United States Patent [19]

Shelden

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[45] **June 3, 1975**

[54] **HOSPITAL BED**

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[73] Assignee: **Huntington Institute of Applied Medical Research,** Pasadena, Calif.

[22] Filed: **July 11, 1973**

[21] Appl. No.: **383,298**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 171,702, Aug. 13, 1971, abandoned.

[52] **U.S. Cl.** ..... **5/81 R;** 5/61; 5/91

[51] **Int. Cl.** **A61g 7/02;** A61g 7/10

[58] **Field of Search** 297/283, 223; 5/17, 18, 5/60, 61, 63, 66, 68, 81, 90, 91, 317, 88

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Primary Examiner—Casmir A. Nunberg

Attorney, Agent, or Firm—Christie, Parker & Hale

[57] **ABSTRACT**

A hospital bed for patients who require assistance in repositioning themselves on the bed. A mattress for the bed is formed by a number of separate bolsters or cushions each covered with a removable slip-cover sheet. Each bolster extends across the width of the bed, and the several bolsters are aligned side by side to extend along the length of the bed. A drive mechanism is provided on a frame of the bed to move the bolsters as a group along the length of the bed, thereby enabling longitudinal repositioning of the patient. End portions of the bolsters can also be raised to assist it turning the patient. In an alternative form, the modular mattress is carried on a frame adapted for mounting on a standard hospital bed.

