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B. A. BOWERS ETAL

3,131,404

PATIENT LIFT

Filed Sept. 1, 1961

3 Sheets-Sheet 1

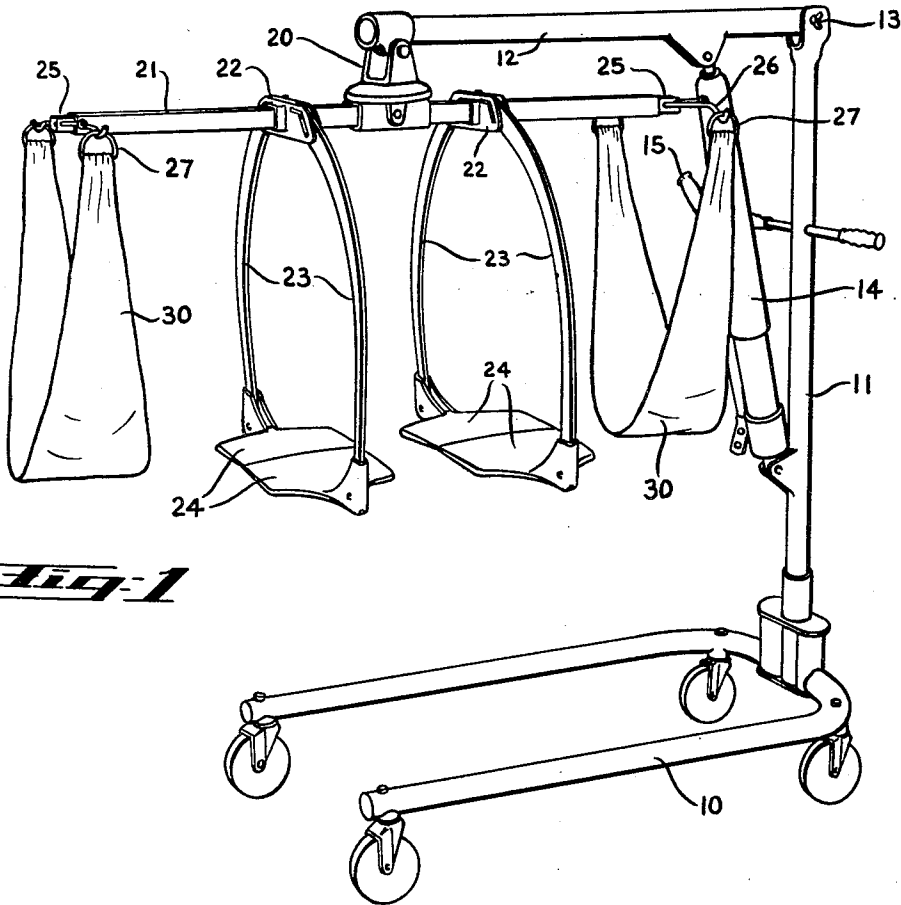


FIG. 1

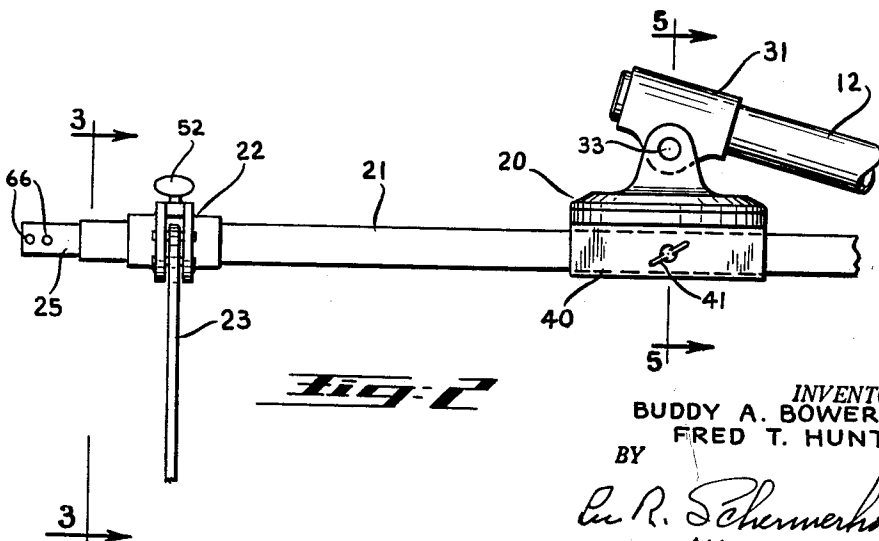


