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(54) **Opening mechanism of a storage bed base**

(57) The present invention relates to an opening mechanism for a storage bed base of the type comprising a movable cover (25) and a fixed box (24), the opening mechanism comprising a pair of arms (4, 5) articulated to one another by means of a double shaft comprising a hollow shaft (11) and an inner shaft (12) which arms are in turn articulated at their free ends to a first (2) and second (7) pulley means by means of double threaded offset

shafts (1, 21), third (14) and fourth pulley means (10) being connected to the first (2) and second (7) pulley means by means of first (13) and second (15) driving means respectively, the pulley means (2, 7, 14, 10) being configured such that one revolution of the first (2) and second (7) pulley means corresponds respectively to two revolutions of the third (14) and fourth (10) pulley means.

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Description

Object of the Invention

[0001] The present invention relates to an opening mechanism for a storage bed base, provided to perform a vertical lifting of the cover of the storage bed base, the cover being maintained in a horizontal plane during the lifting, as well as to maintain said stable cover in a lifted position, corresponding to an open position of the storage bed base.

[0002] The object of the invention is to allow the opening of the storage bed base, the mattress and bed linen being immovably maintained thereon, which further allows making the bed with complete comfort. Another object of the invention is to provide a structurally simple and functionally efficient mechanism to carry out the opening of storage bed bases or vertical lifting of the cover, moving the cover vertically while maintaining in horizontal arrangement.

Background of the Invention

[0003] Beds that incorporate storage bed bases are much more advantageous and practical than conventional beds because the storage bed base forms a box in which objects, clothes, etc. can be stored, therefore, the storage bed base today provides a solution to various problems, among those are economic and living space problems, since a storage bed base establishes in itself a space complementary to that of closets, but without occupying useful space of the room where it is placed.

[0004] Nevertheless, traditional storage bed bases present a series of limitations and drawbacks because on one hand, making the bed is uncomfortable, and on the other hand, to access the space available in the storage bed base, i.e., the space under the upper cover thereof on which the mattress is supported, said mattress must be removed to subsequently open said cover, which is performed in a pivoting manner, said cover being inclined until handling the inside of the box of the storage bed base is allowed.

[0005] These drawbacks have led storage bed base manufacturers to search for solutions so that instead of the upper cover supporting the mattress and bed linen opening by pivoting, it is moved vertically, being maintained in a horizontal plane. Two favorable effects are achieved with this, because on one hand it is not necessary to remove the bed linen to open the storage bed base, and on the other hand, the task of bed making is aided, as it will be performed comfortably and without bending over because it allows placing the cover of the storage bed base with the mattress at an appropriate height to carry out this work.

[0006] Although there are mechanism which allow lifting the cover of the storage bed base in a vertical movement, and therefore in a horizontal position, they are complex and even questionably efficient mechanisms. Fur-

thermore, in the majority of said mechanisms the movement of the cover is not strictly vertical, but presents a certain pivoting or even a movement in the plane of the cover, generally forwards or sideways, therefore having an additional space in the room is essential.

Description of the Invention

[0007] The present invention solves the existing deficiencies by means of an opening mechanism for a storage bed base according to claim 1 and a storage bed base according to claim 10, allowing a completely vertical lifting of the cover. Preferred embodiments of the invention are defined in the dependent claims.

[0008] A first aspect shows an opening mechanism comprising:

first pulley means integral to a fixed securing section intended to be integral to the box of the storage bed base,

second pulley means integral with a movable securing section intended to be fixed to the movable cover of the storage bed base,

a first arm articulated at a first end to the first pulley means by means of a first double threaded offset shaft,

a second arm of substantially the same length as the first arm, articulated at a first end to the second pulley means by means of a double threaded offset shaft, the first and the second arms being articulated to one another in respective second ends by means of a double shaft comprising a hollow shaft and an inner shaft partially housed inside the hollow shaft, the first arm being integral to the hollow shaft and the second arm to the inner shaft,

third pulley means integral to the inner shaft and connected to the first pulley means by means of first driving means,

fourth pulley means integral to the hollow shaft and connected to the second pulley means by means of second driving means,

the pulley means being configured such that one revolution of the first and the second pulley means correspond respectively to two revolutions of the third and fourth pulley means.

[0009] Pulley means is understood as a pulley, wheel or ratchet capable of rotating about its shaft, of the type used in belt transmissions.

[0010] The pulley means are preferably provided with teeth or gears, the third and fourth pulley means having respectively, half the teeth, of the first and second pulley means to which they are connected.

[0011] The driving means are preferably cogged belts or roller chains.

[0012] The opening mechanism preferably comprises blocking means to maintain the cover of the storage bed base in an open position.

[0013] The first arm is preferably configured as a double flat bar.

[0014] A second aspect shows a storage bed base comprising at least one opening mechanism according to the first inventive aspect.

