

Description

[0001] The present invention relates to a bed with a frame and, along a side of the bed, at least one security barrier collapsible under the bed.

[0002] Such hospital beds are generally known. The drawback of the existing hospital beds with collapsible security barriers is that the security barriers protrude far beyond the side of the bed while being collapsed under the bed. In hospitals where there is often little space available, there is a demand for security barriers which can be collapsed more easily, and which in particular allow a collapsing movement wherein the security barrier moves outward as little as possible.

[0003] The invention thus has for its object to meet the above stated demand.

[0004] The invention provides for this purpose a bed with a collapsible security barrier which is provided with guide means extending over at least a part of the height of the security barrier, and with at least one element guidable by the guide means, wherein each guidable element is connected to the frame of the bed for pivoting around a first pivot shaft parallel to the side of the bed.

[0005] Such guide means with guidable element allow the security barrier to be moved downward in an only slightly tilted position in a first phase of the collapsing movement, wherein the guidable element moves upward along the guide means and the security barrier thus moves downward. The higher the guidable element is situated in the guide means, the further the security barrier can be tilted in order to eventually be situated wholly under the bed. Because the guidable element is connected pivotally to the frame, the security barrier can drop downward along the guidable element and be tilted around the first pivot shaft, and a collapsing movement is possible in which the security barrier only protrudes over a short distance relative to the side of the bed. This will be further illustrated on the basis of figure 2, which shows that security barrier 3 extends over a maximum distance D relative to the side of the bed.

[0006] According to a preferred embodiment, the guide means extend over substantially the full height of the security barrier. In this way the security barrier in the collapsed position will hardly protrude relative to the side of the bed.

[0007] The guide means preferably comprise at least two straight guides parallel to each other and at a distance from each other. These two straight guides can for instance be provided on the two transverse side edges of the security barrier. For each straight guide a guidable element is then provided which is connected to the frame of the bed for pivoting around the first pivot shaft. The number of straight guides can be modified in accordance with the width of the security barrier.

[0008] According to a further developed embodiment, the underside of the security barrier is pivotally connected to the underside of the bed via at least one pivoting arm in order to further define the collapsing movement of the

security barrier under the bed. The pivoting arm can perform a movement around a second pivot shaft parallel to the side of the bed, and thus ensures that the underside of the security barrier performs a circular movement from its upward position adjacently of the bed to the fully collapsed position as shown in figure 2. The greater the radius R of the circular movement, the smaller the distance D will be. The choice of the length of the pivoting arm (i.e. of the length of radius R) will however also be determined by the space available under the bed.

[0009] According to a possible embodiment, a spring element such as a gas spring can further be provided in order to damp the movements of the pivoting arm and to hold the security barrier in the collapsed position.

[0010] Further advantageous embodiments are described in the dependent claims 2-11.

[0011] The invention will be further elucidated on the basis of a number of non-limitative exemplary embodiments which are described hereinbelow with reference to the accompanying drawings, in which:

- figure 1 is a perspective view of a bed according to an embodiment of the invention;
- figures 2A-2G are schematic views of a security barrier in seven different positions, from the upward position along a side of the bed to the fully collapsed position under the bed;
- figure 3 is a side view of an embodiment of the security barrier in the upward position;
- figure 4 is a perspective view of the embodiment of figure 3; and
- figure 5 is a top view of the embodiment of figure 3.

[0012] Figure 1 shows a possible embodiment of a bed according to the invention. Bed 1 has a frame 2 and is provided with four security barriers 3. These security barriers 3 can be collapsed in compact manner under the bed. In compact manner is understood to mean that the security barriers do not protrude further than a determined distance from the side of the bed. Security barrier 3 is provided on either side with guide means 4 extending over substantially the full height of the security barrier, i.e. the height of the security barrier when extension 12 is in the retracted position - see below. The guide means consist here of a channel arranged in the two side edges 20 of the security barrier. Arranged in channel 4 is a guidable element 5 which is connected to the frame of the bed for pivoting around a first pivot shaft 6 parallel to the side of the bed.

