June 10, 1952 C. G. MENZIES 2,599,717

TRANSPORT TRUCK ARRANGEMENT FOR HOSPITAL BEDS

Filed June 16, 1950

2 SHEETS—SHEET 1

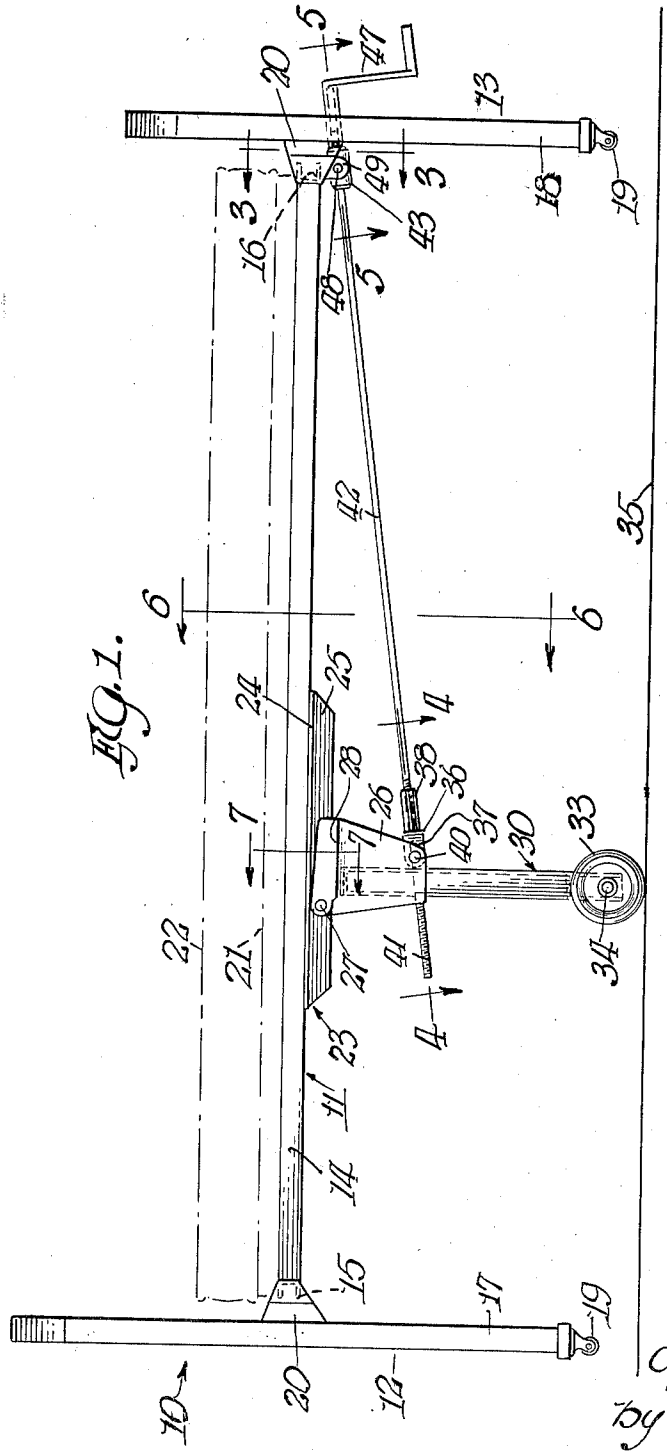

FIG. 1.

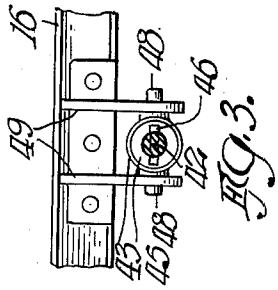

FIG. 3.

