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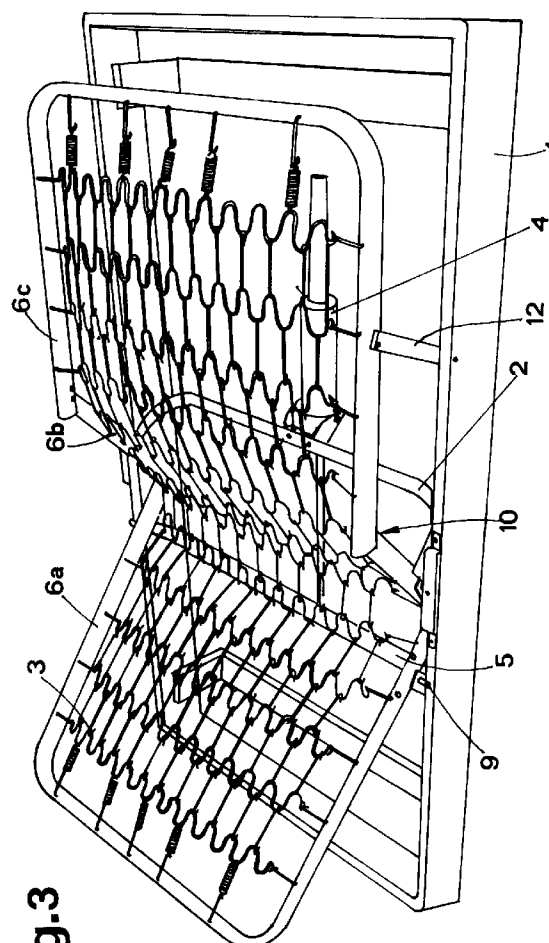
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(54) **A motorised and articulated structure for bedspring frames.**

(57) The invention finds its application in the field of motorised and articulated structures for bedspring frames for people who are not independent or who are affected by certain illnesses. More precisely, the invention relates to a structure comprising a single motorised organ (4) for the movement of a mobile bedspring frame (6) supporting a bedspring net (3) with respect to a fixed frame (1). Said motorised organ (4), preferably constituted by a jack, acts on an area of the mobile frame (6) which is substantially close to the centre of gravity of the said mobile frame (6) when a person is lying on the bed. This permits of the use of a simple motorisation means, requiring only low levels of power.



**fig.3**

The invention relates to a motorised and articulated structure for bedspring frames.

Bedspring frames for articulated and motorised beds are mostly used in hospitals, in public and private clinics and also in homes for bed rest for senior citizens and prevalently for people who are not independent, or for patients with cardiopathic conditions or circulation difficulties.

Prior art motorised and articulated bedspring frame structures comprise a support frame for the bedsprings and means for bending the springs along predisposed articulations, or for regulating the height of the bed.

The motorisations with which the prior art beds are equipped can perform regulations of height and inclination, with the head or feet end lowered, while the various bed accessories such as the shelf or tray remain horizontal, independently of the position of the bedspring frame.

Generally there is a motorised organ for the regulation of the backrest, as well as another motorised organ for the separate regulation of the knee-level articulation of the bedspring frame, but in some realisations a single activating organ is employed, by means of which a coupled regulation of the backrest and knee articulation is possible, with the knee articulation optionally uncouplable.

A further raising organ is present for the height regulation of the bedspring frame.

A common drawback with all prior art realisations is that of their being constructionally rather complex and therefore expensive.

A further drawback is the fact that such bedspring frames need heavy motorisation capable of generating elevated levels of power, which is also energetically expensive.

The aim of the present invention is to eliminate the above-described drawbacks and in particular to provide a motorised and articulated bedspring frame structure which is constructionally simple and inexpensive, equipped with a single motorised organ capable of moving the bedspring frame with low energy costs and using low levels of power.

Said aims are fully attained by the motorised and articulated bedspring frame structure object of the present invention, comprising: a fixed support frame for a mobile bedspring frame; motorised organs to move the mobile bedspring frame, inclining it or raising it with respect to the fixed support frame, wherein the said motorised organs act on an area which is substantially near the centre of gravity of the mobile bedspring frame when a person is lying on it.

