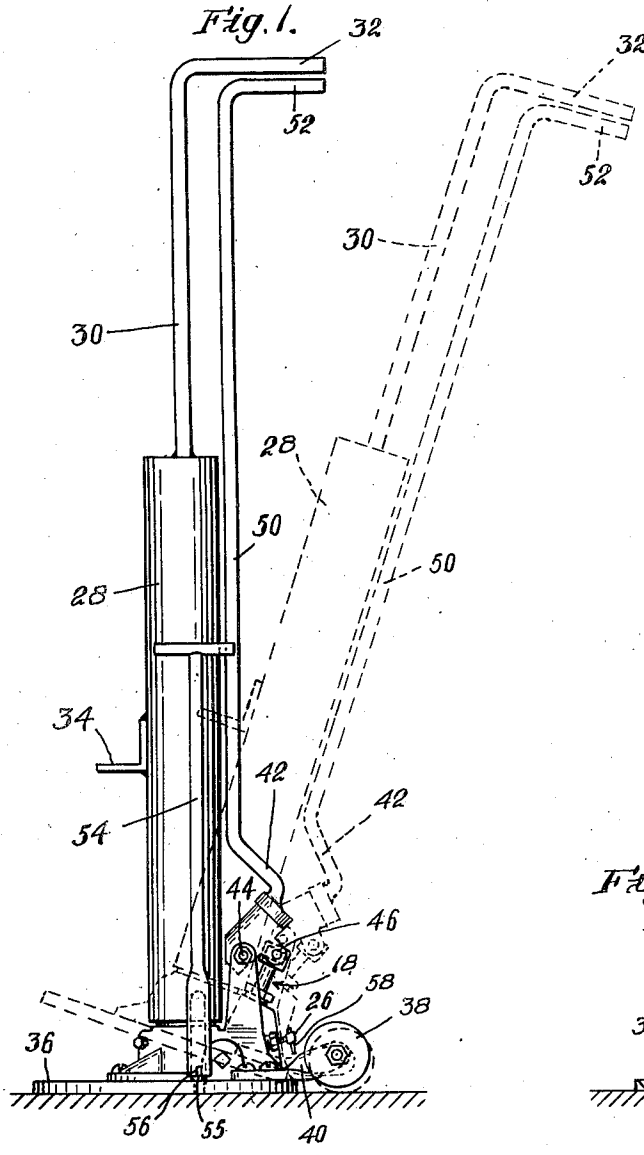
Oct. 24, 1944. E. D. HALLINAN 2,361,197

BED LIFTER

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Fig. 1.



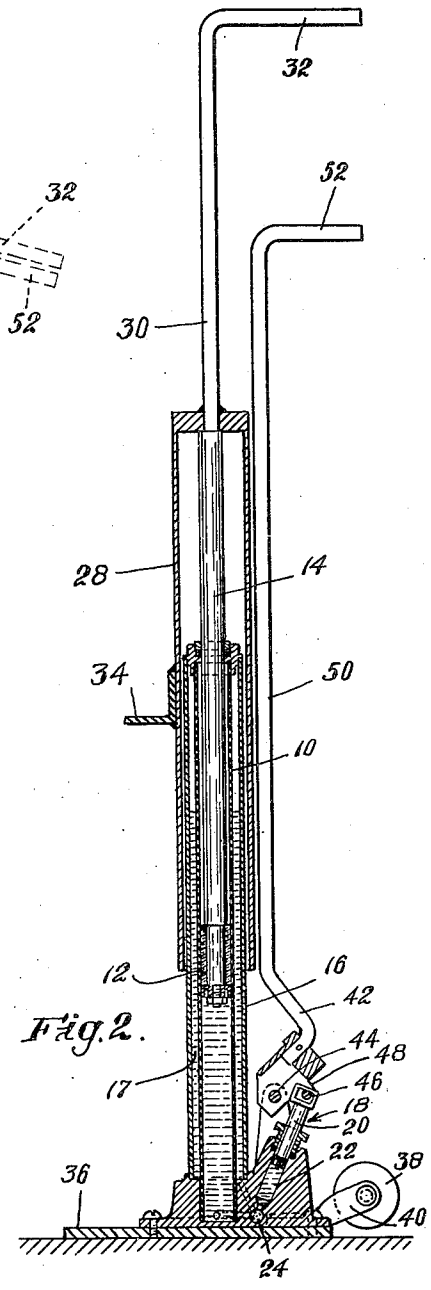


Fig. 2.