16 Claims, 19 Drawing Figures

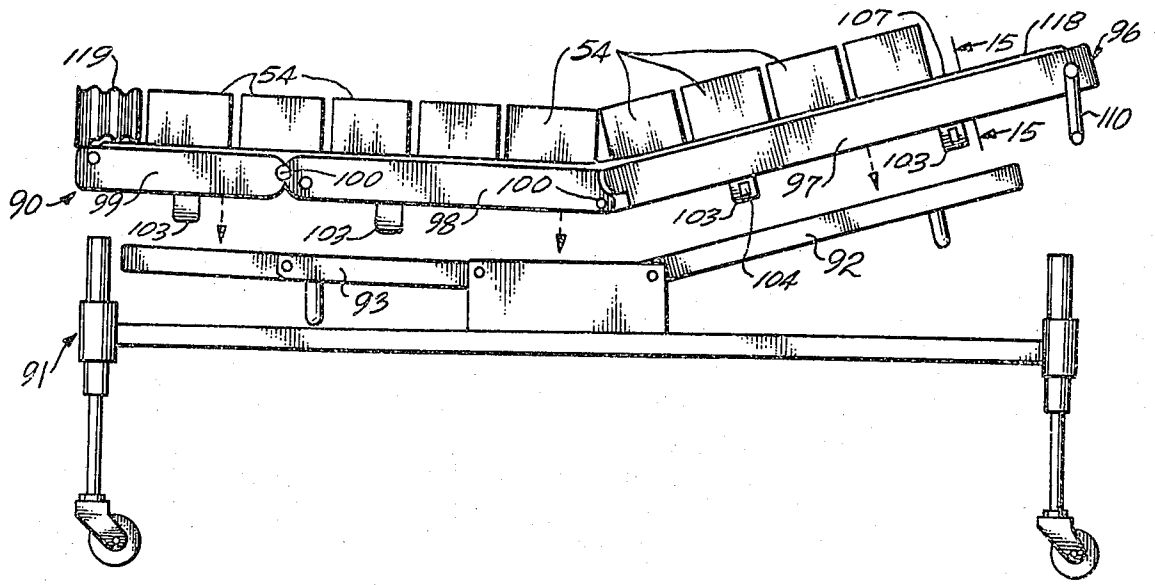


FIG_1

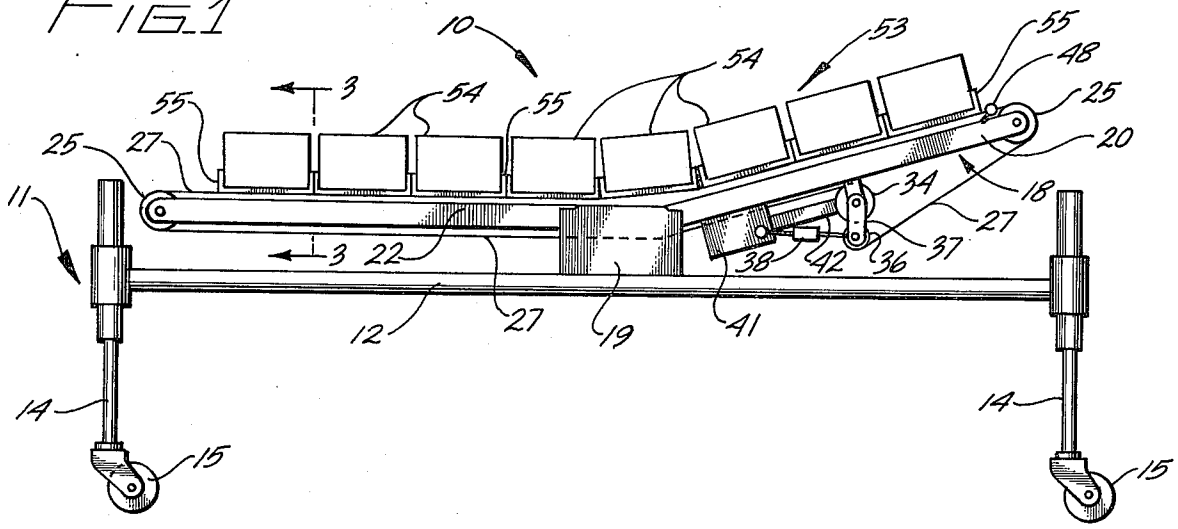


FIG_2

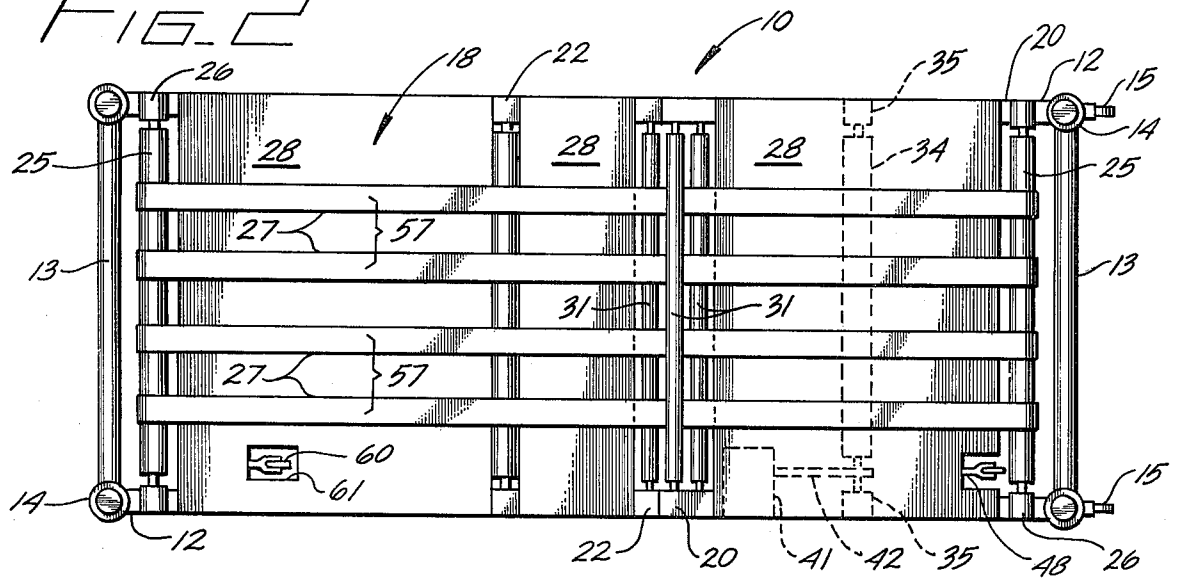


FIG_3

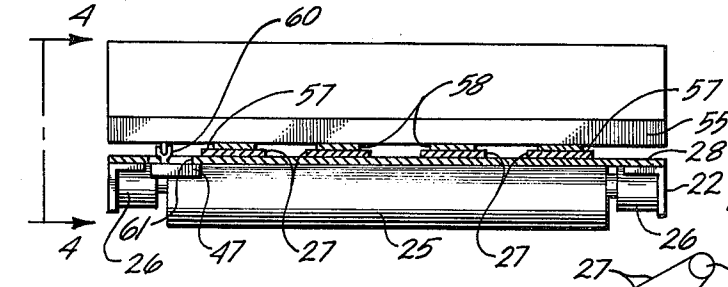


FIG_4

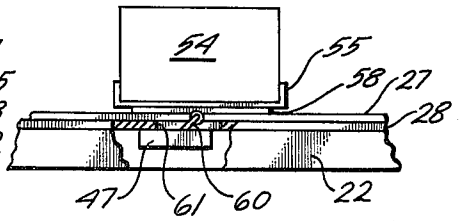
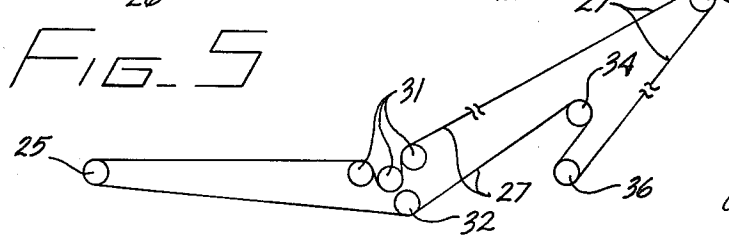


