

[54] **PATIENT TRANSFER METHOD AND APPARATUS**

[76] Inventor: **Blair H. Warman**, 5 Woodland Rd., Stoneham, Mass.

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[63] Continuation of Ser. No. 9,504, Feb. 9, 1970, abandoned.

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[51] Int. Cl. A61g 7/08, A61g 7/10

[58] Field of Search 5/81 R, 81 A, 86, 5/82; 271/68; 214/83.34-84

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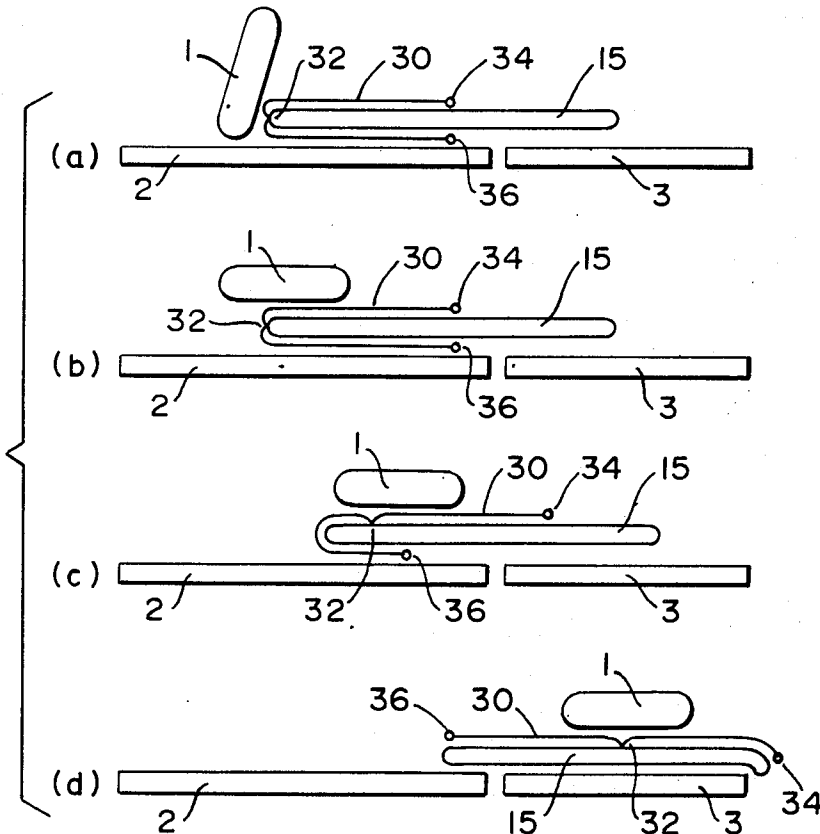
Primary Examiner—Casmir A. Nunberg

