

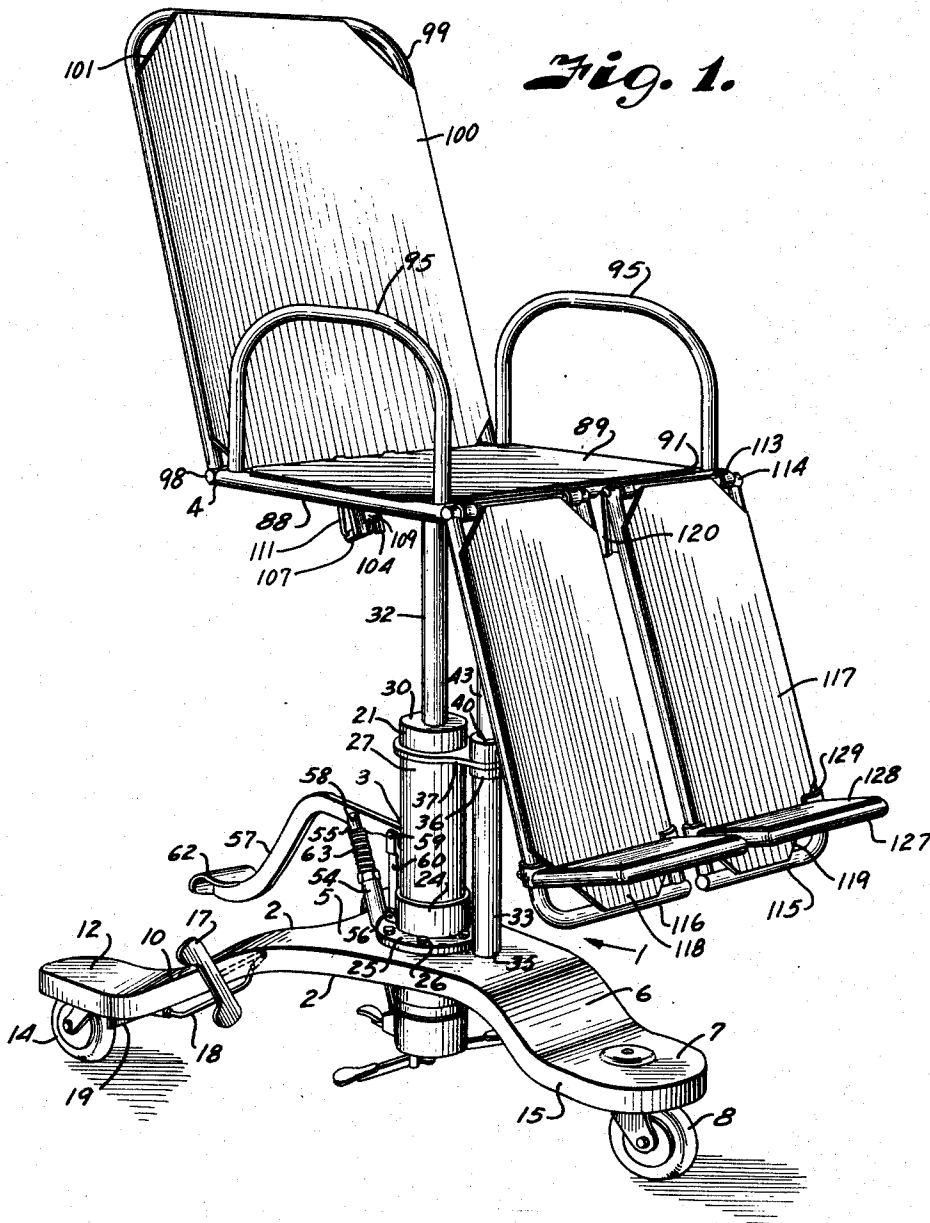
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Filed Aug. 21, 1946