[0013] The movement of the security barrier during the collapsing movement will now be illustrated with reference to figure 2. In step A the security barrier is in the highest position, with extension 12 fully extended. When it is desired to collapse the security barrier under the bed, extension 12 is first lowered (figures 2A-2B). As can be seen in figure 1, extension 12 is provided with two tubes 16 which are arranged telescopically in the side edges of the security barrier. Extension 12 is thus moved down-

ward by sliding these tubes into the side edges. In a subsequent step the locking mechanism (see below) is released so that the barrier can be bent downward, wherein guidable element 5 moves along guide means 4 (figure 2C). In order to further define this collapsing movement the bottom end of the security barrier is pivotally connected to the underside of the bed via a pivoting arm 7. This pivoting arm 7 thus defines the circular movement of the lowermost point of security barrier 3, while the movement of the other end of the security barrier is defined by guide means 4. Steps C-G show the successive positions of the security barrier during the collapsing movement.

[0014] A detailed possible embodiment of the guide system of the security barrier will now be described with reference to figures 3-5. In the shown embodiment the security barrier 3 consists substantially of two side edges directed transversely of the side of the bed and two longitudinal bars 21, 22. Note that the lower longitudinal bar 21 functions as a support bar for the mattress and is fixedly connected to frame 2 such that this bar does not co-displace when security barrier 3 is collapsed under the bed. An extension 12 is further provided which is arranged telescopically in side edges 20 using two transverse tubes 16. Side edges 20 are each provided on their outside with a channel 4 in each of which two wheels 10a, 10b of a guidable element 5 are guided.

[0015] Side edges 4 are further connected pivotally to a first end of an arm 7, wherein the other end of arm 7 is connected to frame 2 on the underside of the bed for pivoting around a pivot shaft 8 parallel to the side of the bed. The two pivoting arms are further mutually connected via a shaft 14. The movement of pivoting arm 7 is damped by a gas spring 13 acting between the frame and shaft 14. The gas spring provides for a controlled movement and retention of the security barrier in the collapsed position.

[0016] The lower longitudinal bar 21 is provided on its end with one or more bores 11, in which pins are accommodated which can move outward in order to engage in openings 16 arranged in a part connected to side edges 20 such that the security barrier can be locked in the upward position. This system with pins thus forms the locking mechanism referred to earlier in the text. A means which can be operated by the user can control the movement of pins 11 and thus lock or unlock the security barrier as desired.

[0017] The invention is not limited to the above described embodiments and the skilled person will appreciate that many variations and modifications are possible without departing from the scope of the invention, which is defined solely by the appended claims. Guide means 4 for instance do not necessarily have to be provided in two side edges 20 but can also be provided in other transverse parts of the security barrier. The skilled person will further appreciate that more than two guide means can be provided in the case of wider security barriers. Although the only shown embodiment of the guide means is a channel in which wheels can move, the skilled person

will understand that numerous other embodiments are possible. It will further be apparent that the two pivoting arms 7 are not essential, and that the lower end could for instance also be guided in a suitable channel provided under the bed.

Claims

- 10 1. Bed (1) with a frame (2) and, along a side of the bed, at least one security barrier (3) collapsible under the bed, **characterized in that** the security barrier is provided with guide means (4) extending over at least a part of the height of the security barrier, and with at least one element (5) guidable by the guide means, wherein each guidable element is connected to the frame of the bed for pivoting around a first pivot shaft (6) parallel to the side of the bed.
- 15 2. Bed as claimed in claim 1, **characterized in that** the guide means extend over substantially the full height h of the security barrier.
- 20 3. Bed as claimed in claim 1, **characterized in that** the guide means (4) comprise at least two straight guides extending parallel to each other and at a distance from each other over at least a part of the height of the security barrier, and that for each straight guide a guidable element is provided which is connected to the frame of the bed for pivoting around the first pivot shaft.
- 25 4. Bed as claimed in claim 1, **characterized in that** the underside of the barrier is pivotally connected to at least one pivoting arm (7) which is connected to the frame for pivoting around a second pivot shaft (8) parallel to the side of the bed, wherein the second pivot shaft lies at a distance from the side of the bed, which pivoting arm is adapted to further define the collapsing movement of the security barrier under the bed.
- 30 5. Bed as claimed in claim 1, **characterized in that** two pivoting arms are provided which at one end are pivotally connected in each case at a distance from each other to the underside of the barrier, and are connected at the other end to the underside of the bed for pivoting round a second pivot shaft which is parallel to the side of the bed and which lies at a distance from the side of the bed.
- 35 6. Bed as claimed in claim 4 or 5, **characterized in that** the at least one pivoting arm is connected to a spring element such as a gas spring for the purpose of damping the collapsing movement and for retaining the security barrier in the collapsed position.
- 40 7. Bed as claimed in any of the foregoing claims, **char-**
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acterized in that the guide means consist of at least one channel.

