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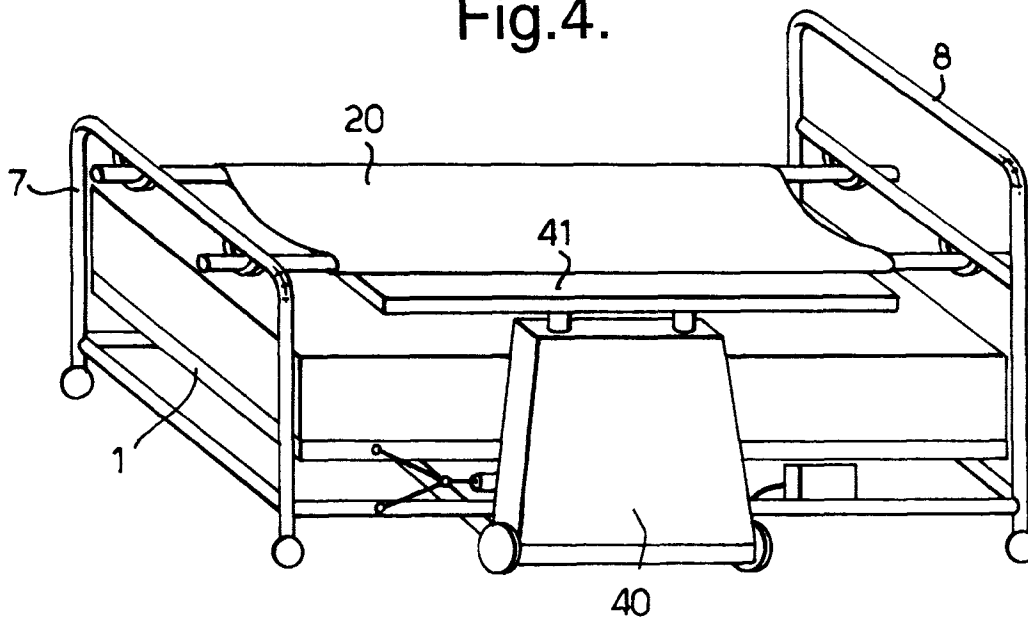
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(54) **Beds, transfer systems and methods**

(57) A bed has rings 10 on the foot and head frame 7 and 8 in which stretcher poles 23 can be located. The mattress 1 is movable up to a position level with the locating rings 10 so that a stretcher web 21 can be placed under the patient and stretcher poles 23 inserted in the

locating rings 10 and in pockets 22 along opposite sides of the web. The mattress 1 can then be lowered so that the patient is supported on the stretcher 20 suspended between the foot and head frames 7 and 8 and spaced sufficiently above the mattress to enable the top 41 of a transfer trolley 40 to be pushed beneath the patient.

Fig.4.



Description

This invention relates to beds of the kind having a mattress structure, a head frame projecting above the upper surface of the mattress structure at one end of the bed and a foot frame projecting above the upper surface of the mattress structure at the opposite end of the bed.

The conventional way of transferring a patient from bed to, for example, an operating theatre involves placing a stretcher canvas beneath the patient while he is lying on the bed by threading stretcher poles through pockets extending along opposite sides of the canvas and then lifting him onto a transfer trolley. This technique requires at least two people to perform and can involve the users lifting relatively heavy weights.

It is an object of the present invention to provide an improved bed, transfer system and method.

According to one aspect of the present invention there is provided a bed of the above-specified kind, characterised in that the head frame and the foot frame both have a pair of stretcher pole locating members, and that the mattress structure is movable up and down relative to the locating members such that a stretcher can be placed between the upper surface of the mattress structure and the patient, and such that the poles of the stretcher can be engaged with the locating members and the mattress structure lowered relative to the head and foot frames to enable a transfer trolley top to be positioned beneath the patient.

The locating members may be rings on horizontal rungs of the head and foot frames. The mattress structure may be movable up and down relative to a base frame, or the locating members may be movable up and down relative to a base frame.