3 Sheets-Sheet 1



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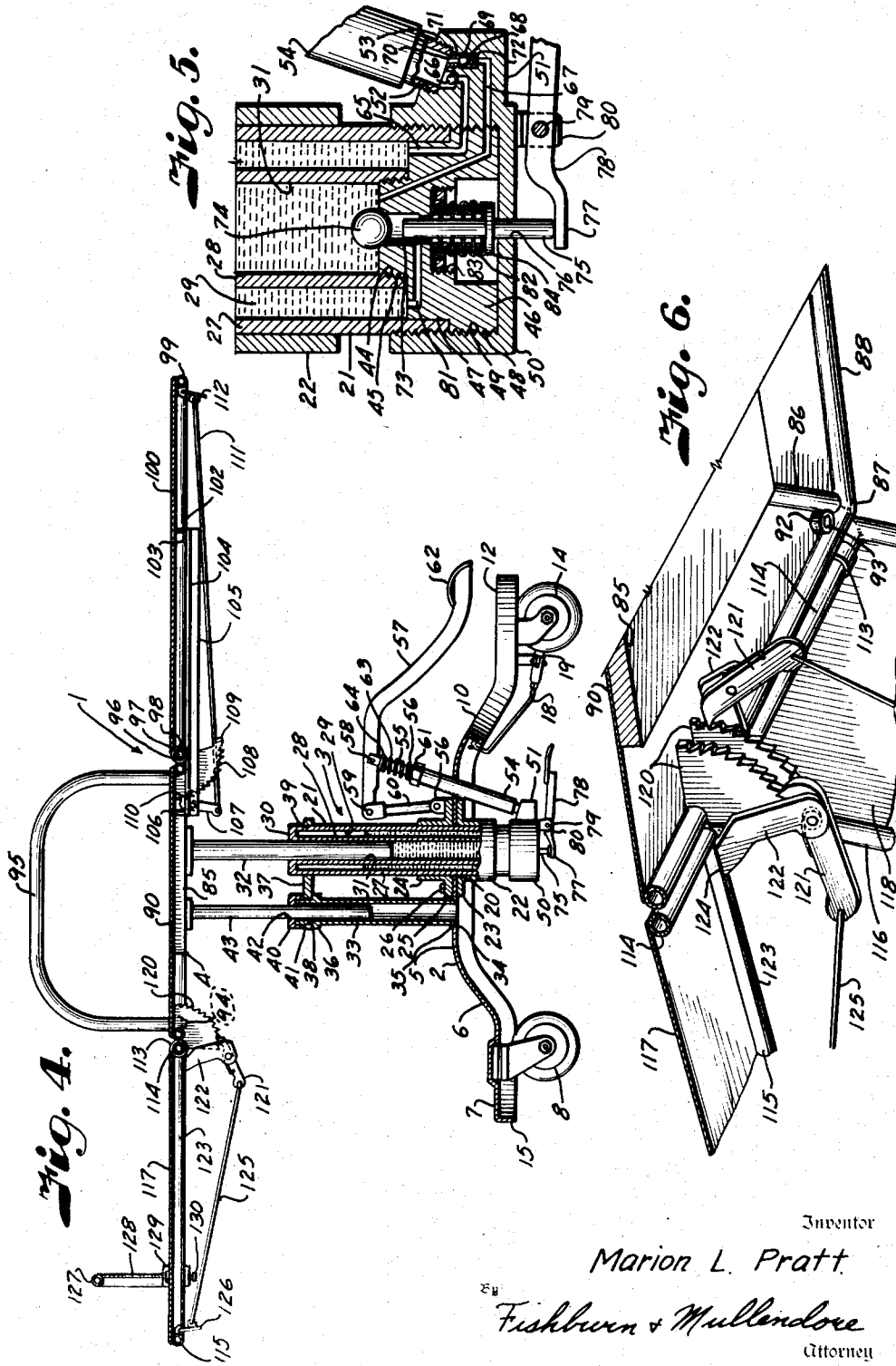
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HOSPITAL CHAIR

Marion L. Pratt, Topeka, Kans., assignor, by direct and mesne assignments, to The Marion Chair Company, Inc., Topeka, Kans., a corporation of Kansas

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2 Claims. (Cl. 155—30)

1

This invention relates to hospital equipment and more particularly to hospital chairs and the like adapted for conversion into a stretcher for moving patients and supporting said patient in any desired position from reclining to sitting.

