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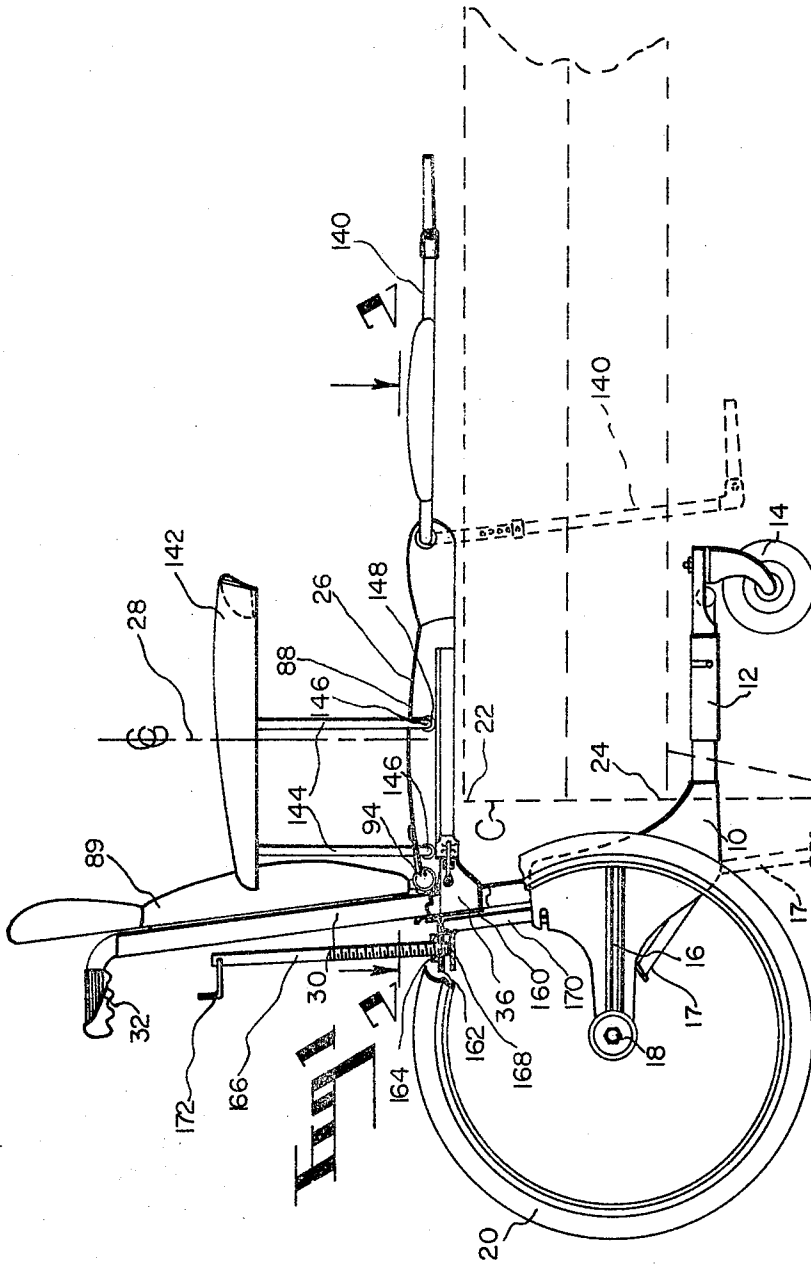
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3,264,658