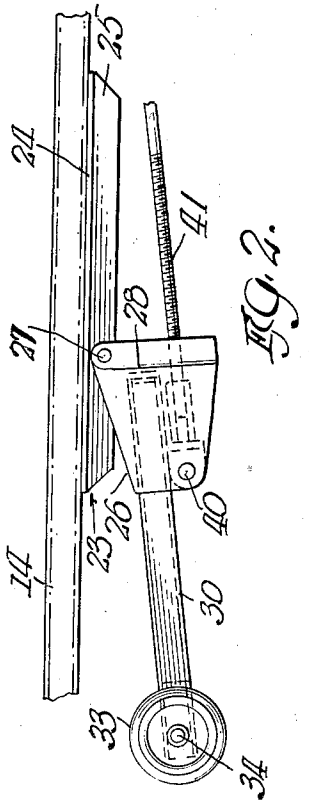

FIG. 2.

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TRANSPORT TRUCK ARRANGEMENT FOR HOSPITAL BEDS

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2 SHEETS—SHEET 2

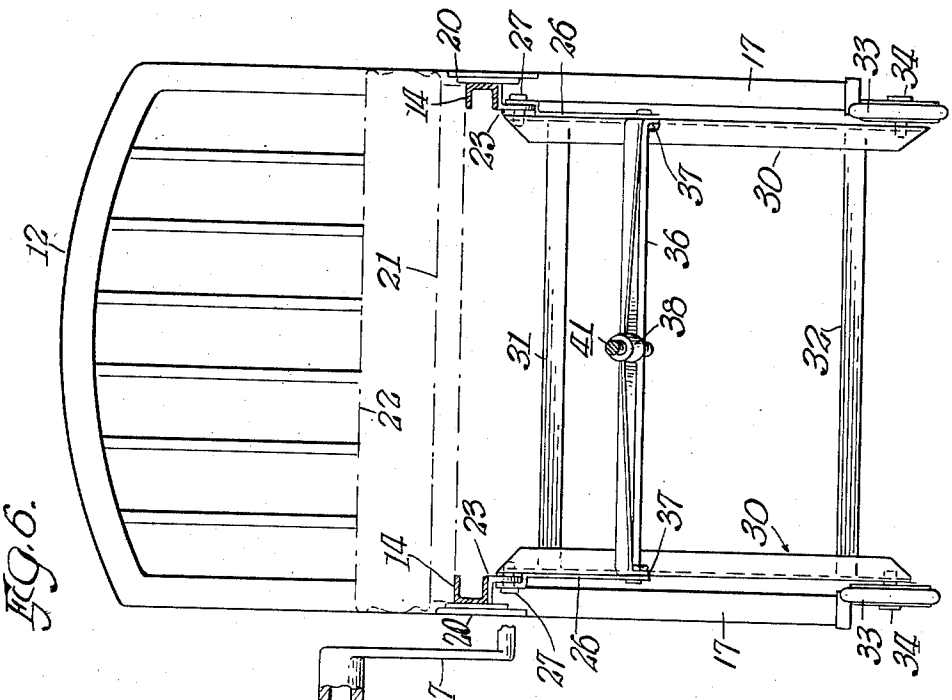

FIG. 6.

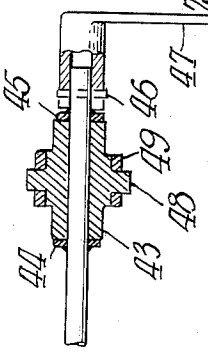

FIG. 5.

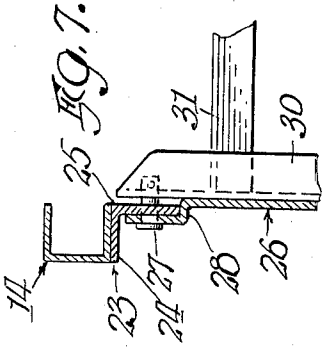

FIG. 7.