FIG. 2

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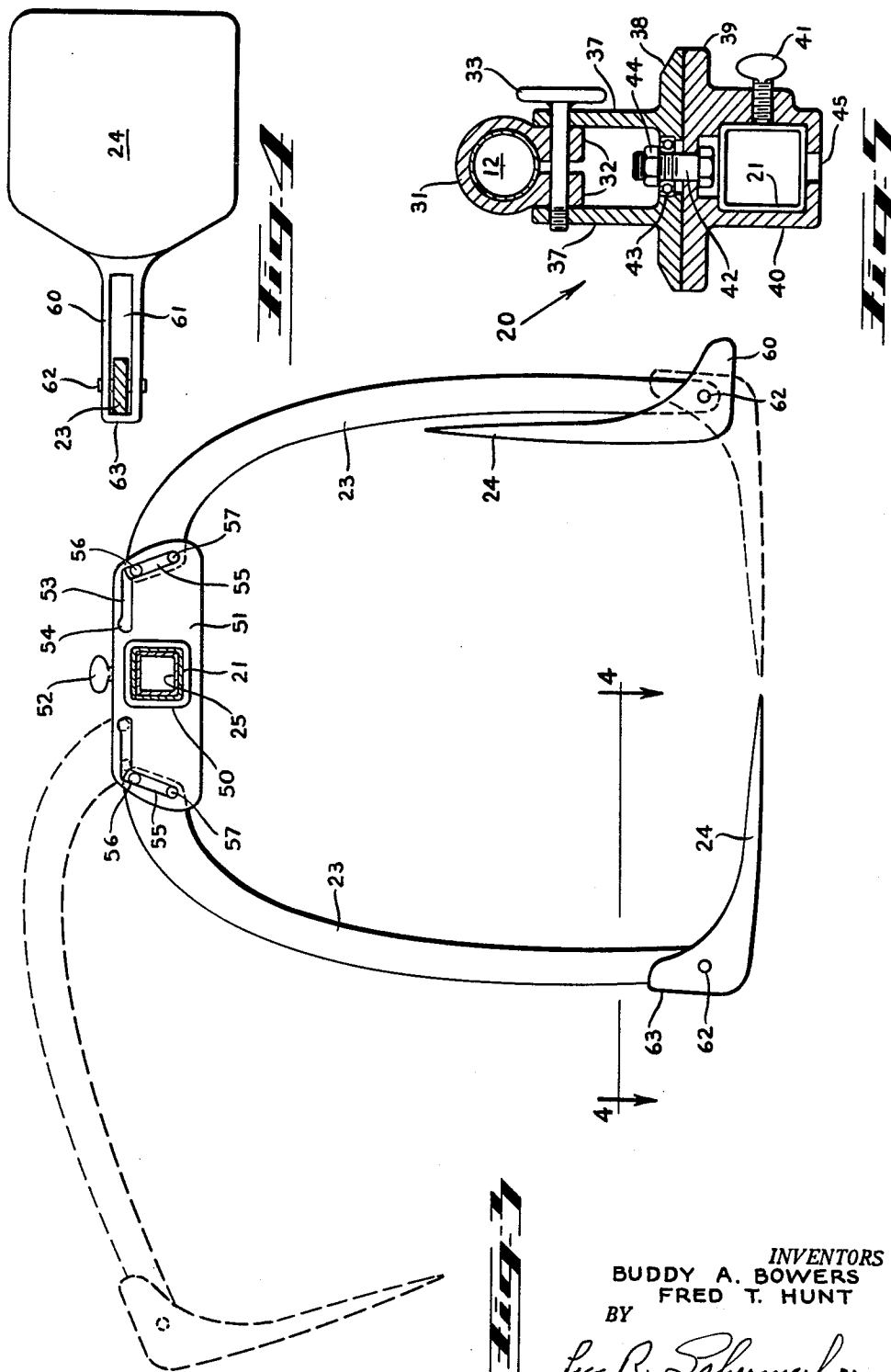
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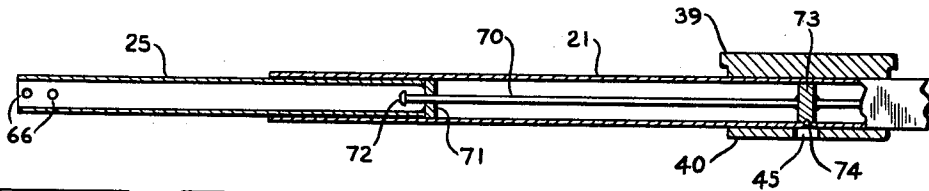