WHEEL CHAIR

Filed Dec. 20, 1962

3 Sheets-Sheet 1



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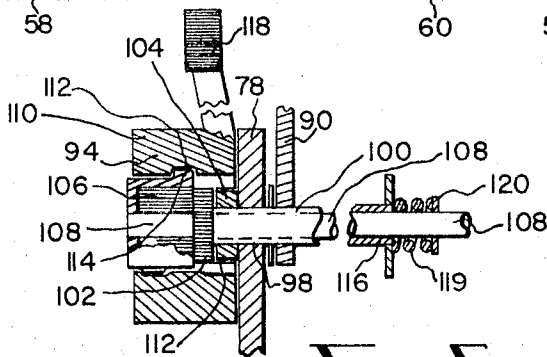
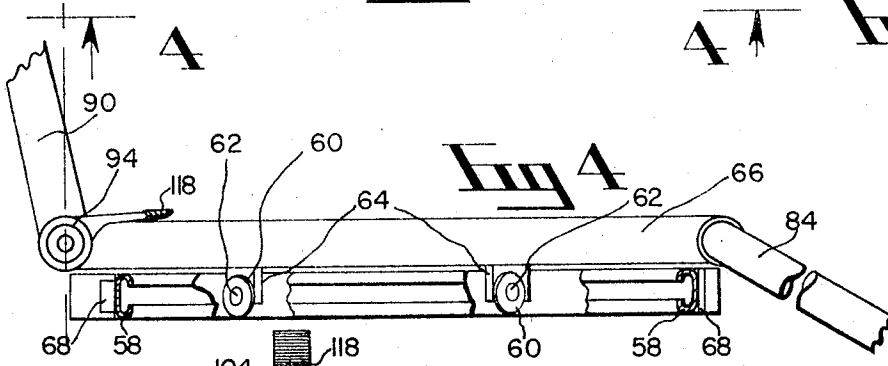
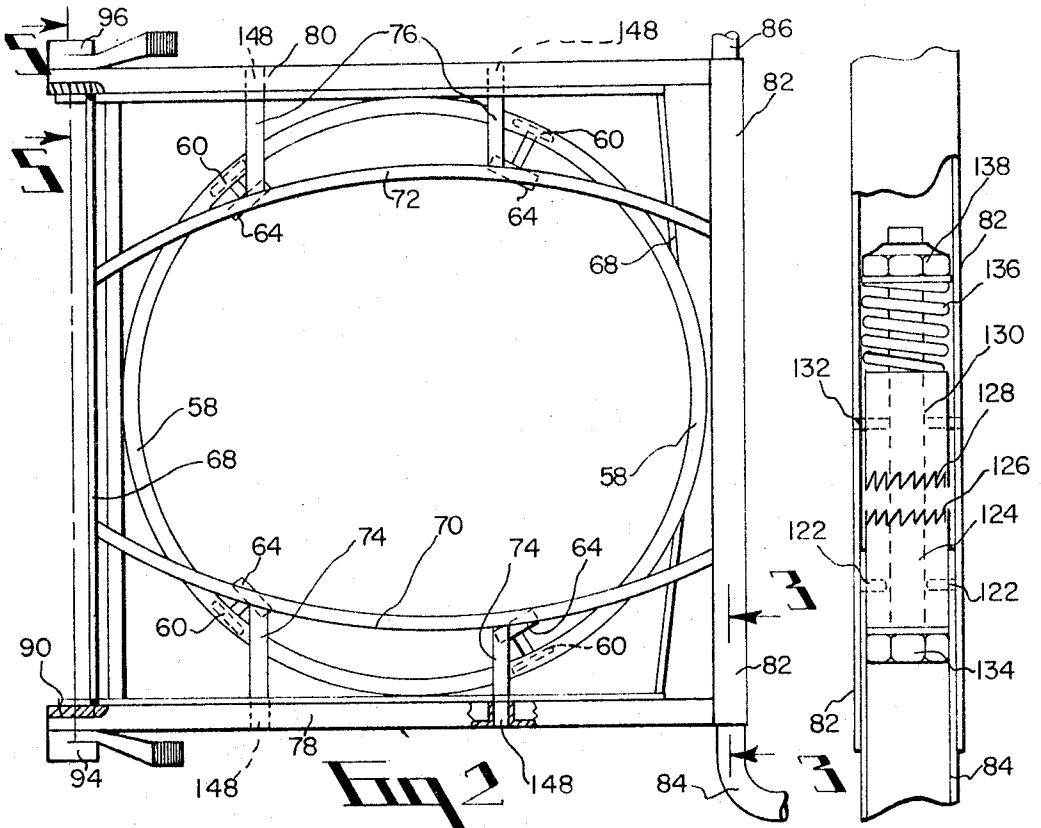
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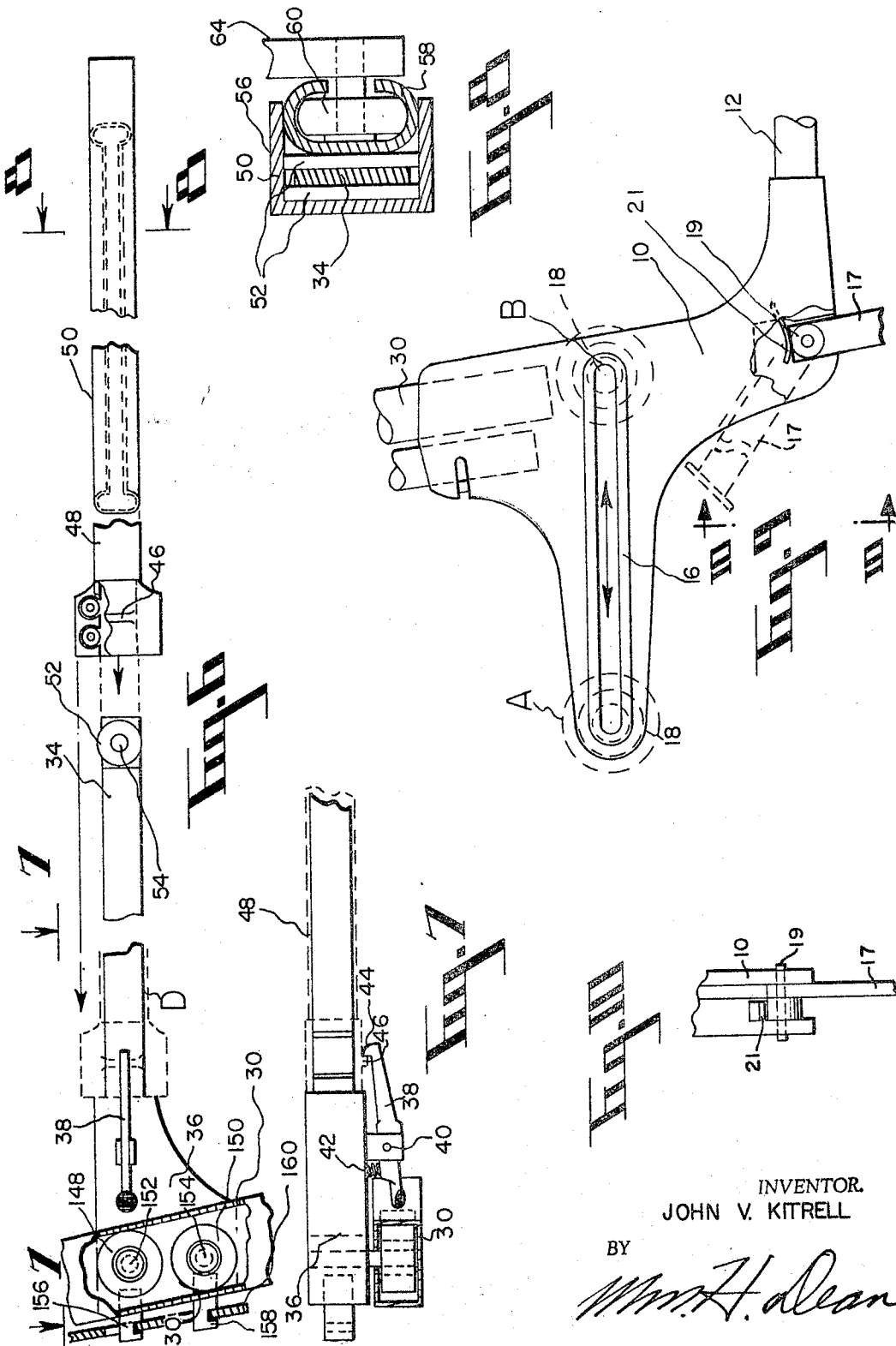
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3 Sheets-Sheet 3



