

United States Patent

Kjellberg et al.

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[54] BEDSTEAD

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[51] Int. Cl.A61g 7/10, A47c 3/32

[58] Field of Search5/62, 63, 66, 68; 108/147; 280/36; 248/161

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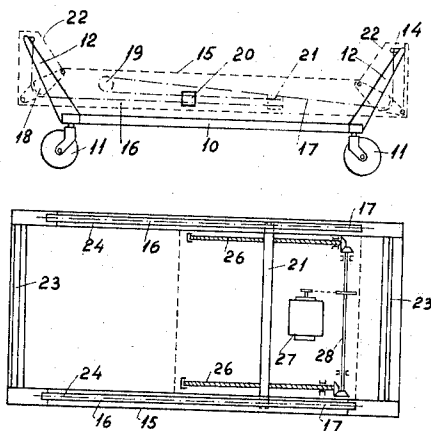
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[57]

ABSTRACT

The invention relates to a bedstead, the bottom of which is adjustable to various levels, and to oblique positions, said bottom being movably suspended in wires or chains secured to corner posts of a rigid undercarriage for the bed, the extremities of said wires or chains being carried to a cross-bar with propelling means for exerting a pull on the suspension chains or wires to effect adjustment of the bed bottom, all movable parts being built-in in a double-walled bedframe enclosing the undercarriage and its corner posts.

7 Claims, 6 Drawing Figures



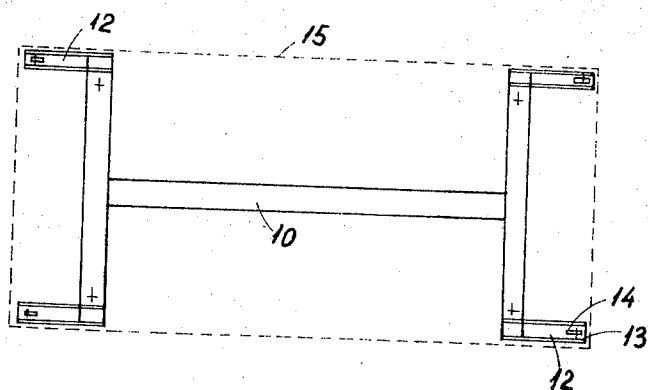


Fig. 1.

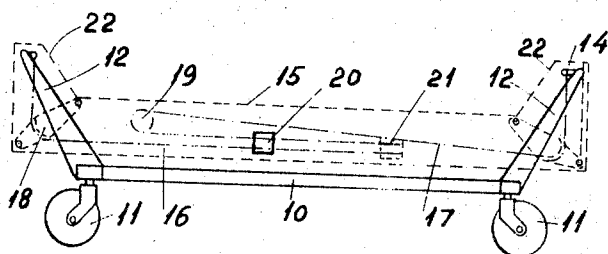


Fig. 2.

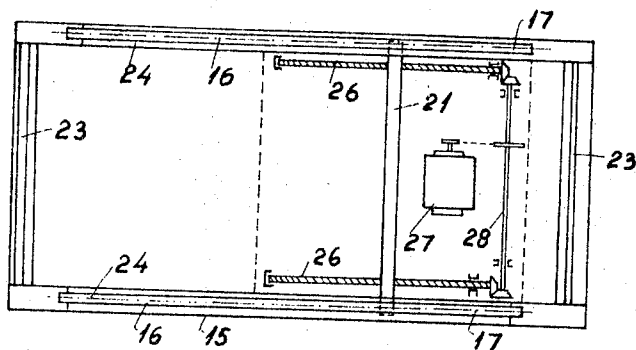


Fig. 3.

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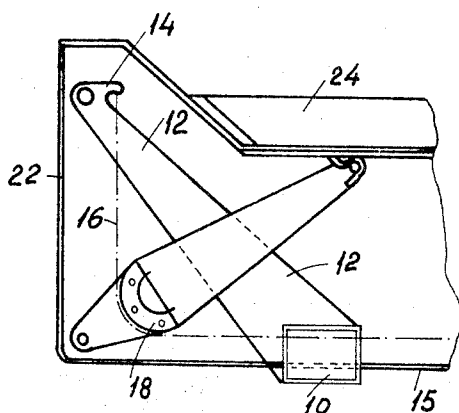


Fig. 4.

