

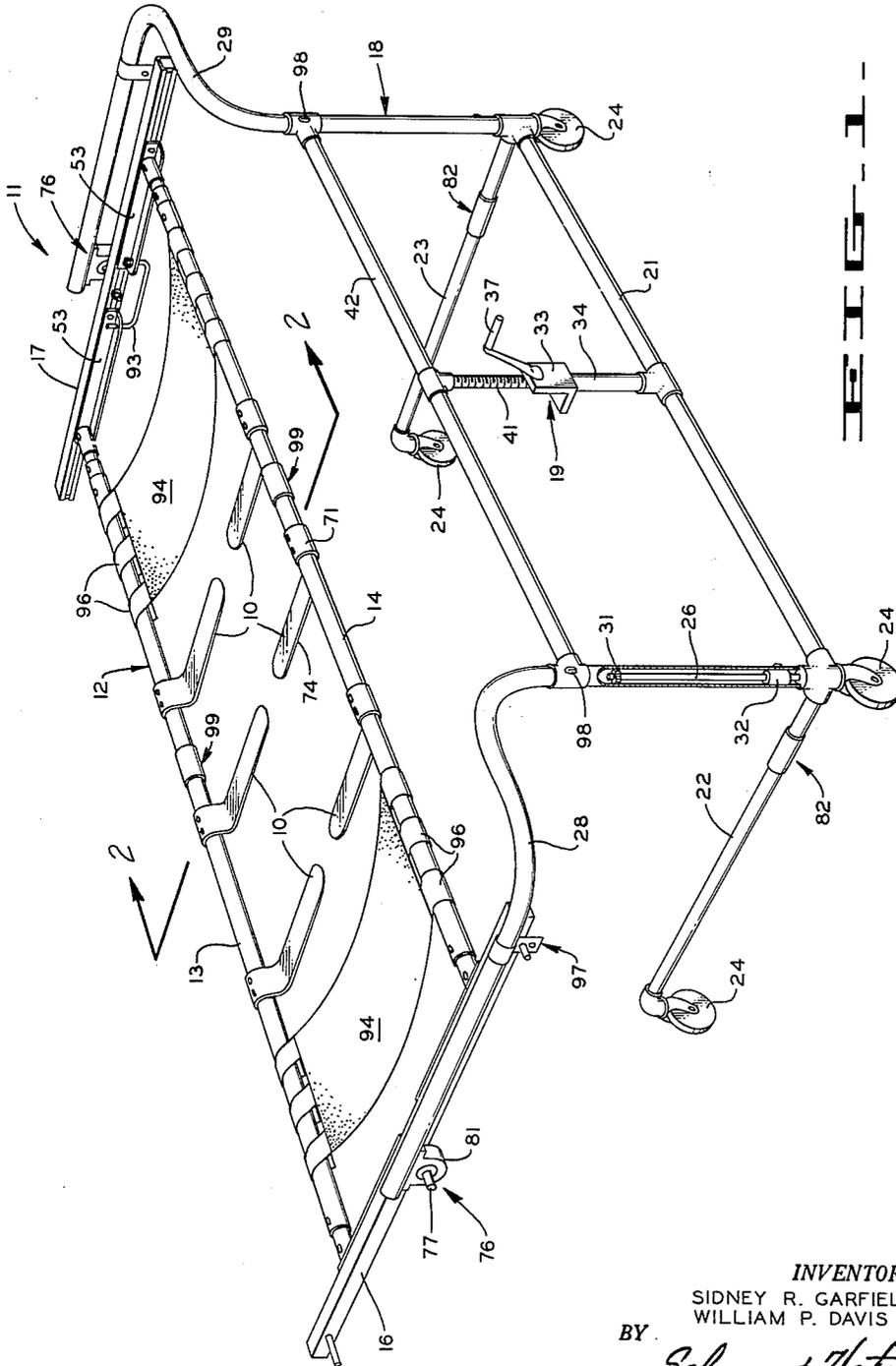
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S. R. GARFIELD ETAL
PATIENT-HANDLING APPARATUS