Fig. 6

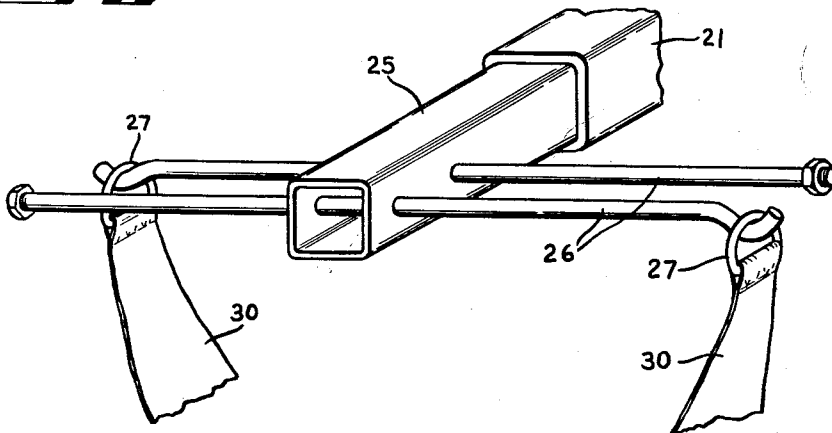


Fig. 7

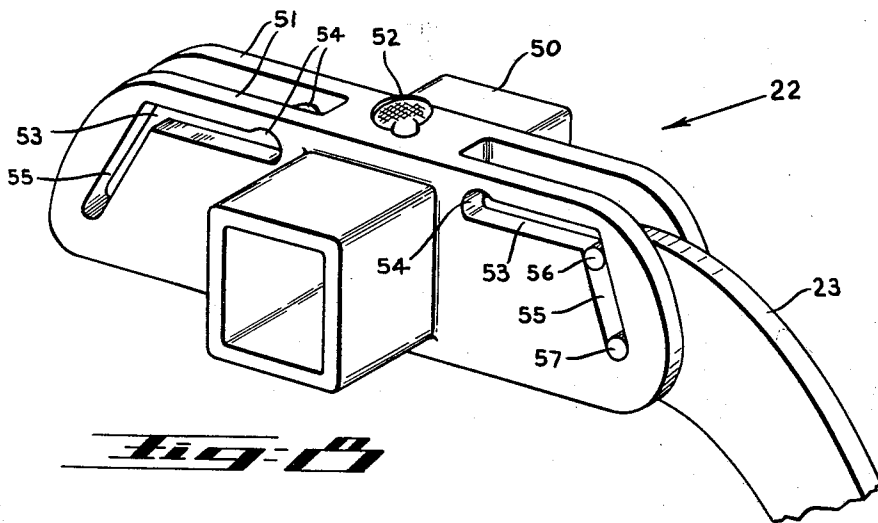


Fig. 8

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3,131,404

PATIENT LIFT

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6 Claims. (Cl. 5-86)

This invention relates to a grapple type prone patient lift to be used in conjunction with a lifting dolly for lifting and transporting bed patients in a hospital, nursing home, or any other place where a prone lift may be needed.