According to another aspect of the present invention there is provided patient transfer system including: a bed having a mattress structure, a head frame projecting above the upper surface of the mattress structure at one end of the bed, and a foot frame projecting above the upper surface of the mattress structure at the opposite end of the bed, the head frame and the foot frame both having a pair of stretcher pole locating members, and the mattress structure being movable up and down relative to the locating members; a stretcher having a web and two poles that can be located to extend along opposite edges of the web, the ends of the poles being locatable in respective ones of the locating members; and a transfer trolley having a top that can be positioned between the upper surface of the mattress structure and the lower surface of the stretcher when the mattress structure is lowered relative to the head and foot frames.

The mattress structure may be movable up and down relative to the base structure, the support surface of the transfer trolley being movable up and down. Alternatively, the locating members may be movable up and down relative to the base frame.

According to a further aspect of the present invention there is provided a method of transferring a patient from a bed onto a transfer trolley including the steps of placing a stretcher web beneath the patient while he is lying on the bed mattress, locating stretcher poles with head and foot frames of the bed, lowering the mattress relative to the head and foot frames so that the patient is supported by the stretcher while suspended between the head and foot frames, placing the top of a transfer trolley between the upper surface of the mattress and the underside of the stretcher, moving the trolley top and stretcher relative to one another so that the weight of the patient is supported by the trolley, removing the stretcher poles from the head and foot frames and moving the patient away from the bed on the trolley.

The head and foot frames may be fixed, the mattress being lowered to suspend the stretcher between the head and foot frames, and the trolley may be raised to support the weight of the patient. Alternatively, the mattress may be fixed and the head and foot frames raised to suspend the stretcher between the head and foot frames. The head and foot frames may be subsequently lowered after positioning the trolley beneath the patient so that the weight of the patient is supported by the trolley.

A transfer system and a method for transferring a patient from a hospital bed, according to the present invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective, simplified view of the bed;

Figures 2 to 4 are perspective, simplified views illustrating the system in use; and

Figure 5 is a perspective, simplified view of an alternative bed.

With reference first to Figure 1, the bed has a mattress structure 1 comprising a rigid platform 2 supporting a mattress 3. An adjustable support 5 supports the mattress structure 1 on a base frame 4.

The adjustable support 5 may take many different forms and is only shown schematically in the drawings. In the example illustrated, the support has two scissor mounts 50 and 51 spaced from one another along the bed. The mounts 50 and 51 each comprise an upper strut 52 and a lower strut 53 connected at one end by pivot joints 54 and 55 to the platform 2 and the base frame 4 respectively. The other end of the struts 52 and 53 of each mount are connected

together by a hinge coupling 56. The support 5 has a single hydraulic cylinder 57 arranged horizontally and connected at opposite ends to respective hinge couplings 56. The hydraulic cylinder 57 is connected to an electric or manual pump 58 by which hydraulic fluid can be supplied to the cylinder, to make it extend, or can be pumped from the cylinder, to make it retract. When the cylinder 57 is fully retracted, the hinge couplings 56 are drawn together and both scissor mounts 50 and 51 are folded closed, so that the pivot joints 54 on the mattress structure 1 are located close to the respective pivot joints 55 on the base frame 4. In this position, therefore, the mattress structure 1 is at its lowest position. When the cylinder 57 is fully extended, the hinge couplings 56 are pushed away from each other, thereby opening out the scissor mounts 50 and 51 and raising the mattress structure 1 to its highest point.

The mattress structure 1 could be foldable about a lateral line at a location between its ends, the support 5 being arranged to tilt up the head end of the mattress structure in the usual way, so that the patient can sit up in bed more easily. The support 5 could also be arranged to enable the mattress structure to be moved to a Trendelenburg position, where the head is lowered.