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3 Sheets-Sheet 1



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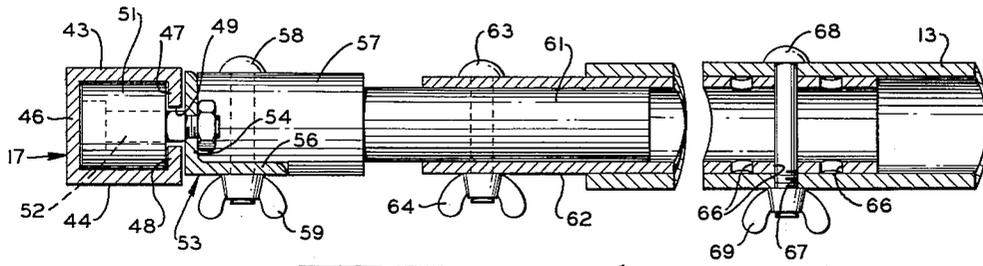


FIG. 4.

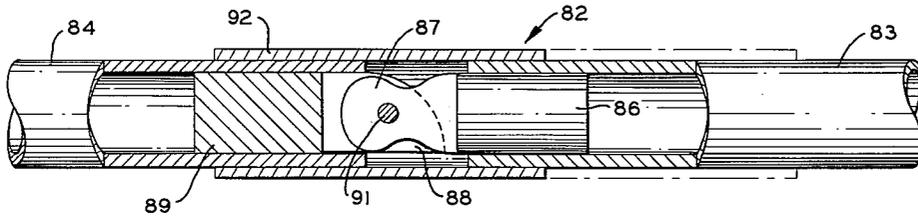


FIG. 5.

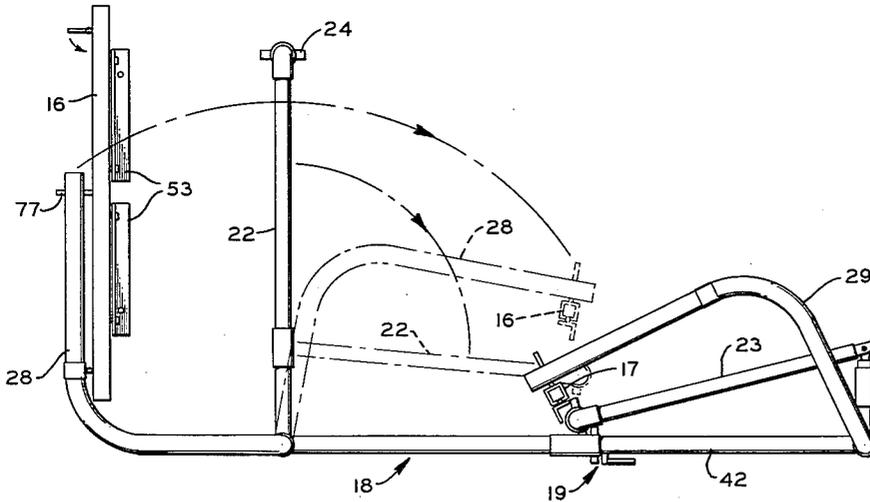


FIG. 6.

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PATIENT-HANDLING APPARATUS

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9 Claims. (Cl. 5—81)

This invention relates to improvements in a patient-handling apparatus and more particularly to devices for lifting and transporting incapacitated persons.

The lifting of patients onto and off beds, etc. is often a problem where the condition of the patient demands a minimum of handling and bodily movement. Previous devices of this character have all required that the patient, or some portion of his anatomy, be lifted or rolled onto a supporting means.

The most common patient-lifting and transporting devices utilize a canvas sling in which the patient sits while being lifted and transported. Where the patient is helpless this type of device is of little use since it requires the services of two or more strong persons to place the patient in the sling and someone must stand by to be sure he does not topple out.

