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(54) **BED SIDE RAIL**

SEITENLEISTE FÜR EIN BETT

LONG PAN DE LIT

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(56) References cited:

WO-A1-2013/065907 KR-U- 20100 011 277

US-A1- 2005 144 720 US-A1- 2008 209 633

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Description

Technical Field

[0001] The invention relates to a bed side rail, comprising two side bars with a rotational bearing at the bottom end for attachment to the bed, connected by a top bar at the top to form a parallelogram, with a locking mechanism fitted between one of the side bars and the top bar.

Background Art

[0002] Several different types of side rails are used to prevent a patient from falling out of a bed. A patient is prevented from falling off the bed's mattress either by several side rails operating together or by a single side rail taking up most of the side of the mattress area. Generally, these types of side rails are not fixed to the bed rigidly, but in such a way that they can be lowered to allow the patient to get out of bed or to allow medical personnel access to the patient and easier manipulation.

[0003] Many devices are known that lock the side rails in the position, by which they fulfil their function of stopping a patient from falling out of bed.

[0004] To lock side rails in the raised position, mechanisms are used which are located, for example, between the area where the side rail is attached to the bed or between individual parts of the side rail. In many types of these mechanisms, the side rails are lowered using different combinations of vertical and horizontal movements.

[0005] Tubular side rails are generally attached to the bed using two rotational pins, and sometimes the locking device is a part of one of these pins. When unlocking the side rails, there is rotation around these axes and at the same time a movement of the side rail from the raised to the lowered position. In this type of side rail, the problem is that the side rail remains in the raised position, and at the same time is not locked in position. For this reason these side rails are constructed in such a way that they are always forced downwards in the raised position and the locking device prevents this movement.

[0006] This design problem is resolved more easily in side rails where the rotational axis of the pin is parallel with the edge of the mattress, such as in the solution described in US 7,350,248. In these cases, the centre of gravity of the side rail is shifted significantly away from the axis of rotation, so that there is a spontaneous downward movement without restriction. For tubular side rails, the axis of rotation of the pins is perpendicular to the plane formed by the side of the bed. Their centre of gravity is generally near the axis of the line segment joining the two rotational pins of one side rail. If the bed is in a horizontal position, and is not standing on an inclined plane, there is no spontaneous downward movement of the side rails because of the position of the centre of gravity of the side rails in relation to the axis of rotation of the pins

by which the side rails are attached to the bed.

[0007] This axis arrangement increases the risk that the side rails will remain in the raised position and not be locked in position. To prevent this risk, it is possible to use either a suitably shaped side rail, where an additional bar is used on the side we need to lower the side rail, or it is possible to move one of the axes closer to the other, and whilst preserving the same length of the side rail, create a connecting crossbar perpendicular to the vertical member of the side rail. In connection with the pin, the crossbar causes a torque in the axis and thus spontaneous lowering of the side rail. Patents US 7,073,219 and DE9216881 show both types in one solution. The disadvantage of this solution is the residual risk of the side rail sticking in the raised position.

[0008] Utility model CZ 16127 shows a similar tubular side rail. A combination of two buttons serves as the locking mechanism of the side rail. When pressed in sequence, the side rail is unlocked. The disadvantage of this solution is the unsuitable position of the entire locking mechanism in relation to the operation of the bed, as the side rail lock is located on the pin attaching the side rail to the bed. Another disadvantage is the need to operate the lock using fingers, which is not as simple or fast as using the entire hand. Moreover, the operator is forced to manipulate the side rail using both hands, as in the case of the solution based on patent US 7,073,219.

[0009] Patent application US2012023666 shows another locking mechanism. In this solution, an actuator in the form of a button, which when pressed causes the movement of the locking member against a spring by virtue of pressure force to unlock the side rail. The disadvantage of this solution is in the force of the members of the locking mechanism, where enormous friction occurs between the button and locking element, which may cause a malfunction of the mechanism or unnatural movement of the button.

[0010] JP2009213797 shows another mechanism for a folding side rail. In this solution, the locking mechanism of the side rail consists of a lever rotating around an axis to which a blocking element is connected via a system of brackets. When the lever is raised, this causes the movement of the blocking element and a shift of the blocking pin. Following the rotational movement of the lever, the side rail bar is released as the blocking element and blocking pin are unblocked. The solution in this invention has the disadvantage of an excessively complicated mechanism and low level of robustness, due to which the solution is prone to failures.

Disclosure of Invention

[0011] The aforementioned problem is resolved by a side rail of bed as claimed in claim 1 or in claim 2.