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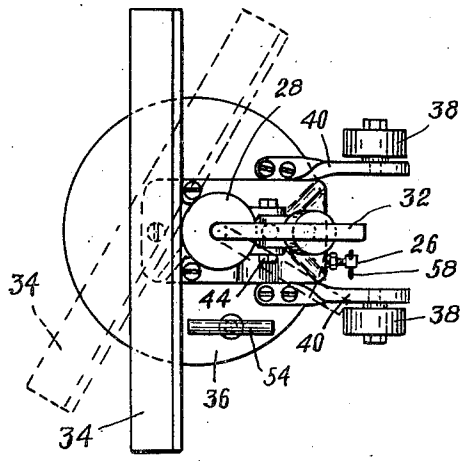


Fig. 3.

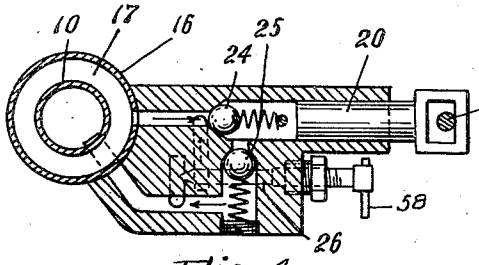


Fig. 4.

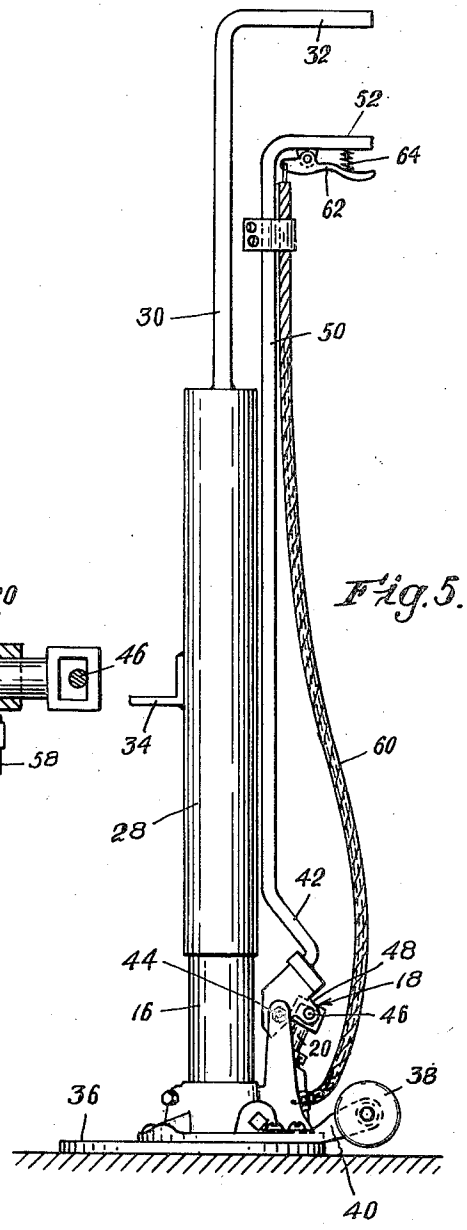


Fig. 5.

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UNITED STATES PATENT OFFICE

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BED LIFTER

Edward D. Hallinan, Brockton, Mass.

Application May 10, 1944, Serial No. 534,862

6 Claims. (Cl. 254—93)

This invention relates to improvements in bed lifters.

More especially it provides a lifting device which has particularly utility for elevating and for tilting beds in hospitals and comparable institutions, thereby to greatly facilitate what has been a laborious task with devices heretofore available for this purpose. Furthermore, the elevating or tilting of a bed, with a patient therein, not infrequently is required to be effected by a nurse or other female attendant and is a chore which taxes the strength of whatever person, male or female, undertakes to do it.