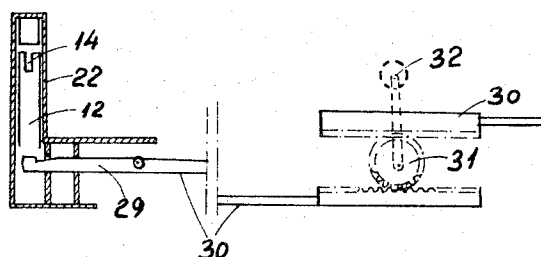


Fig. 5.

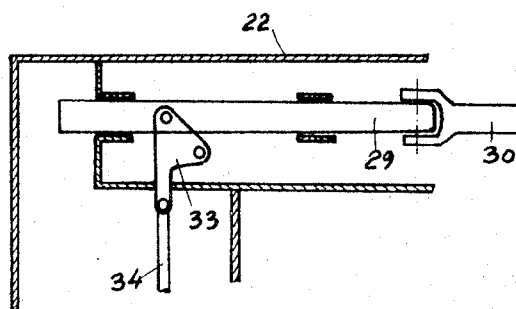


Fig. 6.

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BEDSTEAD

The invention relates to a bedstead, the bottom of which can be adjusted to different levels and to oblique positions, wherein one end, be it the head or the foot, is at another level than the other, and where the level can be varied infinitely.

Bedsteads of this kind are used in particular in hospitals and nursing homes, where it means a substantial relief to the staff that the bed bottom can be raised to a comfortable level for care of the person confined to the bed and for cleaning under the bed, whereas it may be desirable to adjust the bottom to an oblique position in various treatments of difficulty in breathing.

It is the object of the invention to provide for a design of a bedstead, in which the said adjustments can be made in a simple manner either manually or mechanically, as desired, and in the latter case so that the patients themselves can make the adjustment, the movable parts of the adjustment mechanism being designed and placed so that practically no cleaning problems are encountered.

With this object in view, the bedstead of the invention has a rigid undercarriage on legs or provided with wheels, the corners of which undercarriage, being corners of a rectangle, are provided with posts to the top of which a system of wires or metal chains, possibly combined with drawbars, is secured to slidingly support the four corners of a bedframe, whereas the wires or chains from the two posts at one end of the bed, being carried over reversing members, return towards the bed end in question parallel to the wires or chains from the other end of the bed, all four extremities being secured to a common drawbar within the bedframe, the latter carrying locking means being coupled together in such manner as to allow for optional locking of one or both bed ends at the highest level.

The drawbar is preferably driven by one or more longitudinal spindles. If more spindles are used, they are driven at equal speed of rotation. Preferably, two spindles are used, which are placed near the ends of the drawbar, which are provided with bores through which the extremities of the draw members are loosely carried and secured on the opposite side, e.g., by means of nuts or in other suitable manner. By the extreme placing of the spindles, the free projections of the drawbar are reduced so that the bending stress becomes fairly modest. The power for driving of the spindles is expediently supplied from a reversible electromotor with reduction gear and worm gear with the possibility of affixing a hand wheel or crank for turning of the worm shaft. However, the transmission of power can also be in other manner, e.g., by means of gear wheels, or by chains and sprockets.

The drawbar and its propelling members are preferably located near the foot of the bed and adjusted in such manner that the extreme point of movement of the drawbar towards the foot of the bed corresponds to the highest level of the bed bottom, the other extreme point of movement corresponding to the lowest level.

Appropriately, switches are provided at the extreme ends of movement to be activated by the drawbar for reversing the direction of rotation of the motor and thus of the spindles.

Preferably, the motor is started and stopped by a pushbutton control which can be operated by the person confined to the bed.

The mode of operation is as follows, starting from the lowest level of the bed. By starting the motor, a pull is effected on the draw members, whereby the bed is equally raised at both ends to the highest level, if the motor is not stopped on the way. If an oblique position of the bedbottom is desired, it is locked at one end at the highest level, and simultaneously the direction of rotation of the motor is reversed. This initiates a lowering of the end of the bed, which is not locked, said lowering continuing until the bed end is at its lowest level. If the motor is not then stopped, it is automatically reversed, and the low end is again raised to the maximum height.