[0012] The side rail of the bed based on this invention improves operator comfort and patient safety.

[0013] It is advantageous when the blocking member is rotationally positioned in the top bar and pushed into

the blocking position by a blocking spring. The movement of the latch is controlled by an actuating member, which is rotationally located in the top bar.

[0014] It is advantageous when side rail includes at least one auxiliary bar which is located between the side bars below the top bar and which is rotationally connected to the side bars.

[0015] A torsion spring is located in the rotational bearing of at least one side bar.

Brief Description of Drawings

[0016] Fig. 1 shows the bed side rail based on the invention. Fig. 2 and 3 show a detail of the locking mechanism in various positions. Fig. 4 shows a detail of the rotational bearing of the side bar with the torsion spring.

Modes for Carrying Out the Invention

[0017]

Fig. 1 shows the side rail 2 of a hospital bed, which has two tubular side bars 5. The side bars 5 are connected together by a tubular top bar 6 at the top end to form a parallelogram, and the locking mechanism 3 is fitted between one of the side bars 5 and the top bar 6. Two auxiliary bars 7 are fitted between the side bars 5 below the top bar 6, which are pivotally connected to the side bars 5 at both ends.

Fig. 2 shows the locking mechanism 3 comprising two members. The rotational member 11 is firmly fixed to the side bar 5 and the cover member 12 is firmly fixed to the top bar 6. These members have a rotational part consisting of circular profiles with a common axis of rotation 10. The rotational member 11 is located inside the cover member 12, along with the locking mechanism. The cover member 12 includes the stop 13.

[0018] It is evident to person having ordinary skill in the art that in an analogous design, not shown, the rotational member 11 may be firmly fixed to the top bar 6, and the cover member 12 may be firmly fixed to the side bar 5, in the same way as the movement of the cover member 12 in relation to the rotational member 11 may be alternatively blocked by the stop 13.

[0019] The side bars 5 have a rotational bearing 4 at the bottom end for attachment to the bed frame 1. In the rotational bearing 4 shown in fig. 4, there is a torsion spring 19, which is fixed through the side bar 5 at one end, and the other end is fixed to the bed frame 1 via the anchor of the spring 18. The anchor of the spring 18 remains in one position during the movement of the side rail, and does not rotate as it is firmly attached to the bed frame 1 via the spring case 20, first flange 21 and second flange 22. The first flange 21 and second flange 22 are either welded to the spring case 20, or make up a single

integrated component with the spring case 20, so that they do not move in relation to each other. During movement of the side rail, the second case 23 remains fixed in position in relation to the side bar 5 as it is attached to it with a friction washer 24, which engages with the latch in the side bar 5. The torsion spring 19 is fitted in such a way that in the raised position of the side rail 2 it acts in one direction with a smaller torque and in the lowered position of the side rail 2 it acts in the other direction with a greater torque. This results in the torsion spring 19 causing a downward movement of the unlocked side rail in the raised position and inhibition of this movement in the lowered position, because the torque is reversed during the movement of the torsion spring 19. When the side rail is locked, where the torsion spring 19 acts in a downward direction, the friction forces between the latch 9 and recess 15 of the locking mechanism are so great that it is not possible to move the actuating member 8 by pressing the actuating member 8 and thus rotate the latch 9 into the unlocked position. The inability to spontaneously rotate the latch 9 into the unlocked position is also ensured by the spring 14. Thus the torsion spring 19 and spring 14 act together to prevent spontaneous unlocking of the side rail. In order to unlock the side rail 2, it is necessary to first apply force on the side rail 2 in an upward direction, which overcomes the downward force of the torsion spring 19, and then to release the latch 9 using the actuating member 8 with a second force, which overcomes the force of the spring 14. On movement of the unlocked side rail downwards, there is a change in the direction of the torque that the torsion spring 19 applies to the side rail 2, and this new direction of torque acts against the downward movement of the side rail, thereby inhibiting its downward movement. The overall path of the downward movement is restricted by the stop 13, which approaches the first notch 16 of the rotational member 11 during the downward movement of the side rail 2, until they come into contact and further downward movement of the side rail 2 is prevented. In reverse upward movement, the highest possible position of the side rail 2 is restricted by contact between the stop 13 and the second notch 17.

