

May 1, 1945.

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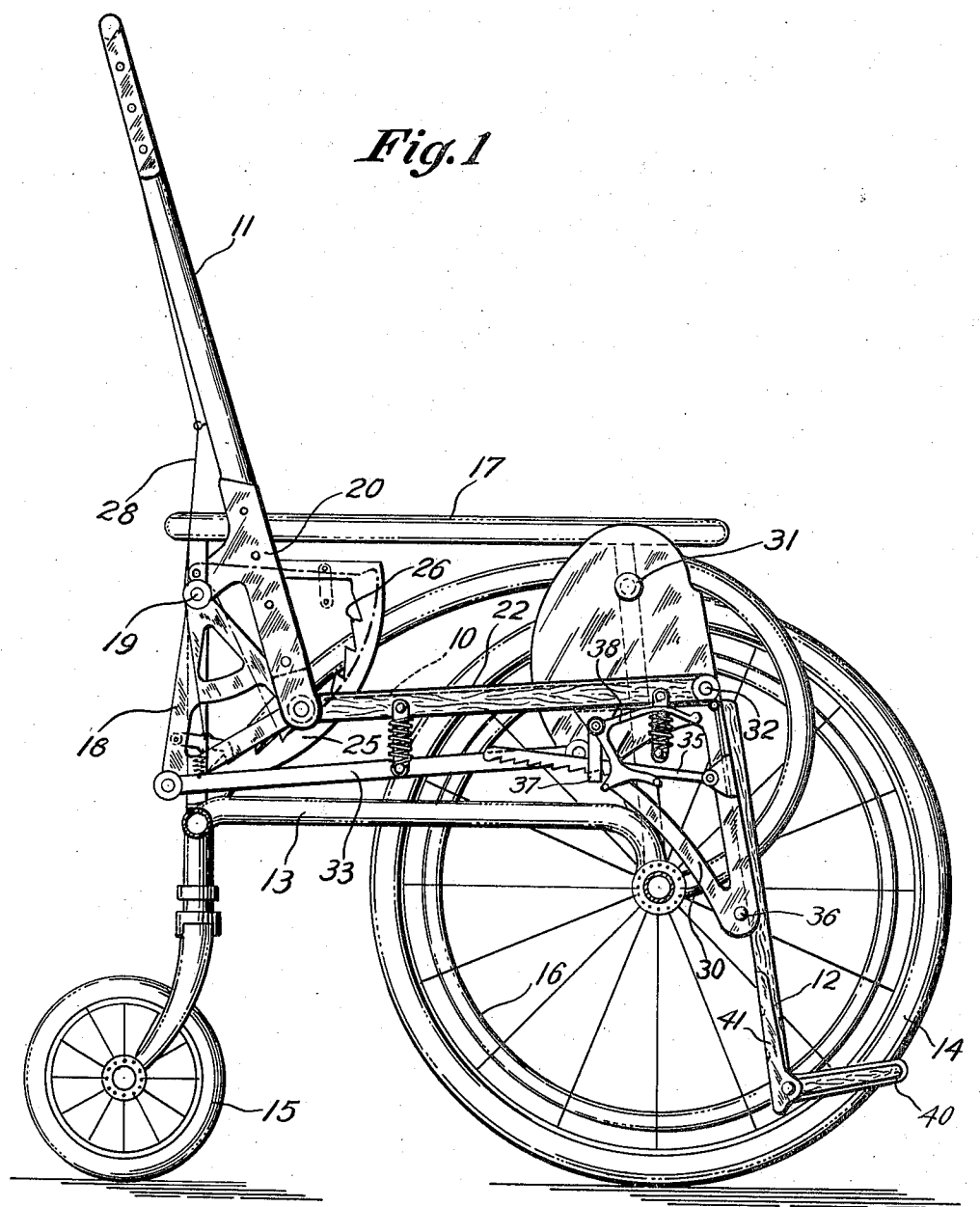
2,375,151

