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(54) Positional adjustment mechanism for beds

(57) A positional adjustment mechanism for beds allowing the movement of an articulated bed base (1) towards the headboard simultaneously to the raising of the sections of the back, consisting of a movable frame (4) incorporating wheels (5) with rotational capacity and at least one cross bar (7), the articulated bed base (1) being locked together to said movable frame (4), and a rolling base (3) of the wheels (5) to the fixed frame (2), the movable frame (4) internally registering a shaft (9) with rotational capacity on which a motor (10) acts, there being arranged integrally to said shaft (9) at least one connecting rod (11) which is hingedly joined to the fixed frame (2) by means of the arrangement of another connecting rod (6), which is hinged at one end to the fixed frame (2), there being arranged in the opposite end of the connecting rod (11) a connecting rod (12) which is in turn hinged to another connecting rod (13) duly locked together to one of the cross bars (14) of the cervical section of the articulated bed base (1).

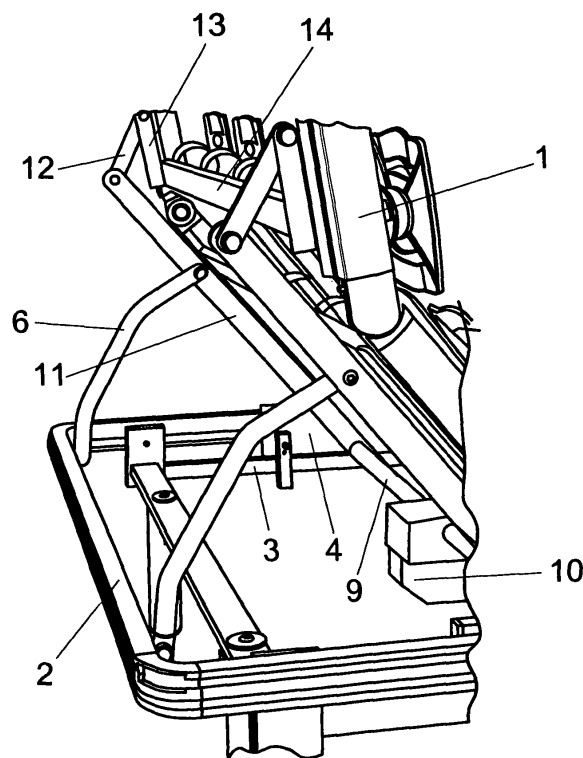


FIG. 4

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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a positional adjustment mechanism for beds allowing the movement of the articulated bed base of a bed towards the headboard area thereof simultaneously to the raising the cervical and dorsal sectors of the articulated bed base by means of a simple, economical and easy-to-assemble and -disassemble system, the movements of the movable frame, and therefore of the entire articulated bed base, occurring safely and smoothly, with no alterations in its path.

[0002] The object of the invention is applicable in all types of beds, both clinical and conventional, susceptible of having an articulated bed base, the fixed frame thereof being constituted of any type of elements, it not being necessary for it to be made up of certain profiles for the arrangement of the movable frame forming part of the invention.

BACKGROUND OF THE INVENTION

[0003] There are currently several mechanisms allowing the movement of the articulated bed base of a bed simultaneously to the raising the cervical and dorsal sections of the articulated bed base thereof, which is carried out by means of a motor for the purpose of moving the articulated bed base, and therefore the patient-user, towards the headboard area of the bed, such that the patient or user has access to the small table and light switches located in the headboard area of the bed.

[0004] One of these devices is defined in utility model application with publication number ES 1 052 140 U, wherein an articulated mattress support consisting of a frame movable with respect to the base of the bed, on which the articulated bed base thereof is arranged, being assisted by a series of connecting rods producing the movement thereof while at the same time raising the sections corresponding to the back of the articulated bed base is carried out. This device has a series of drawbacks given that the means allowing said movement consist in carrying out guides on the base of the bed in which sheaves located in the bottom portion of the movable frame play, with the cost increase caused by the manufacture of a special fixed base for its use with said movable frame, which seriously restricts the versatility of the device, in addition to the complexity of its assembly and disassembly, the arrangement of stops being necessary for the register of the section corresponding to the back when it is fully collapsed in the horizontal position.