[0020] The latch 9 is located in the cover member 12. In the raised position of the side rail, the latch 9 rests on the recess 15 and prevents the rotational movement of the rotational member 11 relative to the cover member 12. The movement of latch 9 is limited by the spring 14, which is also located in the cover member 12 and acts against the latch 9 on first end through torque. At the second end, the spring 14 is locked by a pin. Pressing the actuating member 8 leads to its axial rotation and contact between the actuating member 8 and the latch 9 results in axial rotation of latch 9. When the rotational member 11 is rotated relative to the cover member 12 along the common axis of rotation 10, the side rail 2 drops down and the latch 9 contacts the rotational member 11 from the side and is forced against it by the spring 14. When the side rail 2 is raised again, it is automatically

locked in position.

[0021] Person having ordinary skill in the art of hospital bed is capable of designing an alternative version according to the specified invention in which the mechanism, containing an actuating member 8, spring 14, latch 9 and cover member 12, can be connected to the side bar 5 instead of the top bar 6.

[0022] If the side rail 2 should be dropped to the lowered position shown in fig. 3, it is first necessary in locked position to push the top bar 6 against the torque of the torsion spring 19 with hand and thus end the complete engagement of the latch 9 on the recess 15. Without frictional resistance between these two members, it is possible to push the actuating member 8 against the spring 14 and thus rotate the latch 9 into a position where latch 9 does not prevent the rotational movement of the rotational member 11. When the side rail 2 is dropped into its lowered position, the side bars 5 rotate around their rotational bearings 4.

[0023] Recess 15 is shaped so as to prevent the spontaneous slipping of the latch 9 from this recess. Additionally the recess 15 can be designed to copy the shape of the latch 9.

[0024] When the side rail 2 is lifted from the lowered to the raised position, the procedure is reversed. When moving from the lowered to the raised position, the torsion spring 19 reduces the force necessary to lift the side rail 2. Staff use their hand to raise the top bar 6, and at the same time the stop 13 starts to move away from the first notch 16 towards the second notch 17 and before they come into contact, the spring 14 moves the latch 9 against the recess 15, and the side rail is locked in position.

Claims

1. Side rail (2) of bed (1) comprising two side bars (5) which are fitted with a rotational bearing (4) at the bottom end for attachment to the bed (1) with side bars (5) at the top end connected by a top bar (6) to form a parallelogram, and a locking mechanism (3) fitted between one of the side bars (5) and the top bar (6), wherein the locking mechanism (3) comprises a first member (11) firmly fixed to the side bar (5), a second member (12) firmly fixed to the top bar (6), where these members (11, 12) have a common axis (10) of rotation, a latch (9) engaging with the first member (11), **characterized in that** the first member (11) is rotatable in relation to the second member (12) in a first direction by applying a first force on the side rail (2) in an upward direction to release the latch (9) whose movement releases the first member (11) for its rotation in relation to the second member (12) in a second direction opposite to the first direction, the latch being an actuating member (8) acting on the latch (9) whose activation unblocks the latch (9).
2. Side rail (2) of bed (1) comprising two side bars (5)

which are fitted with a rotational bearing (4) at the bottom end for attachment to the bed with side bars (5) at the top end connected by a top bar (6) to form a parallelogram, and a locking mechanism (3) fitted between one of the side bars (5) and the top bar (6), wherein the locking mechanism (3) comprises a first member (11) firmly fixed to the side bar (5), a second member (12) firmly fixed to the top bar (6), where these members (11, 12) have a common axis (10) of rotation, a latch (9) engaging with the second member (12), **characterized in that** the second member (12) is rotatable in relation to the first member (11) in a first direction by applying a first force on the side rail (2) in an upward direction to release the latch (9) whose movement releases the second member (12) for its rotation in relation to the first member (11) in a second direction opposite to the first direction, the latch being an actuating member (8) acting on the latch (9) whose activation unblocks the latch (9).

3. Side rail (2) of bed (1) according to claim 1 or 2 **characterized in that** the latch (9) engages with the recess (15) in at least one position of side rail (2).
4. Side rail (2) of bed (1) according to claim 3 **characterized in that** the recess (15) has a shape preventing the spontaneous slipping of the latch (9) from this recess (15).
5. Side rail (2) of bed (1) according to claim 1 **characterized in that** the latch (9) is located in the top bar (6) and is pushed into the blocking position by the blocking spring (14).
6. Side rail (2) of bed (1) according to any of the preceding claims 1 to 5 **characterized in that** there is at least one auxiliary bar (7) located between the side bars (5) under the top bar (6) rotationally connected to the side bars (5) at both ends.
7. Side rail (2) of bed (1) according to any of the preceding claims 1 to 6 **characterized in that** a torsion spring (19) is located in the rotational bearing (4) of at least one of the side bars (5).
8. Side rail (2) of bed (1) according to any of the preceding claims 1 to 7 **characterized in that** the size of the mutual rotation of the first member (11) and second member (12) is limited by the stop (13).