Various forms of chairs and wheel mounted stretchers are well known. They may be moved to the side of the patient's bed and then two or three nurses are required to move the patient from the bed to the stretcher or chair. This is particularly true where the patient has an injury or ailment that is painful when the ailing member is moved. There are many cases, for example, a broken leg, where a patient may sit up and be moved in and out of the room if movement from the bed to a wheel chair could be performed without pain or injury to the patient.

Conventional forms of chairs and stretchers not only present a problem of lifting the patient off the bed onto the chair or stretcher or vice versa, but there is also the ever present danger that the chair or stretcher will move as the patient is being placed thereon greatly endangering the patient and in some cases even causing the patient to be dropped onto the floor. This condition also prevails in moving a patient to and from an operating room.

The principal objects of the present invention are to provide a chair in which the body supporting members may be adjusted relative to a bed or other surface whereby the patient may be moved directly onto the chair without lifting said patient; to provide for centrally locating the operative structure of the chair forming extensive over-hanging portions of the body supporting member for permitting said portions to overlap the bed and be moved downwardly thereon until the body supporting members are substantially on a level with the remainder of the bed whereby a patient who is able to move may slide himself onto the chair and in the case of a helpless patient, a single nurse, with the aid of a blanket or the like under the patient, may slide said patient onto the body supporting members without injury or pain to the patient; to provide back and leg sections capable of adjustment to any desired inclination; to provide an adjustable foot rest on the leg section; to provide foot-operated control for raising and lowering the body supporting members; to provide foot-operated brakes to prevent movement of the chair; to provide centrally located controls for angular adjustment of the back and leg sections; to provide an all-metal chair to facilitate maintenance in a sanitary condition; to provide relatively thin

2

sections of the body supporting members; to provide an improved hospital chair of simple, durable, and inexpensive construction, yet positive and efficient in its use for the movement of a patient from a bed to said chair without any detrimental effects on the patient; and to provide a chair capable of being used for the substantially painless movement of patients that were heretofore dangerous to move in conventional stretchers and chairs.

Further objects and advantages of the invention will be had from the following description of the apparatus, reference being had to the accompanying drawings wherein the preferred form of the present invention is shown.

Fig. 1 is a perspective view of the device comprising the present invention, the respective parts being shown in chair forming position.

Fig. 2 is a perspective view of the device, the respective parts thereof being arranged to form a stretcher, said device being shown in position relative to a bed for movement of a patient thereon.

Fig. 3 is an end elevation of the chair, the body supporting portions being shown overlapping and compressing the mattress on said bed for movement of a patient thereon.

Fig. 4 is a longitudinal sectional view through the hospital chair.

Fig. 5 is a vertical sectional view through the lower portion of the chair elevating mechanism showing the operating parts thereof.

Fig. 6 is a bottom perspective view of the seat and leg sections particularly illustrating the leg section inclination locking apparatus.

Referring more in detail to the drawings:

1 designates a hospital chair composed generally of a base 2 carrying an elevating mechanism 3, serving as an adjustable support for body supporting members 4. The base structure in this instance is formed of sheet metal and consists of a central flat portion 5, having a downwardly sloping forward portion 6, terminating in a horizontal extension 7 for suitably mounting a caster wheel 8. The rear portion of the base is provided with downwardly and outwardly sloping legs 9 and 10 terminating in horizontal portions 11 and 12 adapted to mount rollers 13 and 14, said rollers 13 and 14 being spaced laterally sufficiently to provide suitable support for the chair and to prevent tipping thereof. The entire periphery of the base portion is provided with a downwardly extending flange 15 providing rigidity to the structure. The rollers 8, 13 and 14 are preferably rubber-tired wheels to provide

quiet operation as is desirable in moving such equipment in a hospital.