CONVERTIBLE CHAIR

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5 Sheets-Sheet 1

Fig. 1



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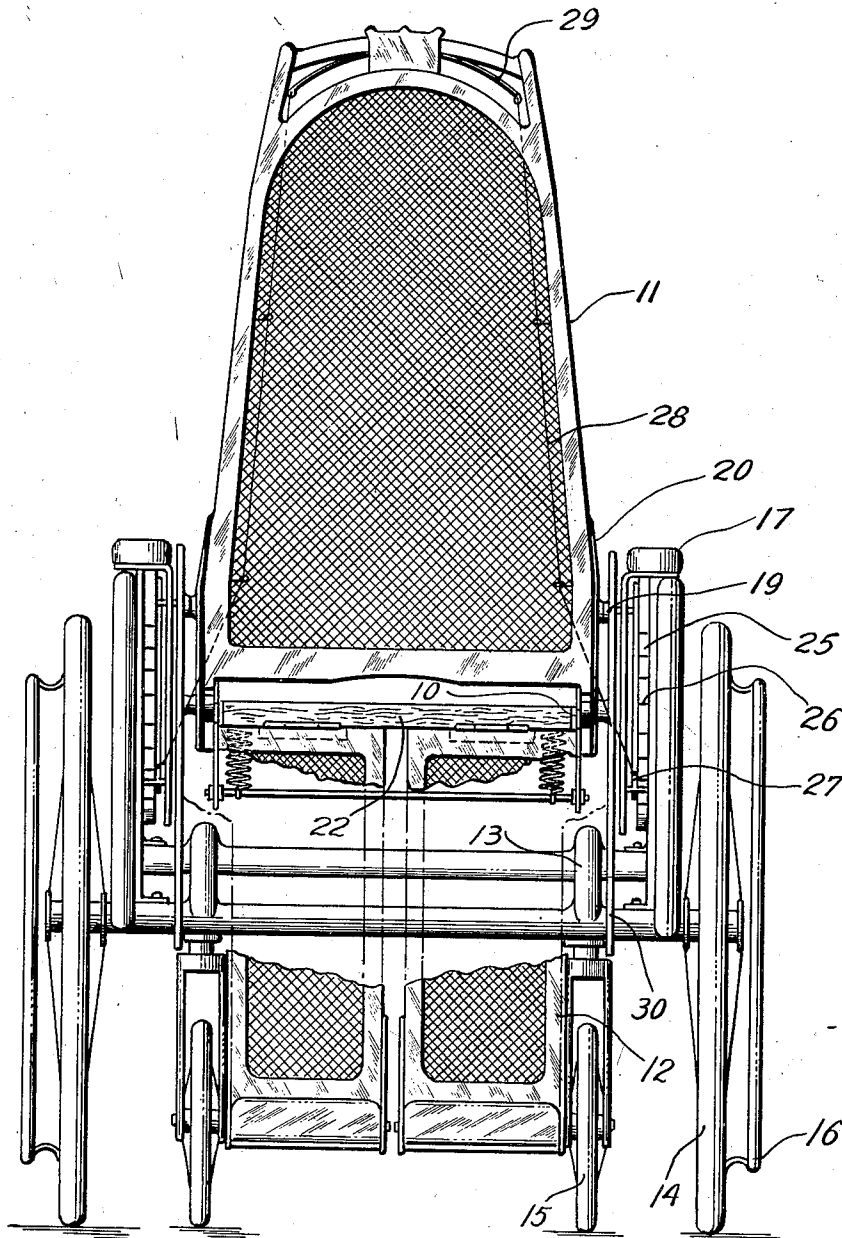
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Fig. 2