Patentansprüche

1. Seitensicherung (2) des Bettes (1), die zwei Seitenleisten (5) umfasst, die mit einem Drehlager (4) am unteren Ende für die Befestigung am Bett mit Seitenleisten (5) am oberen Ende ausgerüstet sind, die

- durch eine obere Leiste (6) verbunden sind, um ein Parallelogramm zu bilden und ein Verriegelungsmechanismus (3), der zwischen einer der Seitenleisten (5) und der oberen Leiste (6) angebracht ist, wobei der Verriegelungsmechanismus (3) ein erstes Element (11), das fest an der Seitenleiste (5) befestigt ist, ein zweites Element (12), das fest an der oberen Leiste (6) befestigt ist umfasst, wobei diese Elemente (11, 12) eine gemeinsame Drehachse (10) besitzen, einen Riegel (9), der sich mit dem ersten Element verbindet (11), **dadurch gekennzeichnet, dass** das erste Element (11) in Bezug auf das zweite Element (12) in die erste Richtung drehbar ist, indem Kraft auf die Seitensicherung (2) in Aufwärtsrichtung angewandt wird, um den Riegel (9) zu lösen, dessen Bewegung das erste Element (11) für dessen Drehung in Bezug auf das zweite Element (12) in eine zweite Richtung entgegen der ersten Richtung freigibt, wobei der Riegel ein Betätigungsorgan (8) ist, das auf den Riegel (9) einwirkt, dessen Aktivierung den Riegel (9) entsichert.
2. Seitensicherung (2) des Bettes (1), die zwei Seitenleisten (5) umfasst, die mit einem Drehlager (4) am unteren Ende für die Befestigung am Bett mit Seitenleisten (5) am oberen Ende ausgerüstet sind, die durch eine obere Leiste (6) verbunden sind, um ein Parallelogramm zu bilden und einen Verriegelungsmechanismus (3), der zwischen einer der Seitenleisten (5) und der oberen Leiste (6) angebracht ist, wobei der Verriegelungsmechanismus (3) ein erstes Element (11), das fest an der Seitenleiste (5) befestigt ist, ein zweites Element (12), das fest an der oberen Leiste (6) befestigt ist umfasst, wobei diese Elemente (11, 12) eine gemeinsame Drehachse (10) besitzen, einen Riegel (9), der sich mit dem zweiten Element verbindet (12), **dadurch gekennzeichnet, dass** das zweite Element (12) in Bezug auf das erste Element (11) in die erste Richtung drehbar ist, indem Kraft auf die Seitensicherung (2) in einer Aufwärtsrichtung angewandt wird, um den Riegel (9) zu lösen, dessen Bewegung das zweite Element (12) für dessen Drehung in Bezug auf das erste Element (11) in eine zweite Richtung entgegen der ersten Richtung freigibt, wobei der Riegel ein Betätigungsorgan (8) ist, das auf den Riegel (9) einwirkt, dessen Aktivierung den Riegel (9) entsichert.
3. Seitensicherung (2) des Bettes (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Riegel (9) in mindestens einer Position der Seitensicherung (2) in die Auskehlung (15) eingreift.
4. Seitensicherung (2) des Bettes (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** die Auskehlung (15) eine Form hat, die das spontane Herausgleiten des Riegels (9) aus dieser Auskehlung (15) verhindert.
5. Seitensicherung (2) des Bettes (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Riegel (9) sich in der oberen Leiste (6) befindet und durch die Sperrfeder (14) in die Sperrstellung geschoben wird.
6. Seitensicherung (2) des Bettes (1) nach einem der vorhergehenden Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** sich zwischen den Seitenleisten (5) und der oberen Leiste (6) mindestens eine Hilfsleiste (7) befindet, die an beiden Enden mit den Seitenleisten (5) drehverbunden ist.
7. Seitensicherung (2) des Bettes (1) nach Anspruch 1 bis 6, **dadurch gekennzeichnet, dass** sich eine Torsionsfeder (19) im Drehlager (4) mindestens einer der Seitenleisten (5) befindet.
8. Seitensicherung (2) des Bettes (1) nach einem der vorhergehenden Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Größe der gegenseitigen Drehung des ersten Elements (11) und des zweiten Elements (12) durch den Anschlag (13) begrenzt ist.