Pivotaly mounted on the leg portions 9 and 10 are brake pedals 16 and 17 having suitable connection by links 18, with brake levers 19 pivotaly mounted to the extensions 11 and 12 and adapted to contact the rollers 13 and 14 in response to movement of the pedals 16 and 17 to prevent movement of said rollers. The brake pedals 16 and 17 are so arranged relative to the links 18 that said connection between the pedal and the links pass center when the brakes are applied as illustrated in Figs. 2 and 4, the brakes being in released position when the pedals are as shown in Fig. 1.

The central portion of the base is provided with an aperture 20 to receive a hydraulic cylinder 21. The aperture 20 is preferably reinforced by a collar 22 mounted on the lower side of the central portion of the base 5 by means of a flange 23 welded or otherwise suitably secured to the base member. Cylinder 21 extends through the aperture and is secured in position by means of a collar 24 mounted or otherwise suitably fastened to the cylinder and preferably provided with a flange 25 which may be suitably secured to the base and the flange 23, for example, by means of cap screws 26. Cylinder 21 consists of an outer wall 27 and an inner wall 28 spaced from said outer wall to provide a chamber 29 therebetween, the upper end of said chamber being closed by an end wall 30. The inner wall 28 is provided with a bore 31 adapted to receive a piston 32, reciprocal therein, the upper end of which supports the body supporting members 4 as later described. Providing additional support and also forming a guide to maintain alignment of the body supporting member with the base structure is a tubular post 33 extending through an aperture 34 in the central portion of the base member and spaced from the aperture 20, said post being welded to the base structure as at 35. Adjacent to the upper end of the post 33 is a collar 36 adapted to form a support for an arm 37 having spaced apertures 38 and 39 adapted to sleeve over the post 33 and cylinder 21 respectively to maintain spacing at the upper end of the cylinder and post and to provide a more rigid structure. The arm 37 is held in place by means of a cap 40 threaded on the upper end of the post 33, the lower edges 41 of said cap engaging the arm 37. The cap 40 is provided with a central aperture 42 adapted to slidably receive a rod 43 suitably secured to the body supporting member as later described.

While I have shown an elevating mechanism as being hydraulically actuated, it is obvious that other suitable mechanisms may be used.

In the illustrated structure, the lower end of the tubular wall 28, preferably is provided with internal threads 44 adapted to engage threads 45 on a plug 46 for the bore 31. The plug 46 is preferably provided with an enlarged portion 47 below the wall 28 adapted to engage the inside surface of the cylinder 21 which is preferably longer and extends downwardly from the wall 28 whereby the portion 47 seals the chamber 29 between the walls 21 and 28 of the cylinder. The lower end of the plug 46 and the wall 21 are threaded as at 48 and adapted to engage threads 49 of a cap 50 closing the lower end of the hydraulic device.

The rear of the cap 50 is provided with a projection 51 having a threaded recess 52 in the upper face 53 thereof, said face 53 sloping relative

to the upper portion of the base, and arranged perpendicular to the recess 52 to mount a pump body 54 which extends through an aperture, the central portion of the base structure to the rear of the cylinder 21. The pump 54 includes a plunger 55 extending upwardly from the pump cylinder as at 56, the upper end of said plunger being pivotaly connected to a pump operating level 57 as at 58. The forward end of the lever 57 terminates adjacent to cylinder 21 and is pivotaly connected as at 59 with a link 60 pivotaly mounted on upwardly extending ears 61 on the flange 25 whereby the ears 56, link 60 and the respective pivotal connections provide a fulcrum for the pump lever 57. The rearward end of the lever 57 is provided with a plate 62 adapted to be engaged by the foot of an operator whereby actuation of said lever will force the piston down in the pump 54, said lever being returned to its upper position by means of a spring 63 sleeved on the plunger 55 and having engagement with the end 61 of the pump and a washer or the like 64 having bearing contact on said lever 57.