These and other characteristics will better emerge from the following description of a preferred embodiment of the invention, accompanied by the illustrations which are in the form of a non-limiting example, in which:

– Figure 1 shows the structure in a perspective

view, with the mobile bedspring frame stretched out;

– Figure 2 shows the structure, in a perspective view, with the mobile bedspring frame inclined with respect to the fixed frame;

– Figure 3 shows, in a perspective view, the whole structure;

– Figure 4 shows a simplified functioning scheme.

With reference to the drawings, 1 denotes a fixed support frame for a mobile bedspring frame 6, which has a three-part articulation 6a, 6b, 6c.

A bedspring net 3 of any known type is fixed to the mobile frame 6.

A substantially "C"-shaped crossbar 5 is bolted to the ends of part 6a of the mobile frame 6, which part 6a corresponds to the head and back area of a person lying on the bed of which the mobile frame 6 is part.

An identical crossbar 2 is bolted to part 6b.

Parts 6b and 6c, which substantially correspond to the knee articulation, are equipped with a joint 10 which permits of reciprocal mobility between the said parts 6b and 6c.

A motorised organ is applied to the crossbar 2 by fixing elements 7, which motorised organ comprises a hydraulic jack 4 whose stem 11 acts on the crossbar 5 as a result of which the crossbar 5 acts as a raising and rotation lever on part 6a with respect to the fixed frame 1.

Part 6a is laterally equipped with two opposed pivots 8 which are inserted in corresponding pivot-holders 9 fixed on the two opposite long sides of the fixed frame 1.

Said pivots 8 permit the rotating movement of part 6a with respect to the fixed frame 1.

Part 6a is kinematically connected to part 6b by means of a small plate 15.

Part 6b is laterally equipped with two opposed pivots 16 which slide internally to slots 17 bored into the two opposed long sides of the fixed frame 1.

The bedspring structure of the present invention supports a common bed mattress and is generally used for senior citizens or people affected by particular health conditions.

With the stem 11 of the hydraulic jack 4 retracted, the bedspring net 3 is arranged on a substantially horizontal plane, as illustrated in figure 1, and is very similar to any bedspring net of the non-articulated kind. The extending of the jack 4 stem 11 causes the inclination of part 6a of the mobile bedspring frame 1, which rotates about the axis passing through the two pivots 8.

Consequently the plate 15 is lowered, moving part 6b, which performs a sliding movement (which is that of the pivots 16 internally to the slots 17) and a rotating movement about the axis passing through the pivots 16.

The inclination of part 6b causes in its turn the

raising of part 6c.

Part 6c is in fact connected to the fixed frame by means of two connecting rods 12.

Each connecting rod 12, together with part 6b of the mobile frame constitute the opposite oblique sides of a parallelogram structure, in which the two long opposite sides are constituted by part 6c and a section of the fixed frame 1.

The articulated rod 12 is pivoted at the point denoted by 13 to the fixed frame 1, and at the point denoted by 14 to part 6c of the mobile frame 6.

Thus with only one jack 4, both the movement of part 6a relative to the head and back of the person lying on the bed and the movement of parts 6a and 6b corresponding to the articulation of the knee are obtained, since the said parts 6a, 6b and 6c are kinematically connected among themselves with only one degree of freedom.

Furthermore the installation of the motorisation organ constituted by the jack 4 is particularly simple, as is that of the mobile frame 6, and this is made possible by the fact that the said jack 4 acts on points on the mobile frame and on the person lying on the bed which are substantially close to the centre of gravity, in such a way that movement of the said mobile frame 6 is permitted with the use of less power with respect to that used by the motorisation organs applied to prior art bedspring frames.

The regulation of the structure is very simple since it is sufficient to vary the length of the stem 11 of the jack 4 or act on the pivots 8 and 15 and on the articulated rods 12.

of said three parts (6a) is made to rotate about an axis passing through two lateral pivots (8) inserted in two pivot-holding elements (9) solid with the said fixed frame (1); said part (6a) being connected, by means of a small plate (15), to another of said three parts (6b), which part (6b) is laterally equipped with pivots (9), which pivots (9) are slidable internally to slots (17) bored into the fixed frame (1).