[0015] The opening mechanism of the invention advantageously allows a completely vertical lifting of the cover, which remains in a completely horizontal position during the movement, all this by means of a simple and reliable mechanism.

Description of the Drawings

[0016] To complement the description that will be made below and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of this description in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows an embodiment of the opening mechanism according to the invention in a semi-open position.

Figure 2 shows the opening mechanism of Figure 1 in a closed position.

Figure 3 shows an exploded view of the opening mechanism according to the invention.

Figure 4 shows a cross-sectional plan view of an opening mechanism according to the invention.

Figures 5-7 show a storage bed base provided with two opening mechanisms according to the invention.

Preferred Embodiment of the Invention

[0017] The opening mechanism of the invention has been devised to be applied mainly, but not exclusively, in opening boards of storage bed bases, being able to be applied to other containers comprising a fixed box (24) and a movable cover (25).

[0018] Figures 1 and 2 show an embodiment of the opening mechanism according to the invention, in semi-open and closed position respectively. Figure 3 shows an exploded view of the main elements making up the mechanism and Figure 4 shows a cross section of the mechanism of the invention.

[0019] The opening mechanism according to the invention comprises a fixed section (3) integral to first pulley means (2), the fixed section (3) being intended to be fixed to the box of the storage bed base (24) or to the fixed element of the container in which the opening mechanism will be used. The mechanism further comprises a first arm (4) articulated by an end to the centre of the first pulley means (2) by means of a first double threaded offset shaft (1), a second arm (5) of the same length as the first arm (4), articulated in turn to the free end thereof, second pulley means (7) which are articulated to the free end of the second arm (5) by means of a second double

offset shaft (21) and are integral to a movable part (8) intended to be fixed to the cover (25) or section of the storage bed base which will be moved linearly with respect to the box of storage bed base (24) or fixed element.

[0020] The two arms (4, 5) are articulated by means of a common hollow shaft (11) having a threaded area (11b) and a smooth area (11a), the latter drilled transversally to fix fourth pulley means (10). The hollow shaft (11) is drilled longitudinally to partially house therein an inner shaft (12) which will be described below. The threaded part (11b) of the hollow shaft (11) is inserted into the first arm (4), which in this case is formed by two plates or parallel flat bars similar to one another, in which ends there are respective threaded holes. To support the hollow shaft (11) and the first arm (4) two hexagonal lock nuts (20) have been used. In the smooth cylindrical section (11a) of the hollow shaft (11), the fourth pulley means (10) connected by means of second driving means (15) with the second pulley means (7) mentioned above, are fixed. Rotating the hollow shaft (11) driven by the first arm (4) makes the fourth pulley means (10) integral to it rotate.

[0021] The inner shaft (12) has a smooth area (12a) in an end portion in which it there is fixed third pulley means (14) for first driving means (13) connected to the first pulley means (2). The inner shaft (12) has a threaded portion (12b) at its other end and the second arm (5) and a nut (19) acting as a lock nut for fixing the second arm (5) to the inner shaft (12) are screwed therein, forcing it to rotate with the rotation of the inner shaft (12).

[0022] The first double threaded offset shaft (1) as well as the second double threaded offset shaft (21) on which the first (2) and second (7) pulley means are articulated respectively allow adjusting the stress of the respective driving means (13, 15) with its offset.

[0023] The pulley means (2, 7, 14, 10) are configured such that a revolution of the first (2) and the second (7) pulley means corresponds respectively to two revolutions of the third (14) and fourth (10) pulley means.

[0024] The first pulley means (2) integral to the fixed section (3) are therefore fixed and through the first driving means (13) drive the third pulley means (14), which in turn drive the second arm (5) through the inner shaft (12) such that by rotating the first arm (4) a determined angle " α " counter-clockwise, the third pulley means (14) controlled by the first pulley means (2) will rotate the second arm (5) clockwise and at an angle " 2α " in relation to the first arm (4) which in absolute value, i.e., with respect to a horizontal plane, will be of value " α ".

[0025] In turn the fourth pulley means (10) which are integral to the first arm (4) through the hollow shaft (11) drive the second pulley means (7) by means of the second driving means (15), but since their relation is of 1 to 2, they will rotate the second pulley means (7) an angle of absolute value " α " counter-clockwise with respect to the first arm (4), but since the latter must rotate the same angle " α " clockwise - i.e., in the opposite direction - this results in the second pulley means (7) have not been

rotated at all. In other words upon moving vertically the second pulley means (7) do not rotate.

[0026] In the embodiments of the drawings, the opening mechanism has respective pulleys as third and fourth pulley means (14, 10), cogged wheels for cogged belt as first and second pulley means (2, 7) and cogged belts as first and second driving means (13, 15).