FIG_5



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FIG. 7

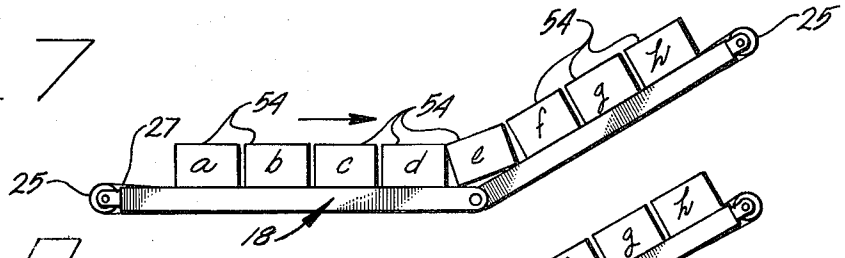


FIG. 8

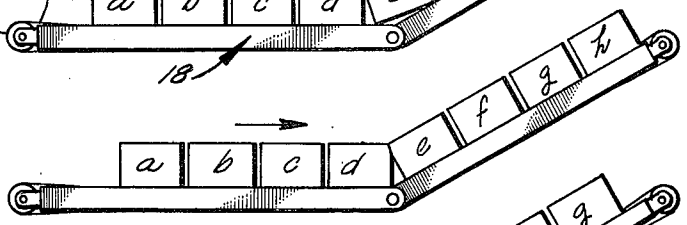


FIG. 9

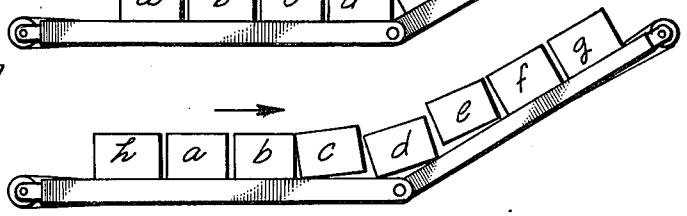


FIG. 6

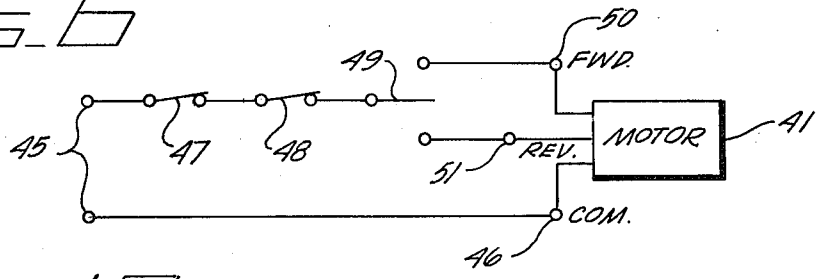


FIG. 10

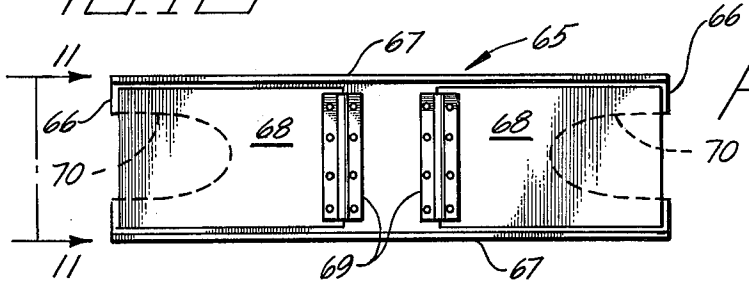


FIG. 11

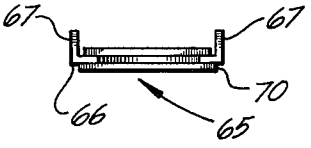


FIG. 12

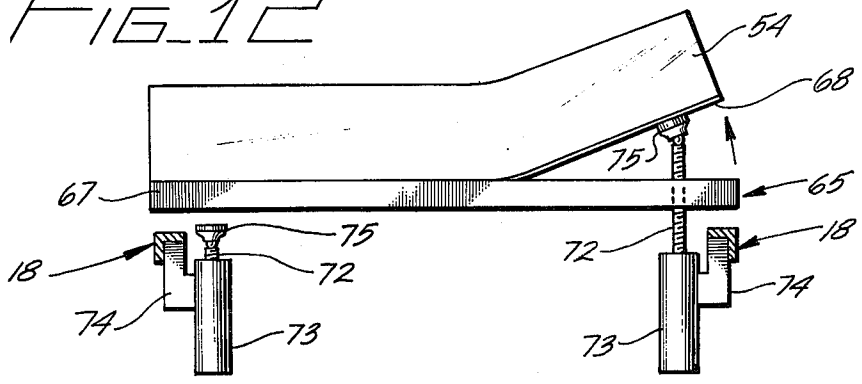


FIG. 13

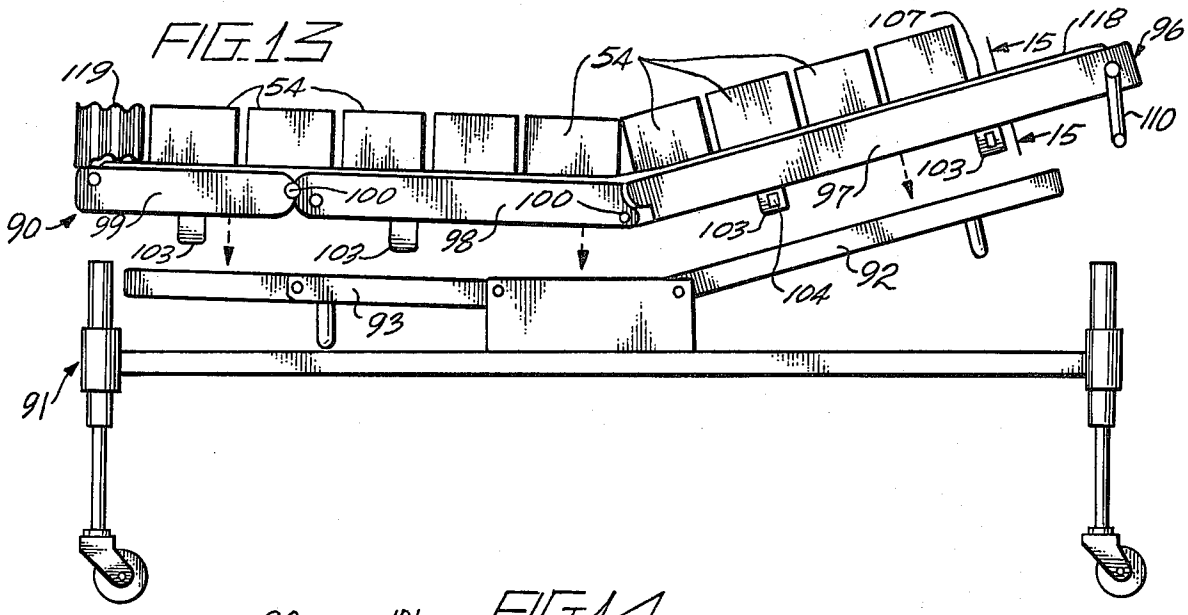


FIG. 14

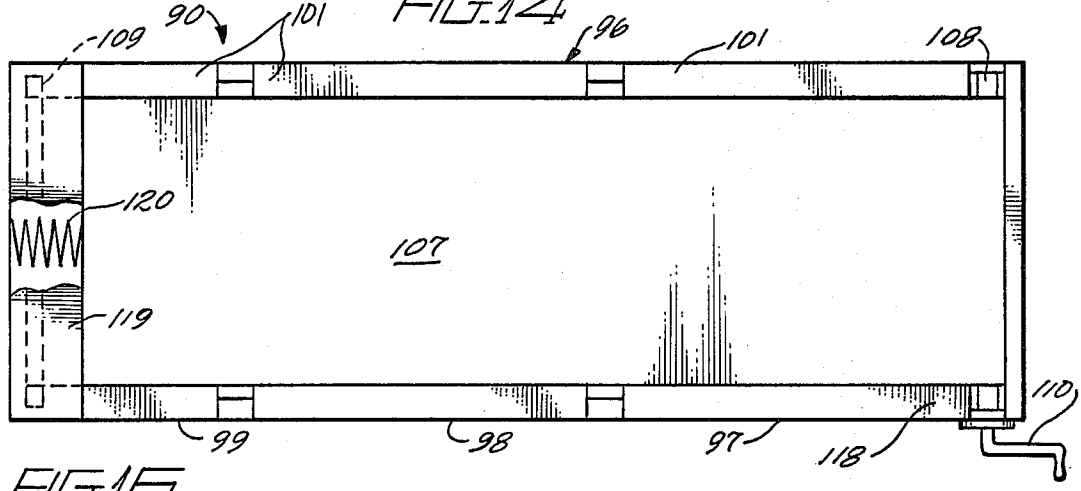


FIG. 16

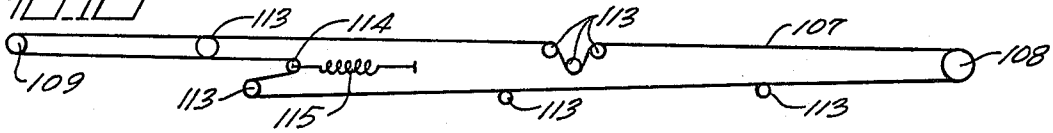


FIG. 15

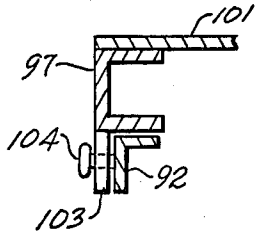


FIG. 17

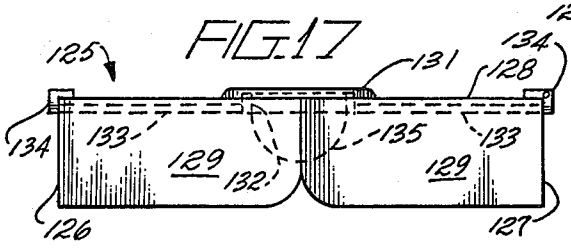


FIG. 18

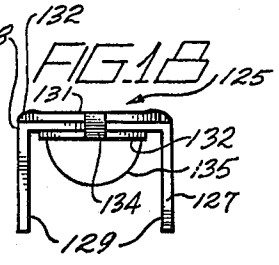
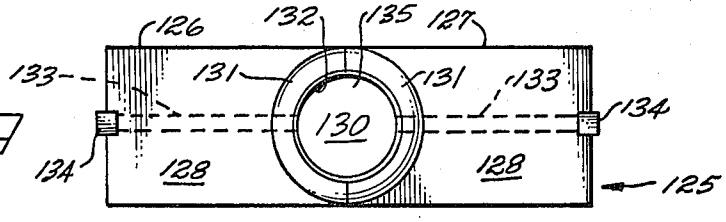


FIG. 19



HOSPITAL BED

CROSS REFERENCE TO RELATED APPLICATION

This is a continuation-in-part of my co-pending patent application Ser. No. 171,702 titled "Hospital Bed" and filed Aug. 13, 1971, now abandoned.

BACKGROUND OF THE INVENTION

Many modern hospitals have intensive-care-unit (ICU) facilities where post-operative, critically ill or unconscious patients can be kept under constant surveillance by nurses. It is normally preferred that the upper part of the patient's body be elevated for easier breathing and other medical reasons, and ICU beds are therefore usually of a conventional type having a head section which can be cranked up to raise the patient's head and shoulders. An unfortunate by-product of this preferred elevated position is that the patient gradually slides downwardly toward the foot or toe end of the bed, and must be frequently repositioned by a nurse or orderly. The patient must also be moved to use a bed pan, or when bed linen is to be changed.

The problem of moving a bed patient is serious in ICU facilities as most ICU patients are either comatose or unable to exert sufficient muscular control to move themselves. These seriously ill patients are awkward to move, not only because of normal body weight, but also because great care must be taken not to interfere with intravenous feeding tubes, drainage tubes, EKG cables, and similar equipment attached to the patients.

ICU nurses are constantly faced with the problem of overexerting themselves in repositioning patients who may weigh several hundred pounds or more, and back strain is a common complaint from these nurses. ICU surveillance should be maintained by highly skilled and experienced nurses in view of the serious condition of ICU patients, but hospital administrators find that the best-qualified nurses shy away from these duties because of the muscle strain and back problems arising from the physical exertion required to reposition patients in their bed.