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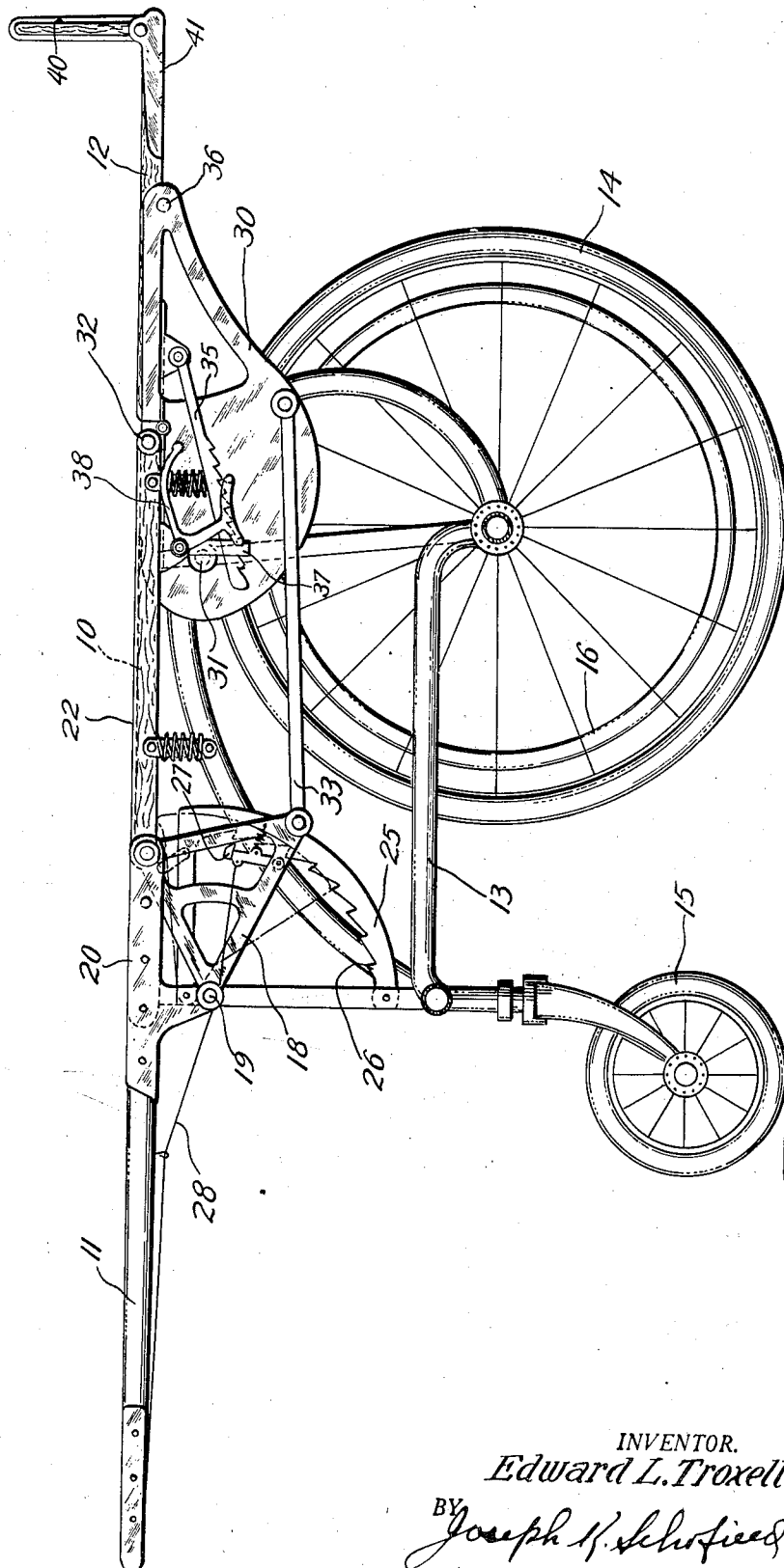
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Fig. 3