[0027] Alternatively, roller chains instead of cogged belts and gear wheels instead of pulleys and cogged wheels, and generally any type of pulley means and driving means can be used, with the only condition that the driving means are capable of withstanding a driving force coming from first rotating pulley means, such as a pulley, a ratchet or a wheel and transmitting it to second pulley means.

[0028] The periphery of the third (14) and fourth (10) cogged pulley means can be the same, i.e., have the same pitch and the same number of teeth as well as the same width, although it is not necessary. It is necessary, in contrast, that each of the first (2) and second (7) pulley means has double the number of teeth as the third (14) and fourth (10) pulley means with which they are connected.

[0029] To facilitate the opening of the cover (25) of the storage bed base and to maintain the mechanism in open position, the opening mechanism can be provided with a blocking mechanism, preferably a gas spring (9), articulated by an end to a first part (23) integral to the second arm (5) and by the other end to a second part (22) integral to the first arm (4).

[0030] Figure 2 shows that when the mechanism is closed, the two arms (4, 5) articulated to one another are overlapped and in this position, if the gas spring (9) is installed it will be compressed, but it cannot open the compass formed by the two arms (4, 5) because it is aligned with the centre of articulation of the arms of the compass (4, 5) and therefore cannot create any torque. Nevertheless, if it is removed from this aligned position by an external action, even if only slightly, a moment or torque is produced forcing the compass to open. It thus achieves that when the storage bed base is closed the possibility of it opening spontaneously does not exist, since it will be necessary to manually lift the cover (25) a little, such that the gas spring or springs (9) can do the rest and the cover (25) will be lifted therefrom by itself. To close the cover (25) it will always be necessary to manually push downwards.

[0031] Figures 5-7 show a storage bed base of the type comprising a fixed box (24) and a movable cover (25), provided with two opening mechanisms according to the invention, in closed, semi-open and completely open positions.

Claims

1. An opening mechanism for a storage bed base of the type comprising a movable cover (25) and a fixed

box (24), the opening mechanism comprising:

first pulley means (2) integral to a fixed securing section (3) intended to be integral to the box (24) of the storage bed base,
second pulley means (7) integral to a movable securing section (8) intended to be fixed to the movable cover (25) of the storage bed base,
a first arm (4) articulated at a first end to the first pulley means (2) by means of a first double threaded offset shaft (1),
a second arm (5) of substantially the same length as the first arm (4), articulated at a first end to the second pulley means (7) by means of a double threaded offset shaft (21), the first (4) and the second arm (5) being articulated to one another in respective second ends by means of a double shaft comprising a hollow shaft (11) and an inner shaft (12) partially housed inside the hollow shaft (11), the first arm (4) being integral to the hollow shaft (11) and the second arm (5) being integral to the inner shaft (12),
third pulley means (14) integral to the inner shaft (12) and connected to the first pulley means (2) by means of first driving means (13),
fourth pulley means (10) integral to the hollow shaft (11) and connected to the second pulley means (7) by means of second driving means (15),
the pulley means (2, 7, 14, 10) being configured such that a revolution of the first (2) and the second (7) pulley means corresponds respectively to two revolutions of the third (14) and fourth (10) pulley means.

2. The opening mechanism according to claim 1, wherein the pulley means are provided with teeth or gears, the third (14) and fourth (10) pulley means having respectively, half the teeth of the first (2) and second (7) pulley means to which they are connected.
3. The opening mechanism according to any one of the preceding claims, wherein the driving means (13, 15) are cogged belts.
4. The opening mechanism according to any one of claims 1-3, wherein the driving means (13, 15) are roller chains.
5. The opening mechanism according to any one of the preceding claims comprising blocking means to maintain the cover of the storage bed base (25) in an open position.
6. The opening mechanism according to claim 5, wherein the blocking means comprises a gas spring

(9).

7. The opening mechanism according to any one of the preceding claims, wherein the inner shaft (12) comprises a smooth end portion (12a) and a threaded end portion (12b). 5
8. The opening mechanism according to any one of the preceding claims, wherein the hollow shaft (11) comprises a smooth end portion (11a) and a threaded end portion (11b). 10
9. The opening mechanism according to any one of the preceding claims, wherein the first arm (4) is configured as a double flat bar. 15
10. A storage bed base comprising at least one opening mechanism according to any one of claims 1-9. 20