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1

3,264,658

**WHEEL CHAIR**

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6 Claims. (Cl. 5—81)

This invention relates to a wheel chair and more particularly to a wheel chair having novel features which facilitate the handling of disabled patients.

It has been a problem to transfer a disabled patient from a bed to a wheel chair or from a wheel chair to a bed without substantial manual stress or strain on a disabled patient. In most instances, a disabled patient must be manually picked up and placed in a wheel chair in order to transfer him from a bed to another location. This is particularly true in convalescing patients who spend part of their time in a wheel chair and the remaining portion of their time in bed. Such patients being disabled to the extent that they are unable to handle themselves in the movements to and from a wheel chair.

Many such patients are heavy and many of the attendants or nurses are not physically equipped manually to transfer such heavy patients to and from a wheel chair and especially when the patient is being moved into or out of a bed relative to the wheel chair.

Various prior art wheel chairs have been devices to assist patients and their attendants. However, a great need has been recognized for a wheel chair which will readily transfer a patient directly onto the upper surface of a bed without any hazard of dropping the patient on the floor or creating undue discomfort of the patient.

Accordingly, it is an object of the present invention to provide a novel wheel chair which is particularly adapted to handle disabled patients and to deposit them directly onto the upper surface of a bed in such a manner that they are transferred to a median portion of the bed without the hazard of rolling off the edge of the bed during the placement of such patients thereon.