8. Bed as claimed in any of the foregoing claims, **characterized in that** the security barrier has two side edges directed perpendicularly of an edge of the bed, and that the guide means consist of a first and a second channel in respectively the first and the second side edge.

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9. Bed as claimed in any of the foregoing claims, **characterized in that** the guidable element comprises at least one wheel.

10. Bed as claimed in claim 9, **characterized in that** the guidable element consists of an arm which is connected at one end to the underside of the bed and on the other end of which is mounted the at least one wheel which is guided by the guide means.

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11. Bed as claimed in any of the foregoing claims, **characterized in that** retaining means which can be operated by a user, such as a snap system, are provided for fixing the security barrier in an upward position along the side of the bed.

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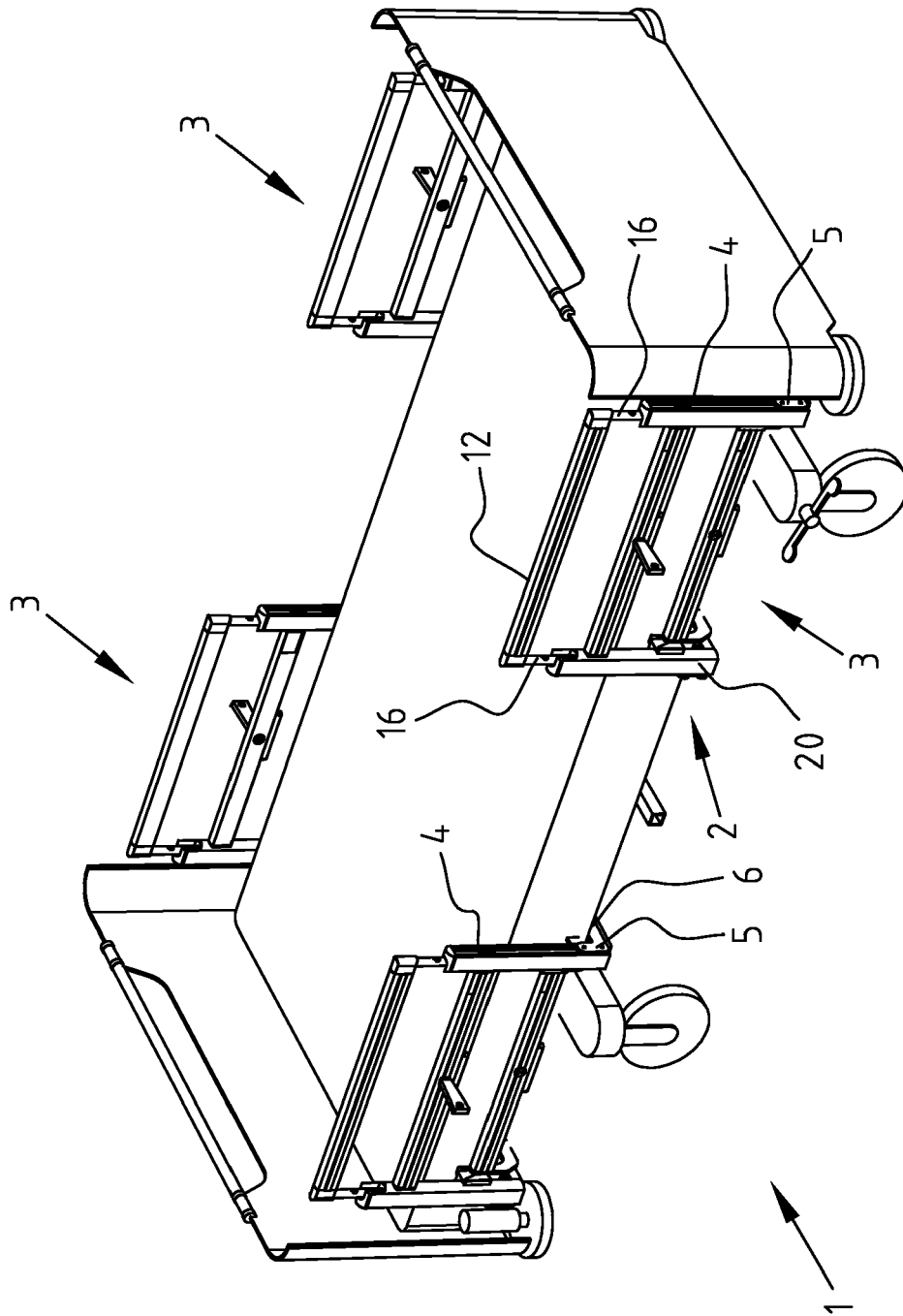