Objects of the invention are to provide mechanical improvements in a device of the type described, to provide novel pivotal self-locking lift arms, and to provide a patient lift of relatively simple construction which is economical to build and which is, at the same time, completely safe and sufficiently rugged and durable for the purpose.

The device is suspended by a swivel hanger adapted to be mounted on the lift beam of a hospital dolly. The device is adaptable to all conventional hospital dollies. A horizontal bar carried by the swivel hanger is equipped with pairs of depending pivotal arms carrying body plates at their lower extremities to be placed under the shoulders and hips of the patient. A special feature of construction comprises a novel form of pivotal connection for the lift arms which is automatically self-locking in both raised and patient-carrying positions of the arms. Additional supports are extendable from the ends of the bar carrying slings to support the patient's head and legs.

The invention will be better understood and additional objects and advantages will become apparent from the following detailed description of a preferred embodiment of the invention illustrated in the accompanying drawings. Various changes may be made, however, in the details of construction and arrangement of parts and certain features may be used without others. All such modifications within the scope of the appended claims are included in the invention.

In the drawings:

FIGURE 1 is a perspective view of a patient lift embodying the features of the invention;

FIGURE 2 is an enlarged fragmentary side elevation view showing a portion of the horizontal bar and dolly lift beam;

FIGURE 3 is a view taken on the line 3-3 of FIGURE 2;

FIGURE 4 is a view taken on the line 4-4 of FIGURE 3;

FIGURE 5 is a sectional view taken on the line 5-5 of FIGURE 2;

FIGURE 6 is a fragmentary longitudinal sectional view through the horizontal bar;

FIGURE 7 is a fragmentary perspective view showing an extensible sling support; and

FIGURE 8 is a fragmentary perspective view of a supporting bracket for the patient lift arms.

Referring first to FIGURE 1, the numeral 10 designates, generally, a conventional wheeled lift dolly having a base adapted to roll under a bed and an upright column 11 mounted on one end of the base. A lift beam 12 is pivotally mounted at 13 on the top of column 11. The lift beam may be raised by a hydraulic cylinder 14 having a pump handle 15. The beam is lowered by gravity by opening a valve, not shown.

The present patient lift is supported by a swivel hanger 20 on the end of beam 12. Swivel hanger 20 carries a horizontal tubular bar having a pair of hanger brackets 22 for patient lift arms 23. The lower ends of arms 23 are equipped with body plates 24 to support the patient's

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shoulders and hips. Telescopically mounted in the ends of horizontal bar 21 are extensible support bars 25. The ends of these bars are equipped with transverse rods 26 having hooked ends to support rings 27 in the ends of slings 30 for the patient's head and legs.

The details of swivel hanger 20 are shown in FIGURE 5. A split sleeve 31 having a pair of apertured ears 32 is secured on the distal end of beam 12. A screw 33 in ears 32 pivotally supports a pair of upstanding ears 37 on a circular plate 38. A lower circular plate 39 is integral with a tubular body 40 which slidably receives the rectangular tubular bar 21. The bar is clamped in body 40 by setscrew 41. Circular plates 38 and 39 are centrally apertured to receive a suspension bolt 42. A nut 44 on bolt 42 hangs in a ball bearing assembly 43 so that the body 40 and bar 21 will turn freely relative to plate 38 and lift beam 12. Also, the ears 37 pivot freely on the axis of screw 33 when the inclination of lift beam 12 changes as it is raised and lowered. The under side of body 40 is provided with an opening 44 for a purpose which will presently appear.