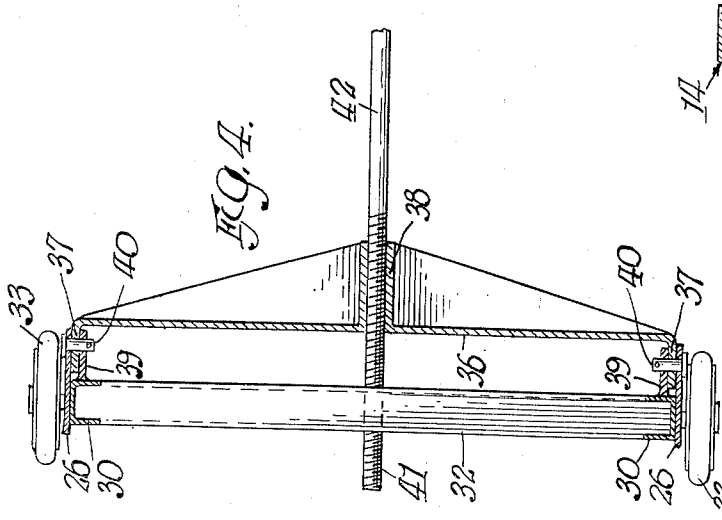

FIG. 4.

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2,599,717

UNITED STATES PATENT OFFICE

2,599,717

TRANSPORT TRUCK ARRANGEMENT FOR HOSPITAL BEDS

Clifford G. Menzies, Iron Mountain, Mich.

Application June 16, 1950, Serial No. 168,629

15 Claims. (Cl. 5—328)

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This invention relates to transport truck arrangement for hospital beds and it consists in the matter hereinafter described and more particularly pointed out in the appended claims.

In hospitals, bed patients are often, at least partially, put to sleep in their own rooms before taken to the operating room. With the conventional hospital bed, two attendants are required, one at the foot end and the other at the head end, for a reasonable management of the bed, rolled on its four casters en route to the operating room. A bed thus rolled, is not only quite difficult to manage in passing through doorways but creates a noise objectionable to other patents in the vicinity of the rolling bed.

In some instances it is also necessary to transport bed patients to other parts of the hospital or clinic, as for example, to receive special treatment, examination and the like. It has heretofore been a laborious task to transport such patients, either in the bed or by transferring them to other devices for transport purposes.

One of the objects of the invention is to provide an arrangement of parts, which may be built into a hospital bed during its manufacture or may be applied to conventional beds so as to form part thereof and whereby the bed may be readily made immobile for room use or mobile for transport purpose by one attendant only.

Another object of the invention is to provide an arrangement of parts, positioned entirely under the bed and out of the way when the bed is in room use, but which may be manipulated from the foot end of the bed, to render it mobile and this without in any way disturbing the patient occupying the bed.

A further object of the invention is to provide an arrangement of this kind, which is not only noiseless when operated, but which is devoid of springs and other mechanical devices which might readily get out of order.

Also it is an object of the invention to provide an arrangement of this kind, which when operated to render the bed mobile requires no manipulation of catches to lock the parts in this position and which cannot slip to permit the bed to return to its immobile condition under its own weight.

The above mentioned objects of the invention, together with others, as well as the several advantages thereof, will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view in side elevation of a conventional hospital bed to which my improved truck arrangement has been applied, and with the same

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in a position affording a two-wheel mobility therefor and by which the bed may be readily moved about as the occasion requires.

Fig. 2 is a detail view in elevation, on an enlarged scale, of certain of the parts appearing in a changed position from that in Fig. 1 and wherein the bed is in condition to be supported by the small casters which are normally a part of the bed structure.

Fig. 3 is a detail transverse vertical sectional view through parts appearing in Fig. 1 as taken on the line 3—3 thereof and on a scale enlarged thereover.

Fig. 4 is a horizontal detail sectional view as taken on the line 4—4 and on a scale enlarged over that of Fig. 1.

Fig. 5 is a horizontal detail sectional view as taken on the line 5—5 and on a scale enlarged over that of Fig. 1.

Fig. 6 is a vertical sectional view through the bed appearing in Fig. 1 and as taken on the line 6—6 thereof.

Fig. 7 is another vertical sectional view through parts of the improved arrangement as taken on the line 7—7 and on a scale enlarged over that of Fig. 1.