The plug and cap 46 and 50 respectively, are provided with passageways 65 leading from the chamber 29 which forms a liquid reservoir to the recess 52, said passage 65 being provided with a check valve 66 permitting flow from the chamber 29 to the pump and stopping return flow therefrom. The plug and cap 46 and 50 are also provided with a passage 67 leading from the recess 52 to the bore 31. The passage 67 adjacent to recess 52 is then provided with an enlarged bore 68 to receive a valve check 69 adapted to close the aperture 70 in a plug 71 located in the upper end of the enlarged bore 68. The check valve is held in closing position by means of a spring 72 to prevent flow of liquids from the bore 31 to the pump yet permitting flow of liquids from the pump to the bore in response to reciprocation of the plunger in said pump. Actuation of the pump 54 removes liquid from the chamber 29 and delivers it to the bore 31 thereby forcing the piston 32 upwardly in the bore 31.

In order to release liquid from the bore 31 to permit lowering of the piston therein, the plug 46 is provided with a central bore 73, the upper end of which is adapted to receive a ball 74 to control the flow of liquid from the bore 31. Located in the bore 73 is a plunger 75 extending downwardly through a central aperture 76 in the cap 50 and adapted to be engaged by fingers 77 of a plurality of chair-lowering levers 78, said levers being pivotaly mounted on pins 79 extending through ears 80 mounted on the lower face of the cap 50, said levers being arranged preferably at approximately 90° to each other, whereby one lever extends to the rear and the other two levers extend to the side of said chair.

The bore 73 is connected by means of a passage 81 with a chamber 29. The lower end of said bore 73 is sealed by means of bellows 82, the upper end of which is secured in sealing contact with the upper end of a counterbore 83 of the plug 46, the lower end of said bellows being secured to a collar 84 of the plunger 75 whereby operation of the levers 78 raises the plunger 75 into engagement with the ball 74 to lift same from its seat, permitting flow of liquids from the bore 31 through the bore 73, passage 81 to the chamber 29. The liquid moving into the bellows will not interfere with operation of the plunger 75 as the passage 81 forms connection with the chamber 29.

Mounted on the upper end of the piston 32 is a plate 85 which also carries the rod 43 spaced for-

wardly from the piston 32. Secured to the corners of the plate 85 are tubular braces 86, the outer ends of which are secured to the corner 87 of a rectangular tubular frame 88 forming the frame of the seat section of the body supporting member 4. Covering the frame 88 and having its edges secured thereto is a panel 89 preferably made of stainless steel to form the seat of the chair, said panel 89 having contact with the upper face 90 of the plate 85. The corners of the panel 89 are preferably cut as at 91 exposing the corners of the frame 88 and the ends of the braces 86. Located adjacent the corners of the frame 88 are bosses 92 having bores 93 adapted to receive pins 94 mounted in the ends of U-shaped arms 95 whereby the pins may be inserted in the bores to support said arms. When it is desired that there be no obstruction on the sides of the seat section, the arms are removed by lifting same from the bosses.