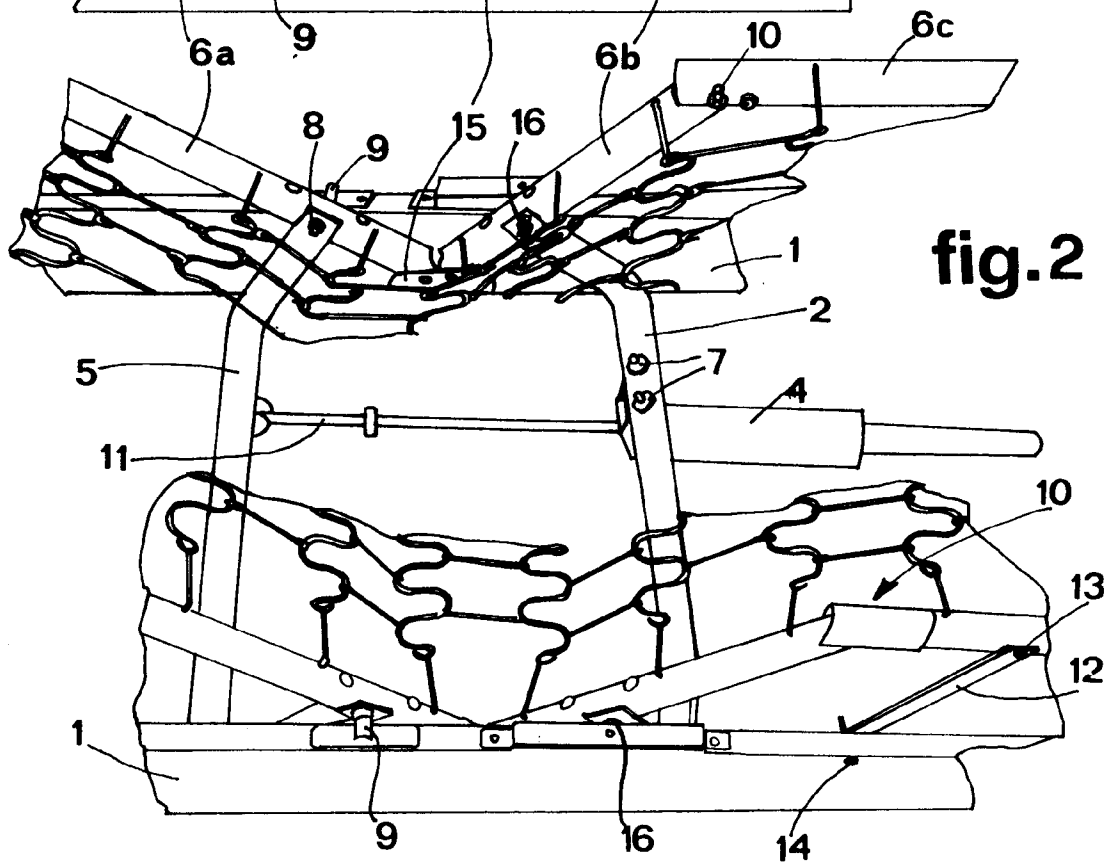
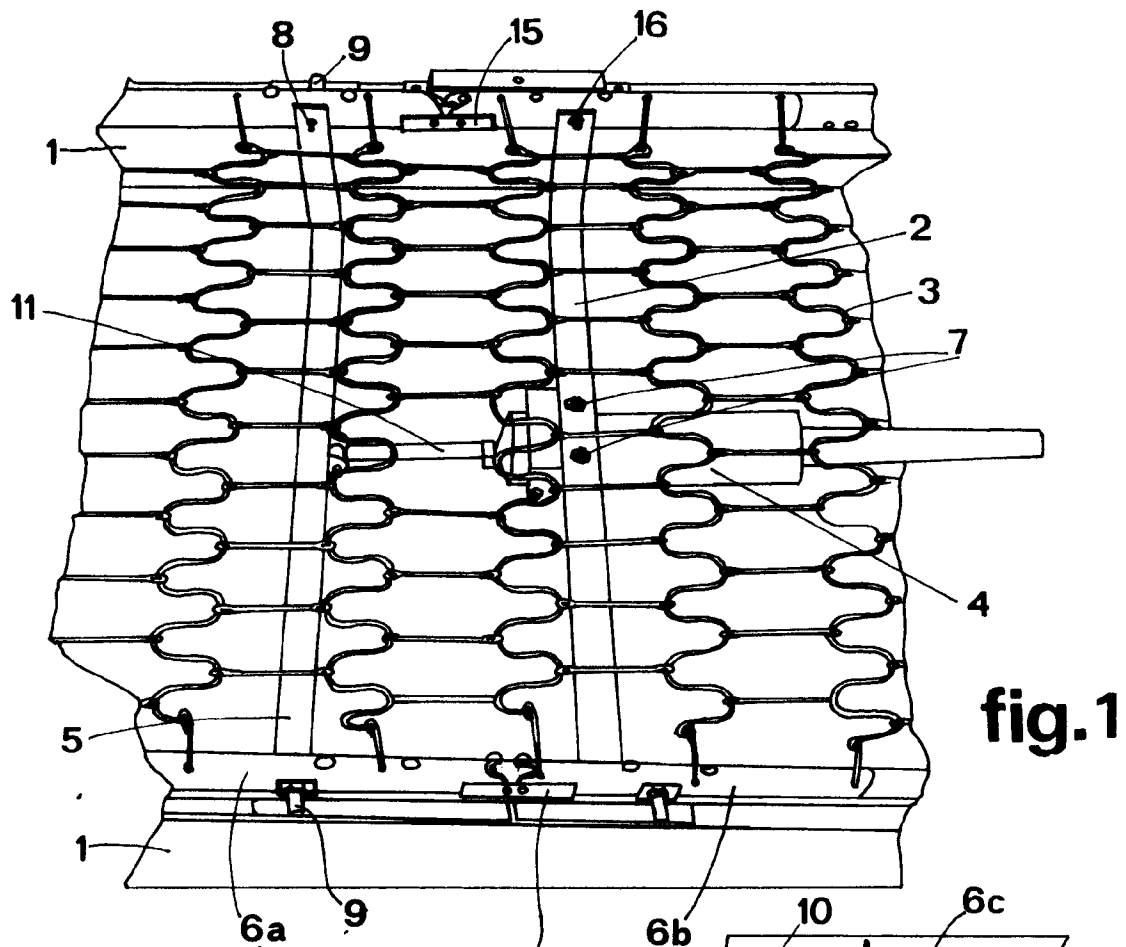
## Claims