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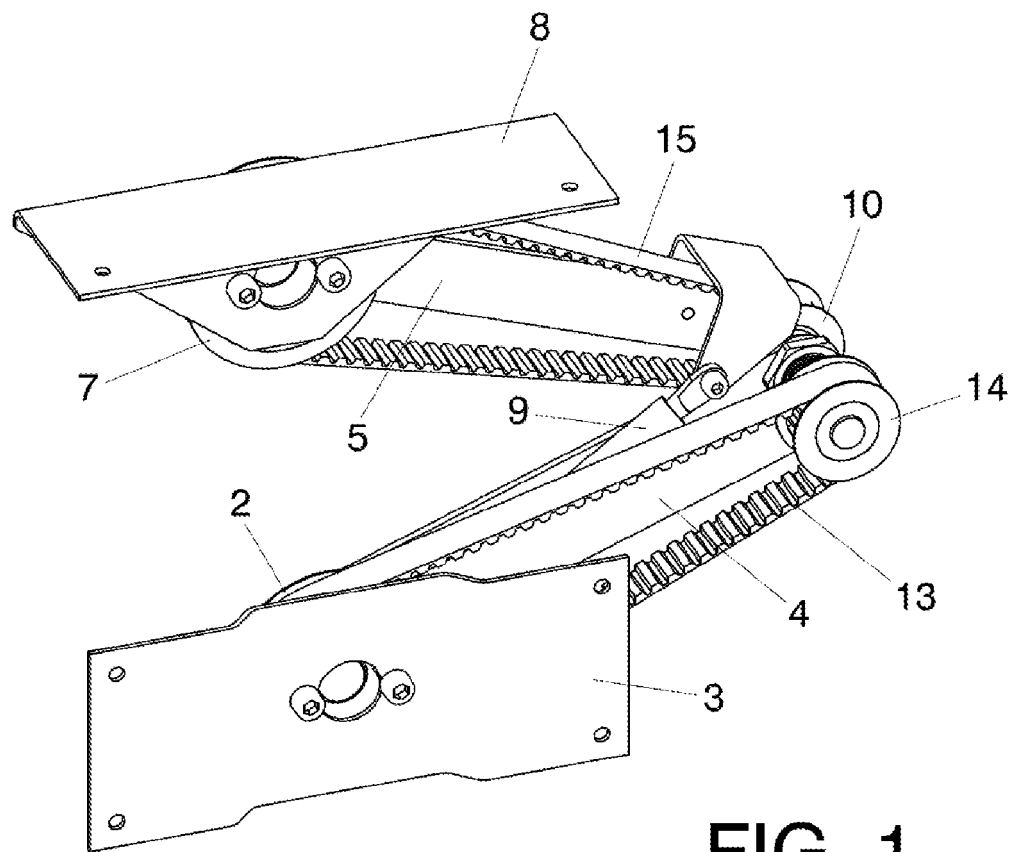