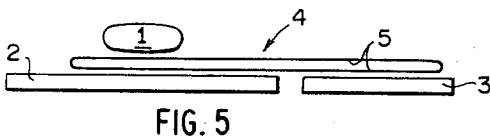
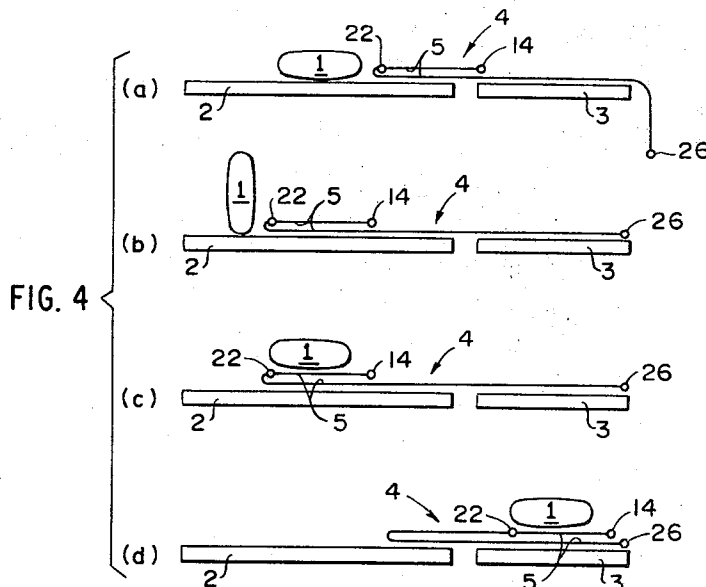
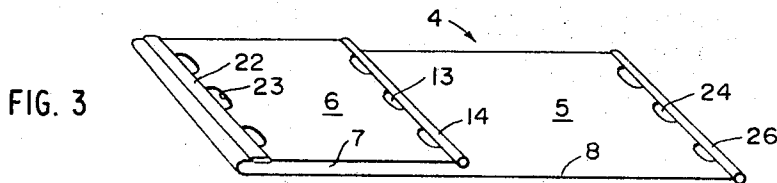
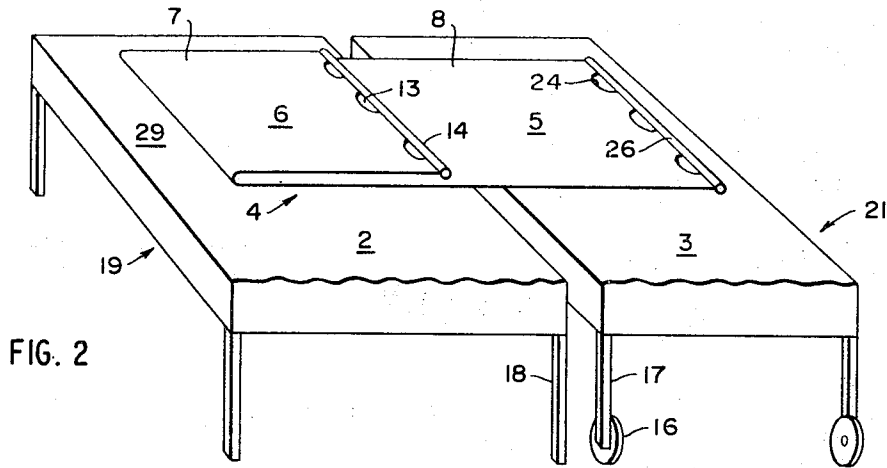
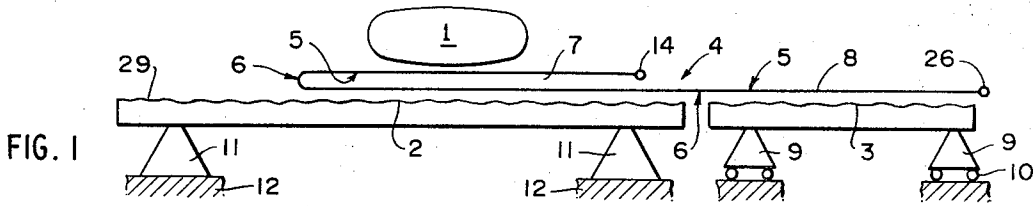
Attorney—Chittick, Pfund, Birch, Samuels & Gauthier

[57] **ABSTRACT**

A patient transfer method and apparatus employs a sheet or continuous band of cloth or similar material wide enough to span the patient's bed and gurney alongside the bed to which the patient is to be transferred with at least the portion of the sheet on the bed doubled back toward the gurney. The patient is moved to lie on the doubled portion and by pulling the edge of a top layer or pushing on the patient, he is transferred as the top of the double layers slides over the bottom layer. The transfer is facilitated by giving the surface of the sheet or band on the inside of the double layer a lower coefficient of friction than the surface on the other side.

13 Claims, 9 Drawing Figures





INVENTOR
BLAIR H. WARMAN

BY
Chittick, Fund, Birch,
Samuels & Gauthier ATTORNEYS

FIG. 6

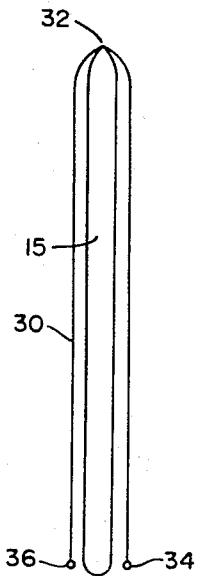
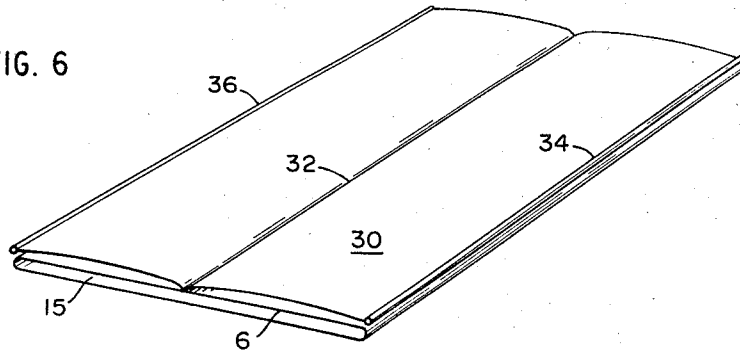