Other devices employ a canvas stretcher mounted on a supporting apparatus. The main problem here is in placing the canvas under the body of the patient. It requires a person of considerable strength to place the canvas under the patient and considerable lifting and tugging could be deleterious to the well-being of many patients.

A third type of invalid carrier utilizes a fork-lift principle and provides a row of closely spaced fingers or tines upon which the patient is supported. In order to place the patient on the fingers without physically lifting him free of the bed, it is necessary to roll him on his side. The fingers are then placed on the bed next to the patient and he is rolled back upon them. This rolling of the patient can also be extremely harmful in certain cases.

The present invention contemplates a patient-lifting and transporting device in which opposed blade-like members are formed for easy insertion between the body of the patient and the bed in a manner requiring very little movement of the patient's body. The apparatus can conveniently be operated by a person of limited strength and makes it possible for a single attendant to lift a patient for the purpose of changing sheets, using a bed pan, changing dressings or the like, even in cases where the patient is utterly helpless and a minimum of bodily movement is indicated.

Accordingly it is a principal object of the present invention to provide a patient-lifting and transporting apparatus which is effective to lift and transport a patient with minimum disturbance and movement of the parts of the body.

Another object of the invention is to provide an apparatus of the character described which may be operated by a single person and which requires no lifting exertions by the operator or any exertion at all by the patient.

Yet another object of the invention is to provide an apparatus of the character described which can be used to lift the patient from the bed, turn him over, and replace him in the bed with the described minimum disturbance and bodily movement.

A further object of the invention is to provide a patient-handling apparatus of the character described which is formed for use with existing hospital beds and operating tables.

A still further object of the invention is to provide an apparatus of the nature set forth which is formed in such manner that it is impossible for the patient to accidentally

roll off the device even if he is temporarily left unattended.

Another object of the invention is to provide an apparatus for lifting and transporting patients in the manner described which is adapted to fold up into a compact unit for storage.

Further objects and advantages of our invention will be apparent as the specification progresses, and the new and useful features of our patient-handling apparatus will be fully defined in the claims attached hereto.

The preferred form of our invention is illustrated in the accompanying drawings forming part of this application in which:

FIGURE 1 is a perspective view of a patient-handling apparatus constructed in accordance with the present invention;

FIGURE 2, a vertical cross-sectional view taken substantially on the plane of line 2—2 of FIGURE 1;

FIGURE 3, an enlarged cross-sectional view taken substantially on the plane of line 3—3 of FIGURE 2 and illustrating a trunnion mounting;

FIGURE 4, an enlarged fragmentary cross-sectional view taken substantially on the plane of line 4—4 of FIGURE 2;

FIGURE 5, an enlarged fragmentary cross-sectional view taken substantially on the plane of line 5—5 of FIGURE 2; and

FIGURE 6, a plan view of the apparatus of FIGURE 1 with portions removed therefrom and illustrating the manner in which the apparatus may be folded into a compact unit.

While we have shown only the preferred form of our invention, it should be understood that various changes or modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawings in detail, it will be seen that the patient-handling apparatus of the present invention includes elongated thin blades 10 mounted in confronting relation and means 11 for moving the blades endwise toward and away from each other for inserting the blades in supporting relation beneath the opposite sides of the body of a patient.

As illustrated in FIGURE 1, the apparatus includes a generally rectangular frame means 12 having elongated side members 13 and 14 mounted in parallel spaced relation on end members 16 and 17, a plurality of the blades 10 being secured in spaced relation along each of the side members 13—14 and extending therefrom toward the opposite side member.

A supporting structure 18 is provided for supporting the frame means 12 to lie normally in a substantially horizontal plane. Means 19, mounted on structure 18, is formed for raising and lowering the frame means 12 whereby a patient supported on the blades 10 may be lifted from a bed or the like (not shown).

The supporting structure 18 is here shown as comprising a wheeled carriage. However, it should be appreciated that the supporting structure could be mounted directly on the hospital bed when transporting of the patient is not necessary, and other types of carriages could be employed where conditions require.