[0005] On the other hand, utility model application with application number U 200200718, the owner of which is the same applicant of the present invention, defines a positional adjustment mechanism of the articulated bed base of beds, consisting of a frame movable with regard to the fixed frame of the bed, the movement of the articulated bed base therefore occurring simultaneously to

the raising of the sections corresponding to the back thereof, being assisted to that end by a series of connecting rods articulately locking together the fixed and movable frames. This mechanism has the drawback that the movement of the mobile frame is carried out by means of a system of runners housed inside the profiles constituting the fixed frame, whereby a given fixed frame, formed by hollow profiles, is required, which has an effect of a reduction of the versatility of the mechanism, in addition to the complexity in the assembly and disassembly of the mechanism, jams entailing a sudden and/or jerky movement which is not comfortable for the patient-user of the bed occurring, requiring the assistance of a gas piston for causing the movement of the mobile frame.

[0006] On the other hand, the connecting rod system for causing the sequential raising of the cervical section, at first, and of the dorsal section consists in the arrangement of stops, lugs and flat bars with guides, jams occurring, which constitutes a drawback when a sudden and/or jerky raising of the articulated bed base occurs, in addition to the cost and complexity added to the device.

DESCRIPTION OF THE INVENTION

[0007] The positional adjustment mechanism for beds proposed by the invention constitutes an advance in the devices of this type used until now, and solves in a fully satisfactory manner the drawbacks set forth above, in the sense that it achieves a continuous movement of the articulated bed base in an even, smooth, and perfectly guided manner in its path, needing no further means to cause said movement, being a safe, simple, economical and easy-to-assemble and disassemble mechanism, as the mobile frame is fully independent from the fixed frame of the bed, which can be implemented in any type of bed, with any fixed frame configuration, being a highly versatile mechanism having a hinged connecting rod system to cause the raising of the articulated bed base evenly and comfortably for the patient-user.

[0008] The positional adjustment mechanism for beds object of the invention is based on a movable frame made up of two side profiles incorporating wheels, usually on its outer portion, preferably two for each profile, with rotational capacity, being fixed by means of any system such as, for example bearings or bushings, nuts and bolts, and at least one cross bar performing the corresponding functions of stiffening and spacing of the side profiles, it even being possible to use for this the same cross bars of the lumbar section of the articulated bed base, the articulated bed base being locked together to said movable frame, the former being of any type, preferably its lumbar section, also incorporating the corresponding raising means of the articulated bed base, such as a motor, forming a very simple assembly that is independent from the fixed frame of the bed, which can have any configuration, a rolling base of the wheels of the movable frame, constituted by means of profiles for example, being locked together to the fixed frame.

[0009] Therefore, locked together in the fixed frame of the bed by means of any means such as screws, welding, bars or further elements, is a rolling base on each side thereof, constituted for example by means of profiles of a such configuration that it allows the smooth and even rolling of the wheels of the movable frame at its top portion, having a flat surface, it being possible to carry out said solid attachment in at least two points, considerably simplifying the mechanism and preventing the jams typical of encasements and/or guides, further favoring the rolling, especially as the wheels can be of greater sizes.

[0010] In the profiles constituting the movable frame registers a shaft with rotational capacity located in the area corresponding to the back, and another shaft located in the area close to the lower extremities of the patient-user, on which, for example, a motor actuated by a remote control acts to cause both the raising and lowering of the different sections of the articulated bed base.

[0011] Integrally arranged to the shaft corresponding to the back area is at least one connecting rod which lifts as the rotation of said shaft occurs for the purpose of achieving the raising of the cervical and dorsal sections of the articulated bed base. Said connecting rod is hingedly fixed to the fixed frame of the bed by means of the arrangement of another connecting rod which is hinged at one end to the fixed frame in the area close to the headboard, and at the other end to the previously described connecting rod, this connecting rod being the one causing the forward and backward movements of the movable frame with regard to the fixed frame as the rotation of the connecting rod locked together to the shaft located on the movable frame in correspondence with the back area occurs.