The bed here disclosed solves these problems as it provides mechanical assistance for shifting, raising or turning a bed patient. A mattress assembly for the bed is formed by a number of bolsters or cushions which extend across the width of the bed, the bolsters being positioned side by side so the resulting assembly extends from the head to the foot of the bed. A motor-driven drive belt extends along the length of the bed, and the bolsters are connected to the belt. If the patient is to be moved toward the head end of the bed, the drive-belt motor is actuated to move the belt and bolsters mounted thereon in the desired direction. As an end bolster moves past the head end of the bed, it is lifted off the belt and replaced at a starting position on the belt at the bed foot.

An ICU nurse is thus able to reposition a heavy patient by simply pushing a button to actuate the belt-drive mechanism. Alternatively, the drive motor may be omitted, and a simple hand-crank drive is used to drive the bolsters along the bed. This moving modular arrangement can be made as a complete bed, or as an add-on accessory for installation on existing bed frames.

The bolsters are light and easily repositioned by the nurse, and are covered by a slip-cover sheet which is quickly replaced when fresh linen is needed. Any bolster in the series comprising the mattress can be individually removed for a linen change, or to provide a clear space beneath the patient for a bed pan, or for improved air circulation over or access to a body area being treated. One end of the bolsters can also be raised to assist in turning the patient on his side.

SUMMARY OF THE INVENTION

This invention relates to a hospital bed having a frame with head and foot ends, the head end being elevatable to raise an upper part of the patient's body. A mattress is supported on the frame, and a drive means on the frame is engageable with the mattress to move the mattress longitudinally along the frame and upwardly along the elevated head-end portion to reposition the patient on the bed. Preferably, the mattress is formed from a plurality of separate bolster sections, each of which includes a support tray and a body of resilient material in the tray.

The drive means may include one or more drive belts extending between rollers on opposite ends of the frame, and a motor or crank drive to move the belts. A releasable fastener means or frictional engagement couples the belt or belts to the bolster sections, and the bolster sections are moved as a group toward an end of the frame by operating the motor. When a leading bolster section approaches a roller at one end of the frame, that section is removed from the belt and replaced at the opposite end of the frame. A limit switch is provided to prevent inadvertent overtravel of the leading bolster. The bed may also include a power-operated lifting means to raise one end of a selected bolster section, or to tilt or raise the entire bolster section to aid in repositioning the patient.

In one form the invention is incorporated in an accessory system having a frame adapted for attachment to a standard hospital bed, permitting conversion of existing equipment for ICU use. Also disclosed is a bed-pan module which can be temporarily substituted for one of the mattress bolsters.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation of a hospital bed according to the invention;

FIG. **2** is a top view of the bed;

FIG. **3** is a view on line **3—3** of FIG. **1**;

FIG. **4** is a view on line **4—4** of FIG. **3**;

FIG. **5** is a schematic diagram of a belt-drive system used in the bed;

FIG. **6** is a schematic diagram of the bed electrical-wiring system;

FIGS. **7–9** are schematic diagrams showing a sequence of events as the bed is operated;

FIG. **10** is a plan view of a modified mattress-bolster carrier useful with the invention;

FIG. **11** is a side elevation of the carrier taken on lines **11—11** of FIG. **10**;

FIG. **12** is an end view of a portion of the bed showing the operation of the modified mattress-bolster carrier.

FIG. **13** is a side elevation of a conventional hospital bed and an accessory movable-mattress system;

FIG. **14** is a top view of the accessory system;

FIG. **15** is a view on line **15—15** of FIG. **13**;

FIG. **16** is a schematic diagram of a belt-driven system used in the accessory system.

FIG. **17** is a front elevation of a bed-pan unit;

FIG. 18 is a side view of the bed-pan unit; and
FIG. 19 is a top view of the bed-pan unit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A hospital bed 10 according to the invention is shown in FIGS. 1 and 2, and the bed includes a conventional main frame 11 with longitudinal and lateral frame members 12 and 13 respectively. Conventional tubular legs 14 are mounted at the four corners of the main frame, and carry caster wheels 15 at their lower ends.

An upper mattress-supporting frame 18 is mounted above main frame 11 on a pair of upright brackets 19 secured to the central part of each longitudinal frame member 12. The upper frame includes a pair of first rails 20 pivotally secured to brackets 19 to permit the head end of the upper frame to be elevated to raise the upper part of the patient's body. A pair of second rails 22 extend from brackets 19 toward the foot of the bed, and these rails may also be pivotally secured to the brackets if it is desired to elevate the lower part of the patient's body. Cross braces (not shown) extend between the pairs of rails to form a rigid structure. The details of this construction are omitted from the drawings as this style of framework (and the mechanism for raising the frame sections) is conventional in hospital beds.

A pair of main rollers 25 are mounted on opposite ends of the upper frame, and each roller is rotatably supported by a pair of bearings 26 secured to the upper frame. A plurality of continuous drive belts 27 extend between main rollers 25 along the length of the upper frame. The undersurface of the upper part of each belt loop is supported by a plurality of rigid metal panels 28 which are secured to and extend between the upper surfaces of rail pairs 20 and 22.

A guide means including a set of three hold-down rollers 31 guides belts 27 past the pivotal connection of first rails 20 to brackets 19. Two of the rollers are rotatably mounted in bearings (not shown) secured to first rails 20, and the third roller is similarly mounted to brackets 19. A lower guide roller 32 (FIG. 5 is also rotatably mounted on brackets 19, and provides guidance for the lower part of the drive-belt loops.

A main drive roller 34 extends between first rails 20, and is rotatably supported in bearings 35 secured to the first rails. A tension roller 36 is rotatably mounted on a pair of arms 37 which are pivotally connected to first rails 20. A variable-length element 38 such as a turnbuckle or spring is connected between the lower end of each arm 37 and the frame, and element 38 is adjusted to remove any slack from the belts. The overall arrangement of the belts and various rollers is shown in schematic form in FIG. 5.

