EUROPEAN PATENT SPECIFICATION

Automatic lifting system for the supporting surface of a bed base

Système de levage automatique pour la surface de support d’un sommier de lit

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References cited:

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The present invention refers to a automatic lifting system for the supporting surface of a bed base. Such lifting systems are known, for example in US 5 687 437 A. There exist in the prior art specific bed base structures (called "Sommier") which form an internal compartment under the supporting surface of the mattress, to be used as a store to contain objects. Instead, other structures, called "giroletto", are composed of vertical walls under the supporting surface, which characterize an open space below the supporting surface. The space in the bed base between the vertical walls can be empty or open, or can comprise another supporting surface below.

When idle the supporting surface of the mattress is in direct contact with the upper edge of the bed base, while to allow access to the inner compartment the supporting surface can be lifted manually by means of a system of mechanical arms with optional return springs, positioned at one end of the supporting surface, which allows the other end of the supporting surface to be lifted, tilting it in elevation.

There are also known other manual lifting systems of the supporting surface, also with mechanical arms and optional return springs, which allow a lifting movement that takes the supporting surface to a raised horizontal position, to facilitate tidying of the bed.

All said manual lifting systems of the supporting surface cause problems of difficulty of use, as normally a considerable manual force must be exerted, at least in the initial stage in which it is necessary to overcome the counteracting force of the return springs of the lifting system, both during opening and closing.

Moreover, in conventional systems with return springs the opening operation can be triggered suddenly and unexpectedly with consequent limits in terms of safety.

Therefore, the object of the present invention is to overcome all the aforesaid drawbacks and to indicate an automatic lifting system of the supporting surface of a bed base which is easy to use, safe and moderate in cost.

It is an object of the present invention to provide a lifting system according to claim 1.

It is also another object of the invention a lifting system that is also capable of automatically lifting the supporting surface to a substantially horizontal and translated raised position with respect to that of the bed base.

It is another object of the invention a bed comprising said lifting system.

Further objects and advantages of the present invention will be apparent from the detailed description below of an embodiment thereof (and variants thereof) and from the accompanying drawings provided purely by way of non limiting example, in which:

- to allow access to the internal compartment 2 of the bed base 1;
- to facilitate operations to tidy the bed;
- to facilitate cleaning operations if the bed base has no bottom and the floor is accessible, once the supporting surface is raised;
- to lift the supporting surface together with the mattress, and if necessary also the person lying on top, for example to assist a disabled or bedridden person.

The present invention an automatic lifting system is inserted between the bed base and the supporting surface.

An embodiment of the lifting system with raising and translation is shown in figure 1. There is provided a system with parallel arms 5, for example two or more parallel arms for each opposed side of the bed base 1: the arms are pivoted at one end thereof inside two opposite lateral walls 3 of the bed base, and at the other end thereof at the internal edge of the supporting surface 4.

The length of the arms 5 and the pivot points thereof at the ends are such that in the idle position the supporting surface 4 is correspondingly resting on the bed base 1.

Preferably, in the internal compartment 2 there are provided horizontal bars 6 which transversely join the lower ends of the opposed parallel arms 5.

The number 4 indicates a supporting surface 4 is correspondingly resting on the bed base 1.

In normal closed position, the supporting surface rests on the upper edge of the bed base. It must then be possible to take the supporting surface to a raised position without considerable physical effort, substantially for the following purposes:

- to allow access to the internal compartment 2 of the bed base 1;
- to facilitate operations to tidy the bed;
- to facilitate cleaning operations if the bed base has no bottom and the floor is accessible, once the supporting surface is raised;
- to lift the supporting surface together with the mattress, and if necessary also the person lying on top, for example to assist a disabled or bedridden person.

The raised position must be substantially horizontal.

Therefore, in accordance with the present invention an automatic lifting system is inserted between the bed base and the supporting surface.

An embodiment of the lifting system with raising and translation is shown in figure 1.

There is provided a system with parallel arms 5, for example two or more parallel arms for each opposed side of the bed base 1: the arms are pivoted at one end thereof inside two opposite lateral walls 3 of the bed base, and at the other end thereof at the internal edge of the supporting surface 4.