[0012] Hingedly arranged on the end opposite to the shaft of the previously mentioned connecting rod is a connecting rod of notably smaller dimensions than the previous one, which in turn transfers the movement, both in the raising and lowering, in a hinged manner to another connecting rod which is arranged duly locked together to one of the cross bars of the cervical section of the articulated bed base, for example by means of welding, the raising of the back thus occurring as the connecting rod which is locked together to the shaft of the back area arranged on the movable frame lifts, at first the raising of the cervical section and then the dorsal section of the articulated bed base sequentially occurring in a smooth manner, without needing stops, lugs or flat bars with a guide, the movement of the movable frame, and therefore of the articulated bed base and the patient-user, towards the headboard area of the bed occurring simultaneously.

[0013] In a practical embodiment variant of the invention, should the fixed frame of the bed not have a cross bar joining the sides thereof in the area corresponding to the headboard, said cross bar not being able to act as a stop of the cervical section of the articulated bed base when it is fully collapsed, i.e. in horizontal position, the possibility of arranging an additional connecting rod integrally to one of the cross bars of the dorsal section of

the articulated bed base, which is articulated to an extension of the connecting rod previously described, which is locked together to the cervical section of the articulated bed base, is contemplated by incorporating a stop preventing the connecting rod of the cervical section from surpassing this connecting rod of the dorsal section in its lowering, constituting the stop maintaining the horizontality of the cervical and dorsal sections when the articulated bed base is fully collapsed.

[0014] On the other hand, the raising of the tibial section, and therefore also the femoral section, i.e. those sections corresponding to the lower extremities of the patient, occurs upon acting on the remote control, the motor causing the rotation of the shaft arranged in the movable frame in the area corresponding to the lower extremities, which shaft is locked together to a connecting rod which rotates as the shaft, said connecting rod being hinged at its end opposite to the shaft to another connecting rod which is locked together to a cross bar of the tibial section of the articulated bed base, the raising or lowering of the sections corresponding to the lower extremities thus occurring.

[0015] For the purpose of aiding in an even movement of the movable frame in the lowering of the sections of the back of the articulated bed base, especially when the patient is not in bed and his or her weight is not acting on the articulated bed base, the possibility of arranging at least one resilient element which is fixed at one end, for example by means of a screw, to one of the profiles of the movable frame, either internally or externally, and at the other end is fixed to any point of the area close to the lower ends of the fixed frame, aiding in the return of the movable frame in the lowering of the sections of the back of the articulated bed base, is contemplated as a variant.

[0016] As has been discussed, the articulated bed base with the movable frame and the fixed frame are independent elements, joined exclusively by connecting rods, which substantially facilitates their assembly, the articulated bed base on one hand and the fixed frame on the other even being able to be moved independently, their subsequent joining being simple. However, the arrangement of at least one flat bar, for example of the angular configuration type, on the inner face of each one of the profiles constituting the movable frame, or equivalent solutions, is contemplated for the purpose of aiding, if the user moves the bed by pulling on the articulated bed base, in dragging the fixed frame in the movement.

[0017] Lastly, should the profiles constituting the movable frame be hollow, the possibility of arranging trim caps, which can be closed or incorporate a hole for allowing the passage of the resilient element to the inside of the profile, is contemplated for the purpose of contributing to a better appearance and greater hygiene thereof.

DESCRIPTION OF THE DRAWINGS

[0018] To complement the description being made and

for the purpose of helping 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 said description in which, with an illustrative and nonlimiting character, the following has been represented:

Figure 1 shows a perspective view of a bed incorporating the positional adjustment mechanism object of the invention.

Figure 2 shows a perspective view of the portion corresponding to the lower ends of the bed of the previous figure.

Figure 3 shows a perspective view of a detail of the lumbar section of an articulated bed base fixed to the movable frame forming part of the mechanism of the invention.