FIG. 7

FIG. 8

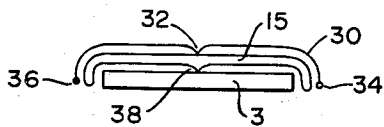
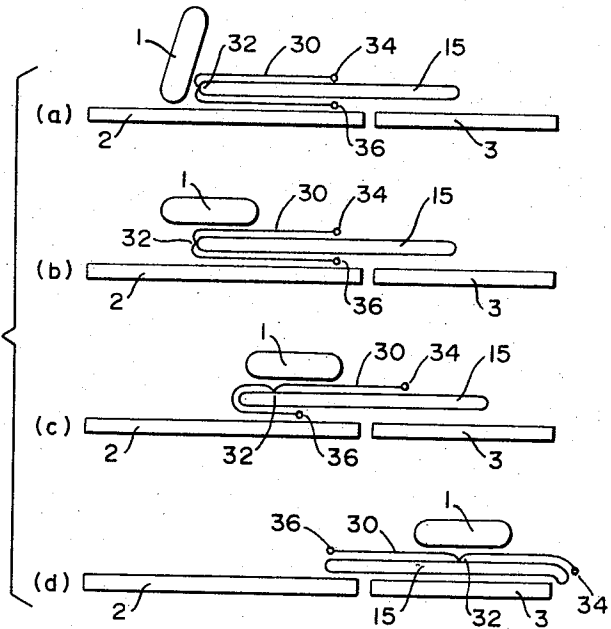


FIG. 9

INVENTOR
BLAIR H. WARMAN

BY *Chittick, Pfund,*
Birch, Samuels & Gauthier
ATTORNEYS

PATIENT TRANSFER METHOD AND APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

This application is in part a continuation of applicant's copending Ser. No. 9,504, filed Feb. 9, 1970 now abandoned.

BACKGROUND OF THE INVENTION

The field of this invention is patient transfer methods and apparatus to facilitate the transfer of a bed patient from a bed to an adjacent support surface and return.

Several complex and expensive attempts have been made in the past to provide a means for transferring a hospitalized patient from his bed to a movable, roll-around platform or gurney or between such a platform and any other horizontal surface. Often in conveying a patient between such supports it is essential to minimize the stresses placed upon his body and to keep him from exerting his own muscles. The task of conveying a patient under such circumstances is further hindered by the soft deformable nature of the bed or other padded surface. Prior attempts to solve these difficulties have generally involved complex pulling and support mechanisms or bed attachments which are relatively expensive and which are cumbersome and difficult to store when not in use. It is thus an object of the present invention to provide a patient conveyor of simple and inexpensive design.

It is a further object of this invention to provide a patient conveyor which can be easily carried from one location to another in a hospital or stored in a small space in many locations throughout a hospital.

It is a further object of this invention to provide a conveyor which minimizes the discomfort and strain to the patient when he is moved from one surface onto another.

It is a further object of this invention to minimize the effort required by a nurse in moving a patient between two horizontal surfaces by providing for that purpose a minimum of equipment which is easy to use and store.