The supporting carriage here includes an elongated base member 21 and shorter members 22 and 23 extending laterally from the opposite ends of the base member. Swivel wheels 24 depend from the opposite ends of the lateral members 22—23. Rod members 26 are secured to and extend vertically from the junctions of the members 22—23 with the base member 21.

Arm members 28 and 29 have lower end portions telescopically engaged with the upstanding rod members 26

and extend horizontally in spaced relation to the end members 16—17 of the frame means 12.

Preferably, and as here shown, a ball bearing 31 is secured to the upper end of rod 26 and rides against the inner periphery of the arm 28. A bearing 32 is secured to the lower end of arm 28 and journals the rod 26 for axial movement relative thereto. We prefer to form the arms 28—29 of tubing which may be bent into a compound curve defined by perpendicularly related quarter-circles as illustrated in FIGURE 1. This permits the lower portion of the carriage to be low enough to pass easily under the ordinary hospital bed, while the outer ends of arms 28—29 are positioned sufficiently far apart to accommodate the frame means 12.

The means 19 for effecting vertical movement of the arms 28—29 and the frame means 12 carried thereby, here consists of a manually operable screw jack. The construction of this jack is best shown in FIGURE 2 of the drawings. As shown therein, the jack includes a bracket 33 splined onto an upstanding tubular member 34 supported by the base member 21. Journalled in the bracket 33 is a shaft 36 having a handle 37 attached to one end and a bevel gear 38 attached to its other end. A second bevel gear 39 is enmeshed with the gear 38 and is supported for coaxial rotation by the member 34. A rod 41 has a threaded connection with the gear 39 and moves up and down as gear 39 is rotated. The upper end of rod 41 is connected to a tie member 42 which extends between the arms 28 and 29 so that rotation of handle 37 will cause the arms to go up and down in accordance with the direction of rotation.

For reasons of economy, we prefer to provide the manually engageable handle 37 for operating the screw jack 19. However it should be appreciated that suitable motor means could be used for driving the jack and that other lifting and lowering means could be used. For example, other manually or power operated mechanical jacks could be used or a hydraulic cylinder could be substituted for the jack in toto.

It will be noted from FIGURE 2 of the drawings that the carriage, as shown and described, is of substantially C shape. This configuration permits the members 22—23 with their attached wheels 24 to be positioned under the hospital bed while the frame means 12 is moved directly over the patient in correct position for the lifting operation.

In accordance with the present invention the end members 16—17 of the frame means 12 are formed to provide longitudinally extending guideways in which the side members 13—14 are supported for movement toward and away from each other. As here shown, the members 16—17 are of channel shape with the opening of the channels facing each other to provide the longitudinally extending guideways.

The cross-sectional shape of the end members is best seen in FIGURE 4 of the drawings. As there shown, the end member consists of top and bottom flanges 43 and 44 joined by a vertical wall 46 and having confronting short flanges 47 and 48, opposite the wall 46, defining a longitudinal opening 49. Thus it may be seen that the end members comprise essentially a box section having a longitudinal slot cut through one of the walls.

Rollers 51, preferably formed of nylon or the like, are mounted to ride freely inside the box section of the end members, with the axles 52 for the rollers extending through the opening 49.

As here shown, the axles 52 are mounted in spaced relation on elongated L-shaped members or trucks 53. Preferably the upper flanges 54 of the trucks 53 carry the roller axles 52 while the lower flanges 56 support the ends of the side members 13—14.

Supported on the trucks 53 are generally cylindrical mounting members 57 secured in place by bolts 58 provided with thumb screws 59. The members 57 have a distal end 61 of reduced diameter upon which the opposite ends of the side members 13—14 are mounted.

A certain amount of lengthwise adjustment of the side members 13—14 is provided by an intermediate tube 62 secured to end 61 of member 57 by a bolt 63 and thumb screw 64. The tube 62 is proportioned to be slidably received in the end of the side member and is formed with a plurality of openings 66 which may be selectively brought into alignment with corresponding openings 67 formed in the side members. The parts are releasably held in position by a bolt 68 passing through the registering openings and secured in place by a thumb screw 69.