Revendications

1. La barrière latérale (2) du lit (1), comprenant deux barres latérales (5) équipées d'un palier rotatif (4) situé à l'extrémité inférieure à des fins de fixation sur le lit (1) avec les barres latérales (5) à l'extrémité supérieure reliées par une barre supérieure (6) pour former un parallélogramme, et d'un mécanisme de verrouillage (3) monté entre l'une des barres latérales (5) et la barre supérieure (6), où le mécanisme de verrouillage (3) comprend un premier élément (11) solidement fixé à la barre latérale (5), un second élément (12) solidement fixé à la barre supérieure (6), et où ces éléments (11, 12) ont un axe commun de rotation (10), un loquet (9) s'engageant dans le premier élément (11), avec la caractéristique que le premier élément (11) peut effectuer des rotations par rapport au second élément (12) dans une première direction par l'application d'une première force sur la barrière latérale (2) en direction du haut pour libérer le loquet (9) dont le mouvement libère le premier élément (11) pour permettre sa rotation par rapport au second élément (12) dans une seconde direction opposée à la première direction, le loquet étant un élément d'actionnement (8) agissant sur le loquet (9) dont l'activation débloque le loquet (9).
2. La barrière latérale (2) du lit (1), comprenant deux barres latérales (5) équipées d'un palier rotatif (4), situé à l'extrémité inférieure à des fins de fixation sur le lit (1) avec les barres latérales (5) à l'extrémité supérieure reliée par une barre supérieure (6) pour former un parallélogramme, et d'un mécanisme de verrouillage (3) monté entre l'une des barres latérales

les (5) et la barre supérieure (6), où le mécanisme de verrouillage (3) comprend un premier élément (11) solidement fixé à la barre latérale (5), un second élément (12) solidement fixé à la barre supérieure (6), et où ces éléments (11, 12) ont un axe commun de rotation (10), un loquet (9) s'engageant dans le second élément (12), avec la caractéristique que le second élément (12) peut effectuer des rotations par rapport au premier élément (11) dans une première direction par l'application d'une première force sur la barrière latérale (2) en direction du haut pour libérer le loquet (9) dont le mouvement libère le second élément (12) pour permettre sa rotation par rapport au premier élément (11) dans une seconde direction opposée à la première direction, le loquet étant un élément d'actionnement (8) agissant sur le loquet (9) dont l'activation débloque le loquet (9).

3. La barrière latérale (2) du lit (1) conformément à la déclaration 1 ou 2, est **caractérisée par** le loquet (9) qui interagit avec le renforcement (15) dans au moins une position de la barrière latérale (2). 20
4. La barrière latérale (2) du lit (1) conformément à la déclaration 3, est **caractérisée par** le renforcement (15) qui présente une forme empêchant le glissement spontané du loquet (9) hors de ce renforcement (15). 25
5. La barrière latérale (2) du lit (1) conformément à la déclaration 1, est **caractérisée par** le loquet (9) qui se trouve dans la barre supérieure (6) et est poussé en position de blocage par le ressort de blocage (14). 30
6. La barrière latérale (2) du lit (1) conformément à n'importe laquelle des déclarations précédentes 1 à 5, est **caractérisée par le fait qu'il y a** au moins une barre auxiliaire (7) située entre les barres latérales (5) sous la barre supérieure (6) connectée par rotation aux barres latérales (5) aux deux extrémités. 35 40
7. La barrière latérale (2) du lit (1) conformément à n'importe laquelle des déclarations précédentes 1 à 6, est **caractérisée par** un ressort de torsion (19) se trouvant dans le palier rotatif (4) d'au moins une des barres latérales (5). 45
8. La barrière latérale (2) du lit (1) conformément à n'importe laquelle des déclarations précédentes 1 à 7, est **caractérisée par le fait que** l'envergure de la rotation réciproque du premier élément (11) et du second élément (12) est limitée par la butée (13). 50