SUMMARY OF THE INVENTION

These and other objects of the preferred embodiment of the present invention are accomplished with a patient conveyor consisting of flexible sheet material having first and second surfaces. The first surface has a more slippery characteristic than the second surface and when in contact with itself will have low coefficients of friction to permit ease of sliding contact. The patient conveyor is generally constructed as two layers of the sheet material having their low friction surfaces in contact with each other. The conveyor is generally long enough to underlie the full torso of an adult person, and wide enough to span the surfaces of an adjacent bed and gurney. The conveyor is laid across the gurney or surface to which the patient is to be moved and onto the bed or other surface on which the patient presently rests. The patient is then rolled or eased onto the double layer portion of the conveyor. A relatively low force on the patient or pull on the top layer causes movement of the patient in the direction of force allowing him to be transferred to the gurney or other surface to which he is to be moved. The low friction interface between the layers facilitates the sliding motion while the relatively higher friction second surface in contact with the bed keeps the bottom layer from slipping which would result in a bunching or crumpling of the

bottom layer in front of the patient's path of travel. The flexibility of the sheet material allows it to conform to the patient's body and the depressions of the bed or other surface that the patient traverses as he is transferred.

It can be seen that objects other than patients can be transferred across a surface with this conveyor as well.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of an embodiment of the patient conveyor comprising a sheet of material positioned under a patient and between two horizontal surfaces;

FIG. 2 is a perspective view of the conveyor of FIG. 1 spread on the upper support surfaces of a bed and a movable, roll-around platform or gurney;

FIG. 3 is a perspective view of a modified form of the conveyor of FIG. 1;

FIGS. 4a to 4d are diagrams showing steps in the method of transferring a patient according to the invention utilizing the conveyor of FIG. 3;

FIG. 5 is a schematic diagram of the conveyor of this invention in a further modified form comprising a continuous band;

FIG. 6 is a perspective view of a further modified form of the patient conveyor of FIG. 5 comprising an additional sheet of material;

FIG. 7 is an end elevation view of the conveyor of FIG. 6 as it is held to orient the parts just prior to use;

FIGS. 8 to 8d are diagrams showing steps in the method of transferring a patient according to the invention utilizing the patient conveyor of FIG. 6; and

FIG. 9 is an end view of a modification attached to the mattress of a stretcher.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a patient conveyor in its preferred embodiment generally indicated at 4 is composed of a thin rectangular sheet of flexible material such as nylon or canvas with some form of hand holds 14 and 26 preferably provided at opposite edges. The material for the sheet 4 should be flexible and strong enough in tension to permit pulling with the weight of the patient thereon, as hereinafter described, and the opposite surfaces 5 and 6 preferably have different textures or degrees of slipperiness to provide different sliding friction characteristics. The first surface 5 is provided with low coefficients of friction between it and itself, while the second surface 6 has relatively higher coefficients of friction between it and a bed or rest surface 2, or a gurney or receiving surface 3.

The preferred embodiment's low friction surface 5 is obtained with a sheet of woven nylon fabric. It may, however, be obtained by a waxed lacquer or other slippery coating.

The higher friction surface 6 is obtained in the case of the nylon sheet by a coating which increases the coefficients of friction of the nylon fabric. Such a coating can be achieved by a polyurethane compound coating under the tradename ESTANE. A rosin coating can also be applied by spraying on a solution of rosin in alcohol. Nylon fabric with an ESTANE coating is available under the further tradename ALKOTE, and provides a light, flexible and washable sheet. Instead of using a coating to achieve the higher friction surface, it can be achieved by using a sheet material like canvas

inherently having such a higher friction and providing the lower friction surface with a coating as described above.

The conveyor 4 is used by placing it across a receiving surface 3 to which a patient is to be conveyed and a surface 2 where a patient 1 is at rest. The portion of the sheet 4 over the patient's rest surface is folded back upon itself as shown at 7 with the smooth surface on the inside of the fold 7. The patient 1 can then be gently rolled or urged onto the folded portion of sheet 4 until substantially all of his body is resting on the fold. Grasping means 14 are provided on the edge of the sheet that has been folded back over towards the receiving surface. Any suitable handholds such as cutout portions 13 (FIG. 2) in the sheet may be provided as well as a stiffening rod 14 inserted in a sewn hem pocket in the sheet 4. The handholds and rod allow a nurse standing on the side of the receiving surface opposite to the patient to grasp the upper layer of the fold 7 and pull it toward her onto the receiving surface 3. In so doing the patient 1 is transported from the rest surface 2 to the receiving surface 3. The low friction surface 5 on the inside of the fold 7 slides over itself as the nurse pulls. The low coefficients of friction between the portions of surface 5 in contact make the pulling operation relatively easy. When using the nylon sheet it has been found possible to merely push or pull on the patient resting on the conveyor in order to generate sliding of the low friction surfaces.