The base frame 4 extends horizontally a short distance above the floor and is supported on the floor by means of castors 6 at each of its four corners. At opposite ends of the bed, a foot frame 7 and head frame 8 project vertically from the base frame 4, to which they are fixed. The foot and head frames 7 and 8 are generally rectangular and their upper ends project above the upper surface of the mattress 3. The head frame 8 is shaped to provide support for pillows at the head of the patient, in the usual way. The head and foot frames 7 and 8 differ from conventional frames in that they each have two stretcher pole locating members 10 in the form of rings spaced apart from one another. The locating members 10 on the foot frame 7 are spaced along its horizontal top rung 11, whereas they are spaced along a horizontal intermediate rung 12 of the head frame 8 at the same height as the foot rung 11. The locating members 10 may take various different forms providing they support the ends of stretcher poles vertically and prevent them sliding together. They may, for example, take the form of hooks or notches in the upper surface of the rungs 11 and 12.

In normal use, the mattress structure 1 is in its lowest position, as shown in Figure 1. When it is necessary to move the patient from the bed, this is done in the manner illustrated in Figures 2 to 4, using a stretcher 20 (Figure 3) and a transfer trolley 40 (Figure 4). The stretcher 20 is entirely conventional, comprising a canvas web 21 with pockets 22 extending along opposite edges in which two poles 23 can be inserted. The web 21, with the poles 23 removed, is slipped under the patient (not shown) while he is lying on the mattress 3, in the usual way, so that the patient lies on the web 21 with the pole pockets 22 extending along opposite sides. The mattress structure 1 is then raised by operating the pump 58 so as to bring the top surface of the mattress 3 level with the stretcher pole locating members 10, as shown in Figure 2. Some users may prefer to raise the mattress structure 1 to this height before slipping the stretcher canvas 21 under the patient, to avoid bending. The two stretcher poles 23 are then slid through respective locating members 10 in the foot frame 7, along respective pockets 22 in the stretcher canvas 21 and into respective ones of the locating members 10 in the head frame 8. The poles 23 are, therefore, positioned so that one end is located with the foot frame 7 and the other end is located with the head frame 8.

The next step is to lower the mattress structure 1 by operating the pump 58 in reverse, so that the weight of the patient is taken by the stretcher 20 supported at opposite ends on the foot and head frames 7 and 8, as shown in Figure 3. The mattress structure 1 is lowered sufficiently to leave a clear gap between the lower surface of the stretcher 20 and the upper surface of the mattress 3. A conventional transfer trolley 40 is then brought alongside the bed, as shown in Figure 4, and its top 41 is positioned so that it can be pushed between the mattress 3 and the stretcher 20. When the trolley top 41 is located below the patient, the top is raised sufficiently to take his weight and to enable the stretcher poles 23 to be slid out. The patient can then be moved on the trolley 40 in the usual way.

If desired, a similar method could be used to transfer the patient back from the trolley to the bed, or to a different bed. The trolley top 41 is positioned over the bed, with the mattress structure 1 in its lowest position, the trolley top being raised or lowered to a height where the top is level with the stretcher pole locating members 10 on the foot and head frame 7 and 8. The stretcher poles 23 are then inserted through the locating members 10 and along the pockets 22 in the canvas 21. The trolley top 41 is then lowered so that the weight of the patient is taken by the stretcher poles 23, and the trolley can be moved away. The mattress structure 1 is then raised to take the weight of the patient off the poles 23 so that these can be slid out. The patient is then lowered on the mattress structure 1 and the stretcher canvas 21 is removed.

The mattress structure itself does not have to be adjustable in height, instead, the relative movement between the stretcher pole locating members and the mattress structure could be achieved by a bed of the kind shown in Figure 5 in which the stretcher pole locating members 10' can be raised and lowered. The foot and head frames 7' and 8' have a lower part 71 and 81 fixed with the base frame 4' and an upper part 72 and 82, which is telescopic on the lower part, the upper parts carrying the stretcher pole locating members 10'. Hydraulic cylinders 90 or other adjustable means are connected between the respective lower and upper parts 71 and 72, and 81 and 82 so that the locating members 10' can be raised or lowered relative to the base frame 4'. The patient is transferred to a transfer trolley by raising the upper parts 72 and 82 of the frames 7' and 8' to lift the stretcher and patient above the mattress, so that the trolley top can be slipped under the patient. The weight of the patient is then taken by the trolley, either by raising the trolley top,

or by lowering the upper parts 72 and 82 of the frames. It can be seen that such a bed enables transfer of patients with a trolley having a fixed top.