FIG. 1

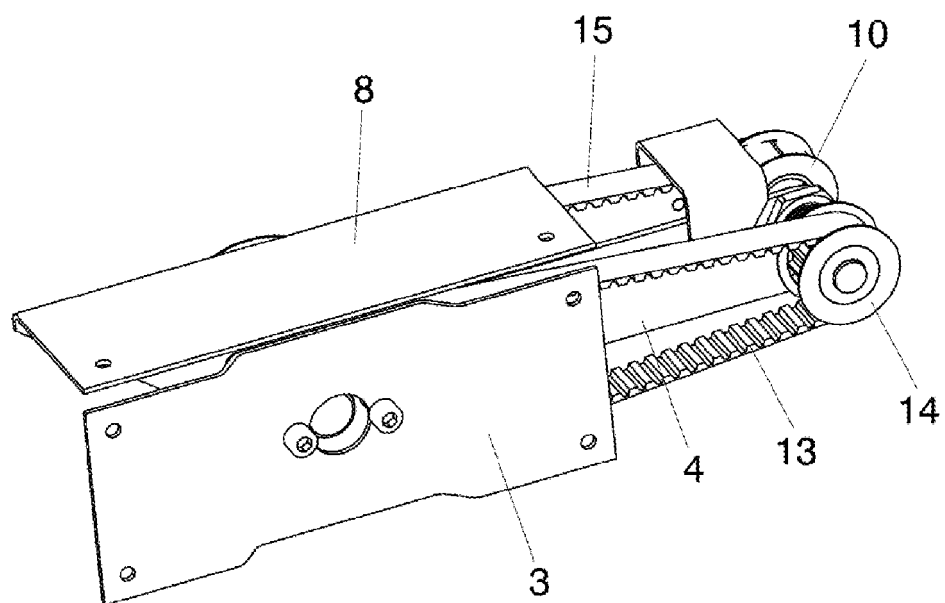


FIG. 2

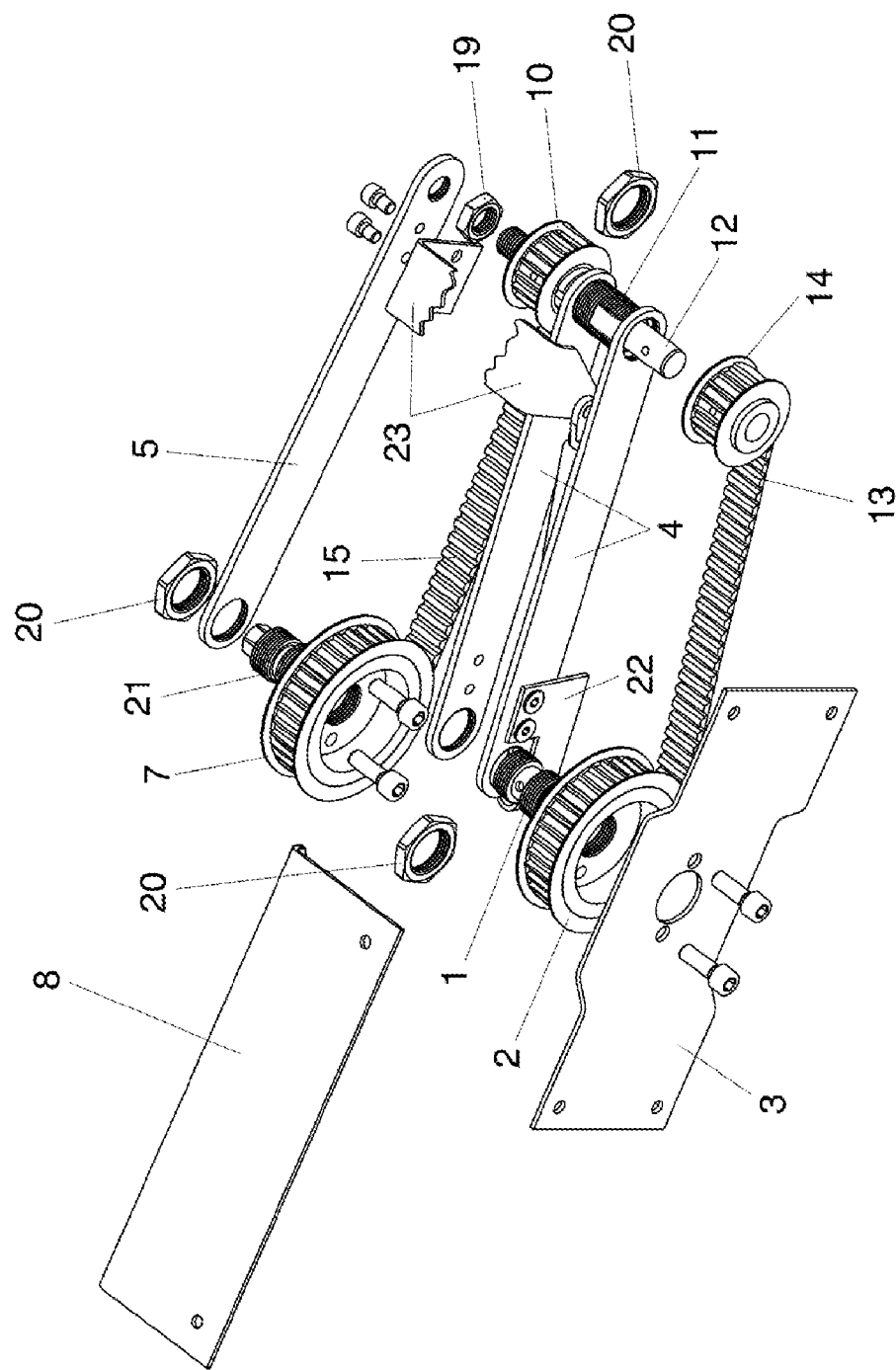


FIG. 3

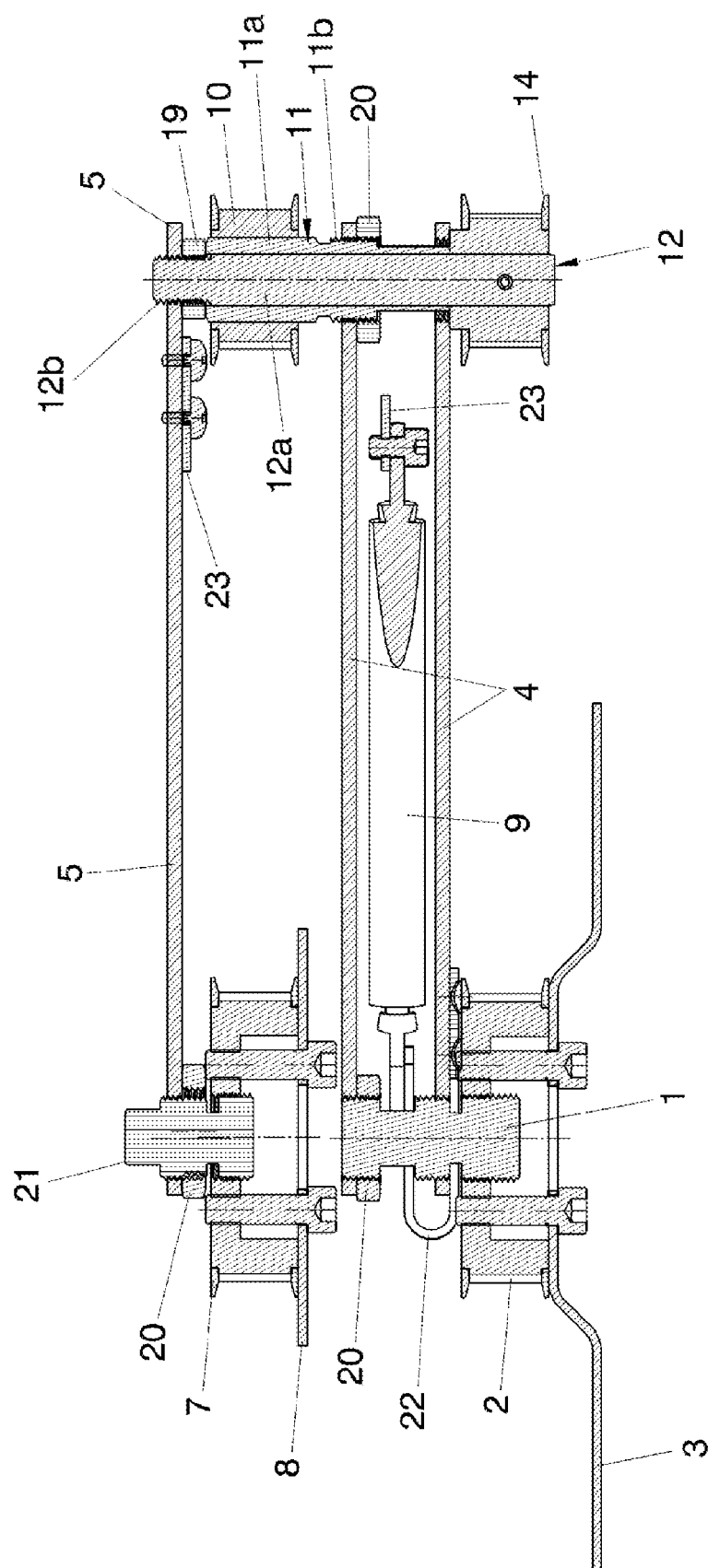


FIG. 4

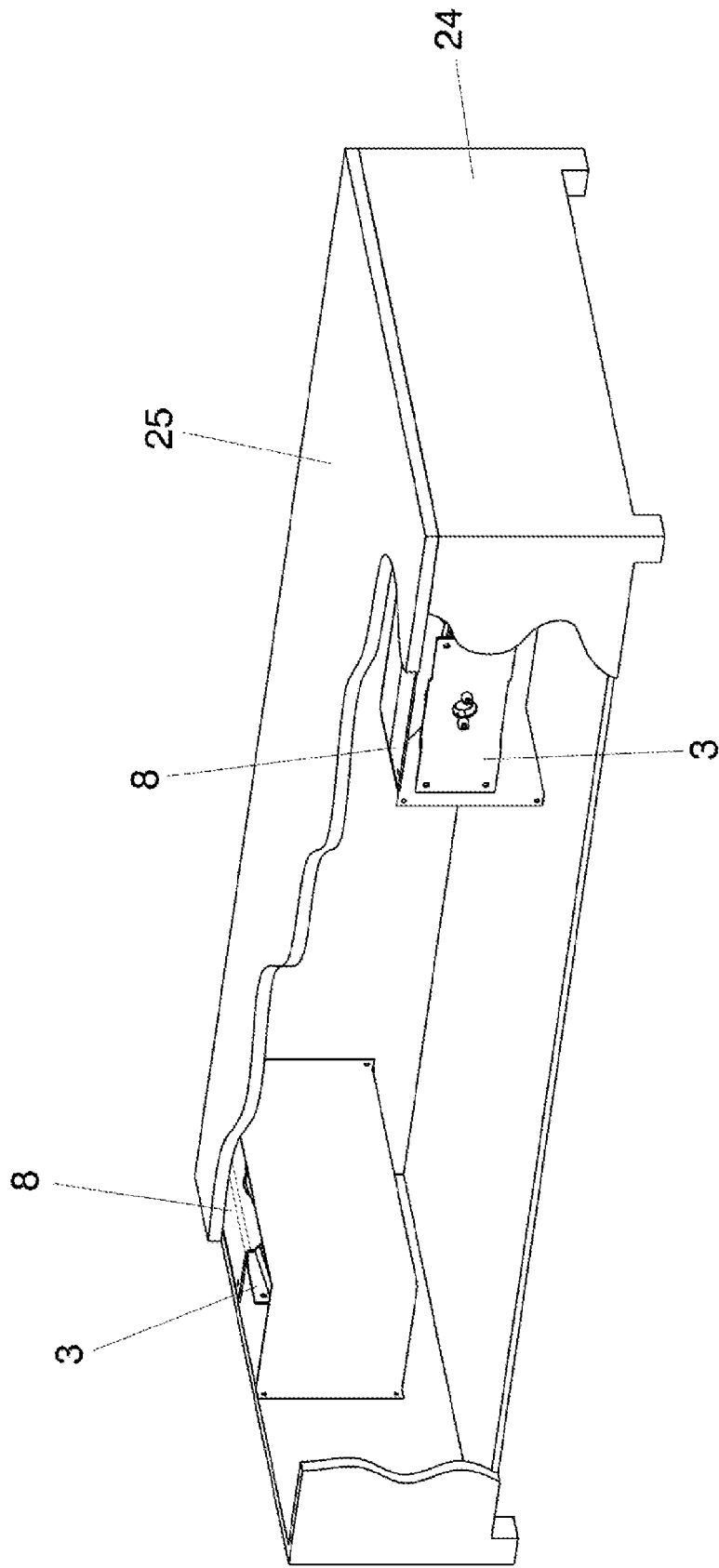


FIG. 5

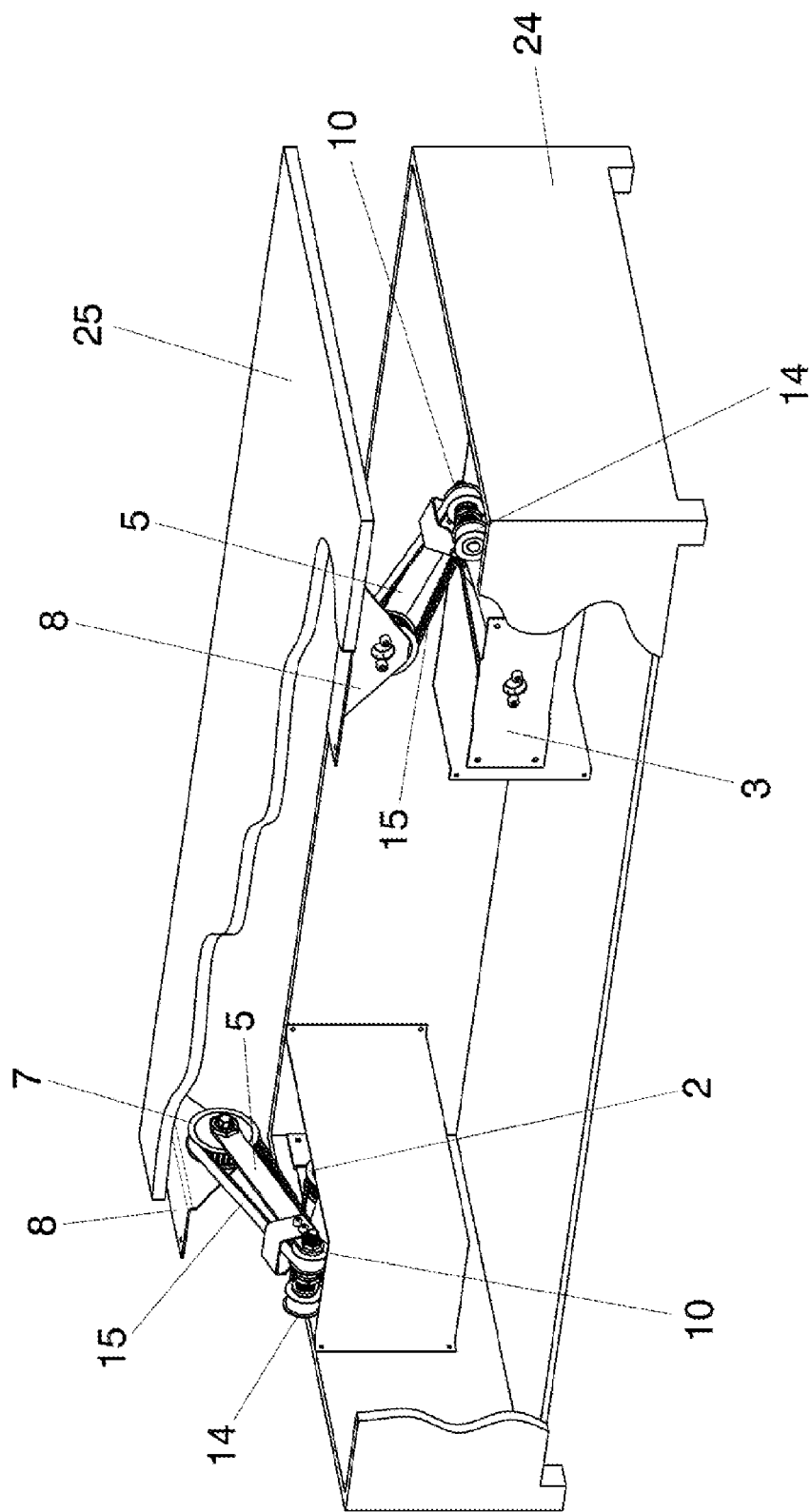


FIG. 6