In accordance with the present invention the blades 10 are easily insertable between the body of the patient and the supporting surface upon which he is lying. The preferred shape of the blades 10 is best shown in FIGURES 1 and 2 of the drawings. As seen therein, each of the blades 10 is formed with a tubular end portion 71 journalled for axial and rotational movement on the side members 13—14. The blades are secured in desired positions along the side members by bolts 72 which pass through aligned openings in the portion 71 and the side member, the bolts being releasably secured in place by thumb screws 73.

As a feature of the invention, the blades are formed so that a patient supported thereon cannot accidentally roll off the patient-handling apparatus. This is partially accomplished by forming the blades so that, when positioned in confronting patient-supporting relation, the blades describe a flattened U shape. In other words, the side members 13—14 are elevated above the thin, flat, tapered portions 74 of the blades upon which the patient rests.

In accordance with the present invention, the versatility of the present apparatus may be increased by making it possible for the attendant to turn the patient over in a gentle manner. To accomplish this, the frame means 12 is pivotally secured to the supporting arms 28—29 by trunnions 76 lying on the longitudinal center line of the frame means 12. This makes it possible for the operator to secure the patient to the frame means 12, lift the patient from the bed, rotate the frame means 180° around the trunnions, and lower the patient back onto the bed.

The structure of the trunnions 76 is best seen in FIGURE 3 of the drawings wherein a trunnion shaft 77 is threadably engaged in a block 78 mounted in each of the members 16 or 17 and held in place by a nut 79. The trunnion shaft 77 projects outwardly from the end member and is journalled in a bearing 81 secured to one of the supporting arms 28 or 29.

The present apparatus is designed to fold up into a compact unit for easy storage. For this purpose, hinge means 82 is provided in each of the lateral members 22—23 to permit them to be folded in the manner illustrated in FIGURE 6 of the drawings. Details of the hinge means 82 may be seen in FIGURES 2 and 5 of the drawings. As there shown, each of the lateral members 22 and 23 is provided by short and long sections of tube 83 and 84. Secured in the end of tube 83 is a cylindrical hinge member 86 having a flattened ear 87 extending therefrom. The ear 87 is slidably received between spaced ears 88 formed on a hinge member 89 secured in the end of tube 84. The ears 87 and 88 are pivoted on a hinge pin 91 to permit the lateral members to fold up in the manner illustrated in FIGURE 6. When the apparatus is in use the hinge means 82 is held against accidentally folding up by a tubular sleeve 92 which may be slid from a retracting position illustrated in phantom lines in FIGURE 5 to the position illustrated in solid lines.

In operation, the apparatus is unfolded and set up as illustrated in FIGURE 1. It is wheeled into place with the frame means 12 overlying the patient. The side members 13 and 14 are moved outwardly in the end members 16 and 17, and bolt 63 is removed to let the blades 10 swing down to the position illustrated in dotted lines in FIGURE 2.

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The operator then rotates handle 37 to lower the frame means 12 and the blades 10 are lowered to lie flat against the surface of the bed. The blades are then moved toward each other and are gently inserted between the patient and the bed. When the blades have been moved into the position illustrated in FIGURE 2, a clip member 93 is snapped into suitable holes formed in the trucks 53 to prevent lateral movement of the side members 13—14.

The patient may then be lifted from the bed providing a sufficient number of blades 10 are located in correct position to support the body. If desired, fewer blades 10 may be utilized, with some of the blades being replaced by flexible slings 94 having clips 96 at their opposite ends formed to engage over the side members 13—14. The slings 94 would normally be used at the ends of the frame means 12 under the head and feet of the patient and would be used only where the condition of the patient would permit lifting of the head and feet for insertion of the slings thereunder. In any event the main portion of the body weight would be supported upon the blades 10.