FIG. 1

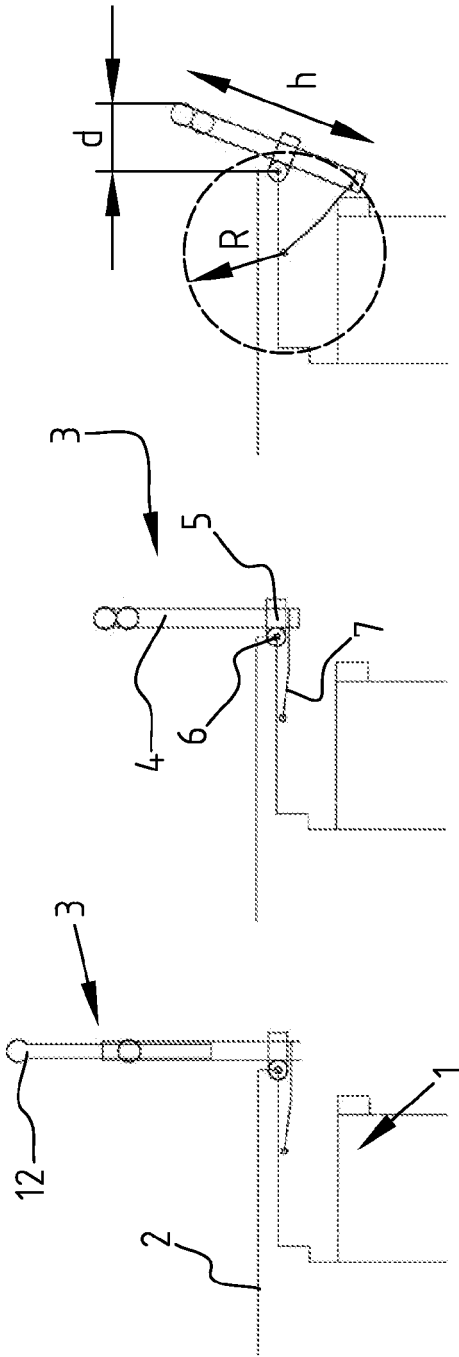


FIG. 2A

FIG. 2B

FIG. 2C

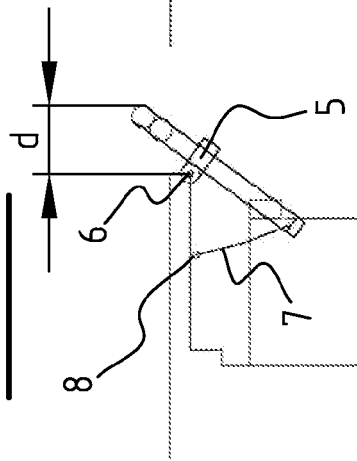


FIG. 2D

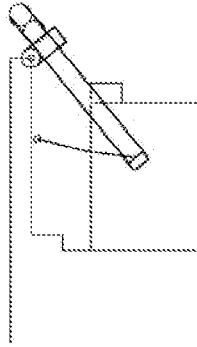


FIG. 2E

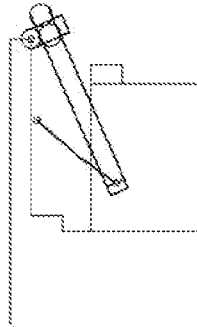


FIG. 2F

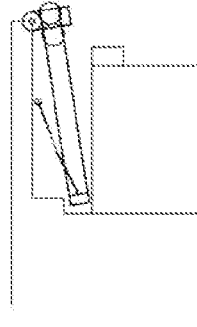


FIG. 2G

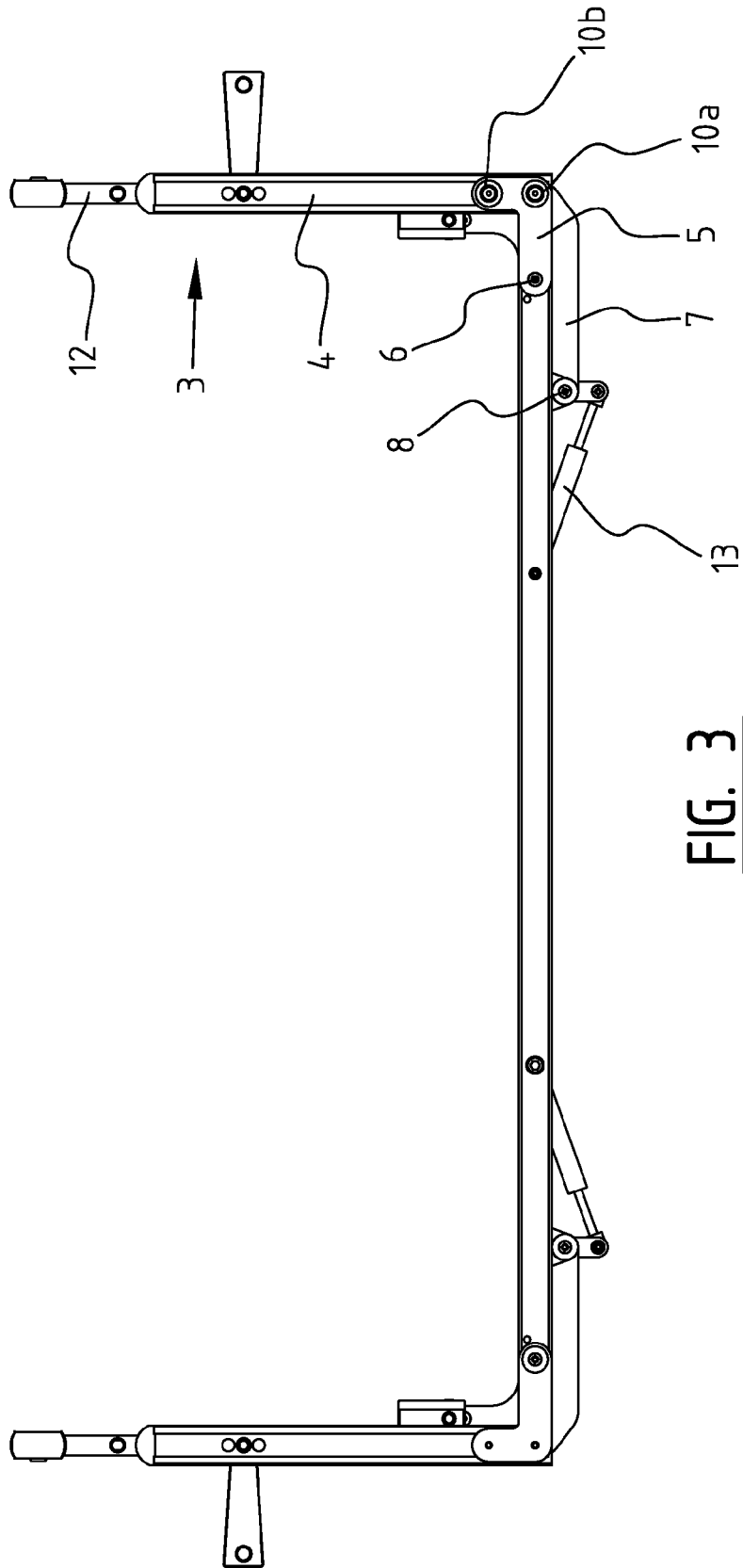


FIG. 3

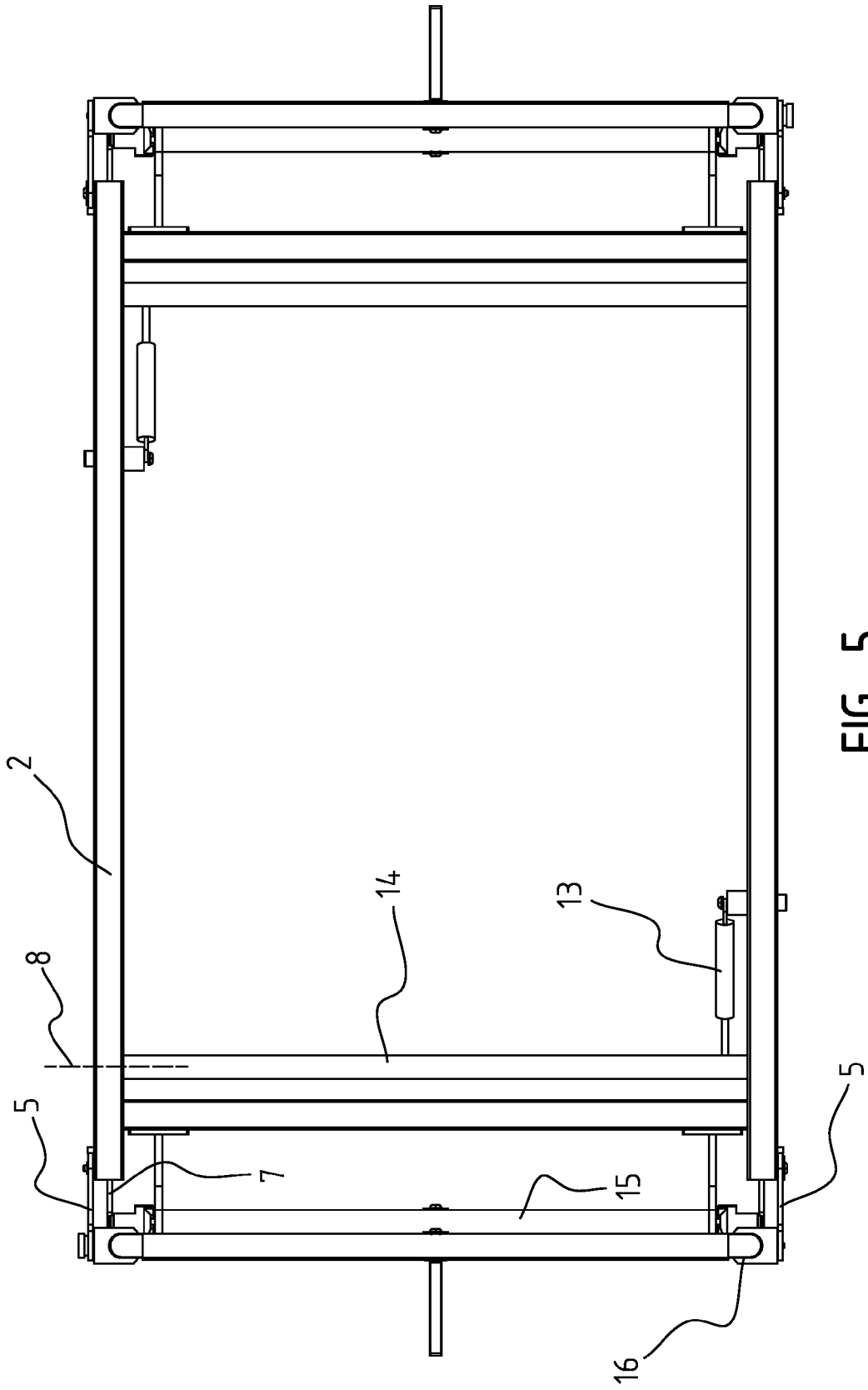


FIG. 5



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 00/42884 A1 (HILL ROM CO INC [US]) 27 July 2000 (2000-07-27) * page 12, line 13 - page 13, line 28 * * figures 4-8 *	1-7,11	INV. A61G7/05 A47C21/08
X	US 2006/195984 A1 (HAKAMIUN REZA [US] ET AL) 7 September 2006 (2006-09-07) * paragraph [0037] - paragraph [0044] * * figures 1,8a,8b *	1-3,7,11	
A	DE 298 24 011 U1 (VOELKER MOEBELPRODUKTIONSGESEL [DE]) 2 March 2000 (2000-03-02) * figures 20,21 * * page 31, line 14 - page 32, line 17 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61G A47C A41D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		27 June 2008	Ong, Hong Djen
CATEGORY OF CITED DOCUMENTS		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	
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 10 2479

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-06-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82