A drive motor 41 which includes a speed reducer is secured to the upper frame on one of first rails 20 and associated cross braces. This drive-motor speed-reducer assembly is of a conventional type having an output shaft (not shown) connected to main drive roller 34 by a chain or belt 42. These components are covered by sheet-metal shields which are omitted in the drawings for clarity.

An electrical wiring diagram for drive motor 41 is shown in FIG. 6. One terminal of a pair of power-input terminals 45 is connected to a common terminal 46 on the motor. The other power-input terminal is connected through a pair of limit switches 47 and 48 (described below) to the arm of an SPDT operate switch 49. The fixed contacts of the operate switch are connected to a forward terminal 50 and a reverse terminal 51 respectively of the drive motor. With limit switches 47 and 48 in their normally closed positions, the operate switch (which may be mounted at any convenient location on the bed) is actuated to drive the motor in either a forward direction (moving the upper surface of the drive belts toward the head end of the bed) or a reverse direction.

A mattress 53 for the bed is formed from a plurality of mattress sections or bolsters 54 which are elongated rectangular-cross-section blocks of a resilient material such as foam rubber. Each bolster is covered by a slipcover sheet made of a material such as cotton cloth. Alternatively, the slipcover may be made of sheepskin or a synthetic decubitus-pad material. A metal tray 55 with upturned edges receives each bolster 54 and serves to couple the bolsters to belts 27.

The outer surface of each drive belt 27 includes a body of pile fastener material 57 such as sold under the trademark "Velcro." Mating strips of hook material 58 of this type are secured to the undersurface of each tray 55 as best seen in FIG. 3. The tray and associated bolster are thus connected to the drive-belt system simply by pressing the tray against the belts to engage the hook and pile sections of this fastener material. Other types of fastening means can of course be used to connect the trays to the drive belts.

Limit switch 47 is mounted on the undersurface of one of metal panels 28 adjacent the foot end of the bed (FIGS. 3 and 4). This switch has an upwardly extending roller-carrying arm 60 which is urged upwardly through an opening 61 in the panel. If a bolster is present above the switch, arm 60 is depressed by associated tray 55 to close the switch. If no bolster is present above the switch, the switch arm moves upwardly to a position which opens the switch contacts and prevents operation of drive motor 41. Limit switch 48 is similarly arranged at the head end of the bed, but his switch is of a normally closed type. That is, the contacts of switch 48 open to disable drive motor 41 only when a bolster and associated tray move over the switch to depress the switch arm.

Operation of the bed is shown in schematic form in FIGS. 7–9. In FIG. 7, upper frame 18 has been loaded with eight mattress bolsters 54 designated *a–h*, and associated trays. If a patient resting on the mattress slides downwardly toward the foot end of the bed, drive motor 41 is actuated by switch 49 to drive the bolsters in a forward direction (toward the head of the bed) to move the patient back to a desired position. This transport of the mattress sections can be continued until the bolsters reach the position shown in FIG. 8 where the limit switches open to disable the drive motor and thus to prevent overtravel of the bolsters. Bolster *h* at the head end of the bed is then removed by pulling its associated tray away from the drive belts, and this bolster is replaced in the now-vacant space at the foot of the bed as shown in FIG. 9. The patient can thus be moved upwardly in the bed simply by actuating the drive switch, and periodically moving the leading bolster back to the foot end of the bed.

A continuous mattress can also be used to eliminate manual transfer of individual bolster elements, but the bolster construction is preferred for its mechanical simplicity, and also because soiled bolster covers can be

individually replaced without changing all of the bed linen. Another advantage of the bolster construction is that a single bolster can be removed from beneath the patient's hips to permit use of a bed pan, or to provide access to the underside of the patient's body. The individual bolsters are light and easy to handle for a nurse, and replacement of a bolster cover is readily accomplished.

Another advantage of the individual bolsters is made possible by a modified bolster tray **65** (FIGS. **10–11**). This tray is generally similar in shape to tray **55** in that it has a flat base panel **66** with upwardly turned edges **67** to receive a bolster **54.** Tray **65,** however, includes a pair of movable panels **68** pivotally mounted by hinges **69** on opposite sides of the tray centerline. An opening **70** is formed through each end of base panel **66.**

A pair of lifting means such as electrically operated jackscrews **72** (FIG. **12**) with drive motors **73** are used in connection with tray **65,** and the drive motors are secured by brackets **74** to the rails of upper frame **18.** For example, one pair of jackscrews can be mounted to rails **20** spaced slightly from rails **22** toward the head end of the bed, and another pair of jackscrews can be mounted on rails **22** slightly toward the foot of the bed from rails **20.** A pad **75** is mounted by a ball-socket fitting at the top end of each jackscrew.

If it is necessary to turn the patient in the bed, the jackscrews on one side of the bed are actuated to raise one end of the associated bolsters as shown in FIG. **12.** The patient is turned as the bolster ends are elevated, and manual effort required to reposition the patient is considerably reduced. When the jackscrews are used in this mode, the bolsters are positioned by drive belts **27** to place openings **70** immediately above the jackscrews so pads **75** can contact hinged panels **68** to raise the bolster end.

The jackscrews are also useful to tilt a pair of bolsters *c* and *e* as shown schematically in FIG. **9.** In this mode, the trays are positioned so pads **75** contact the solid undersurface of base panel **66** at one side of opening **70.** The associated bolsters are then tipped upwardly to raise the patient's hips, and thus to enable ready removal of bolster *d.* A bed pan can then be easily moved into position beneath the patient without any extra exertion on the part of either the nurse or the patient. The tray is also readily adapted for manual operation by levers or cranks if power assistance in raising or turning the patient is not considered necessary in a particular application of the bed.