Referring now in detail to that embodiment of the invention illustrated in the drawing, 10 indicates as a whole a conventional hospital type of bed which includes a bed frame 11 and head and foot ends 12 and 13 respectively, the latter being of a less height than the former.

The bed frame includes side rails 14 and head and foot end rails 15 and 16, said rails being herein shown as made of channel irons with their flanges directed inwardly. The head and foot ends each include a pair of laterally spaced upright legs or posts 17 and 18, each of which carries a small swivelling caster 19 at its bottom end. The ends of the side rails 14 of the bed frame are supported from the legs 17 and 18 of the head and foot ends by brackets 20—20. The bed frame supports a bed spring 21 which in turn supports a mattress 22, said spring and mattress being indicated by dotted lines in Figs. 1 and 6 respectively.

Fixed to and depending from each side rail 14, nearer the head end 12 than the foot end 13 is an angle bar 23, the horizontal flange 24 of which is suitably secured to the bottom of the associated rail and faces outwardly thereof and the vertical flange 25 of which faces downwardly along the inner edge of the associated rail, as best appears in Fig. 7.

There is a stiffener plate 26 at each side of the

bed frame just outside the vertical flange 25 of an associated angle bar 23, to which it is pivoted as at 27. The upper horizontal portion of each plate is offset outwardly from the remaining lower portion of the plate to form a shoulder 28 therein which best appears in Fig. 7, and the purpose of which will soon appear.

Fixed to the inner face of each plate 26 toward the foot end of the bed relative to the pivot 27 is one end of a supporting leg 30. Each leg is preferably made from a length of channel iron with its flanges directed inwardly, both legs being connected together toward their ends by upper and lower cross bars 31 and 32 respectively, which best appear in Fig. 6. On the outside of the other end of each leg there is journalled a rubber tired wheel 33 as by means of a stub axle 34 fixed to said leg and which legs are disposed just within the vertical planes of the outer side of the side rails of the bed frame, as best appears in Fig. 6.

The legs 30 and cross bars 31—32 in connection with the stiffener plates 26 define a wheel carrying frame, which may be swung about the pivot 27 from the vertical bed frame supporting position shown in Fig. 1 to the non-supporting position for the bed frame shown in Fig. 2. When this frame is in the position shown in Fig. 1, the shoulder 28 of each plate 26 engages the lower edge of the associated angle bar 23 and the wheel 33 carried by each leg engages for a rolling action upon the floor surface indicated by the line 35. Said wheel carrying frame has a length greater than that length of the side legs 17—18 of the head and foot ends 12 and 13 of the bed frame, and when said frame is in its upright position, the casters 19 carried by said legs are spaced above the floor line, as best appears in Fig. 1. In this position the said wheel carrying frame renders the bed freely mobile and readily turnable laterally by reason of said wheels.

When the wheel supporting frame is in the position shown in Fig. 2, even though the casters on the legs of the head and foot ends of the bed frame engage the floor, the bed is relatively immobile.

Means is provided for swinging the wheel carrying frame between the two positions mentioned and such means, while devoid of springs, catches, or other contrivances that might readily get out of order and be hard to operate, will hold said wheel carrying frame in either position and this without danger of moving out of the position into which it has been swung.

The means mentioned includes a shallow U-shaped yoke, that comprises a cross member 36 having end arms 37, 37 arranged at a right angle to the cross member and a centrally arranged internally threaded sleeve 38, which parts best appear in Fig. 4. The arms engage between the inner faces of the stiffening plates 26 and projections 39 on each leg and are pivotally connected thereto by pins 40—40, as best appears in Fig. 4. These pins are disposed in that corner of the plates 26, diagonally opposite the pivot pins 27.

One end 41 of an actuating or power transmitting shaft 42 has a threaded engagement in the sleeve 38 and the other end of said rod is journalled in a member 43, said shaft carrying thrust bearing members 44—45 engaged with opposite ends of the member 43. The free end of said shaft extends beyond the member 43 and has a cross pin 46 therethrough for engagement by a removable hand crank 47 and by which

the shaft may be turned in either direction from outside the foot end of the bed, as appears in Fig. 1. The parts just above mentioned best appear in Fig. 5.