In an embodiment of the object of the present invention, the lock members consist of tie bolts of a construction to make them releasable only when both ends of the bed are at the

maximum height. This prevents the locked end from being released and from flopping down, when the bedbottom is in oblique position. This would otherwise be possible, since the pull on the draw members is relinquished when the drawbar returns to its starting position.

To prevent parts of the wires and chains of the draw members of a locked end of the bed bottom from following the drawbar when the latter returns with lowering of the not locked end, the draw members at each side are influenced by a frictional brake-block. In this way, slack parts curving down below the bed frame are avoided, which would otherwise disfigure the look of the bed or it might cause disorder of the draw members.

To simplify the operation of the locking means, these are coupled to a common manual control handle. The locking system at both ends can be designed after the principles of the pasquil lock, in that the individual tie bolts are each acted upon by one arm of a bell crank lever, the other arm of which is operated from the control handle through a rod with a rack member. The system can be designed so that a movement of the control handle to one side locks one end of the bed bottom, and a movement to the other side locks the other end, the locking being relinquished in the central position of the control handle.

In a preferred embodiment of the present bedstead, the bedframe is designed as a double-walled self-supporting structure with corner posts, enclosing the posts of the rigid undercarriage, and having grooves or dovetail sockets for securing detachable bed gables and side boards, whereas the movable parts of the adjustment means and locking means, including chains, wires, rods, or combinations of these are built into the cavities of the double walls, and the drawbar and its control members are enclosed in a housing connecting the two long sides of the bedframe. This has obvious advantages both for hygienic and aesthetic reasons, and because the risk is eliminated of the bed linen and the clothing of the bed-confined person coming into contact and being entangled with the movable parts.

An embodiment of the bedstead of the invention is illustrated in the accompanying drawings, wherein

FIG. 1 is a plan view of the rigid undercarriage with the outlines of the enclosing bedframe shown in broken lines,

FIG. 2 an elevation of the same,

FIG. 3 a plan view of the bedframe,

FIG. 4, on a larger scale, details of the suspension of the bedframe, and

FIGS. 5 and 6 details of the locking members.

As shown in FIGS. 1 and 2, the bedstead has a rigid undercarriage 10 of H-shape placed on turnable wheels 11 being provided with (not shown) locking means for braking the turning as well as the rolling movement of the wheels.

At each corner, the undercarriage 10 has posts 12 made from two parallel, inclined riders being welded to the undercarriage 10, and being connected to one another at the top by means of a spacing piece 13 having a knob 14.

The undercarriage 10 supports a bedframe 15, shown with broken lines in FIGS. 1 and 2, which is suspended in wires or chains 16 and 17 secured to the knobs 14 and carried over wheels or circular discs 18, cf. FIG. 4, one set of wires or chains 17, however, being carried over reversing wheels 19 to return parallel to the chains or wires 16. The ends of the chains or wires 16 and 17 preferably continue in drawbars passing through holes in a frictional brake block 20 and forward to a cross-bar 21. The drawbars are carried loosely through bores at the end of the cross-bar 21, and nuts are screwed on the ends to bear against the cross-bar.

The bedframe 15, seen in plan view in FIG. 3, is manufactured as a double-walled structure with corner posts 22 enclosing the posts 12 on the undercarriage 10. These corner posts 22 carry (not shown) securing means for detachable gables 23 and side boards 24.

The propelling means for the cross-bar 21 are enclosed in a housing 25, being indicated by broken lines in FIG. 3. In the

shown embodiment, the propelling means consist of two spindles 26, each journaled close to and parallel with one long side of the bedframe 15. The spindles are driven from an electromotor 27, for example as suggested by a chain drive to a transverse shaft 28, transmitting the pull to the spindles 26 through bevel gears. However, the propelling means can be constructed in many other ways, and their construction is of no importance for the principles of the present invention.

The wires or chains 16 and 17 and their extending drawbars, the wheels or discs 18, and the reversing members 19 are all built into the cavities in the bedframe 15. In these cavities, a locking system is also built in, by means of which the bedframe can be locked at its maximum height at one end, if desired.

The locking system is designed after the pasquill lock principle, and its principal details are schematically shown in FIGS. 5 and 6.