The end of conveyor 4 in FIG. 1 opposite the rod 14 and holes 13 can also be provided with a bar 26 and holes 24 so that either edge of the conveyor sheet 4 can be used to pull the patient over to the receiving surface. This saves the nurse's time in trying to locate the proper edge for making a fold.

It would be possible to construct the conveyor of two separate sheets one forming the top of the fold region 7 and the other comprising the entire bottom layer but it has been found that the single piece construction makes the conveyor easier to use.

With additional sewing on the sheet of material for the patient conveyor 4 or otherwise connecting its longitudinal edges it can be formed as a continuous band as shown in FIG. 5 at 15. Here the low friction surface 5 would be on the inside and the higher friction surface 6 on the outside of the band. Grasping means also may be provided. The conveyor in the form of a band does not require the nurse or attendant to select the correct portion of the sheet to be placed under the patient. Instead a fold can be made at any point and the fold is then placed under the patient. Band 15 should be wide enough to be spread over a substantial portion of both the bed and the adjacent gurney. A sufficient number of grasping means may be provided so that regardless of where the crease of the fold is made a grasping means will be sufficiently positioned for use in transferring the patient.

In using the preferred embodiment of the invention as shown in FIG. 2, the patient's rest surface 2 is immovably supported by legs 11 to a floor 12. The receiving surface 3, however, is usually movably supported through legs 9 and rollers 10 between the legs and a floor 12. The two surfaces 2 and 3 should not move relatively during transfer and for this purpose the reaction force of the nurse's pull on rod 14 helps keep receiving surface 3 firmly pressed against the patient's rest surface 2 during the conveying operation. Alternatively,

the rollers 10 may be locked during transfer to inhibit movement of the surface 3.

FIG. 2 shows the patient conveyor 4 spread across a receiving surface 3 in the nature of a movable roll-around platform or gurney 21 and a patient rest surface 2 in the form of a bed 19. The conveyor 4 is positioned over both surfaces 2 and 3 with a portion 7 folded back toward the gurney 21. During this procedure the patient can be positioned on that portion 29 of the rest surface 2 which is not covered by the conveyor 4. He is then rolled or eased over onto the fold portion 7 and the smooth surface 5 in contact with itself under the fold 7 permits the fold 7 to be drawn across onto the receiving surface 3. The receiving surface 3 is supported by legs 17 and wheels 16 which allow it to be moved along the floors of the hospital to any desired position. Legs 18 on bed 19 immovably support it above the floor.

FIG. 3 shows another modified form of the patient conveyor. At the point where the folded portion 7 curves to join upper and lower portions of the fold grasping means in the form of an additional bar 22 and holes 23 are provided. Effectively this allows the nurse to reverse the procedure previously described and pull the patient from receiving surface 3 to rest surface 2 after the patient has been first pulled onto receiving surface 3. With this modification the patient can be first conveyed to receiving surface 3, rolled to a new location and conveyed from the receiving surface 3 onto a new rest surface such as an operating table. During such a procedure the patient is only disturbed once when he has to be eased from his rest surface position 29 onto the fold 7 of conveyor 4. The bar 22 is flat so as to minimize the bulge in the sheet at that point.

To prevent the top of fold 7 on which the patient rests from sliding over the bottom portion 8 of conveyor 4 while he is being transported on the receiving surface 3 the patient can be secured to the receiving surface 3. This can be accomplished through a variety of belts or tying devices.

In actual use a convenient size for the conveyor 4 has been found to be about 7 feet wide by 3½ feet long. These dimensions allow the majority of a patient's weight to fit lengthwise within the conveyor and allow sufficient width for it to be doubled up beneath the patient on his rest surface 2 and still extend over the adjacent receiving surface 3.

A further modification of the patient conveyor of FIG. 5 is shown in FIG. 6. As indicated, an additional sheet 30 of a thin flexible material is firmly attached by sewing or other appropriate method to the outside surface 6 of continuous band 15 along a seam 32. Seam 32 divides sheet 30 in two substantially equal portions, each of them extending on the opposite side of seam 32 over and upon band 15. The width of sheet 30 is approximately equal to that of band 15. Grasping means 34, 36, such as a thin soft rope sewn in a hem are preferably provided at the opposite longitudinal edges of sheet 30 in a similar way as shown in FIG. 2 at 13, 14 and 24, 26 and previously described in the specification. Each of the opposite portions of sheet 30 thus forms a draw member adapted to pull the patient placed on the top of said sheet, transversely across the continuous band in the direction to one or the opposite of the band by pulling the edges 34 or 36 of the sheet, respectively.