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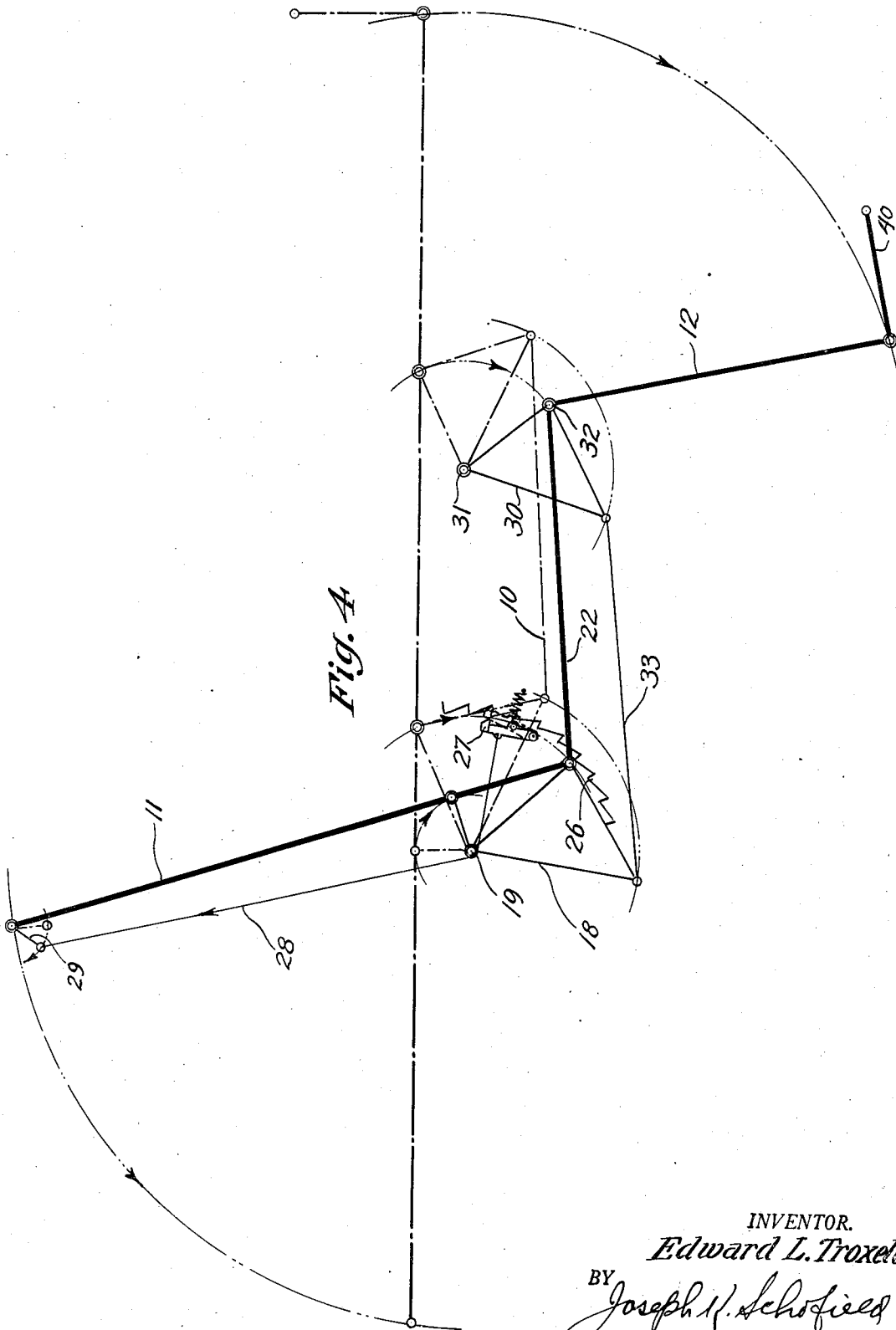
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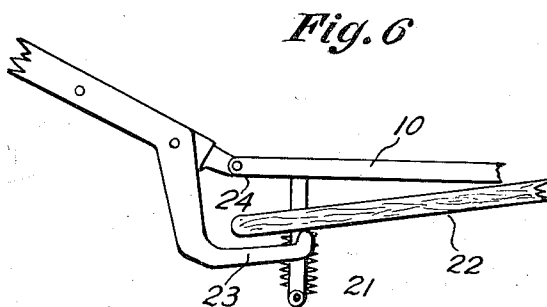