The hanger brackets 22 for the lift arms 23 are best shown in FIGURE 8. Each hanger bracket comprises a square tubular body 50 equipped on its opposite sides with pairs of integral outstanding ears 51. Tubular body 50 slides on bar 21 and is equipped with a setscrew 52 to engage the bar. Each of the ears 51 has a horizontal slot 53 with an enlarged inner end 54 providing an upward offset at the end of the slot. From the outer end of slot 53 the slot angles downward in an inclined portion 55. Thus, the slot is of generally L-shape with the two straight portions 53 and 55.

Each arm 23 is received between a pair of ears 51, and the upper end of the arm is equipped with a pair of pins 56 and 57 outstanding on opposite sides of the arm to travel in the angular slots 53, 55 of the ears. The arrangement is such that the arms 23 are in patient-supporting position when both pins 56 and 57 are disposed in the lower depending portion 55 of the slot as shown in FIGURE 8 and in solid lines in FIGURES 3. Slot portion 55 is slightly longer than the distance between the two pins. The arms hang in this position by gravity and the walls of slot 55 prevent any pivotal movement of the arms whereby they cannot spread apart and drop the patient. The arms 23 cannot swing outward without being lifted sufficiently to pass the upper pin 56 into the horizontal portion 53 of the slot.

By merely raising an arm, the lower pin 57 will follow the upper pin until the upper pin reaches the inner end of the slot with the arm in the elevated position shown in broken lines in FIGURE 3. Lower pin 57 is then also in the horizontal slot portion 53, this portion the same as slot portion 55 being longer than the distance between pins 56 and 57. When the arm is released in this upper position its weight causes the pin 56 to engage and lock itself in the upward offset 54 whereby the arm cannot accidentally fall or be jarred back to its lower position. In order to lower the arm from its broken line position in FIGURE 3, it is necessary first to raise it slightly and draw it outwardly away from bar 21 sufficiently to disengage pin 56 from the upward offset 54 and move lower pin 57 into slot portion 55.

Thus, the arms lock themselves automatically in both upper and lower positions without requiring any lock device that must be separately manipulated. When in the lower position the arms cannot spread accidentally, and when in the upper position they cannot drop as a result of vibration whereby the action of the arms is entirely safe at all times. In intermediate positions with pin 56 in slot portion 53 and pin 57 in slot portion 55, the arms swing with a pivotal movement as though mounted on hinge pins.

Referring now to FIGURES 3 and 4, each body plate 24 is preferably a metal casting having on one end an integral bell crank arm 60 with an opening or slot 61 to receive the lower end of arm 23. The two parts are pivotally connected together by a pin 62. A web or heel portion 63 engages the arm 23 to limit the downward swinging movement of the plate in patient-supporting position. The plate may be swung upward alongside arm 23 when not in use. If desired, the pivotal connection 62 may have sufficient friction to hold the plate in this position. If, for example, a patient has a broken hip, one of the hip plates 24 may be swung up out of the way, as shown in FIGURE 3, and the patient will then receive stable support from the other hip plate and two shoulder plates, plus the head and leg slings, without supporting any weight on the injured hip.

The details of extension bars 25 are shown in FIGURES 6 and 7. The end of each bar is provided with a pair of apertures 66 to slidably receive the sling hanger rods 26. As shown in FIGURES 1 and 7, a single sling 30 is supported at each end upon one of the rods 26 so that the ends of the sling may be drawn together or spread apart, as may be desired, through a wide range of movement. Also, a separate sling may be used for each leg, in which case both rings 27 of one sling are hooked on one of the rods 26 and both rings of the other sling are hooked on the other rod. In this way the legs may be carried spread apart, if desired.