Figure 4 shows a perspective view of the area corresponding to the back of the mechanism of the invention.

Figure 5 shows a view according to the previous figure of a practical embodiment variant of the mechanism object of the invention.

Figure 6 shows a perspective view of a detail of the area corresponding to the lower ends of the movable frame forming part of the positional adjustment mechanism for beds object of the invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] In view of the figures discussed, it can be seen how the positional adjustment mechanism for beds object of the invention is made up of a movable frame (4), made up of two side profiles incorporating wheels (5), preferably two for each profile, with rotational capacity, being fixed by means of any system, such as bearings or bushings, screws and nuts for example, and at least one cross bar (7) carrying out the corresponding functions of stiffening and spacing of the side profiles, even the same cross bars (7) of the lumbar section of an articulated bed base (1) being able to be used, an articulated bed base (1) being locked together to said movable frame (4), preferably at its lumbar section, the former being of any type, also incorporating means of raising the articulated bed base (1), such as a motor (10), forming an assembly which is independent of a fixed frame (2) of the bed, which can have any configurations, a rolling base (3) of the wheels (5) of the movable frame (4), constituted by means of profiles for example, being locked together to the fixed frame.

[0020] Therefore, locked together on the fixed frame (2) of the bed by any means such as screws, welding, flat bars or additional elements, is a rolling base (3) on each side thereof, constituted for example by means of profiles of such configuration that it allows the smooth and even rolling of the wheels (5) of the movable frame (4) on its upper portion, having a flat surface, said solid attachment being able to be carried out in at least two

points.

[0021] In the profiles constituting the movable frame (4) registers a shaft (9) with rotational capacity located in the area corresponding to the back, and another shaft (8) located in the area close to the lower extremities of the patient-user, on which, for example, a motor (10) actuated by a remote control acts to cause both the raising and lowering of the different sections of the articulated bed base (1).

[0022] Integrally attached to the shaft (9) corresponding to the back area there is arranged at least one connecting rod (11) which lifts as the rotation of said shaft (9) occurs for the purpose of achieving the raising of the cervical and dorsal sections of the articulated bed base (1). Said connecting rod (11) is hinged to the fixed frame (2) of the bed by means of the arrangement of another connecting rod (6) which is hinged at one end to the fixed frame (2) in the area close to the headboard, and at the other end to the previously described connecting rod (11), this connecting rod (6) being the one producing the forward and backward movements of the movable frame (4) with regard to the fixed frame (2) as the rotation of the connecting rod (11) locked together to the shaft (9) located on the movable frame (4) in correspondence with the back area occurs.

[0023] Hinged on the end opposite to the shaft (9) of the previously mentioned connecting rod (11) is a connecting rod (12) of notably smaller dimensions than the previous one, which in turn transfers movement, both in raising and lowering, in a hinged manner to another connecting rod (13) which is arranged duly locked together to one of the cross bars (14) of the cervical section of the articulated bed base (1), for example by means of welding, the raising of the back thus occurring as the connecting rod (11) which is locked together to the shaft (9) of the back area arranged on the movable frame (4) lifts, at first the raising of the cervical section and then the dorsal section of the articulated bed base (1) sequentially occurring in a smooth manner, without needing stops, lugs or bars with a guide, the movement of the movable frame (4), and therefore of the articulated bed base (1) and of the patient-user, towards the headboard area of the bed occurring simultaneously.

[0024] In a practical embodiment variant of the invention, should the fixed frame (2) of the bed not have a cross bar joining the sides thereof in the area corresponding to the headboard, said cross bar not being able to act as a stop of the cervical section of the articulated bed base (1) when it is fully collapsed, i.e. in horizontal position, the possibility of arranging an additional connecting rod (15) integrally to one of the cross bars (16) of the dorsal section of the articulated bed base (1), which is articulated to an extension of the connecting rod (13) previously described, which is locked together to the cervical section of the articulated bed base (1), is contemplated, said connecting rod (15) incorporating a stop (17) preventing the connecting rod (13) of the cervical section from surpassing connecting rod (15) of the dorsal section

in its lowering, constituting the stop maintaining the horizontality of the cervical and dorsal sections when the articulated bed base (1) is fully collapsed.