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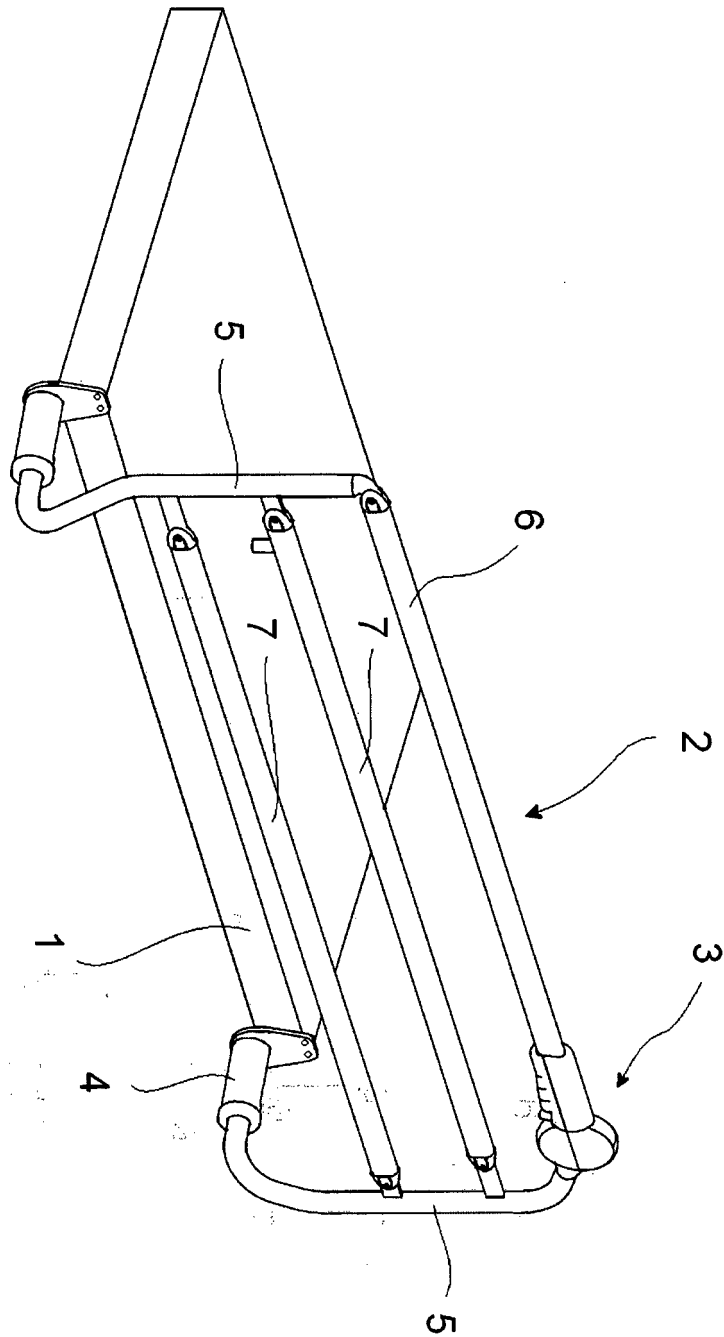