An alternative form of the invention is shown in FIGS. **13–16** which illustrates an add-on accessory movable-mattress system **90** useful for converting a conventional hospital bed **91** to incorporate the advantages of the invention. Bed **91** is of a standard style having an articulated bed frame with an elevatable head-end portion **92** and a hinged foot-end portion **93** which can also be elevated. The usual cranks or drive-motor mechanisms for elevating these frame portions are omitted in the drawings.

Accessory system **90** (which is shown lifted above bed **91** in FIG. **13** for clarity) includes a frame **96** made of metal channels, and having a head section **97,** central section **98,** and foot section **99.** These sections are pivotally connected by pins **100** so the several sections can be hinged up or down to conform to the elevation of bed **91.** The top of each frame section is covered by a panel **101** which extends across the width of the section.

Retaining flanges **103** (FIGS. **13** and **15**) extend downwardly from sections **97–99** of frame **96** to overlap the angle-iron frame of bed portions **92** and **93.** These flanges anchor accessory system **90** against sideways movement on bed **91.** Flanges **103** on head section **97** include clamp screws **104** which are tightened against the frame of bed **91** so the head section is also locked against longitudinal movement with respect to head-end portion **92.** Central and foot sections **98** and **99** are free to slide along foot-end portion **93** to accommodate changes in the frame geometry as the various movable portions of the bed are elevated.

A continuous and flexible drive belt **107** (which may be canvas) extends along the length of accessory system **90** between a drive roller **108** rotatably mounted adjacent the end of head section **97** and a return roller **109** rotatably mounted adjacent the end of foot section **99.** A drive means such as a crank handle **110** is connected to drive roller **108,** and the crank handle and drive roller connection may include gearing and rachet locks (not shown) so the belt can normally be driven only clockwise as viewed in FIG. **13.** If a rachet is used, it should preferably be of a releasable type permitting reverse drive of the belt if desired.

As shown schematically in FIG. **16,** a number of guide rollers **113** extend across accessory system **90** between rollers **108** and **109** to insure proper tracking of belt **107.** A tensioning roller **114** is movably mounted, and is urged by a tension spring **115** into a position which keeps the drive belt taut.

A plurality of mattress bolsters **54** as described above are positioned along the top of accessory system **90** to rest on drive belt **107.** When the belt is driven by rotating roller **108,** the bolsters are driven toward the elevated head end of the bed to reposition a patient as already discussed. There is sufficient frictional engagement between the bolsters and the wide drive belt that no special coupling is necessary between these components.

Preferably, the upper end of head section **97** is lengthened to form a platform **118** to accommodate and temporarily hold the uppermost bolster as the patient is being repositioned. An accordian-like end section **119** is preferably secured at the outer end of foot section **99** to hold the bolsters at the foot end of the bed in position. End section **119** has internal springs **120** which are compressed to compress the end section when a bolster removed from the head end is being replaced at the foot end of the movable-mattress system.

Accessory system **90** is advantageous in that it can be added to existing hospital beds to provide the patient-conveyance features of the invention. Installation and removal is straightforward, permitting conversion of standard beds for either ICU use or ordinary ward use depending on the nature of the patient load being carried by the hospital.

FIGS. **17–19** show a bed-pan unit **125** which is useful with either of the embodiments of the invention described above. Unit **125** is channel shaped, and is formed from two halves **126** and **127** each having a top panel **128** and a pair of downwardly extending legs **129** along opposite side edges of the top panel. The length and height of the abutted halves are substantially the same as the corresponding dimensions of bolster **54,** and the width of the halves equals the width of the bol-

ster or a multiple of such width. That is, the halves may, for example, span the width of two adjacent bolsters. An opening **130** is formed in the inner end of the top panel **128** of each half, and a raised partial seat **131** extends around the opening.

In use, the patient is turned slightly so one of halves **126** and **127** can be slipped over the bolster (or bolsters) beneath the patient's buttocks. The patient is then turned slightly in the opposite direction, and the other half is similarly installed from the opposite side of the bed to abut the inner end of the first half. The assembled halves thus form a complete seat beneath the patient, and the bolster (or bolsters) beneath the halves can now be slipped out as the patient is supported by unit **125.** With the bolster thus removed, an open space is available beneath top panels **128** and between legs **129** for insertion of a bed pan beneath opening **130.**

A presently preferred arrangement for the bed pan comprises a ring **132** having an outside dimension slightly smaller than that of opening **130.** A pair of support arms **133** extend from opposite ends of ring **132,** and the outer ends of the arms form hooks **134** which fit over the edges of top panels **128** as shown in FIG. **17.** One of the hooks is hinged to act as a releasable latch fitting over the adjacent edge of the top panel.

A conventional solid bowl-shaped bed pan (not shown) can be fitted into ring **132,** but preferably a disposable transparent plastic bag **135** is secured around the edges of the ring to extend downwardly through the ring as shown in FIG. **18.** The bag preferably has a self-adhesive lip to permit quick and simple fastening in place. After the bag is installed, the ring is slipped into the open space beneath top panels **128,** and hooks **134** are engaged with the top panel edges to raise ring **132** and the upper end of bag **135** into opening **130** beneath the patient's buttocks.

After use, the bed-pan unit is slipped out from beneath top panels **128,** the bag is removed from ring **132** and sealed, and the bag contents may be weighed or checked for appearance as is often required with seriously ill patients. The mattress bolster (or bolsters) is then replaced beneath the bed pan units, and halves **126** and **127** are removed.