Another object of the invention is to provide a novel wheel chair for transferring patients to and from a bed which comprises a novel frame having supporting wheels disposed to run under the bed to support a load disposed over a median portion of the bed; said wheel chair structure also comprising a vertically swiveled cantilevered seat which is disposed to pass over the upper surface of the bed whereby the seat may be pivoted about a vertical axis and the back of the seat may be pivoted downwardly into horizontal position so that a patient may lie in horizontal position in the chair directly over the bed so that he may subsequently be rolled onto a median portion of the bed at a considerable distance inwardly of the edge of the bed.

Another object of the invention is to provide a novel wheel chair particularly adapted for loading and unloading patients relative to the upper surface of a bed comprising novel wheel and frame structure disposed to receive a patient's bed below the wheel chair seat which is provided with novel pivoted foot and back supports which may be disposed horizontally subsequent to the pivotal movement of the seat about a vertical axis whereby the entire seat, foot rest, and back rest structure of the chair may be disposed in superimposed relationship over the upper surface of the bed at a considerable distance inwardly of the edge of the bed.

Another object of the invention is to provide a novel wheel chair structure which permits relatively frail attendants or nurses to load and unload relatively heavy patients when transferring them to or from a bed relative to the wheel chair of the present invention.

2

Another object of the invention is to provide a novel wheel chair which contributes to the comfort of patients being loaded and unloaded to or from a bed relative to the wheel chair of the present invention.

Other objects and advantages of the invention may be apparent from the following specification, appended claims, and accompanying drawings, in which:

FIG. 1 is a side elevational view of a wheel chair in accordance with the present invention, shown with the seat of the wheel chair overlying a bed structure and wheel supports of the chair disposed beneath the bed structure and illustrating varying positions of the chair, backrest, and leg supporting structure relative to the bed which is illustrated in broken lines;

FIG. 2 is an enlarged fragmentary plan sectional view taken from the line 2—2 of FIG. 1, but showing the padding of the seat structure removed and illustrating the seat frame and structure for pivoting it about a vertical axis relative to the chair frame;

FIG. 3 is an enlarged fragmentary sectional view taken from the line 3—3 of FIG. 2 showing clutch structure of the leg rest of the invention in disengaged position;

FIG. 4 is a fragmentary side elevational view taken from the line 4—4 of FIG. 2, showing portions broken away and in section to amplify the illustration;

FIG. 5 is an enlarged fragmentary sectional view taken from the line 5—5 of FIG. 2, showing the reclining seat back hinge and lock assembly structure of the invention;

FIG. 6 is a fragmentary side elevational view of a portion of the wheel chair frame structure showing the turntable track assembly and its supporting forks in an exploded view;

FIG. 7 is a fragmentary sectional view taken from the line 7—7 of FIG. 6;

FIG. 8 is an enlarged fragmentary sectional view taken from the line 8—8 of FIG. 6, showing details of the turntable track structure and the supporting forks therefor;

FIG. 9 is an enlarged fragmentary side elevational view of the main wheel supporting frame structure of the invention disposed to permit forward and rearward adjustment of the main wheels of the wheel chair so that the frame of the wheel chair may receive the edge of a bed, as shown in FIG. 1 of the drawings;

FIG. 10 is a fragmentary elevational view of the kick stand structure of the invention taken from the line 10—10 of FIG. 9.

As shown in FIG. 1 of the drawings, the wheel chair of the present invention is provided with a main frame 10 having cantilever caster arms 12 supported by wheel casters 14. These arms 12 are secured to the main frame 10 which is provided with a horizontal slot 16 in which an axle 18 of main wheels 20 may be horizontally adjusted to move the main wheels 20 fore and aft, as desired, for the purpose of receiving a bed structure within the wheel chair frame, all as will be hereinafter described in detail.

With reference to the slot structure 16, attention is directed to FIG. 9 of the drawings, wherein the main frame 10 is shown on an enlarged scale. The axle 18 of the main wheels 20 may be moved to either of two positions, as indicated by broken lines A or B, in FIG. 9 or the axle 18 may be disposed in any intermediate position therebetween within the limits of the slot 16, as desired.

From an inspection of FIG. 1 of the drawings, it will be seen that bed, mattress, and box spring structures 22 and 24 are received above the arms 12 and that the casters 14 may be disposed thereunder a considerable distance from the outer edge C of the bed. Seat structure 26 is supported above the casters 14 which are beyond the normal center of gravity 28 of a patient on the seat

structure 26. Thus, the wheel chair of the invention may be placed in a position wherein the casters 14 are below the bed and a considerable distance inwardly of the outer edge C and the seat 26 may be placed over the bed while the wheels 20, at their axles 18, may be disposed in the broken line position A in the slot 16. Thus, the periphery of the wheels 20 does not interfere with the placement of the seat structure 26 above the bed and inwardly of the outer edge C thereof.