The length of the arms 5 and the pivot points thereof at the ends are such that in the idle position the supporting surface 4 is correspondingly resting on the bed base 1.

Preferably, in the internal compartment 2 there are provided horizontal bars 6 which transversely join the lower ends of the opposed parallel arms 5.
there are also provided two reinforcing section bars 7, to which the lower ends of the arms 5 and the horizontal bars 6 are pivoted.

[0025] There is provided an electric motor 8, fitted directly to the junction between the ends of a horizontal bar 6 and of an arm 5. The electric motor 8 is capable of imparting a raising motion of the arms 5 by rotating according to the direction of the arrow a in figure, so as to make the supporting surface 4 perform a raising and translating movement according to the direction of the arrow b.

[0026] The electric motor 8 can be fastened to the wall 3 of the bed base or to the reinforcing section bar 7 so as to exert leverage thereon for rotation of the arm 5. Otherwise, it can be fastened to the horizontal bar 6 so as to exert leverage thereon; in this case, the bar 6 does not rotate together with the arm 5, but is fixed on the walls 3 or on the reinforcing section bars 7.

[0027] The lifting system can be installed so that translation of the supporting surface can take place in any of the horizontal directions with respect to the position of the bed base.

[0028] An illustrative example of a second type of lifting system with raising only is shown in figure 2 (not part of the present invention).

[0029] The electric motor can be controlled by a remote control with or without wires, or by an electric push button in a suitable position, for example concealed in the bed base.

[0030] There can be several motors 8 at the vertices of the lifting system, for example one for each point in which the arms are pivoted to the bed base.

[0031] Variants to the non-limiting example described are possible, without however departing from the scope of protection of the present invention, including all equivalent embodiments for those skilled in the art.

[0032] The advantages deriving from application of the present invention are apparent.

[0033] The main advantages consist in the ease of use in the raising operations of the bed to allow complete accessibility of the internal compartment and to allow easy access at a suitable height to tidy the bed.

[0034] The lifting system overcomes the drawbacks linked to the sudden ascent or descent of conventional systems, for example in conventional systems with return springs.

[0035] The lifting system allows the supporting surface to be taken to a raised position without appreciable physical effort, substantially for the following purposes:

- to allow access to the internal compartment 2 of the bed base 1;
- to facilitate operations to tidy the bed;
- to facilitate cleaning operations if the bed base has no bottom and the floor is accessible, once the supporting surface is raised;
- to lift the supporting surface together with the mattress, and if necessary also the person lying on top, for example to assist a disabled or bedridden person.

[0036] From the description given above, those skilled in the art are able to produce the subject of the invention without introducing further constructional details.

Claims

1. Lifting system, wherein said lifting system comprises a supporting surface (4), a bed base (1), and means for automatic lifting of said supporting surface (4) with respect to said bed base (1), able to automatically raise the supporting surface to a substantially horizontal raised position corresponding to that of the bed base,

wherein the system comprises:

- at least two parallel arms (5) for each opposed side of the bed base (1), said arms being pivoted at a first end thereof to the inside of two opposite lateral walls (3) of the bed base (1), and at a second end thereof to an internal edge of the supporting surface (4); and
- horizontal bars (6) which transversely join the first ends two opposed parallel arms (5) connected to said bed base (1);

characterized in that the system comprises further:

- an electric motor (8) fitted directly to the junction between the ends of the horizontal bar (6) and of one of the arms (5) and capable of imparting a rotating motion to the one arm (5).

2. Lifting system as claimed in claim 1, characterized in that said automatic lifting means (8, 9', 9") of said supporting surface (4) with respect to the bed base (1) are also suitable to automatically lift the supporting surface to a substantially horizontal and translating raised position with respect to that of the bed base.

3. Listing system as claimed in claim 2, characterized in that the length of said arms (5) and the pivoting points thereof at the ends being such that in the idle position the supporting surface (4) is correspondingly resting on the bed base (1).

4. Lifting system as claimed in claim 3, characterized in that said at least one electric motor (8) is controlled by a remote control with or without wires, or by an electric push button, preferably concealed in the bed base.

5. Bed comprising a bed base and a supporting surface, characterized in that it comprises a lifting system of said supporting surface as claimed in any one
of the preceding claims.