The present invention enables patients to be transferred with little effort by the users. It also enables one person to transfer the patient onto the transfer trolley. The invention also has the advantages of causing little disturbance to the patient and of using a conventional stretcher and transfer trolley.

Claims

- 10 1. A bed having a mattress structure (1), a head frame (8, 8') projecting above the upper surface of the mattress structure at one end of the bed and a foot frame (7, 7') projecting above the upper surface of the mattress structure at the opposite end of the bed, characterised in that the head frame (8, 8') and the foot frame (7, 7') both have a pair of stretcher pole locating members (10, 10'), and that the mattress structure (1) is movable up and down relative to the locating members (10, 10') such that a stretcher (20) can be placed between the upper surface of the mattress structure (1) and the patient, and such that the poles (23) of the stretcher can be engaged with the locating members (10, 10') and the mattress structure (1) lowered relative to the head and foot frames (8, 8' and 7, 7') to enable a transfer trolley top (41) to be positioned beneath the patient.
- 15 2. A bed according to Claim 1, characterised in that the locating members are rings (10, 10') on horizontal rungs (12, 11) of the head and foot frames (8, 8' and 7, 7').
- 20 3. A bed according to Claim 1 or 2, characterised in that the mattress structure (1) is movable up and down relative to a base frame (4).
- 25 4. A bed according to Claim 1 or 2, characterised in that the locating members (10') are movable up and down relative to a base frame (4').
- 30 5. A patient transfer system including: a bed having a mattress structure (1), a head frame (8, 8') projecting above the upper surface of the mattress structure (1) at one end of the bed, and a foot frame (7, 7') projecting above the upper surface of the mattress structure at the opposite end of the bed, the head frame (8, 8') and the foot frame (7, 7') both having a pair of stretcher pole locating members (10, 10'), and the mattress structure (1) being movable up and down relative to the locating members (10, 10'); a stretcher (20) having a web (21) and two poles (23) that can be located to extend along opposite edges (22) of the web, the ends of the poles (23) being locatable in respective ones of the locating members (10, 10'); and a transfer trolley (40) having a top (41) that can be positioned between the upper surface of the mattress structure (1) and the lower surface of the stretcher (20) when the mattress structure is lowered relative to the head and foot frames (8, 8' and 7, 7').
- 35 6. A patient transfer system according to Claim 5, characterised in that the mattress structure (1) is movable up and down relative to the base structure (4), and that the support surface (41) of the transfer trolley (40) is movable up and down
- 40 7. A patient transfer system according to Claim 5, characterised in that the locating members (10') are movable up and down relative to the base frame (4').
- 45 8. A method of transferring a patient from a bed onto a transfer trolley (40) including the steps of placing a stretcher web (21) beneath the patient while he is lying on the bed mattress (3), locating stretcher poles (23) with head and foot frames (8, 8' and 7, 7') of the bed, lowering the mattress (3) relative to the head and foot frames (8, 8' and 7, 7') so that the patient is supported by the stretcher (20) while suspended between the head and foot frames, placing the top (41) of the transfer trolley (40) between the upper surface of the mattress (3) and the underside of the stretcher, moving the trolley top (41) and stretcher (20) relative to one another so that the weight of the patient is supported by the trolley (40), removing the stretcher poles (23) from the head and foot frames (8, 8' and 7, 7') and moving the patient away from the bed on the trolley (40).
- 50 9. A method according to Claim 8, characterised in that the head and foot frames (8 and 7) are fixed, and that the mattress (3) is lowered to suspend the stretcher (20) between the head and foot frames (8 and 7).
- 55 10. A method according to Claim 9, characterised in that the trolley (40) is raised to support the weight of the patient.