Bag **135** is preferably a transparent polyvinyl-alcohol plastic which dissolves when immersed in water at a temperature of about 140°F. When this material is used, the bag can be discarded in a toilet which has a hot water supply, and the bag will dissolve harmlessly without blocking the toilet plumbing.

There has been described a hospital bed system which is particularly suited for use in intensive care units where patients are usually unable to assist themselves when repositioning on the bed is required. The bed eliminates a major part of the manual effort normally required by ICU nurses to reposition a patient, and the long standing problems of fatigue and back strain often encountered by these nurses is solved.

What is claimed is:

1. A bed, comprising:

a bed frame having a foot end and a head end, the frame being hinged so the head end can be raised to elevate a patient's upper body;

mattress means for supporting a patient on the bed frame;

drive means on the frame and engaged with the mattress means for moving the mattress means longitudinally toward the head end of the bed and along an upwardly sloping portion of the frame adjacent the head end when the head end is elevated, whereby a patient who has slipped downwardly toward the foot end can be moved back toward the head end and along the upwardly sloping frame portion by moving the mattress means.

2. The bed defined in claim **1** in which the drive means includes rollers rotatably mounted at the head and foot ends of the frame, a drive belt extending between the rollers in engagement with the mattress, and means coupled to the drive belt for maintaining the belt under tension as the elevation of the head end is adjusted.

3. A bed, comprising:

a bed frame having head and foot ends, the frame being arranged so an upper frame portion adjacent the head end can be sloped upwardly with respect to a lower frame portion adjacent the foot end, whereby an upper portion of a patient's body can be elevated;

mattress means on the frame and including a plurality of separate bolster sections each extending laterally across the frame, the sections being positioned side by side to extend between the ends of the frame; and

drive means on the frame and engageable with the bolster sections for moving the sections along the frame toward the head end and along the upper frame portion whereby a patient who has slipped downwardly in the bed can be moved back toward the head end and along the upwardly sloping frame portion without being raised off the bolster sections.

4. The bed defined in claim **3** in which the drive means includes rollers mounted at the head and foot ends of the frame, a drive belt extending around the rollers longitudinally along the bed, the bolster sections being disposed on the belt, a guide means on the frame intermediate the rollers for guiding the belt along an upper surface of the frame, means coupled to the belt for maintaining the belt under tension when the elevation of the upper frame portion is adjusted, and means coupled to the belt to move the belt longitudinally along the bed.

5. The bed defined in claim **4** in which the bolster sections each include a body of resilient material and a support tray fitted against an undersurface of the resilient material; the drive belt and trays having a releasable fastening means therebetween so an individual bolster section can be removed from the belt as it reaches an end of the frame to be repositioned on the belt at the other end of the frame.

6. The bed defined in claim **5** in which said means for moving the belt includes an electric motor, means connecting the motor to the belt, and an operate switch and a limit switch in series connection with the motor, the limit switch being mounted on the frame for actuation by the bolster sections, the limit switch being operative to disable operation of the motor when a bolster section is to be repositioned on the frame.

7. The bed defined in claim **6** and further comprising a pair of lifting means secured at opposite sides of the frame and arranged to lift a selected end of the body of resilient material positioned above the lifting means to aid in turning a patient.

8. The bed defined in claim 7 in which each support tray comprises a base panel with an opening at each end, and a pair of movable panels pivotably mounted on the base panel above the respective openings, an individual tray being positionable so the lifting means can extend upwardly through the openings to raise a selected one of the movable panels to raise the selected end of the body of resilient material, the tray further being positionable in a second position so the lifting means contacts the base panel to raise the entire bolster section with respect to an adjacent bolster section.

9. The bed defined in claim 3 and further comprising lifting means on the frame for elevating at least a portion of a selected bolster section with respect to the frame.

10. The bed defined in claim 3 and further comprising a bed-pan unit adapted to be substituted for one of the bolster sections, the unit having a top panel with an opening therethrough to receive a container.

11. The bed defined in claim 10 wherein the container is a plastic bag.

12. The bed defined in claim 11 wherein the plastic bag is formed of polyvinyl-alcohol plastic which is soluble in hot water.

13. An accessory movable-mattress system for addition to and use with a conventional hospital bed, the conventional bed having a bed frame with a head end which can be raised to elevate a patient's upper body, the accessory system comprising:

an elongated hinged frame adapted to fit on the bed frame, the hinged frame having a head section which can be raised in conjunction with the bed-frame head end;

mattress means for supporting a patient on the hinged frame; and

drive means on the hinged frame and engaged with the mattress means for moving the mattress means longitudinally toward the head end of the bed and along an upwardly sloping portion of the frame head section when the head section is elevated, whereby a patient who has slipped downwardly toward a foot end of the bed can be moved back toward the head end and along the upwardly sloping frame portion by moving the mattress means.

14. The accessory system defined in claim 13 wherein the mattress means comprises a plurality of separate bolster sections each extending laterally across the hinged frame, the bolster sections being positioned side by side to extend longitudinally along the hinged frame.

15. The accessory system defined in claim 14 wherein the drive means includes rollers mounted adjacent opposite ends of the hinged frame, a drive belt around the rollers longitudinally along the hinged frame, the bolster sections being disposed on and being movable with the belt, and means for driving the belt longitudinally along the bed.

16. The accessory system defined in claim 14 and further comprising attachment means for securing a portion of the hinged frame to the bed frame, tensioning means coupled to the drive belt for maintaining the belt under tension as the elevation of the head section is adjusted, and guide means on the hinged frame for guiding the belt along an upper surface of the hinged frame.

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