FIG. 1

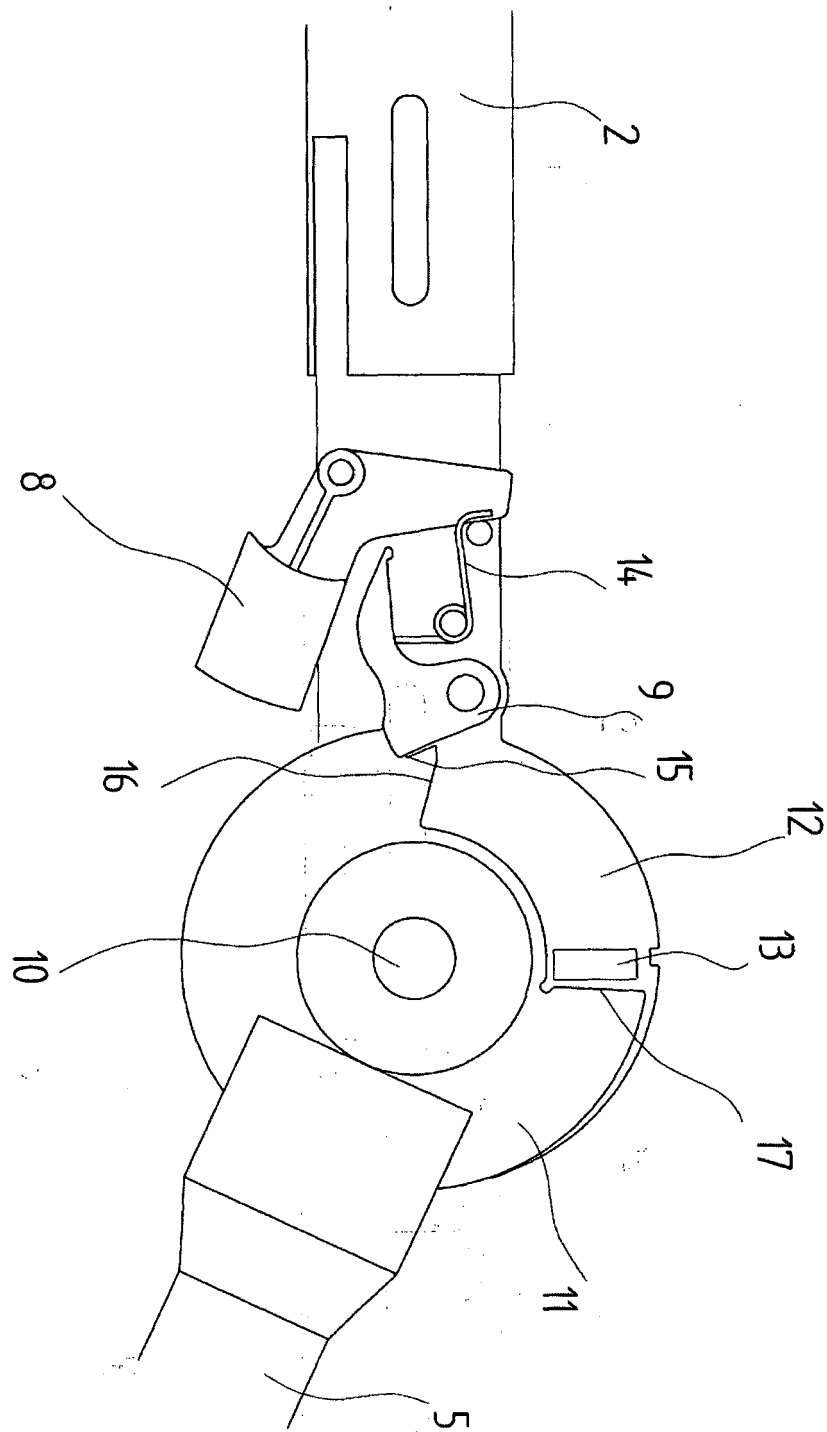


FIG. 2

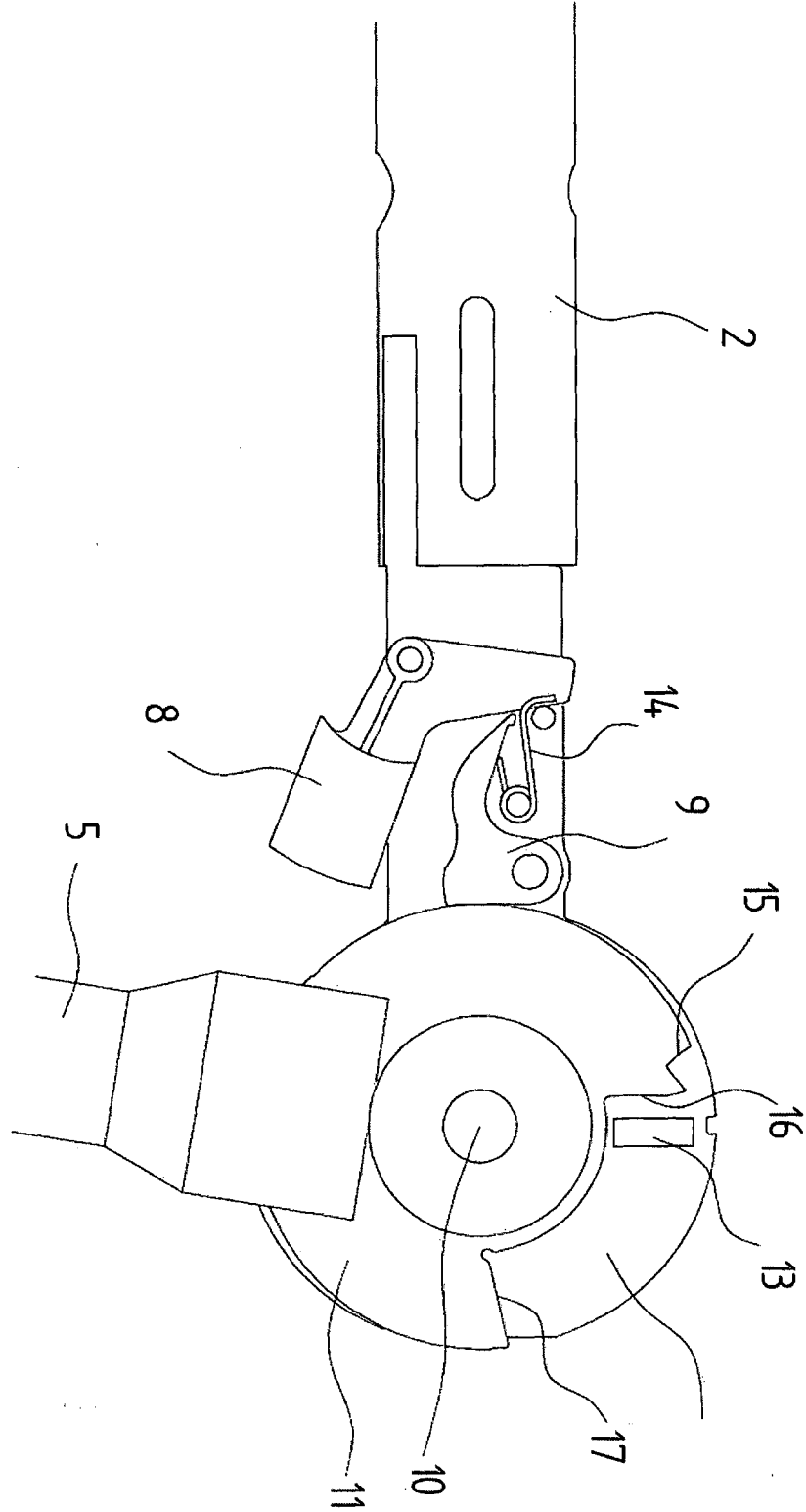


FIG. 3

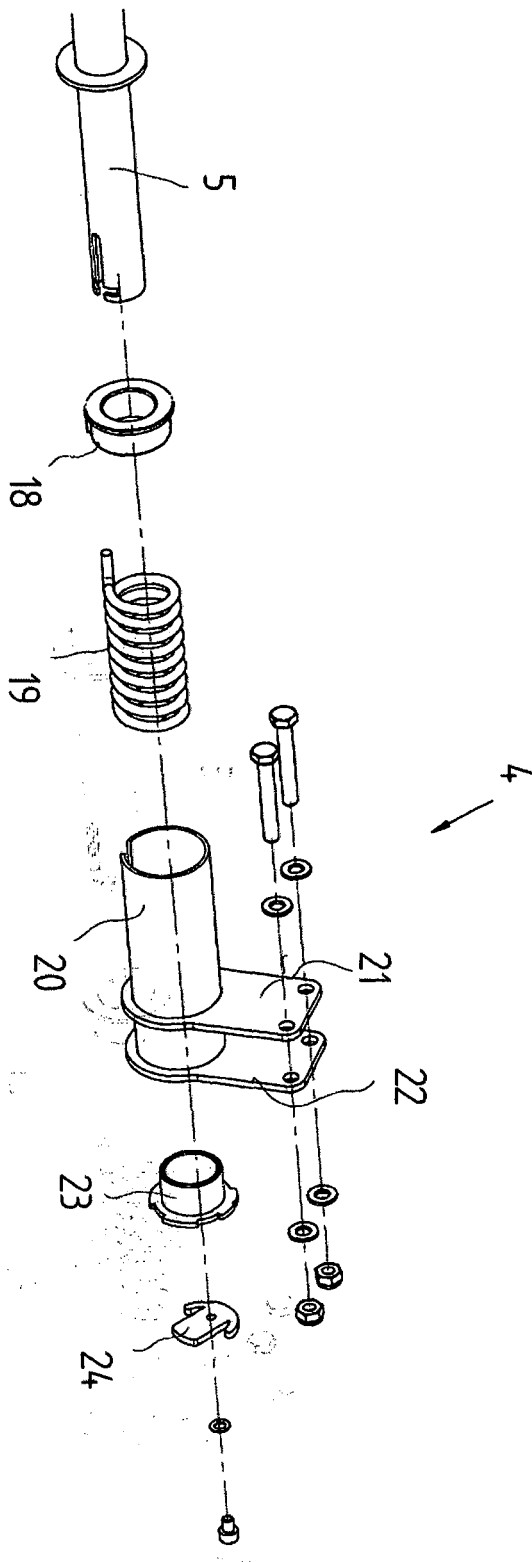


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 7350248 B [0006]
- US 7073219 B [0007] [0008]
- DE 9216881 [0007]
- CZ 16127 [0008]
- US 2012023666 A [0009]
- JP 2009213797 B [0010]