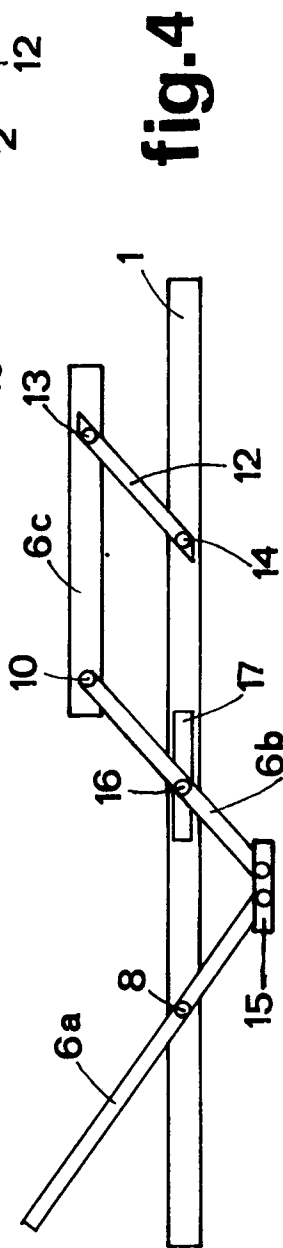
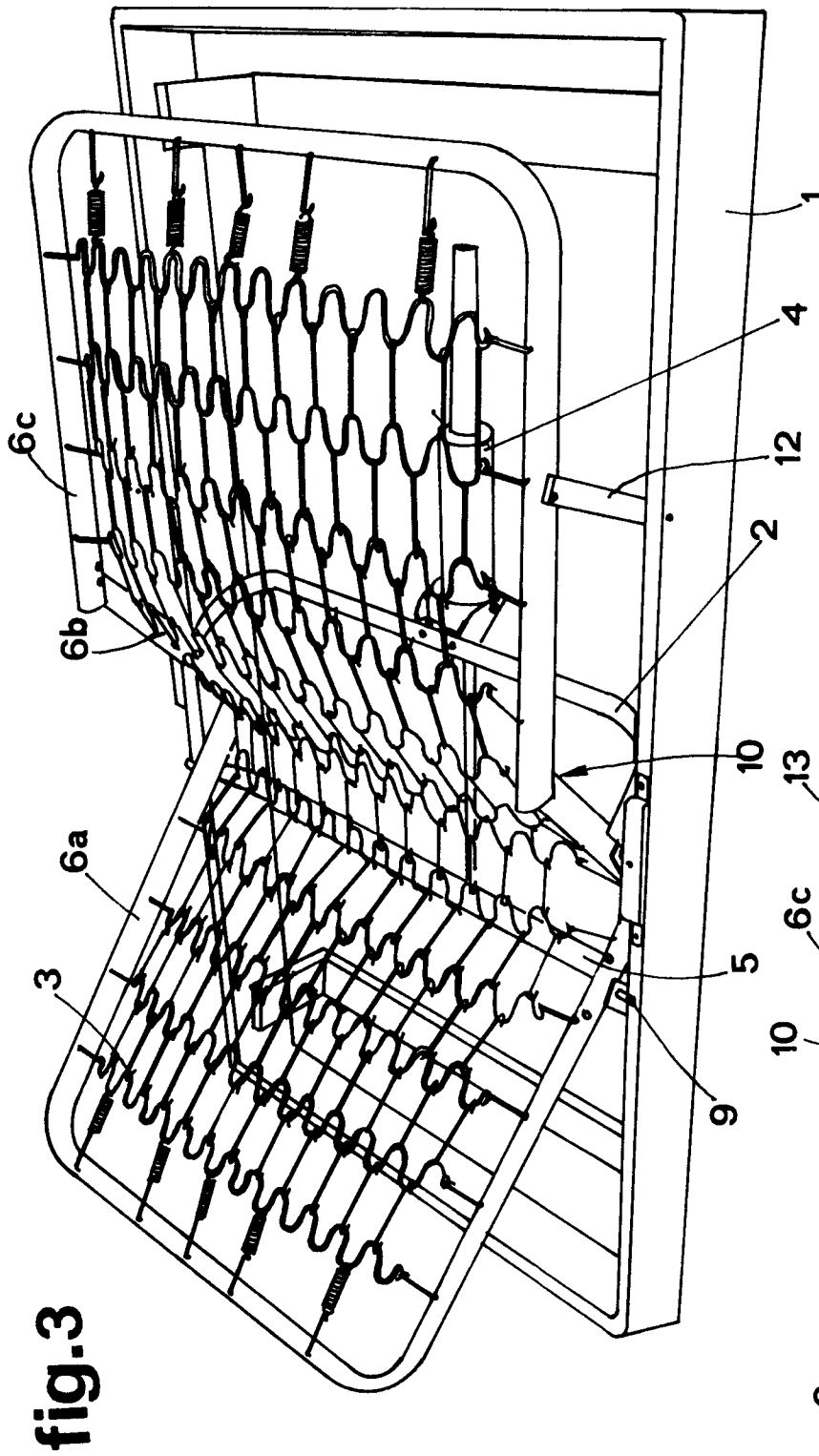
1. A motorised and articulated structure for bedspring frames, of the type comprising: a fixed frame (1) supporting a mobile frame (6) to which a bedspring net (3) is applied; motorised organs for the movement of the mobile frame (6) by inclining and/or raising it with respect to the said fixed frame (1), wherein said motorised organs act on an area of the mobile frame (6) which is substantially close to its centre of gravity when a person is lying upon it.