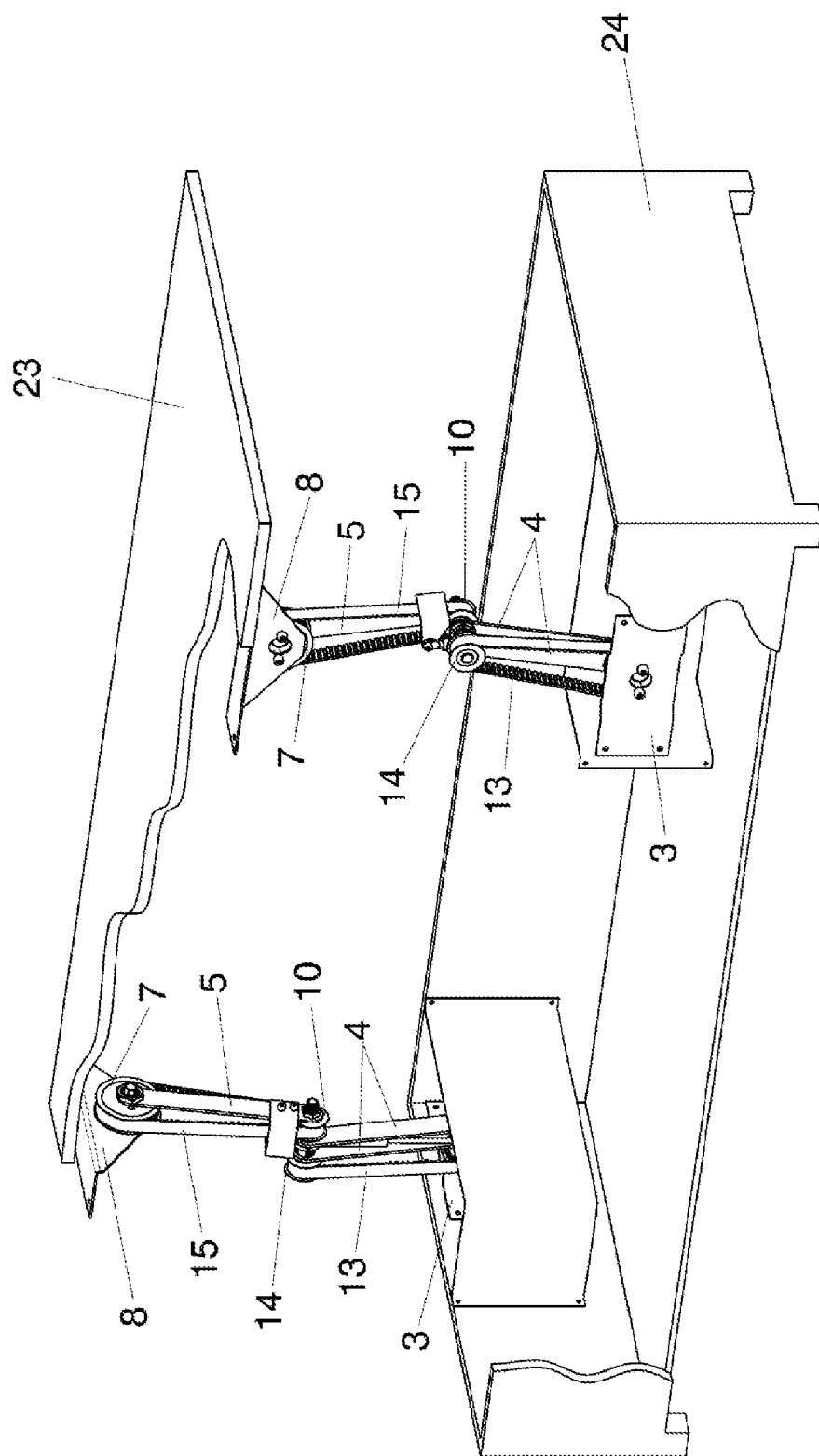


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 7206

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	KR 2009 0094419 A (LEE JUNG SIN [KR]) 7 September 2009 (2009-09-07) * the whole document *	1-10	INV. A47C20/00
A	US 2005/065580 A1 (CHOI SANG UI [KR]) 24 March 2005 (2005-03-24) * the whole document *	1-10	
A	DE 103 49 918 A1 (PORSCHE AG [DE]) 25 May 2005 (2005-05-25) * the whole document *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C A61H A61G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 November 2011	Examiner Behammer, Frank
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 17 7206

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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22-11-2011

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