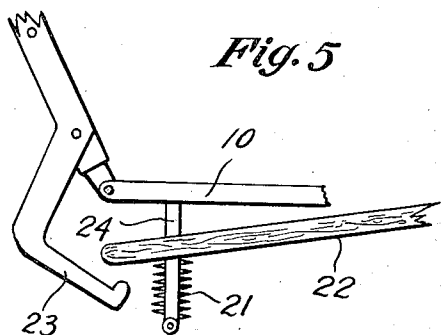
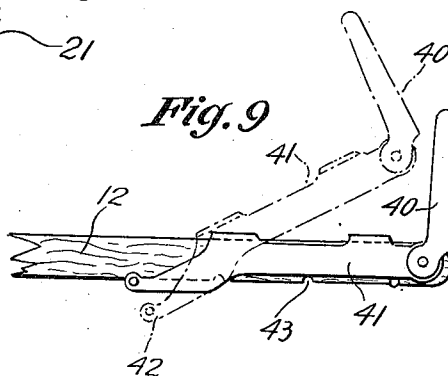
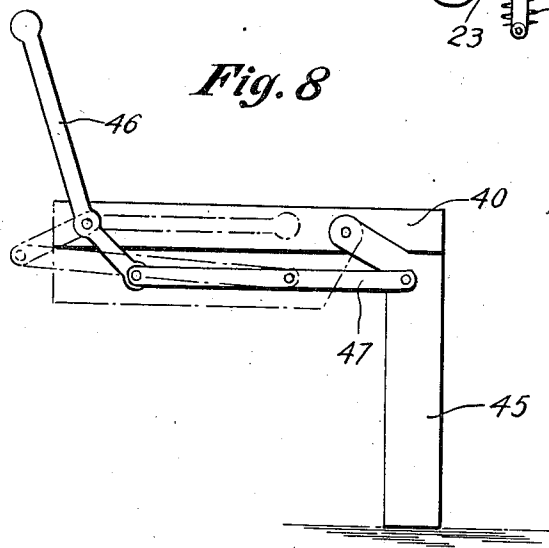
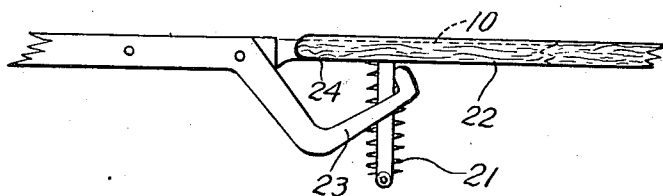