Secured to the rear end members of the frame 88 are a plurality of bearings 96 having bores 97 adapted to receive an end member 98 of a rectangular tubular frame 99 forming the back section of the body supporting member whereby the back section is pivotally mounted on the seat section. The frame 99 is covered with a metal top 100 having its edges secured to the frame 99. The top 100 is preferably of stainless steel and is cut as at 101 to expose the corners of the frame 99 providing handholds to be grasped by the nurse or other person controlling operation of the chair. Mounted on the underside of the back section and preferably between the ends thereof is an angle 102 having its ends secured to the side members of the frame 99. Secured to the lower leg 103 of the angle 102 is a pair of spaced angles 104 having horizontal legs extending outwardly from downwardly extending legs 105, said horizontal legs being secured to the angle 102 and the end member 98 of the frame 99. The angles 104 are provided with extensions 106 adapted to engage under the plate 85 when the back section is in horizontal position as shown in Fig. 4. Pivotaly mounted on the angles 104 is a pawl 107 adapted to engage teeth 108 of a segment 109, said segment being mounted rigidly on the seat section of the chair and coaxial with the bearings 96. The teeth 108 are so arranged that when the detent 110 carried by the pawl 107 engages therein, the back portion of the chair is held against downward movement relative to the seat section. When it is desired to lower the back section, the detent 110 is released from the teeth 103 by means of a link 111 having connection with the lower end of the pawl 107, the other end of said link being connected to a lever 112 pivotally mounted adjacent the center of the rear end of the frame 99. When it is desired to raise the back section, lifting the rear portion thereof will automatically release the detent 110 whereby the back section may be lifted to the inclination desired, the detent engaging the next lower tooth of the segment 109.

It is to be noted that the angles 104, segment 109 and pawl 107 are all centrally located relative to the sides of the body supporting members whereby there is no structure below the overhanging portions of the chair to interfere with said body supporting members engaging a bed or the like as shown in Fig. 3. Secured to the end portion of the frame 88 opposite the back section are bearings 113 adapted to pivotally mount end members 114 of leg supporting sections 115 and 116, said leg supporting sections being rectangu-

lar in shape and the frame thereof being of tubular steel. The leg sections are covered with sheet metal, preferably of stainless steel as at 117 and 118. The corners of the panels are cut as at 119 to expose the corners of the frame to provide handholds therein.

The inclination of the respective leg supporting sections are controlled similarly to the control of the back section, said leg sections being movable independently of each other. As shown in Fig. 6, two segments 120 are mounted on the seat section and adapted to be engaged by pawls 121 from the respective toothed segments 120 permitting the lowering of the respective leg section. When it is desired to lift the leg section, the upward movement of the forward end thereof will automatically disengage the pawl and permit free upward movement of said raised section to the desired inclination thereof.

It is desirable that foot rests be placed on the leg sections and be movable thereon to adjust same for different height people. The preferred form of foot rest consists of a U-shaped tubular frame 127 for each of the leg portions, said frame being covered with a metal plate 128. The ends of the tubular frame preferably mount U-shaped members 129 adapted to slide over the side of the leg section frames 115 and 116 whereby pressure on the foot rests will cause engagement of the U-shaped members with the leg section frames to anchor the foot rests in position, however, to supplement the clamping action and prevent movement of the foot rests when there is no pressure thereon, screws 130 may be provided in the lower portion of the U-shaped members 129 adapted to engage the frames 115 and 116 to anchor the foot rests in place.

It is to be noted that all of the apparatus under the body supporting sections is located relatively close to the longitudinal center of the chair whereby the body supporting sections are provided with substantial lateral overhang particularly as shown in Figs. 2 and 3.

Using a chair, substantially constructed as described, and particularly for moving a patient from a hospital bed to the chair, the chair is moved to the side of the hospital bed, the back section of the body supporting members being arranged at the head end of the bed; the arm 95 adjacent to the bed, and the foot rests are removed from the chair and the back and leg sections moved to a horizontal position. The operator will then use his foot to actuate the pump lever 57 to move liquid from the chamber 29 to the bore 31 to raise the piston 32 and thereby raise the body supporting sections a point above the mattress on the hospital bed as shown by the dotted lines shown in Fig. 3. The chair is moved close to the bed until the side of the body supporting members overhang the edge of the bed, and the brake pedals 16 and 17 are actuated to engage the brakes with the rollers 13 and 14 to prevent movement of the chair. One of the lowering levers 78 is pressed to actuate the plungers 75 to lift the ball valve 74 permitting hydraulic fluid to flow from the bore 31 to the reservoir chamber 29 thereby lowering the body supporting portion into engagement with the mattress of the hospital bed. Pressure preferably should be applied to the seat section to force the body supporting member downwardly in the mattress until the panels on the body supporting portion are substantially level with the mattress on the bed. A person able to move himself may then slide across the bed and onto the chair with-