The member 43 is provided centrally with oppositely extending trunnions 48 which are journalled in bearing bracket arms 49 that are fixed to and depend from the central portion of the end member 16 of the bed frame.

As before mentioned, when the wheel carrying frame is in the position shown in Fig. 2 the bed is in its relatively immoble condition with its casters 19 engaging the floor surface represented by the line 35.

Assume it is wished to transport the bed, with the patient therein, say from the patient's room in a hospital to the operating room thereof or elsewhere. The attendant applies the handle 47, which is formed to engage the cross pin 46, to the end of the shaft 42 from the foot end of the bed and then turns the handle so as to rotate the shaft in a direction to thread the same through the sleeve 38 of the yoke. As the shaft so threads through said sleeve, the distance between the axis points of the pivot 40 and trunnions 48 will shorten and this will cause the wheel carrying frame to swing downwardly in an anticlockwise direction when viewed from Figs. 1 and 2. As the shaft threads through the sleeve the member 43 rocks on its trunnions 48 to accommodate the changing angle the shaft takes in its rotation. In this respect it is pointed out that the shaft cannot move endwise in the member 43 because of the thrust bearings 44—45.

As the wheel carrying frame swings toward the vertical position shown in Fig. 1, the wheels 33 will first engage the floor surface indicated by the line 35 and this will occur before the legs reach the upright supporting position. When the wheels have so engaged said surface a further turning of the shaft will cause the head end of the bed to rise and leave the floor and as the wheel frame approaches the upright position, the shoulder 28 of the stiffener plates 26 will engage the bottom edges of the flanges 25 of the angle bars 23 and act as stops. When rotation of the shaft has ceased, the wheel frame is locked against movement by reason of the threaded engagement of the shaft 42 in the sleeve 38.

After the attendant removes the crank 47 from the shaft end and as the wheel frame is now locked in its upright position, the bed is substantially balanced on the wheels 33, but as shown with the greater length of the bed between the pivot 27 and the foot end of the bed. The bed can thus be conveniently pushed by the attendant from the foot end of the bed and sufficient downward pressure applied to assure that the patient's head will not drop to a level below the horizontal. In one embodiment of the invention, the arrangement described elevates the bed frame into a position, such that the casters 19 are spaced about three inches above the floor, as represented by the line 35, when the bed rails are in horizontal position.

When the bed frame has been trundled or rolled to its destination the attendant again applies the crank handle to the end of the shaft, as before described, and then turns the shaft in the opposite direction, until the casters 19 on the foot end 13 of the bed frame have been engaged with the floor, as indicated by the line 35. This causes the shaft to turn in the sleeve 38 of the yoke and swing the wheel carrying frame in a clockwise direction as viewed in Fig. 1 into the

position shown in Fig. 2, wherein the legs **30** of the wheel carrying frame are disposed parallel with the shaft **42**. As the wheel frame swings clockwise, the casters **19** on the head end of the bed frame are gradually lowered and gently approach the floor surface as indicated by the line **35**, without any shock to or jarring of the bed.

When the bed is in the relatively immobile position with the wheel frame disposed as in Fig. 2, the latter in no way interferes with cleaning under the bed.

With the arrangement made as described, the wheel carrying frame remains in the position into which it has been moved and this without danger of being accidently or otherwise displaced. No springs, catches or other contrivances, requiring manipulation, are embodied in the arrangement. Also, by means of the arrangement described the services of only one attendant are necessary in transporting a bed patient and this frees another attendant for other duties.

I claim as my invention:

1. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, means providing a transverse pivotal connection for the other ends of said legs with the sides of said frame between the ends thereof and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, means having a pivoted connection with at least one of said legs about an axis parallel with that of the first mentioned pivotal connection, a third means operatively connected at one end to said second mentioned means and extending longitudinally of the bed frame and operable from its other end adjacent one of said ends of said frame to function through said first and second mentioned means to swing said legs jointly between and for locking them in either said supporting or said nonsupporting position for the bed frame.

2. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, means providing a transverse pivotal connection for the other ends of said legs with the sides of said frame between the ends thereof and about which said legs may be swung between a substantially upright supporting position for the bed frame to a nonsupporting position therefor, means having a pivoted connection with said legs about an axis parallel with that of the first mentioned pivotal connection, a third means operatively connected at one end to the second mentioned means between its pivotal connection with said legs and extending longitudinally of the bed frame and operable from its other end adjacent one of said ends of the frame to function through said first and second mentioned means to swing said legs jointly between and for locking them in either said supporting or said nonsupporting position for the bed frame.

3. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, means providing a transverse pivotal connection for the other ends of said legs with the sides of said frame between the ends thereof and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, said means including a shoulder for engagement with a part fixed relative to at least one of the sides of the bed frame when said laterally spaced legs are in

the substantially upright supporting position for the bed frame, means having a pivoted connection with at least one of said legs about an axis parallel with that of the first mentioned pivotal connection, a third means operatively connected at one end to said second mentioned means and extending longitudinally of the bed frame and operable from its other end adjacent one of said ends of the frame to function through said first and second mentioned means to swing said legs jointly between and for locking them in either said supporting or in said nonsupporting position for the bed frame.

4. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, plate-like members fixed to the other end of said legs, means providing a transverse pivotal connection for said plate-like members with parts fixed relatively to the associated sides of the bed frame and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, said plate-like members carrying shoulders for engagement with said parts fixed relatively to the associated sides of the bed frame when the legs are in said substantially upright position, means having a pivoted connection with at least one of said legs about an axis parallel with that of the first mentioned pivotal connection, a third means operatively connected at one end to said second mentioned means and extending longitudinally of the bed frame and operable from the other end adjacent one of said ends of the frame to function through said first and second mentioned means to swing said legs jointly between and for locking them in either said supporting or said nonsupporting position for the bed frame.

5. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, means providing a transverse pivotal connection for the other ends of said legs with the sides of said frame between the ends thereof and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position thereof, means having a pivoted connection with at least one of said legs about an axis parallel with that of the first mentioned pivotal connection, a shaft extending longitudinally of the bed frame and one end of which has a threaded engagement with said last mentioned means, and means adjacent one end of the bed frame and rockable about an axis, parallel the first mentioned axis and in which the other end of said shaft is journalled while held against longitudinal movement, said other end of said shaft being formed for attachment by a member for turning the shaft in either direction so as to function to swing said legs jointly between and for locking them in either said supporting or in said non-supporting position for the bed frame.

6. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, means providing a transverse pivotal connection for the other ends of said legs with the sides of said frame between the ends thereof and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, a yoke having end arms each having a pivotal connection with a part fixed relatively to each leg about an axis

parallel with that of the first mentioned pivotal connection, a shaft extending longitudinally of the bed frame and one end of which has a threaded engagement with a mid portion of said yoke, said shaft being operable from its other end, adjacent one end of the bed frame to function through said yoke to swing said legs jointly between and for locking them in either said supporting or in said non-supporting position for the bed frame.

7. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, plate-like members fixed to the other end of said legs, means providing a transverse pivotal connection for said plate-like members with parts fixed relatively to the associated sides of the bed frame and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, said plate-like members carrying shoulders for engagement with said parts fixed relatively to the associated sides of the bed frame when the legs are in said substantially upright position, a yoke having end arms each pivotally connected to an associated plate member about an axis parallel with that of the first mentioned pivotal connection, a shaft extending longitudinally of the bed frame and one end of which has a threaded engagement with a mid portion of said yoke, said shaft being operable from its other end adjacent one end of the bed frame to function through said yoke to swing said legs jointly between and for locking them in either said supporting or in said non-supporting position for the bed frame.