Extension bars 25 are prevented from falling out of the ends of bar 21 by a stop rod 70 which extends through apertured end plates 71 in the extension bars. Heads 72 on the ends of rods 70 limit the outward telescopic movement of extension bars 25. An apertured square plate or washer 73 is welded to the mid point of rod 70. This plate is secured at the mid point of bar 21 by a screw 74, the head of which is flush with the under surface of bar 21 so as not to interfere with removal of bar 21 from body 40 of the swivel hanger. Opening 44 in the bottom of body 40 provides access to screw 74 for removal of extension bars 25 without first removing the bar 21 from the swivel hanger. When screw 74 is removed, the plate 73 with rod 70, and both extension bars 25, may be withdrawn from one end of the bar 21. By loosening setscrew 41 in FIGURE 5, bar 21 itself may be removed from the swivel hanger. The square cross sections of bars 21 and 25 prevent rotation of the bars one within the other and also prevent rotation or twisting relative to the swivel hanger 20 and hanger brackets 22 to provide a stable support.

In picking up a patient, the dolly base is rolled under one side of the bed with bar 21 turned transversely of lift boom 12 and parallel with the patient. Then by swinging arms 23 downward from raised position, the body plates 24 may be passed under the patient's shoulders and hips from opposite sides without lifting or rolling him in the bed. When the pump is operated to raise lift boom 12, the patient is lifted out of bed with a minimum of disturbance and effort.

Having now described our invention and in what manner the same may be used, what we claim as new and desire to protect by Letters Patent is:

1. A patient lift comprising a swivel hanger, a square

horizontal bar centrally mounted in said swivel hanger, a square extension bar telescopically mounted in each end of said horizontal bar, apertured end plates in the inner ends of said extension bars, a stop rod centrally anchored in said horizontal bar and extending through said end plates, and heads on the ends of said stop rod limiting the withdrawal of said extension bars from said horizontal bar.

2. In a patient lift, a bracket adapted for mounting on a horizontal bar, a pair of patient lift arms mounted on said bracket for pivotal movement between a lower patient carrying position and a raised position, a sliding dual pin and slot connection between each arm and said bracket controlling the movement of said arm, each slot being angular to permit pivotal movement of the arm when said pins are travelling in different legs of the slot and preventing pivotal movement of the arm when both pins have moved into the same leg of the slot.

3. In a patient lift, a bracket adapted for mounting on a horizontal bar, an angular slot in said bracket, a patient lift arm, and a pair of pins in said arm movable in said slot to pivot the arm between a lower patient carrying position and a raised position, each leg of said slot having sufficient length to contain both pins and prevent pivotal movement of the arm in its lower and raised positions.

4. In a patient lift, a bracket adapted for mounting on a horizontal bar, an angular slot in said bracket having a horizontal leg and near vertical leg, a patient lift arm, and a pair of pins in said arm movable in said slot to pivot the arm, each leg of said slot having sufficient length to contain both pins whereby said arm will pivot when one pin is in each leg of the slot but will not pivot when both pins are in the same leg of the slot.

5. In a patient lift, a bracket having a tubular body for slidable mounting on a horizontal bar, two pairs of parallel ears outstanding from opposite sides of said body for mounting a pair of patient lift arms, an angular slot in each of said ears for controlling the movements of said arms, each slot having a horizontal leg and a near vertical leg extending downward from the outer end of said horizontal leg, and an upward offset in the inner end of said horizontal leg.

6. In a patient lift, a bracket having a tubular body for slidable mounting on a horizontal bar, two pairs of parallel vertical ears outstanding from opposite sides of said body, L-shaped slots in said ears each having a horizontal leg and a near vertical leg extending downward from the outer end of the horizontal leg, a patient lift arm mounted between the ears of each pair, a pair of pins in each arm slidable in said slots, each slot leg having sufficient length to contain both pins and prevent pivotal movement of the arm in its lower and raised positions, and a body plate pivotally mounted on a horizontal axis on each arm.

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