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11. A method according to Claim 8, characterised in that the mattress (1) is fixed and the head and foot frames (8' and 7') are raised to suspend the stretcher (20) between the head and foot frames.

5 12. A method according to Claim 11, characterised in that the head and foot frames (8' and 7') are subsequently lowered after positioning the trolley (40) beneath the patient so that the weight of the patient is supported by the trolley.

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Fig.1.

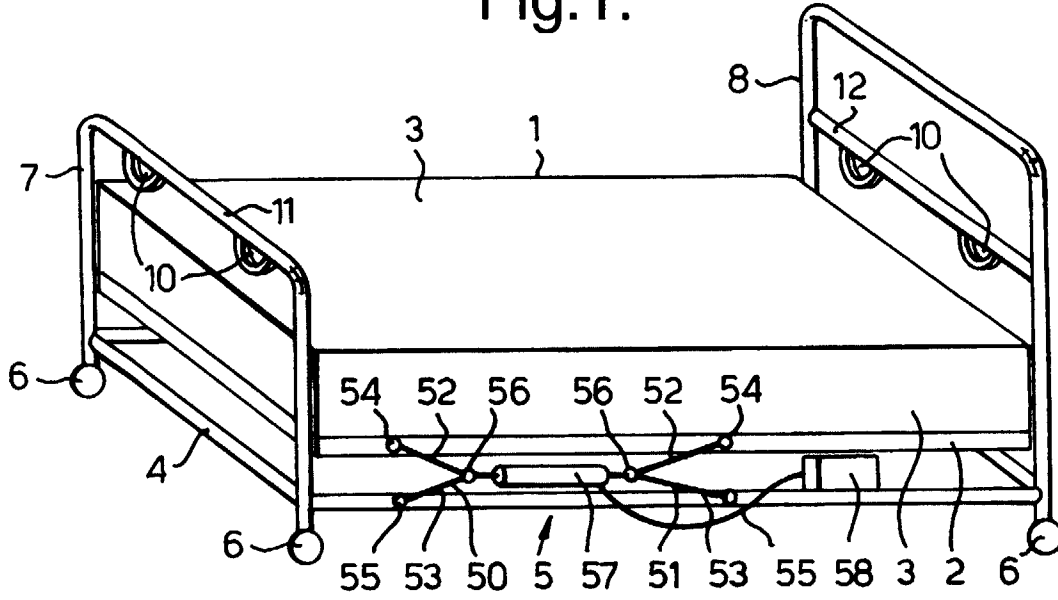


Fig.2.