The sheet 30 is preferably made of the same material as band 15. In this case, sheet 30 is preferably attached with its low friction surface adjacent to the outer higher friction surface 6 of band 15, thus having its relatively high friction surface as the top layer above conveyor 15. This arrangement is preferable because it creates a relatively higher friction surface in contact with the patient.

It is apparent that sheet 30 could be made also of a material different from that of continuous band 15. For the proper operation of the invention it is not necessary for sheet 30 to have a low friction surface on either side of the sheet and a relatively higher friction surface on the opposite side of sheet 30. As it could be seen in FIG. 6, and it follows from the previous description, additional sheet 30 rigidly attached to the outer side of band 15 moves together with the band across in one or the opposite direction and serves actually as a draw member to pull the upper low friction inner surface of band 15 against the reaction force of its lower low friction inner surface and which result in a relatively easy transfer of the patient.

Therefore, sheet 30 could be made of any suitable thin and flexible material, strong enough to resist pull necessitated by the weight of a patient to be transferred.

Another modification of the patient conveyor shown in FIG. 9 may be provided by attaching the bottom surface of band 15 to surface 3 by means of a longitudinal seam 38 opposed to seam 32 along band 15. The advantage of this modification is that it is not necessary to transfer the conveyor from its location of storage to the particular stretcher or gurney whenever a patient has to be transferred and it is thus always ready for immediate use.

The method of conveying a patient according to this invention will be now described by referring to FIGS. 4a-4d. In FIG. 4a, a patient 1 is at rest on surface 2 and a receiving surface 3 has been moved up beside surface 2. The conveyor sheet 4 has been folded over in the region 7 with the low friction surface on the inside. The sheet has been placed across surfaces 2 and 3 with the fold 7 drawn up close beside the patient 1. From the other side of the patient 1 a nurse or attendant rolls the torso of patient 1 toward her until he is approximately on his side as shown in FIG. 4b. The nurse then pulls the fold 7 over the surface 2 toward her so that when the patient 1 is rolled back to his original position, his torso will be resting on the fold 7 as shown in FIG. 4c. From the other side of the receiving surface 3 the nurse can grasp the rod 14 via the hand holds at 13 and pull the top portion of fold 7 toward her with the patient 1 thereon until the patient 1 has been conveyed onto receiving surface 3. Alternatively, the nurse or attendant can push or pull on the patient to move him from the rest surface 2 to the receiving surface 3.

Instead of rolling the patient to the left as shown in FIG. 4b it is possible to ease him to the left without turning him, pull the fold 7 over to his side, and then ease the patient 1 back over onto the fold 7.

In either case, it is possible that the patient is not all the way onto the fold 7 after easing or rolling him on to it. If this should happen, once he has been conveyed only a few inches on the fold he will be entirely supported by the conveyor because of the addition of sheet material to the top layer from the bottom layer.

Once the patient is on receiving surface 3, he can be rolled to another location and placed beside a different rest surface 2 reestablishing the conditions as shown in FIG. 4d. The nurse then grabs the handholds at 23 from a position to the left of the surface as shown in FIG. 4d and pulls the top portion of the fold 7 across to rest surface 2 to a position similar to that shown in FIG. 4c. Care should be taken not to lift the top of fold 7 as it is pulled across to surface 2 or bunching of the sheet 4 below the fold may occur. Again, the patient 1 can be pushed or pulled directly in the direction of rest surface 2.

The operation of the modification of the invention shown in FIG. 6 will now be described. The conveyor is grasped at the opposite ends of seam 32 and held by the attendant in a vertical position such as shown in FIG. 7 with the two halves of sheet 30 draped on opposite sides of the band 15. The assembly is then placed under the patient 1 as shown in FIG. 8a with the seam 32 in the position shown. The patient may then be transported by drawing on the gripping means 34 to be transferred to the position shown in FIG. 8d and when desired the patient 1 can be returned to adjacent surface 2 by drawing on gripping means 36. A similar mode of operation can be performed with the modifications shown in FIG. 9.