With the patient installed on the frame means in the manner described, the operator can then raise the frame means by operating the handle 37 and the apparatus will hold the patient in elevated position to permit changing of the bed, use of bed pan, etc.

Should it be desired to turn the patient over, several of the slings 94 may be snapped into place over the patient's body and locking means 97 released to permit the entire frame means 12 to rotate about the trunnions 76 in the manner illustrated in phantom lines in FIGURE 2 of the drawings. The frame means is rotated 180° and the operator then rotates handle 37 to lower the patient onto the bed.

In extreme cases, where the patient cannot be lifted enough to slide the slings 94 out from under his body, the frame means may be lifted, rotated to its original position, and utilized to lift the patient in the previously described manner while the slings are removed.

When it is no longer desired to use the apparatus, the set screws 98 are loosened to permit the supporting arms 28—29 to rotate about the vertical rods 26. The arms 28—29 are then rotated to the folded position shown in FIGURE 6. If desired, the end members 16—17 may be left on the arms 28—29, in which case they would be moved to a substantially vertical position as shown in FIGURE 6. To accomplish this it is necessary to remove bolts 58 and detach the side arms 13—14 from the trucks 53. If desired, hinge means 99, similar to hinge means 82, may be provided on the side members 13—14 to permit their being folded in half for easier storage.

From the foregoing it will be seen that we have provided a novel and extremely useful patient-handling apparatus which can be used by a single operator and which is designed to lift and transport the patient, and even turn the patient over in bed, in an extremely gentle manner involving minimum movement of the body parts of the patient and minimum exertion on the part of both the patient and the operator.

We claim:

1. In a patient-handling apparatus, a patient-supporting device, comprising a pair of elongated end members mounted in spaced parallel relation, said end members being of channel shape with the opening of the channels providing longitudinally extending guideways, a pair of elongated side members extending between said end members, roller means secured to the opposite ends of said side members and engaged in said guideways for mounting said side members in parallel relation while permitting movement thereof together and apart, and a plurality of elongated thin blades secured in spaced relation along each of said side members and extending therefrom toward the opposite side member.

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2. In a patient-handling apparatus, a patient-supporting device, comprising a pair of elongated end members mounted in spaced parallel relation, said end members being of channel shape with the opening of the channels providing longitudinally extending guideways, a pair of elongated side members extending between said end members, laterally extending trucks connected to the ends of said side members, a plurality of rollers journaled in spaced relation on each of said trucks for rolling engagement in said guideways so as to support said side members in parallel spaced relation while permitting movement thereof together and apart, and a plurality of elongated thin blades secured in spaced relation along each of said side members and extending therefrom toward the opposite side member.

3. In a patient-handling apparatus, a patient-supporting device, comprising a pair of elongated channels mounted in spaced parallel relation, the flanges of said channels extending toward each other to define confronting longitudinally extending guideways, a pair of elongated tubular side members having opposite ends extending into proximity to said channels, elongated L-shaped members detachably secured to said opposite ends of said side members and extending therefrom in parallel relation to said channels, rollers journaled adjacent the opposite ends of each of said L-shaped members and extending therefrom into rolling engagement with said guideways, a plurality of elongated thin blades having a curved portion at one end pivotally engageable with said tubular side members for mounting said blades in spaced relation therealong, and means for selectively locking said curved portions of said blades against rotation on said tubular side members.

4. In a patient-handling apparatus, a patient-supporting device, comprising a pair of elongated end members mounted in spaced parallel relation and formed to provide longitudinally extending guideways, a pair of elongated tubular side members extending between said end members, laterally extending trucks connected to the ends of said side members, a plurality of rollers journaled in spaced relation on each of said trucks for rolling engagement in said guideways so as to support said side members in parallel spaced relation while permitting movement thereof together and apart, a plurality of elongated thin blades secured in spaced relation along each of said side members and extending therefrom toward the opposite side member, said connection of each of said trucks to said tubular side members including a cylindrical pin secured to said truck and journaled in the end of the tubular side member, and locking means for selectively securing said pin and side member against relative movement.