A kick stand is provided for lifting the wheel chair frame and the main wheels 20 clear of the floor for the purpose of adjusting the wheel axles 18 in the slot 16. The kick stand is attached to the main frame 10 by bolts 19 about which the stand members 17 may rotate to broken line positions and be held in such positions by elliptical leaf springs 21 reacting against the main frame 10 and a flat side of the stand member 17. The kick stand members 17 are of a length sufficient to support the wheels 20 above a floor at an elevation of about 1 inch, all of which provides sufficient clearance for the hereinbefore described adjustment of the wheel axle longitudinally of each of the slots 16 in the frame members 10.

The main frame 10 is provided with vertical frame structures 30, there being two of these upstanding frame structures 30 terminating in handles 32, at their upper ends. These handles 32 may be utilized by attendants or nurses for handling the wheel chair with the patient therein.

Cantilevered from the upstanding members 30 which are fixed to the main frame 10 are fork members 34. These fork members are shown best in FIGS. 6 and 7 of the drawings and are cantilevered from respective upstanding members 30 by fixed bracket portions 36 having pivoted latch levers 38 secured thereto. These latch levers 38 are pivoted on pins 40 and are loaded by springs 42 so that hook portions 44 of the latches will engage protruding lugs 46 on tubular structures 48 of a turntable frame 50, as will be hereinafter described in detail.

Each of the fork members 34 is provided with rollers 52 pivoted on pins 54 near the extending ends of these forks 34.

The turntable carriage 50 is provided with side rails 56 in which the forks 34 are disposed, as shown in FIG. 8 of the drawings, when the tubular structures 48 are in the broken line positions D shown in FIG. 6, of the drawings.

Supported in the frame 50 is a circular substantially C-shaped in cross-section track 58 which carries rollers 60 which are rotatably mounted on pins 62 held in brackets 64 extending downwardly from the seat frame 66, all as shown best in FIG. 4 of the drawings.

Extending laterally between the channel-shaped frame members 56 are cross members 68 which support the C-shaped in cross-section circular track 58, all as shown best in FIGS. 2 and 4 of the drawings.

The seat frame 66 is preferably made of tubular material and is provided with curved members 70 and 72 secured by frame members 74 and 76 to side members 78 and 80 which are coupled to a tubular frame member 82 in the normally front portion of the seat structure 26. Footrest bracket members 84 and 86 are pivotally secured to the tubular member 82 and a conventional seat padding structure 88 is secured on top of the seat frame 66 over the members 70, 72, 74, 76, 78, and 80, all as shown best in FIGS. 1 and 2 of the drawings.

A backrest structure 89 is connected to upstanding members 90 and 92 which are pivoted to the rear ends of the seat frame members 78 and 80. The seat back 89 is thus pivotal backwardly into horizontal position, as will be hereinafter described in detail.

As shown in FIG. 5 of the drawings, the reclining back hinge lock structures for holding the seat back 89 in juxtaposition are disclosed. These hinge locks are designated 94 and 96 in FIGS. 1, 2 and 4 of the drawings. These structures are similar and only the structure 94 will

be hereinafter disclosed. The seat frame member 78, as shown in FIG. 5 of the drawings, is provided with a bore 98 in which a hollow shaft 100 is rotatable. The seat back frame member 90 is fixed to this hollow shaft and also fixed to the hollow shaft is an externally serrated or gear-toothed annular member 102 which is disposed axially aligned and adjacent to a similar externally gear-toothed annular member 104 which is fixed to the frame member 78.

An internally gear-toothed cup 106 is fixed to an end of a shaft 108 which is rotatable internally of the hollow shaft 100. An internal cam member 110 surrounds the cup 106 and is provided with a substantially helical internal cam track 112 engaged by a projection 114 of the cup 106. A handle 118 on the internal cam 110 permits it to be rotated for moving the helical track 112 and permitting the follower portion 114 of the cup 106 to move inwardly toward the frame 78. The internal teeth of the cup 106 couple the external teeth of the member 102 and the member 104 thereby locking them together since the member 104 is fixed to the hollow shaft 100 which is fixed to the member 102. The cup 106 thus locks the frame 90 relative to the frame 78.