[0025] On the other hand, the raising of the tibial section of the articulated bed base (1), and therefore also the femoral section, i.e. those sections corresponding to the lower extremities of the patient, occurs upon acting on the remote control, the motor (10) causing the rotation of the shaft (8) arranged on the movable frame (4) in the area corresponding to the lower extremities, which shaft (8) is locked together to a connecting rod (18) which rotates as the shaft (8), said connecting rod (18) being hinged at its end opposite to the shaft (8) to another connecting rod (19) which is locked together to a cross bar of the tibial section of the articulated bed base (1), the raising or lowering of the sections corresponding to the lower extremities thus occurring.

[0026] For the purpose of aiding in an even movement of the movable frame (4) in the lowering of the sections of the back of the articulated bed base (1), especially when the patient is not in bed and his or her weight is not acting on the articulated bed base (1), the possibility of arranging at least one resilient element (20) which is fixed at one end, for example by means of a screw (21), to one of the profiles of the movable frame (4), either internally or externally, and at the other end is fixed to any point of the area close to the lower ends of the fixed frame (2), aiding in the return of the movable frame (4) in the lowering of the sections of the back of the articulated bed base (1), is contemplated as a variant.

[0027] As has been discussed, the articulated bed base (1) with the movable frame (4) and the fixed frame (2) are independent elements, joined exclusively by connecting rods (6) which substantially facilitates their assembly, the articulated bed base (1) on one hand and the fixed frame (2) on the other even being able to be moved independently, their subsequent joining being simple. However, the arrangement of at least one flat bar (22), for example of the angular configuration type, on the inner face of each one of the profiles constituting the movable frame (4), or equivalent solutions, is contemplated for the purpose of aiding, if the user moves the bed by pulling on the articulated bed base (1), in dragging the fixed frame (2) in the movement.

[0028] Lastly, should the profiles constituting the movable frame (4) be hollow, the possibility of arranging trim caps (23), which can be closed or incorporate a hole for allowing the passage of the resilient element (20) to the inside of the profile, is contemplated for the purpose of contributing to a better appearance and greater hygiene thereof.

Claims

1. A positional adjustment mechanism for beds, having as a purpose achieving the movement of an articulated bed base

(1) towards the headboard area of the bed simultaneously to the raising of the sections of the back evenly and continuously by means of a safe and economical system, of the type of those incorporating an articulated bed base (1) with raising and lowering means thereof, such as a motor (10) actuated by means of a remote control, and a fixed frame (2) of any configuration, **characterized in that** it incorporates a movable frame (4) made up of two side profiles incorporating wheels (5), usually on its outer portion, preferably two for each profile, with rotational capacity, and at least one cross bar (7) for the stiffening and spacing of the side profiles, the articulated bed base (1) being locked together to said movable frame (4), and a rolling base (3) of the wheels (5) of the movable frame (4) to the fixed frame (2), on each side thereof, constituted by means of profiles having in their top portion a flat surface, internally registering in the movable frame (4) a shaft (9) with rotational capacity located in the area corresponding to the back on which the motor (10) acts, there being arranged integrally to said shaft (9) at least one connecting rod (11) which is hingedly joined to the fixed frame (2) by means of the arrangement of another connecting rod (6), which is hinged at one end to the fixed frame (2) in the area near the headboard, and at the other end to the connecting rod (11), at the opposite end of which there is hingedly arranged a connecting rod (12) which is in turn hinged to another connecting rod (13) arranged duly locked together to one of the cross bars (14) of the cervical section of the articulated bed base (1).

2. A positional adjustment mechanism for beds according to claim 1, **characterized in that** the articulated bed base (1) is locked together in the movable frame by means of the cross bars (7) themselves of the lumbar section of an articulated bed base (1).