Patentansprüche

1. Hebesystem, wobei das Hebesystem eine Auflagefläche (4), einen Bettunterbau (1) und Mittel zum automatischen Heben der Auflagefläche (4) in Bezug auf den Bettunterbau (1) umfasst, geeignet zum automatischen Anheben der Auflagefläche in eine im Wesentlichen horizontale, bezogen auf die Position des Bettunterbaus angehobene Position, wobei das System umfasst:

- wenigstens zwei parallele Arme (5) auf jeder gegenüberliegenden Seite des Bettunterbaus (1), wobei die Arme an einem ersten Ende hiervon drehbar an der Innenseite von zwei gegenüberliegenden Seitenwände (3) des Bettunterbaus (1), und an einem zweiten Ende hiervon an einer Innenkante der Auflagefläche (4) gelagert sind; und
- horizontale Streben (6), die die ersten Enden der zwei gegenüberliegenden, parallelen, an dem Bettunterbau (1) verbundenen Arme (5) quer miteinander verbinden;

dadurch gekennzeichnet, dass das System weiterhin aufweist:

- ein direkt an der Anschlussstelle zwischen den Enden der horizontalen Strebe (6) und einem der Arme (5) angebrachter elektrischer Motor (8), der zum Übermitteln einer Drehbewegung an den einen Arm (5) geeignet ist.

2. Hebesystem gemäß Anspruch 1, dadurch gekennzeichnet, dass die automatischen Hebemittel (8, 9', 9'') der Auflagefläche (4) in Bezug auf den Bettunterbau (1) ebenfalls zum automatischen Heben der Auflagefläche in eine im Wesentlichen horizontale und versetzt angehobene Positionen in Bezug auf die des Bettunterbaus geeignet sind.

3. Hebesystem gemäß Anspruch 2, dadurch gekennzeichnet, dass die Länge der Arme (5) und die Drehpunkte hiervon an den Enden so ausgestalten sind, dass die Auflagefläche in Ruhestellung dekkend auf dem Bettunterbau (1) aufliegt.


Revendications

1. Système de levage, dans lequel ledit système de levage comporte une surface de support (4), un sommier de lit (1) et des moyens permettant de lever automatiquement ladite surface de support (4) par rapport au dit sommier de lit (1), système capable de relever automatiquement la surface de support jusqu’à une position élevée essentiellement horizontale correspondant à celle du sommier de lit, dans lequel le système comprend :

- au moins deux bras parallèles (5) sur chaque côté opposé du sommier de lit (1), lesdits bras étant à pivotement au niveau de leurs premières extrémités à l’intérieur des deux parois latérales opposées (3) du sommier de lit (1), et au niveau de leurs secondes extrémités sur une bordure interne de la surface de support (4) ; et
- des barres horizontales (6) qui relient transversalement les premières extrémités des deux bras parallèles opposés (5) raccordées au dit sommier de lit (1) :

caractérisé en ce que le système comprend, de plus :

- un moteur électrique (8) adapté directement à la jonction entre les extrémités de la barre horizontale (6) et de l’un des bras (5) et capable de communiquer un mouvement de rotation à l’un des bras (5).

2. Système de levage selon la revendication 1, caractérisé en ce que lesdits moyens automatiques de levage (8, 9', 9'') de ladite surface de support (4) par rapport au sommier de lit (1) sont également appropriés pour lever automatiquement la surface de support jusqu’à une position relevée essentiellement horizontale et translée par rapport à celle du sommier de lit.

3. Système de levage selon la revendication 2, caractérisé en ce que la longueur desdits bras (5) et leurs points de pivotement au niveau des extrémités sont tels que, en position de repos, la surface de support (4) repose, de façon correspondante, sur le sommier de lit (1).
4. Système de levage selon la revendication 3, caractérisé en ce que ledit, au moins un, moteur électrique (8) est commandé par une commande à distance, avec ou sans fils, ou par un bouton poussoir électrique, inséré, de préférence, dans le sommier de lit.

5. Lit comportant un sommier de lit et une surface de support, caractérisé en ce qu’il comprend un système de levage de ladite surface de support selon l’une quelconque des revendications précédentes.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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