Fig. 7



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UNITED STATES PATENT OFFICE

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CONVERTIBLE CHAIR

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Application September 28, 1943, Serial No. 504,118

5 Claims. (Cl. 155—30)

This invention relates to hospital equipment and particularly to a convertible stretcher and invalid wheel chair which, when being converted from a chair to a stretcher, elevates the seat portion from the normal height of a chair to that of a hospital bed.

One object of the present invention is to provide a convenient wheeled structure that will enable the back, seat and leg supporting members of a chair to be adjusted into a common horizontal plane for use as a stretcher; the back member being adjustable to various intermediate or oblique positions and, in moving to its horizontal or stretcher position, elevates the seat portion from normal chair height to the height of a standard hospital bed.

Another object of the invention is to connect the back member, seat supporting members and leg supporting members of a wheel chair pivotally to each other and support them from the opposite sides of the fixed frame or chassis of a wheel chair so that the back may pivot upon a transverse horizontal axis intermediate its length and elevate its lower end when the back is being adjusted to its stretcher position, the rear of the seat member being pivotally attached to this lower end of the back member.

And finally it is an object of the invention to provide a light, convenient and convertible chair or stretcher readily adjustable from one form to the other while in use and adapted to be locked in either extreme position or in any of several inclined intermediate positions.

A feature that enables the above objects to be accomplished is that the metal chassis for a standard wheel chair is provided with a linkage system connecting the back member, seat side members and leg supporting members to the chassis frame and enabling these members to be relatively adjusted so that a patient may be changed from a sitting to a reclining or recumbent position or vice versa by adjustment of the principal members forming the linkage system.

And another feature of the invention that is important is that the seat members or a portion thereof when in its chair position, slope slightly downward toward the back but, when adjusted to its stretcher position, extend in the same horizontal plane as the back member and leg supports.

With the above and other objects in view the invention consists in the features of construction and operation set forth in the following

specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, I have shown the invention embodied in a wheeled vehicle for general hospital use but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a side elevation of the complete construction, the parts being shown adjusted in their positions to form a chair.

Fig. 2 is a front elevation of the complete construction adjusted to form a chair.

Fig. 3 is a similar view of the construction, the parts being adjusted to their stretcher forming positions.

Fig. 4 is a diagrammatic view of the linkage system showing the relative positions of the principal members in both extreme positions of their adjustment; and

Figs. 5 to 9 are views showing several details of construction.

In the above mentioned drawings there has been shown but one complete embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly, and in its preferred aspect, the invention may include the following principal parts: First, a wheel chair chassis of any usual or standard type having a suitable rigid and preferably a metal frame, the chassis being mounted for movement upon spaced pairs of wheels; second, a seat portion having side members pivotally supported from the lower end of a back member which in turn is pivoted to the rigid frame on opposite sides of the chassis so that movement of the back member about its pivotal axis effects up and down movements of the rear portion of the side seat members and seat; third, leg supporting members pivotally connected to the front end of the seat side members or seat and to pivotal members connected to the rigid frame; fourth, linkage controlling movements of the back, seat and leg supporting members so that adjustments may be made of these members to form a chair, a partially reclining chair or a stretcher movable about on its wheeled supporting structure.

Referring more in detail to the figures of the drawings, it will be seen that the construction adapts itself as a chair in which the side seat members 10 forming a portion of the seat 22 are at a usual or convenient height above the floor and that when adjusted as a stretcher the side seat members 10 are raised a substantial distance to a level corresponding to that of a hospital bed. Also when the seat portion is in its chair position it is preferably inclined slightly downward toward the back and when in its stretcher forming position the back member 11, side seat members 10, seat portion 22 and leg supporting members 12 all lie in the same horizontal plane.

The chair and stretcher construction shown in the drawings are built upon a tubular frame or chassis 13 for a standard form of wheel chair, there being a pair of large front wheels 14, mounted on fixed axes in alignment with each other, and preferably a pair of smaller swivelling rear wheels 15 spaced from the large or front wheels 14 a sufficient distance to provide longitudinal stability. Hand wheels 16 on the large wheels 14 permit a patient seated in the chair to propel and guide the chair. On the frame 13 also are fixed arm rests 17 at normal height above the seat 10 when in its chair position and which form a portion of the edges of the stretcher when the members are adjusted to their horizontal positions.

At the rear and on opposite sides of the supporting frame 13 are pivotally mounted plate members 18, the pivots 19 about which these plate members oscillate, being in alignment with each other. To these plate members 18 is attached the chair back member 11, one member 18 being on each side, the pivots 19 being preferably below and at an intermediate part of the back member 11. For the purpose of attaching the back member 11 to the plate members 18 metal brackets 20 may be secured rigidly to each side of the back 11. At the lowermost part of the back is hingedly attached the rear ends of the seat side members 10 so that by tilting the back 11 downward toward a horizontal position about the axis of pivots 19 the side seat members 10 will be elevated as indicated in the diagrammatic view, Fig. 4.

