member 13 is in its lowermost position. The frame member 20 may be raised by turning the shaft 67 and the frame member 21 may be likewise raised by turning the shaft 78.

All the various controls are on one side of the bed where they may be conveniently reached and the utensil supporting means may also be introduced and operated from this same side of the bed.

The separation of the lower sections L and R will facilitate the use of the various utensils and, at the same time, facilitate the examination and treatment of a patient because a doctor or nurse can walk up into the space between these two sections to more easily work.

Each of the auxiliary frame members making up the bed may be equipped with suitable bed springs, some of which are shown at S in Fig. 1. The bed springs will have to be arranged separately in each section, inasmuch as the sections move relative to each other. Likewise, the mattress for a bed of this kind will have to be made in sections to accommodate the movement of the various frame members.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a hospital bed, an upper and lower portion, said lower portion divided longitudinally to

form two leg-supporting surfaces, separate supporting legs and framework for each surface adapted to support each surface separately on the floor upon which the bed rests, means for separating said leg-supporting surfaces and supporting legs and framework to leave an unobstructed passageway therebetween, or for bringing said surfaces and the supporting legs and framework therefor together to form a continuous supporting surface while keeping said supporting surfaces and supporting legs and framework in substantially parallel relationship to each other.

2. In a hospital bed, an upper and lower portion, said lower portion divided longitudinally to form two leg-supporting surfaces, separate supporting legs and framework for each surface adapted to support each surface separately on the floor upon which the bed rests, screw control means for moving said leg-supporting surfaces and said supporting legs and framework apart to leave an unobstructed passageway therebetween, or for bringing them together to form a continuous surface while maintaining them in substantially parallel relationship to each other.

3. In a hospital bed, an upper and lower portion, said lower portion divided longitudinally to form two leg-supporting surfaces, separate supporting legs and framework for each surface adapted to support each surface separately on the floor upon which the bed rests, a track on which one end of each leg-supporting surface and supporting legs and framework is adapted to move, manually operable means for separating said leg-supporting surfaces and supporting legs and framework to leave an unobstructed passageway therebetween, or for bringing said surfaces and supporting legs and framework together to form a continuous supporting surface while keeping them in substantially parallel relationship to each other.

4. In a hospital bed, an upper and lower portion, said lower portion divided longitudinally to form two leg-supporting surfaces, separate supporting legs and framework for each surface adapted to support each surface separately on the floor upon which the bed rests, means for holding and guiding one end of each leg-supporting surface and the supporting legs and framework therefor, means for separating said leg-supporting surfaces and supporting legs and framework therefor to leave an unobstructed passageway therebetween, or for bringing said surfaces and supporting legs and framework together to form a continuous supporting surface while keeping them in substantially parallel relationship to each other.

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