In each corner post 22 of the bedframe 15, a tie bolt 29 is journaled, which can lock the bedframe 15 to the post 12. The tie bolts 29 at the foot of the bedframe are actuated by a rack and pinion drive 30 from a gear wheel 31 with a control handle 32. By their movement, the two tie bolts 29 at the foot of the bedframe act upon bell crank levers 33, which via drawbars 34 and (not shown) bell crank levers transmit a reciprocal movement to the tie bolts at the opposite end of the bed so that when one set of tie bolts lock, the other set becomes disengaged. Preferably, the locking system is so designed that all of the tie bolts are disengaged when the control handle 32 is in its central position, whereas turning the handle to one side locks at one end, and turning it to the other side locks at the other end.

What is claimed is:

1. A bedstead comprising:
 - A. an undercarriage;
 - B. a bedframe;
 - C. flexible means constituting a bedframe support operatively associated with and interconnecting said bedframe and said undercarriage;
 - D. draw means for so effectively shortening and lengthening said flexible means as to vertically move said bedframe with respect to said undercarriage;
 - E. elevated position locking means for at least one end of said bedframe, said draw means being reversible and operable to raise or lower the bedframe end remote from the locked end thereof for obliquely positioning said bedframe; and
 - F. frictional brake blocks, said flexible means constituting strands passing through said brake blocks, said strands being in sets respectively operatively connected to opposite ends of said bedframe, said brake blocks preventing slack in one said set of strands when the other set of said strands is withdrawn with the bedframe moving to an oblique position.
2. A bedstead as claimed in claim 1, including elevated position locking means at each end of said bedframe, said locking means being releasable only when both said ends are at maximum elevated position.
3. A bedstead as claimed in claim 2, said flexible means comprising first and second sets of flexible strands, bedframe support and guide means for said flexible strands attached to said bedframe at opposite ends thereof, ends of said strands being attached to said support means, said flexible strands from one said end passing around guide means therefor and extending longitudinally inwardly along said undercarriage, direction reversing guide means for said flexible strands from the other said end, said strands from the other said end passing around said reversing guide means, longitudinally toward said other end and substantially parallel to the extended strands

from said one end, and means for longitudinally drawing selectively said sets of flexible strands around said support and guide means, and said reversing means, to elevate or lower said bedframe supported thereby through shortening or lengthening the effective bedframe support portions of said flexible strands.

4. A bedstead comprising:

- A. a rigid rectangular undercarriage;
 - B. a bedframe;
 - C. upstanding posts at the corners of said undercarriage constituting first and second end post sets;
 - D. first flexible means connected respectively to each said post of said first post set;
 - E. second flexible means connected respectively to each said post of said second post set;
 - F. first bedframe support and guide means for said first flexible means attached to said bedframe proximate one end thereof, said first flexible means extending around said first guide means and longitudinally inwardly along said undercarriage;
 - G. second bedframe support and guide means for said second flexible means attached to said bedframe proximate the other end thereof;
 - H. second flexible means reversing means on said bedframe positioned inwardly from said other end, said second flexible means extending around said second guide means, inwardly along said undercarriage, around said reversing means and longitudinally toward said other end substantially parallel to the longitudinally extended portion of said first flexible means;
 - I. a longitudinally movable draw bar mounted transversely of said bedframe;
 - J. the free ends of said first and second flexible means being attached to said draw bar, whereby upon longitudinal movement of said drawbar, the flexible means are selectively moved around said bedframe support and guide means and said reversing means to elevate or lower said bedframe supported thereby through shortening or lengthening the effective bedframe support portions of said flexible means;
 - K. elevated position locking means for at least one end of said bedframe, said draw means being reversible and operable to raise or lower the bedframe end remote from the locked end thereof for obliquely positioning said bedframe; and
 - L. frictional brake blocks, said flexible means comprising strands passing through said brake blocks, said brake blocks preventing slack in one said set of strands when the other set of said strands is withdrawn with the bedframe moving to an oblique position.
5. A bedstead as claimed in claim 4 including elevated position locking means at each end of said bedframe, said locking means being releasable only when both said ends are at maximum elevated position.
6. A bedstead as claimed in claim 5 including locking means for both ends of said bedframe, said locking means being interconnected and operable for selective alternative or conjoint locking engagement.
7. A bedstead as claimed in claim 6, said bedframe comprising a double-walled self-supporting structure including corner posts enclosing said upstanding posts on said undercarriage, detachable gables and sideboards on said structure, said flexible strands and guides being contained within said structure walls, said draw bar and the moving means therefor being enclosed within a housing interconnected between longitudinal sides of said bedframe.

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