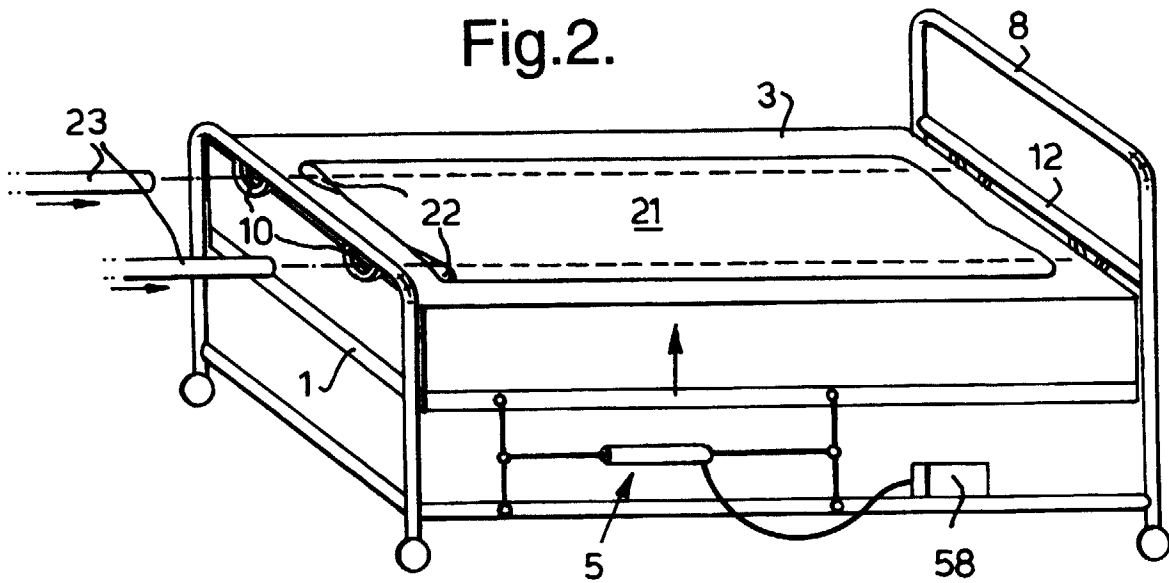


Fig.3.

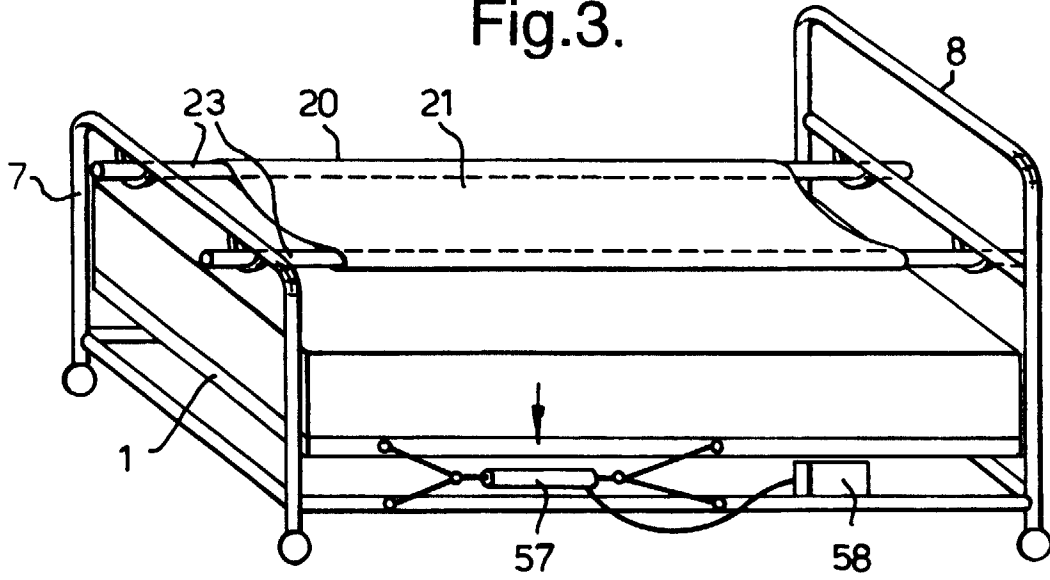


Fig.4.