Hence, it is one object of my invention to provide a bed-lifting device which easily and safely may be utilized for elevating or tilting a bed and which, regardless of the load to be lifted, may be operated without undue effort by a nurse or even by a child. I employ the principle of known hydraulic lifting jacks, but provide means, at a convenient height to be grasped by a person standing erect, serving both as a handle facilitating movement of the device from place to place and as a manual means for readily adjusting the elevation of the lift of the device when the control valve is in one condition.

Another object is to provide means for convenient reciprocatory operation of a hydraulic pump by a person standing erect. A pump actuating lever extends to a convenient elevation and is equipped with a handle by which the pump may be easily operated through a relatively long leverage, the lever and its handle constituting additional means facilitating movement of the device from place to place.

A further object is to provide a substantial stabilizing base ensuring against accidental tipping over of the device.

Still another object is to provide casters or wheels associated with the base and adapted to be out of contact with the floor or other support when the device stands erect and arranged to make contact with the floor when the device is tilted by an elevated handle, whereby the device may be easily rolled from place to place.

A still further object is to provide so that the lift of the device which engages under a part of a bed or the like may be manually adjusted around the vertical axis of the device to different angular relations to an elevated handle and to the axis of the casters or wheels.

An additional object is to provide means for convenient and easy operation of the control valve.

It is, moreover, my purpose and object generally to improve the construction and operation of bed lifters.

In the accompanying drawings:

Figure 1 is a side elevation of a bed lifter embodying features of my invention;

Figure 2 is a medial vertical cross-sectional view of the device of Figure 1;

Figure 3 is a top plan of the device of Figure 1, showing a dotted angular adjustment of the lift;

Figure 4 is a detail sectional view somewhat diagrammatic, of the pump, the valved conduit connections to the pump cylinder and reservoir, and the relief valve, on a larger scale; and

Figure 5 shows a modification in which a flexible shaft extends from the pump to an elevated handle providing for control of the relief valve at said elevated handle.

Referring to the drawings, a well known type of hydraulic lifting jack is shown and comprises a fixed inner cylinder 10 within which the piston 12 on rod 14 is operable. An outer fixed cylinder 16 is spaced from the inner cylinder 10 to provide an annular reservoir 17 for holding the oil or other liquid for operating the piston 12 through the medium of a pump indicated generally at 18. The pump comprises the small piston 20 reciprocable in the pump cylinder 22 with suitable check valves 24, 25 operable respectively in response to strokes of the pump in opposite directions, to draw liquid from reservoir 17 and force it into inner cylinder 10 on the under side of piston 12. A relief valve 26 is provided and is manually openable to permit liquid in cylinder 10 to flow back or to be forced back into reservoir 17 when the device is being lowered. As the details of the pump and control valves and their connections to cylinder 10 and reservoir 17 are well known, further detailed description thereof is unnecessary.

According to my present invention a cylindrical sleeve 28 fits over the fixed outer cylinder 16 which latter has substantial vertical extent. Sleeve 28 preferably has length to completely enclose outer cylinder 16 when the sleeve is in its lowermost position of Fig. 1 and has an upwardly extending axial shaft 30 rigid with the sleeve and formed at its upper end with a laterally projecting handle or grip 32. The sleeve 28 is fixed to the upper end of piston rod 14 so that the piston 12, rod 14, sleeve 28 and shaft 30 constitute a unit which is movable as an entirety when piston 12 is forced upward or downward within its cylinder 10. Also, the angle iron rest or lift 34, which is secured at a mid-location

along sleeve 28 for engaging under a part of a bed or the like, moves with sleeve 28. Additional to the mentioned unitary vertical movement of the piston and sleeve with their adjuncts, the unit is rotatable about the vertical axis for setting the rest 34 in different positions around the said axis.

At the lower end of the device, I provide a base 36 having substantial radial extent to ensure stability of the device when it is resting vertically on a floor or other support. However, a pair of casters 38 are mounted in brackets 40 extending outwardly from the base 36 in position to engage the floor when the device is tilted in direction toward the casters. In the operating erect position of the device, the casters are clear of the floor.