8. In combination with the frame of a bed having sides and ends, laterally spaced legs, each carrying a rotatable member at one end, plate-like members fixed to the other end of said legs, means providing a transverse pivotal connection for said plate-like members with parts fixed relatively to the associated sides of the bed frame and about which said legs may be swung between a substantially upright supporting position for the bed frame to a non-supporting position therefor, a yoke having end arms each pivotally connected to an associated plate member about an axis parallel with that of the first mentioned pivotal connection, a shaft extending longitudinally of the bed frame and one end of which has a threaded engagement with a mid portion of said yoke, said shaft being operable from its other end adjacent one end of the bed frame to function through said yoke to swing said legs jointly between and for locking them in either said supporting or in said non-supporting position, each plate member being formed with an integral offset portion for a shouldered engagement with a part fixed to an associated side frame member of the bed frame, when said legs are in said substantially upright supporting position for the bed frame.

9. In combination with a bed frame structure including side and end rails and head and foot end supporting legs, a bed frame elevating means intermediate said supporting legs and having a pivotal connection at one end with parts of the frame structure for swinging movement about an axis transversely of said frame structure and having wheel means at the other end, said means being swingable about said connection from an operative position in which said wheel means engages the floor and raises the bed frame above its normal position, to an inoperative position in which said wheel means is clear of the floor, whereby the bed frame structure is supported upon said head and foot end supporting legs.

10. In combination with a bed frame structure including side and end rails and head and foot end supporting legs, means located closer to the head end than the foot end and having a pivotal connection at one end with parts of the frame structure for swinging movement about an axis transversely of said frame structure and including wheel means at the other end, said means being swingable about said connection from an operative position in which said wheel means engages the floor and raises the bed frame above its normal position, to an inoperative position in which said wheel means is clear of the floor whereby the bed frame structure is supported upon said head and foot end supporting legs.

11. In combination with a bed frame structure including side and end rails and head and foot end supporting legs, a bed frame elevating means intermediate said supporting legs and having a pivotal connection at one end with parts of said frame structure for swinging movement about an axis transversely of said frame structure and having wheel means at the other end, said means being swingable about said connection from an operative position in which said wheel means engages the floor and raises the bed frame above its normal position, to an inoperative position in which said wheel means is clear of the floor, whereby the bed frame structure is supported upon said head and foot end supporting legs, and means for imparting movement to said elevating means between said operative and inoperative positions.

12. In combination with a bed frame structure including side and end rails and head and foot end supporting legs, a bed frame elevating means intermediate said supporting legs and having a pivotal connection at one end with parts of the frame structure for swinging movement about an axis transversely of said frame structure and having wheel means at the other end, said means being swingable about said connection from an operative position in which said wheel means engages the floor and raises the bed frame above its normal position, to an inoperative position in which said wheel means is clear of the floor, whereby the bed frame structure is supported upon said head and foot end supporting legs, means for imparting movement to said elevating means between said operative and inoperative positions, which last mentioned means is operable from the foot end of the bed frame structure.

13. In combination with a bed frame including side and end rails, a carriage structure positioned beneath the bed frame and means swingably supporting the same from the side rails of the bed frame for swinging movement about an axis transversely of said frame between active operative upright and inactive non-upright positions, said carriage structure including wheel means at one end adapted to engage the floor and elevate the bed frame when said carriage structure is swung to said upright position.

14. In combination with a bed frame including side and end rails, a carriage structure positioned beneath the bed frame and means swingably supporting the same from the side rails of the bed frame for swinging movement about an axis transversely of said frame between active operative upright and inactive non-upright positions, said carriage structure including wheel means at one end adapted to engage the floor and elevate the bed frame when said carriage structure is swung to said upright position, and means for

swinging said carriage structure between said positions.

15. In combination with a bed frame including side and end rails, a carriage structure positioned beneath the bed frame and means swingably supporting the same from the bed frame for movement between active operative upright and inactive non-upright positions, said carriage structure including wheel means at one end adapted to engage the floor and elevate the bed frame when said carriage structure is swung to said upright position, said carriage structure being located closer to the head end than the foot end of the bed frame.

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