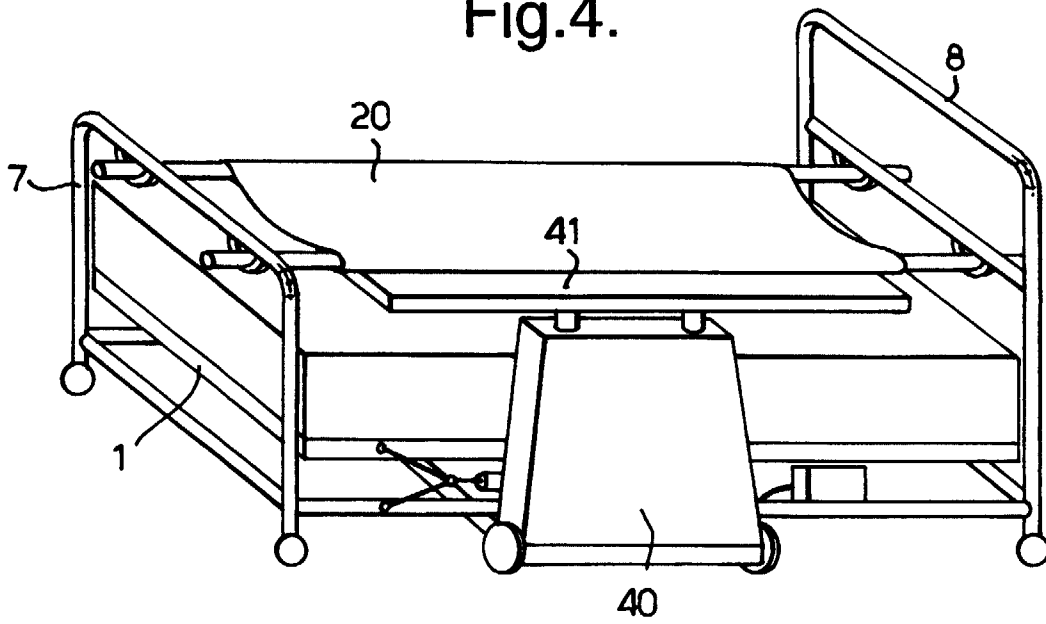
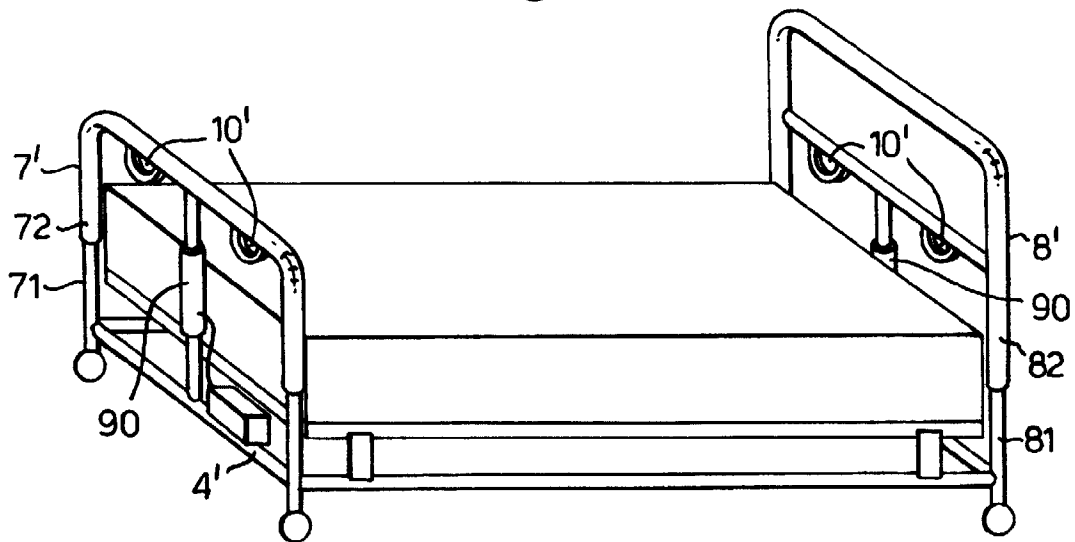


Fig.5.





European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 3675

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.6)
Y	DE 632 018 C (DENIS) 1 July 1936 * the whole document *	1,3,5,6,8,9	A61G7/10
Y A	GB 882 351 A (THIIS) 15 November 1971 * page 1, line 39 - line 53 * * page 1, line 71 - line 83 *	1,5,8,10 4,7,11	
Y	GB 1 270 150 A (CAMPBELL) 12 April 1972 * the whole document *	1,3,5,6,8-10	
A	US 2 539 566 A (BEDARD) 30 January 1951 * column 2, line 15 - line 34; figures 1,2 *	5,8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A61G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 August 1998	Examiner Baert, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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