Operation of the pump piston 20 is accomplished by the operating arm 42 which is pivoted on the base casting at 44. The pump piston 20 projects out of its cylinder 22 and has a pivotal connection at 46 to ears 48 of operating arm 42, whereby rocking of arm 42 about its pivot 44 reciprocates piston 20 in its cylinder 22. The operating arm 42, according to my invention, has its upper part formed as a shaft or rod 50 which extends upward in general parallelism with the vertical axis of the device. Its upper end is formed with a laterally projecting handle or grip 52 which is positioned a little below the handle 32 when the latter is in its lowermost position. The vertical extent of the operating shaft 50 provides a long leverage which enables an operator in erect position to easily and conveniently operate the pump by relatively short reciprocations of shaft 50.

The relief valve 26 may be manually operable between open and closed positions by means of a tool 54 in the nature of a wrench which normally may stand on end as in Fig. 1, supported by a pin 56 rising from base 36 and engaging in the axial hollow of tool 54. The work end of tool 54 has a groove 55 for engaging over a cross pin 58 in the projecting stem of the valve 26, which latter is rotatable counter-clockwise to close the valve and clockwise to open it, the pin 58 limiting the rotational travel of the stem by engagement with a part of the base casting.

In Fig. 5, the control of the relief valve 26 is effected by a flexible push-pull shaft which is operable in a flexible casing 60. In this case the valve 26 may be spring pressed to closed position, and openable by inward thrust of the flexible shaft. Conveniently, the flexible shaft may extend from the valve at the base upward to the upper region of pump-operating shaft 50 where it may be secured to shaft 50 adjacent the handle 52. A hand grip element 62 pivoted on handle 52 and extending below and close to handle 52 is operable against the resiliency of a spring 64 to force the flexible shaft inward to open relief valve 26, and spring 64 restores the parts when the operating pressure is removed.

It will be obvious from the foregoing description that I have provided a bed-lifter which can easily and comfortably be wheeled from place to place without any strain of lifting and without the person moving the device having to stoop to an uncomfortable position. Assuming a bed is required to be tilted to accommodate a person suffering from shock, the device may be wheeled to the foot of the bed and, with the rest 34 in its lowermost position, it can be inserted under the central part of the bed frame and the device swung to vertical position so that it rests on the substantial base 36 with the casters clear of the floor. Then, with the form of the invention shown in Figs. 1–5, the relief valve 26 may be opened by means of tool 54, to condition the device so that the sleeve 28 may be manually lifted until rest 34 engages the bed frame, after which valve 26 may be closed and the bed elevated by reciprocation of the pump-operating handle 52. When the bed has been elevated enough to permit placing of the usual shock blocks under the raised legs, the blocks are inserted and the relief valve 26 opened to permit lowering of the bed, of its own weight, into the grooves of the shock blocks. Manual downward pressure on handle 32 will cause sleeve 28 to move further downward to clear rest 34 from the bed frame, following which the device may be tilted back on the casters 38 and wheeled to an out-of-the-way location to await a further bed-lifting need.

If an already tilted bed is to be lowered, my device can accomplish the task substantially as has been described for the elevating of a bed. The device may be wheeled to proper position with the rest 34 under the bed frame, after which the device is swung to erect position. With relief valve 26 open, the sleeve 28 may be manually elevated until rest 34 engages under the bed frame, after which valve 26 will be closed and the pump operated to lift the bed sufficiently to clear the shock blocks. After removing the blocks, valve 26 may be opened and the bed, of its own weight, slowly drives the sleeve 28 downward, restrained by piston 12 in cylinder 16, until the bed rests on the floor. A further manual downward pressure on handle 32 will clear rest 34 from the bed frame, so that the device may be wheeled away as previously described.

With the form of my invention shown in Fig. 6, the operation will be the same as above described, excepting that the relief valve 26 must be manually held open during a lowering movement of sleeve 28.