A washer 116 of the hollow shaft 100 is engaged by a spring 119 which engages another washer 120 on the shaft 108. In operation, the spring 119 thus tends to retract the shaft 108 and the cup 106 into engagement with the gear-toothed members 102 and 104. Thus, when the cam member 110 is rotated by the handle 118, the spring 119 forces the internally gear-toothed cup 106 to engage the externally gear-toothed members 102 and 104 thus locking the backrest 89 in a certain angular position relative to the seat 26. Thus, the backrest 89 may be disposed at an incline to the horizontal. It may be vertical, or it may be horizontally disposed, as desired, and as will be hereinafter described in detail.

Each of the footrest brackets 84 and 86 are also pivotal about the axis of the tubular member 82 so that the foot rest structures may be disposed in a solid line position, as indicated in FIG. 1, or may be pivoted downwardly to a broken line position so that it may be disposed above the bed, as indicated in solid lines in FIG. 1 of the drawings may be disposed as indicated by broken lines to accommodate a person's legs when in the chair and in sitting position therein.

Each of the footrest brackets 84 and 86 is provided with a detent structure for holding these footrest structures in various angular positions, all as shown best in FIGS. 2 and 3 of the drawings.

The bracket 84 is a tubular member disposed internally and rotatably mounted in the tubular member 82. Fixed by pins 122 to the tubular member 84 is a ratchet-toothed member 124. This ratchet-toothed member 124 is provided with an annular row of buttress teeth 126 disposed to engage similar teeth 128 of a detent member 130 fixed by pins 132 to the tubular member 82.

A bolt 134 passes through both of the detent members 124 and 130 and a compression spring 136 is disposed on the bolt and held in compressive engagement with one end of the detent member 130 by means of a nut 138. The bolt 134 and spring 136 thus tend to force the buttress teeth 126 and 128 together and to retract the bracket member 84 inwardly of the tubular member 82 inasmuch as the pins 132 hold the detent member 130 stationary and the spring 136 is engaged therewith. Thus, the footrest structure generally indicated at 140 in FIG. 1 of the drawings, may be pivoted upwardly by simply raising the footrest structure 140 due to the inclination of the buttress teeth 126 and 128 which will slide over each other by alternate compression of the spring 136.

When it is desired to pivot the footrest assembly downward, the tubular brackets 84 and 86 are pulled outwardly of the tube 82, thus forcing the spring 136 under compression to separate the buttress teeth 126 from the

5

teeth 128 thereby permitting freely pivotal movement of the tubular brackets 84 and 86 relative to the tube 82 and thus permitting downward pivotal movement of the entire footrest assembly 140 to a desired angular or vertical position.

Arm rests 142, at opposite sides of the seat 26, are supported on vertically disposed brackets 144 having lower ends 146 supported in sockets 148 in the seat frame members 74 and 76, all as shown best in FIGS. 1 and 2 of the drawings.

Rotatably mounted on the brackets 36, are rollers 148 and 150; these rollers 148 and 150 being supported on pins 152 and 154, carried by the respective brackets 36.

The rollers 148 and 150 are vertically movable in hollow track structure of the upstanding members 30 so that the cantilevered fork structure carrying the seat of the present wheel chair may be vertically adjusted up and down the vertical members 30, as will be hereinafter described in detail.

Projecting from the brackets 36 are hooks 156 and 158 which project through complementary openings in a bracket 160 to which is connected a lateral clip 162 carrying an internally screwthreaded nut 164 fixed thereto. Screwthreadably engaged with this nut 162 is an elevating screw 166 which bears against a thrust bearing 168 carried by a cross bar structure 170 supported on the members 10.

Accordingly, it will be seen that operation of the screw 166 by a crank handle 172 provides for elevation of or lowering of the seat 26 in connection with the brackets 36 carrying the rollers 148 and 150 which traverse the internal track structure of the upstanding members 30. This adjustment permits the vertical adjustment of the seat 26 to a position above the upper corner 22 of a bed C, so that various beds of varying elevations may be negotiated in such a manner that the seat 26 and footrest 140 may be positioned to overlie the bed and to handle patients relative to the upper surface thereof.