5. In a patient-handling apparatus, generally rectangular frame means having a pair of substantially parallel side members, a supporting structure for said frame means, trunnions connecting the opposite ends of said frame means to said supporting structure whereby said frame means may normally lie in a substantially horizontal plane and may be selectively rotated about its own longitudinal axis, elongated thin blades secured to said side members in confronting relation, means for moving said side members toward and away from each other whereby said blades may be inserted in supporting relation beneath the opposite sides of the body of a patient, a plurality of flexible slings detachably mountable on said side members and extending therebetween for supporting portions of the patient's body not supported by said blades, and means on said supporting structure formed for raising and lowering said trunnions whereby a patient supported by said frame means may be lifted from a bed and turned over for replacement on the bed.

6. In a patient-handling apparatus, generally rectangular frame means having a pair of substantially parallel side members, a wheeled carriage for said frame means, trunnions connecting the opposite ends of said frame means

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to said wheeled carriage whereby said frame means may normally lie in a substantially horizontal plane and may be selectively rotated about its own longitudinal axis, elongated thin blades secured to said side members in confronting relation, means for moving said side members toward and away from each other whereby said blades may be inserted in supporting relation beneath the opposite sides of the body of a patient, a plurality of flexible slings detachably mountable on said side members and extending therebetween for supporting portions of the patient's body not supported by said blades, and means on said carriage formed for raising and lowering said trunnions whereby a patient supported by said frame means may be lifted from a bed and turned over for replacement on the bed.

7. In a patient-handling apparatus, generally rectangular frame means having a pair of substantially parallel side members, a wheeled carriage for said frame means, trunnions connecting the opposite ends of said frame means to said wheeled carriage whereby said frame means may normally lie in a substantially horizontal plane and may be selectively rotated about its own longitudinal axis, elongated thin blades secured to said side members in confronting relation, means for moving said side members toward and away from each other whereby said blades may be inserted in supporting relation beneath the opposite sides of the body of a patient, a plurality of flexible slings detachably mountable on said side members and extending therebetween for supporting portions of the patient's body not supported by said blades, and means on said carriage formed for raising and lowering said trunnions whereby a patient supported by said frame means may be lifted from a bed and turned over for replacement on the bed, said carriage being of generally C shape whereby the lower portions thereof may be inserted under a hospital bed with the frame means positioned above the bed in position to receive the patient.

8. In a patient-handling apparatus, the structure as described in claim 7 and wherein said frame means is demountable from said carriage and said carriage is formed to fold up for compact storage.

9. In a patient-handling apparatus, a patient-supporting device, comprising a pair of elongated channels mounted in spaced parallel relation, the top and bottom flanges of each channel extending toward the other chan-

nel to define confronting longitudinally extending guideways, a pair of elongated tubular side members having opposite ends extending into proximity to said channels, an elongated L-shaped member detachably secured to said opposite ends of said side members and extending therefrom in parallel relation to said channels, rollers journaled adjacent the opposite ends of each of said L-shaped members and extending therefrom into rolling engagement with said guideways, a plurality of elongated thin blades having a curved portion at one end pivotally engageable with said tubular side members for mounting said blades in spaced relation therealong, means for selectively locking said curved portions of said blades against rotation on said tubular side members, a carriage frame for supporting said channels and having an elongated base member and shorter members extending laterally from the opposite ends of said base member, swivel wheels depending from the opposite ends of said shorter members, upstanding rod members extending vertically from the opposite ends of said base member, arm members having end portions telescopically journaled on said upstanding rod members for axial and rotational movement, said arm members extending horizontally in spaced relation to said pair of elongated channels, trunnion members secured to the central portion of said channels and extending therefrom on the sides opposite said guideways, bearings on said arm members journaling said trunnion members, a tie member generally parallel to said base member and connecting said arm members, and a manually operable screw jack interposed between said base member and said tie member for raising and lowering said arm members.

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