I claim as my invention:

1. A bed lifter comprising a base for resting on a support, a cylindrical column extending vertically from a central location on the base, a cylindrical sleeve loosely skirting said column and having at a mid-location along its vertical extent a rest member rigid on the exterior of the sleeve, a handle rigid with the top of said sleeve and extending a substantial distance vertically upward therefrom, means for gradually and forcibly elevating the sleeve relative to said column, said means having an operating handle extending a substantial distance upward in general parallelism with the said sleeve handle, and mean for conditioning said sleeve for relatively rapid movement in response to manual force applied through said sleeve handle.

2. A bed lifter comprising a base for resting on a support, a cylindrical column extending vertically from a central location on the base, a cylindrical sleeve loosely skirting said column and having at a mid-location along its vertical extent a rest member rigid on the exterior of the sleeve, a handle rigid with the top of said sleeve and extending a substantial distance vertically upward therefrom, a piston operable within the said column and having a piston rod projecting out of the upper end of the column, said sleeve being secured to said projecting part of the piston rod, means for applying pressure to the under side of the piston to gradually drive it and said sleeve upward, said means having an

operating handle extending to a location adjacent the upper part of said sleeve handle, and means for releasing the pressure on the under side of the piston thereby to condition the piston for relatively rapid movement in response to manual force applied through said sleeve handle.

3. A bed lifter comprising a hydraulic lifting jack having a cylindrical vertical column mounted on a substantial stabilizing base with a piston and rod operable in said column, a cylindrical sleeve secured to said rod and loosely skirting said column and having an exterior projecting integral member for engaging under a bed frame, a handle rigid with said sleeve and extending to an elevation substantially above the top of said column, means for operating the jack to gradually elevate said piston and sleeve, said means having an operating handle extending to an elevation close to said elevation of the sleeve handle thereby providing a relatively long operating leverage, and means for conditioning the jack for relatively rapid movement in response to manual force applied through said sleeve handle.

4. A bed lifter comprising a base for resting on a support, a cylindrical column extending vertically from a central location on the base, a cylindrical sleeve loosely skirting said column and having at a mid-location along its vertical extent a rest member rigid on the exterior of the sleeve, a handle rigid with the top of said sleeve and extending a substantial distance vertically upward therefrom, means for gradually and forcibly elevating the sleeve relative to said column, said means having an operating handle extending a substantial distance upward in general parallelism with the said sleeve handle, mean for conditioning said sleeve for relatively rapid movement in response to manual force applied through said sleeve handle, and a pair of wheels supported by the said base and mounted on a common axis beside the base, said wheels being located so as to be out of contact with the support on which the base rests when the said column is vertically disposed, and so as to engage said support when the bed lifter is tilted in direction toward said wheels, thereby to condition the lifter for movement on said wheels by a person gripping said sleeve handle.

5. In a bed lifter, a vertically operable member having an exterior bed-engaging projection, a relatively long handle rigid with said member and reaching to an elevation at which a person standing erect can grasp the handle, means for forcibly and gradually elevating said member, said means having a handle reaching to an elevation at which a person standing erect can grasp and reciprocate the handle, means for conditioning said member for relatively rapid movement in response to manual force applied through the handle of said member, and a pair of wheels normally out of contact with the support for the bed lifter and movable into contact therewith when the bed lifter is tilted in direction toward said wheels by the handle of said member.

6. A bed lifter comprising a hydraulic lifting jack having a cylindrical column mounted on a substantial stabilizing base, with a piston and rod operable in said column, a cylindrical sleeve secured to said rod and loosely skirting said column, a bed rest rigid on said sleeve and consisting of a substantial length of angle iron projecting substantially to each side of the sleeve, a relatively long handle rigid with the top of said sleeve and extending vertically to an elevation at which a person standing erect can grasp the handle, means for forcibly and gradually elevating the jack thereby to elevate said sleeve and bed rest, said means including an operating lever pivoted adjacent the said base and extending in general vertical direction to an elevation close to the location of the upper end of said sleeve handle, mean for conditioning the jack for relatively rapid movement in response to manual force applied through said sleeve handle, and a pair of wheels associated with said base for supporting the bed lifter when tilted toward the wheels by a person graping said sleeve handle.

EDWARD D. HALLINAN.