It is intended to cover all modifications and alternations of the above described preferred embodiment which do not depart from the spirit and scope of the invention.

What is claimed is:

1. A patient conveyor for use in transferring a patient across a generally horizontal surface such as a bed and adjacent gurney comprising:

a thin flexible sheet of material adapted to be disposed over said generally horizontal surface; said sheet having a first surface characterized by a low coefficient of friction between said first surface in contact with itself; and

a second surface on the opposite side of said sheet from said first surface, said second surface characterized by a coefficient of friction with said generally horizontal surface which is higher than that between said first surface in contact with itself;

said sheet adapted initially to be disposed over those portions of said horizontal surface occupied by said patient before and to be occupied during and after his being conveyed with at least one portion of said sheet doubled back over and upon said sheet a distance of at least approximately the width of said patient;

said doubled back portion being over that portion of said horizontal surface occupied by said patient before he is conveyed with said first surface on the inside of said doubled back portion whereby the portion of said sheet forming the top of said doubled back portion with said patient thereon can be easily slid across the bottom of said doubled back portion with the effort of an attendant.

2. The patient conveyor of claim 1 further comprising grasping means placed in said sheet and adapted to allow said attendant to convey said patient on the portion of said sheet forming the top of the fold by exerting a pull on said grasping means.

3. The patient conveyor of claim 1 wherein said thin flexible sheet of material is formed in a band adapted

to be folded at a selected point and placed beneath said patient.

4. The patient conveyor of claim 1 wherein said generally horizontal surface further comprises:

an immovable portion whereon said patient is normally contained at rest; and

a movable portion for receiving said patient from said immovable portion on said conveyor and for moving said patient to a different location.

5. The patient conveyor of claim 1 further comprising:

coating adhering to said sheet and forming one of said surface friction characteristics; and

a material selected for said sheet possessing a surface having the other of said surface friction characteristics.

6. The patient conveyor of claim 5 wherein:

said coating further comprises a polyurethane; and said sheet material further comprises nylon.

7. A method of manually conveying patients along a generally horizontal surface using flexible sheet material having a first surface with low coefficients of friction between it and itself relative to the coefficients of friction between the other surface and said horizontal surface comprising:

laying a connected double layer of said sheet material over said horizontal surfaces, said double layer having said low friction surface on the inside and having at least the bottom layer of said double layer extending over said horizontal surface in the direction said patient is to be conveyed a distance he is to be conveyed;

placing the connected portion of said double layer between the patient and the generally horizontal surface supporting the patient;

placing the extended portion of the bottom layer over the portion of the horizontal surface to which the patient is to be conveyed; and

forcing said top layer with the patient thereon to slide across the bottom layer in the direction of the portion of the surface to which the patient is to be conveyed until the patient is over that portion of the horizontal surface.

8. The method of conveying patients of claim 7 further comprising the step of conveying the patient away from the portion of the horizontal surface to which he was conveyed by forcing the top thickness with the patient thereon to slide over the bottom thickness in a direction opposite from the direction in which said patient was conveyed.

9. The patient conveyor of claim 3 and including an additional sheet of thin flexible material firmly attached to said outside surface of said band by means of a longitudinal seam.

10. The patient conveyor of claim 9 wherein said seam is located at approximately the middle of said additional sheet, thus dividing said additional sheet into two approximately equal portions extending on opposite sides of said seam.

11. A patient conveyor for use in transferring a patient across a generally horizontal surface such as a bed and adjacent gurney comprising:

a thin flexible sheet of material formed in a continuous band adapted to be disposed over said generally horizontal surface with the opposed areas of the inner surface of said band in rubbing contact while supporting said patient;

said band having said inner surface characterized by a low coefficient of friction in contact with itself; and

an outer surface characterized by a coefficient of friction with said generally horizontal surface which is higher than that of said inner surface in contact with itself.

12. A patient conveyor according to claim 11 and including an additional sheet of thin flexible material firmly attached along said outside surface of said continuous band by means of a longitudinal seam which divides said sheet into two opposite portions the length of the additional sheet being approximately the same as that of said continuous band.

13. A patient conveyor according to claim 12 wherein said band is attached to said surface along a central line opposed to said seam.

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