In operation, a patient may be carried in the wheel chair of the present invention, sitting on the seat structure 26 and resting against the backrest 89 which may be reclined between the upstanding members 30, if desired. The foot rest structure 140 may be disposed vertically or horizontally or it may be disposed in various angular positions relative to the vertical and horizontal. Normally, however, the patient is carried with the backrest 89 in the upwardly directed position, as shown in FIG. 1 of the drawings, and the footrest structure 140 in the solid line position, as shown in FIG. 1. The wheel axle 18 may be in the normally rear end of the slot 16, in the position A, as shown in FIG. 9, so that the periphery of the wheel will clearly permit the wheels 14 to be disposed under the bed and the wheel 20 will not contact the edge C of the bed. Thus, the patient may be transported from some area toward his bed and when the bed is approached, the footrest structure may be moved upwardly into the broken line or horizontal position, as shown in FIG. 1 of the drawings, so that the wheel 14 or caster 14 may be disposed under the bed and the footrest structure 140 may be disposed over the upper surface of the bed. Subsequently, then, the seat structure 26 is rotated about a vertical axis through the center of the circular track 58 by means of the rollers 60 which run in this circular track 58 forming a turntable for the seat structure 26 and permitting it to be pivoted about a vertical axis. The supports 64 carried by the seat frame 66 support the seat structure 26 on the circular track 58 and the seat, together with the footrest 140 are pivoted around to a position 90 degrees from that shown in FIG. 1, into a substantially parallel position with the bed, as shown in FIG. 1 of the drawings. It will be appreciated that the wheel chair, as shown in FIG. 1, is disposed at the side of the bed and that the view of FIG. 1 is taken from the end of the bed. When the seat structure 26 is rotated substantially 90 degrees, the seat and footrest as-

6

sembly will then be parallel to the longitudinal axis of the bed and the seat back 89 may then be released by the members 94 and 96 permitting the seat back 89 to pivot downwardly into a horizontal position so that the entire body structure of the patient may lie horizontally over the bed and may then be rolled onto the bed inwardly of the edge C without any hazard of dropping the patient over the edge C when loading him onto the bed. It will be appreciated by those skilled in the art that this operation may be carried on in handling a very heavy patient and may be accomplished by a diminutive operator such as a small nurse without undue stress on either the nurse or the patient.

The reverse operation of loading the patient onto the wheel chair from the bed merely includes the rolling of the patient onto the wheel chair structure with the footrest, seat, and backrest structures all aligned in a horizontal position above the bed and in close proximity to the upper surface thereof.

When the patient is on the wheel chair, the backrest 88 may be moved upward into a substantially vertical position, as shown in FIG. 1 of the drawings. The seat 26 may then be rotated about a vertical axis concentric with the circular track 58 substantially 90 degrees, whereupon the wheel chair may be retracted away from the bed to permit downwardly pivotal movement of the footrest structure 140 and to thereby place the patient into a normal upright sitting position for transportation or other activity, as desired.

It will be appreciated by those skilled in the art that the forks 34 may be released from the turntable track frame 50 by pivoting the latches 38 at their hook portions 44 out of engagement with the projections 46 on the frame 60. Thus, the wheel chair and the forks may be moved away from the entire seat, footrest, and backrest structures when placed on a bed, if desired, so that the operator may load the patient onto the footrest, seat, and backrest structures without being encumbered by the upstanding members 30 of the wheel chair frame. Further, it will be noted that the arm rest 142 may readily be removed from the sockets 148, as hereinbefore described, so that a patient may be loaded onto the footrest, seat, and backrest structures of the wheel chair, all in horizontal position on the upper surface of the bed without interference from the arm rest 142 or the upstanding members 30 of the wheel chair structure. When the patient is loaded onto the patient supporting structure of the chair, the forks 34 may be forced into the channels 56 of the frame 50 by means of the rollers 52 acting as anti-friction members and thus, the entire footrest, seat, and backrest structures may be picked up from the upper surface of the bed after the patient has been loaded thereon.

It will be obvious to those skilled in the art that various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claims.

**I claim:**

1. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame having first supporting wheels of small enough diameter to pass under a bed; second relatively larger wheels supporting said frame and disposed to support said wheel chair at the side of a bed, said larger wheels having peripheries disposed in a position adapted to be operated by a patient in said chair; a seat frame pivotally mounted on said main frame on a substantially vertical axis, said seat frame cantilevered from said main frame and disposed in spaced relation with and above said cantilever frame portion; a turntable means rotatably supporting said seat frame on a vertical axis; second cantilever means projecting horizontally from said main frame in vertically spaced relation to said cantilever frame portion; and receiving portions of said turntable means, said receiving portions removably mounted on said second cantilever

means and relatively engageably and disengageably by movement of said second cantilever means and said main frame at substantially right angles relative to the axes of said second wheels and relative to said turntable means and said seat frame when said seat frame is deposited on a stationary support to thereby permit loading and unloading of the seat frame relative to the main frame.

2. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame having first supporting wheels of small enough diameter to pass under a bed; second relatively larger wheels supporting said frame and disposed to support said wheel chair at the side of a bed, said larger wheels having peripheries disposed in a position adapted to be operated by a patient in said chair; a seat frame pivotally mounted on said main frame on a substantially vertical axis, said seat frame cantilevered from said main frame and disposed in spaced relation with and above said cantilever frame portion; a turntable means rotatably supporting said seat frame on a vertical axis; second cantilever means projecting horizontally from said main frame in vertically spaced relation to said cantilever frame portion; and receiving portions of said turntable means, said receiving portions removably mounted on said second cantilever means and relatively engageably and disengageably by movement of said second cantilever means and said main frame at substantially right angles relative to the axes of said second wheels and relative to said turntable means and said seat frame when said seat frame is deposited on a stationary support to thereby permit loading and unloading of the seat frame relative to the main frame backrest and footrest structure each pivoted on a horizontal axis to said seat frame whereby the seat frame, backrest, and footrest structures may all be disposed horizontally above a bed and pivoted into parallel alignment therewith about said vertical axis.

3. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame having first supporting wheels of small enough diameter to pass under a bed; second relatively larger wheels supporting said frame and disposed to support said wheel chair at the side of a bed, said larger wheels having peripheries disposed in a position adapted to be operated by a patient in said chair; a seat frame pivotally mounted on said main frame on a substantially vertical axis, said seat frame cantilevered from said main frame and disposed in spaced relation with and above said cantilever frame portion; cantilever forks on said main frame projecting above and in the same direction as said cantilever frame portion; a turntable frame removably mounted on said forks and having pivot means providing a pivotal support for said seat frame about said vertical axis, said vertical axis being forwardly beyond the peripheries of said second wheels.

4. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame having first supporting wheels of small enough diameter to pass under a bed; second relatively larger wheels supporting said frame and disposed to support said wheel chair at the side of a bed, said larger wheels having peripheries disposed in a position adapted to be operated by a patient in said chair; a seat frame pivotally mounted on said main frame on a substantially vertical axis, said vertical axis being forwardly and beyond the peripheries of said second wheels, said seat frame cantilevered from said main frame and disposed in spaced relation with and above said cantilever frame portion; an elevating portion of said frame, supporting said seat frame; and means for actuating said elevating portion to move said seat frame upwardly and downwardly with respect to said

wheels said elevating portion of said main frame being disposed rearwardly beyond the forward peripheral portions of said second wheels.

5. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame having first supporting wheels of small enough diameter to pass under a bed; second relatively larger wheels supporting said frame and disposed to support said wheel chair at a side of a bed, said relatively larger wheels having peripheries disposed and adapted to be operated by a patient in said chair, a seat frame pivotally mounted on said main frame on a substantially vertical axis, said seat frame cantilevered from said main frame and disposed in vertically spaced relation with and above said cantilever frame portion and thereby adapted to be projected over a bed when said first supporting wheels are disposed under a bed; axle means for said second wheels; and means supported on said frame for holding said axle means in various forward and rearward positions on said frame to permit variations of operating positions of said second wheels forwardly for operation by a patient and backwardly relative to said main frame to clear the peripheries of said second wheels relative to the side of a bed when said first supporting wheels are under a bed and forward relative to a patient supported on said seat frame above the bed.

6. In a wheel chair the combination of: a main frame; a cantilever frame portion of said main frame; first wheels disposed to support said cantilever portions, said first wheels of small enough diameter to pass under a bed; first axle means for rotatably mounting said first wheels relative to said cantilever frame portion; second relatively larger wheels supporting said frame and disposed to support said wheel chair at a side of a bed; second axle means for said second wheels for rotatably coupling them to said frame, said relatively larger wheels having peripheries disposed and adapted to be operated by a patient in said chair; a seat frame pivotally mounted on said main frame on a substantially vertical axis, said seat frame cantilevered from said main frame and disposed in vertically spaced relation with and above said cantilevered frame portion and thereby adapted to be projected over a bed when said first supporting wheels are disposed under a bed; and means supported on said frame for holding said first and second axle means and said first and second wheels in various relative forward and rearward spaced positions on said frame to permit variations of operating positions of said first and second wheels in order to clear the peripheries of said second wheels relative to the side of a bed when said first supporting wheels are under a bed and forward relative to said frame and a patient supported on said seat frame above the bed.

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