3. A positional adjustment mechanism for beds according to the previous claims, **characterized in that** a connecting rod (15) is arranged integrally to one of the cross bars (16) of the dorsal section of the articulated bed base (1), which is hinged to an extension of connecting rod (13), said connecting rod (15) incorporating a stop (17) preventing the connecting rod (13) from surpassing the connecting rod (15) in its lowering, constituting the stop maintaining the horizontality of the cervical and dorsal sections when the articulated bed base (1) is fully collapsed.

4. A positional adjustment mechanism for beds according to the previous claims, **characterized in that** there is arranged at least one resilient element (20) which is fixed at one end, for example by means of

a screw (21), to one of the profiles of the movable frame (4), either internally or externally, and at the other end is fixed to any point of the area close to the lower ends of the fixed frame (2).

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5. A positional adjustment mechanism for beds according to the previous claims, **characterized in that** there is arranged at least one flat bar (22), for example of the angular configuration type, on the inner face of each one of the profiles constituting the movable frame (4) for the purpose of preventing the loss of contact between the fixed frame (2) and movable frame (4) from occurring upon transferring or moving the bed.
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6. A positional adjustment mechanism for beds according to the previous claims, **characterized in that**, should the profiles constituting the movable frame (4) be hollow, trim caps (23), which can be closed or incorporate a hole for allowing the passage of the resilient element (20) to the inside of the profile, are arranged.
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7. A positional adjustment mechanism for beds according to the previous claims, **characterized in that** the inner portion of the movable frame (4) registers a shaft (8) with rotational capacity located in the area close to the lower extremities of the patient on which the motor (10) acts, there being arranged integrally to said shaft (8) a connecting rod (18) which is hinged at its end opposite to the shaft (8) to another connecting rod (19) which is locked together to a cross bar of the tibial section of the articulated bed base (1).
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8. A positional adjustment mechanism for beds according to the previous claims, **characterized in that** the movable frame (4) incorporates two wheels (5) for each profile.