2. A structure as in claim 1, wherein the said mobile frame (6) is composed of three parts (6a, 6b, 6c), connected among themselves in a kinematic chain with only one degree of liberty.

3. A structure as in claim 1, wherein the said motorised organs comprise a jack (4) whose stem (11) acts on a crossbar (5) which crossbar (5) is solid to the said mobile structure (6).

4. A structure as in claims 1 and 2, wherein the first







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0552

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                   |                                                   |                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Citation of document with indication, where appropriate, of relevant passages                                     | Relevant to claim                                 | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EP-A-0 315 588 (SCHATTI)<br>* column 4, line 61 - column 7, line 7; figures 6,7 *                                 | 1,3                                               | A47C20/08<br>A47C20/04                        |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ---                                                                                                               | 2,4                                               |                                               |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FR-A-1 270 426 (SLUMBERLAND)<br>* page 2, column 2, last paragraph - page 3, column 1, paragraph 1; figures 4-8 * | 2,4                                               |                                               |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FR-A-1 295 987 (GADONNET)<br>* the whole document *                                                               | 1-4                                               |                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                   |                                                   | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                   |                                                   | A47C                                          |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                   |                                                   |                                               |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                   | Date of completion of the search<br>18 MARCH 1992 | Examiner<br>VANDEVONDELE J.                   |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> I : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                                                                   |                                                   |                                               |

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