The seat proper may be disposed or hung between the side members 10 and may be supported resiliently from brackets attached to the side members 10 through a suitable group of springs 21. This part of the construction may be conventional and so constructed that the seat will have any desired resilience. However, one form is shown in the detail views, Figs. 5, 6 and 7. The seat side members 10 are provided with depending brackets 24 and cross rails on which are mounted springs 21, the intermediate seat members or frame 22 resting on the upper ends of springs 21. In order to raise the entire seat to a horizontal position when adjusted to form a stretcher, a metal bracket or arm 23 may be provided on the lower end of the back member 11 so that when the back 11 is lowered to its horizontal or stretcher position the end of arm 23 will engage and positively raise the intermediate seat member 22 into the same horizontal plane as the side members 10, the back member 11 and the leg supporting members 12.

Fixed side plates 25 on opposite sides of the chassis 13 are provided with ratchet teeth 26. Pawls 27 carried by the movable plates 18 are mounted and spring pressed for engagement with teeth 26 so that by engagement of the pawls 27

with the different teeth 26 of the ratchet the back member 11 may be held at any oblique position or in its horizontal position until released. For convenience in actuating the pawls 27 cables 28 may be attached thereto as shown and at their opposite ends attached to spring members 29 manually operated at the upper end of the back member 11.

Pivotally mounted on the rigid frame or chassis 13 directly above the axis of large wheels 14 are plates 30. These plates or members, one on each side, may pivot about the axis 31 in the form of studs outstanding from a portion of the rigid frame members 13. The forward ends of the seat side members 10 are attached pivotally to these plate members 30 at the axis 32. Oscillation, therefore, of the plates 30 about their axis 31 will raise and lower the front end of the seat.

To actuate the pairs of plates 18 and 30 simultaneously a tie rod 33 spaced from the axes 19 and 31 on each side of the chassis is provided which extends between a plate 18 and 30 on each side of the chassis 13 so that a parallel linkage is formed. Movement, therefore, of the back member 11 from the position shown in Fig. 1, which oscillates the plates 18, also through the tie rods 33 and the seat side members 10, oscillates the plates 30 to raise the seat side members 10 and the seat 22 to the position shown in Fig. 3.

Supported by a cross bar 36 extending between the plates 30 are leg supporting members 12, there preferably being two of these members individually adjustable. These members 12 may be hinged directly to the forward portion of the seat 22. Normally with movement of the back and side seat members from stretcher to chair position the leg supporting members 12 will be lowered. It is desirable, however, to provide means so that these members, or either one of them, may remain in horizontal position when the seat and back have been adjusted to form a chair. For this purpose each leg supporting member 12 may be held in its horizontal position by an arm 35 attached at one end pivotally to a short bracket mounted on the under side of the leg supporting member. The opposite end of this arm 35, which may be formed with ratchet teeth along one edge, passes over a projection on a depending bracket 37 supported on the side frame member 22 by means of which a leg supporting member 12 may be held in any adjusted position. To disengage the arm 35 from the bracket 37 a hand lever 38 may be provided on each side of the chassis, one for each leg supporting member 12. Movement of one of these hand levers will raise one of the arms 35 to disengage a tooth from the bracket 37 and permit the member 12 to be lowered. To firmly support the members 12 in their horizontal positions when the structure is in the form of a stretcher, the rod 36 extending between the plates 30 may engage the members 12 directly below an intermediate portion.

The lower end of each leg supporting member 12 is provided with a foot rest 40 which preferably may be adjustable to any of several vertical or extended positions. The means to effect this adjustment are shown in Fig. 9. The foot rest 40 is attached rigidly to a metal member 41 extending over the side surfaces of the leg supporting members 12. At its upper end this member 41 may have a cross bar 42 disposed as shown in this figure. By tilting the member 41 with the foot rest 40 to the position shown in broken lines

the foot rest may be adjusted to different positions in which the cross bar 42 may engage different recesses 43 formed in the under side of the supporting member 12.