out difficulty or pain. Any one incapable of movement may be moved by one nurse grasping the sheet or blanket on the bed, pulling same together with the patient until the patient is located on the chair. Such operation can be carried on by one nurse without injury or pain to the patient regardless of the size of the patient.

The brake engaging the rollers 13 and 14 and the engagement of the body supporting sections and the frame members thereof with the mattress of the bed absolutely prevent any relative movement between the chair and the bed. The brakes may then be released, the pump actuated to lift the body supporting members away from the mattress and the chair moved away from the bed. The arm 95 can be replaced and the patient moved with the sections in horizontal position whereby it serves as a stretcher, the elevation of the body supporting members being adjusted to any desired elevation. In the same manner a patient may be transferred from the chair to an operating table or the like. If the person is able to sit up the seat and body portions may be lowered, the foot rests applied, the leg sections lowered, the back section raised to provide a chair of substantially normal height and the patient moved to any desired position, the brakes set and the patient left to enjoy the surroundings without danger of movement of the chair.

The device is easily maintained in sanitary condition and is capable of many uses and adaptations for hospital and doctors' use, enabling the personnel to handle movement of patients quicker and with substantially no discomfort to said patients.

What I claim and desire to secure by Letters Patent is:

1. A device of the character described including a plurality of relatively thin hinge sections of sheet metal reinforced at the edges and having flat supporting surfaces forming a body supporting member adapted to substantially conform to the plane of a mattress of a bed, the side edges of said sections being of substantially uniform thickness, means for locking said sections in selected hinged relation, a base, an hydraulic lifting means on the base for supporting the body supporting member and providing vertical movement thereto, said lifting means being centrally located to provide substantial overhanging relatively thin laterally extending portions at each side of the body supporting member which are characterized by the absence of obstructions on the top and bottom thereof, and rollers on the base for moving same bodily to position the lifting means alongside of the bed, whereby said portions may overlie the edge of a bed and be lowered to depress the mattress thereon, said overhanging portions of the body supporting member being relatively thin whereby slight depression of the mattress thereunder positions the flat supporting surfaces substan-

tially on a level with the remainder of the mattress for sliding movement of a patient from one to the other of the supporting surfaces and mattress without lifting of said patient.

2. An invalid chair of the character described, a base, a vertical hydraulic lifting means substantially centrally of said base, rollers on the base for moving same bodily to position the lifting means alongside of a bed, seat, back and leg sections each of which is sheet material reinforced at the edges and having flat supporting surfaces, the side edges of said sections being of substantially uniform thickness, means hingedly connecting the back and leg sections on opposite ends of the seat section, means for mounting the seat section on the lifting means whereby said lifting means is located under the central portion of the seat section to provide substantial overhanging relatively thin laterally extending portions of uniform thickness and characterized by the absence of obstructions on the top and bottom thereof whereby the sides of said sections are adapted to overlie the edge of a bed, means for imparting vertical movement to the lifting means, and means adjacent the longitudinal center of the chair for supporting said leg and back sections at selected inclinations relative to the seat section, said back, seat and leg sections being adapted to conform to the plane of a mattress of a bed whereby upon lowering of the lifting means the portions of the sections overlying the bed will press a mattress thereon, said overhanging portions being relatively thin whereby slight depression of the mattress will position the flat supporting surfaces of the sections substantially on the level with the remainder of the mattress.

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