If desired also a support 45 may be provided on the foot rest 40 which in its extended position as shown in full lines in Fig. 8 may contact the floor. This member 45 may preferably be pivotally connected to the outer portion of the foot rest 40 so that it may be folded below the foot rest when not in use. For this purpose a lever 46 is pivotally connected to a side of the foot rest at an intermediate point and its lower end connected by a reach arm 47 to the support 45. Movement of the lever to the position shown in broken lines in Fig. 8 causes the support to be folded and retained in position below the foot rest. When in its extended position in which the lower end contacts the floor the chair is restrained against tilting forward when a patient steps on the foot rest 40 while getting into the chair.

The height of the seat 22 when adjusted as a chair is that of a normal chair but may, if desired, be varied by the provision of an adjustment in the rigid frame 13 of the chassis. The height of the seat may be adjusted by any convenient means so that when converted to a stretcher the seat will be raised to a height corresponding to that of a bed.

I claim as my invention:

1. A convertible chair and stretcher comprising in combination, a rigid frame mounted on a wheeled structure, said frame having fixed arm rests on opposite sides thereof, spaced pairs of pivotally mounted members disposed on parallel axes on said frame, a back member attached rigidly to one pair of members and offset from the axis about which said pair of members pivot, leg supporting members attached to the other pair of members, a seat member attached to and connecting the lower ends of said back member to the upper ends of said leg supports, whereby adjustment of said back member to a horizontal position raises said seat member and leg support to a horizontal plane in alinement with the plane of said back member and with said arm rests.

2. A convertible chair and stretcher comprising in combination, a rigid frame mounted on a wheeled structure, said frame having fixed arm rests on opposite sides thereof, spaced pairs of pivotally mounted members on said frame, a back member attached rigidly to one pair of members, leg supporting members attached to the other pair of members, a seat member attached to the lower end of said back member at points below the axis about which said pair of members pivot,

said seat member being connected to the upper ends of said leg supports, whereby adjustment of said back member to a horizontal position raises said seat member and leg support to a horizontal plane in alinement with the plane of said back member.

3. A convertible chair and stretcher comprising in combination, a rigid frame mounted on a wheeled structure, said frame having fixed arm rests on opposite sides thereof, spaced pairs of pivotally mounted members disposed on parallel axes on said frame, a back member attached rigidly to one pair of members and offset from the axis about which said pair of members pivot, leg supporting members attached to the other pair of members at points below the axis about which said members pivot, a seat member attached to and connecting the lower ends of said back member to the upper ends of said leg supports, whereby adjustment of said back member to a horizontal position raises said seat member and leg support to a horizontal plane in alinement with the plane of said back member.

4. A convertible chair and stretcher comprising in combination, a rigid frame mounted on a wheeled structure, spaced pairs of pivotally mounted members on said frame, a back member attached rigidly to one pair of members, leg supporting members attached to the other pair of members, tie rods connecting the spaced pairs of pivotal members at a distance from and below the axes of movement, a seat member attached to and connecting the lower end of said back member to the upper ends of said leg supports, whereby adjustment of said back member to a horizontal position raises said seat member and leg support to a horizontal plane in alinement with the plane of said back member.

5. A convertible chair and stretcher comprising in combination, a rigid frame mounted on a wheeled structure, said frame having fixed arm rests on opposite sides thereof, spaced pairs of pivotally mounted members on said frame, a back member attached rigidly to one pair of members, leg supporting members attached to the other pair of members, tie rods connecting the spaced pairs of pivotal members at a distance from and below the axes of movement, a seat member attached to and connecting the lower end of said back member below its axis of movement to the upper ends of said leg supports, whereby adjustment of said back member to a horizontal position raises said seat member and leg support to a horizontal plane in alinement with the plane of said back member and with said arm rests.

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