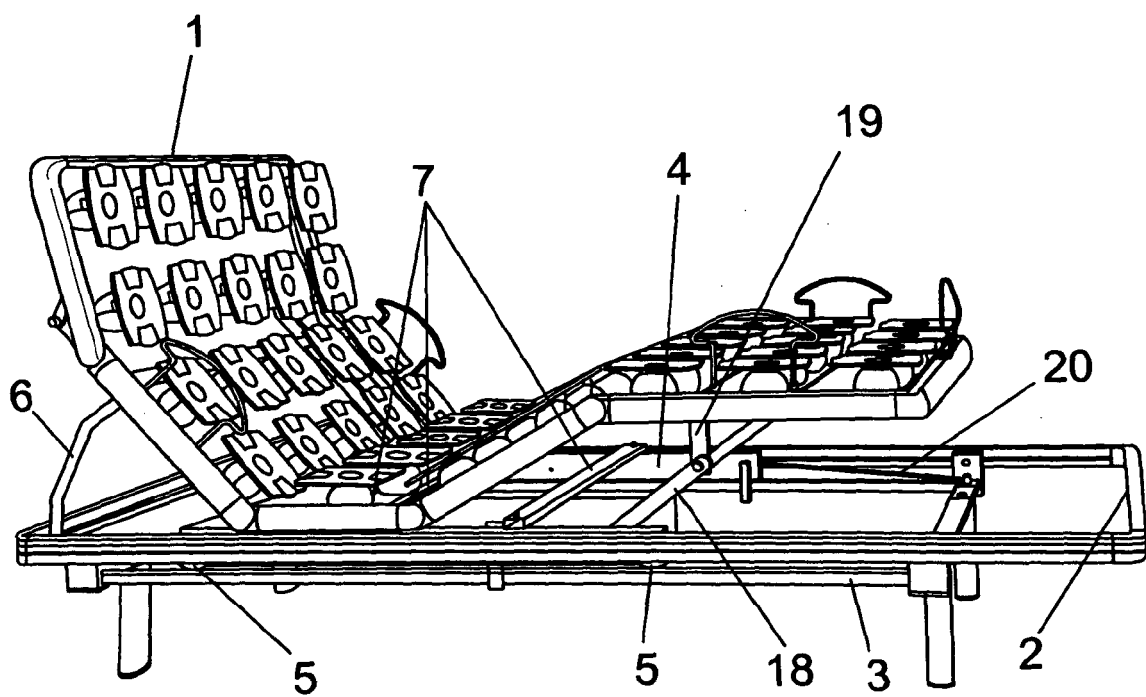


FIG. 1

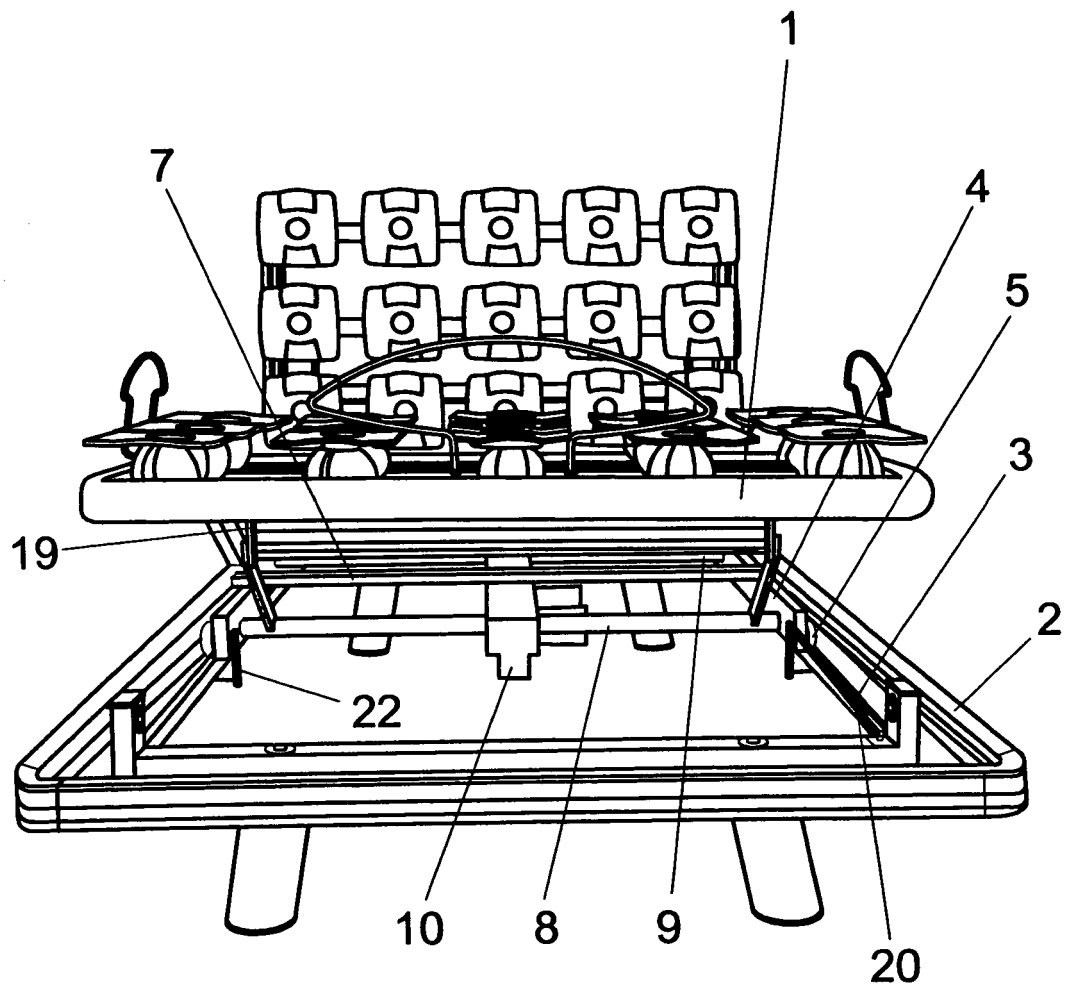


FIG. 2

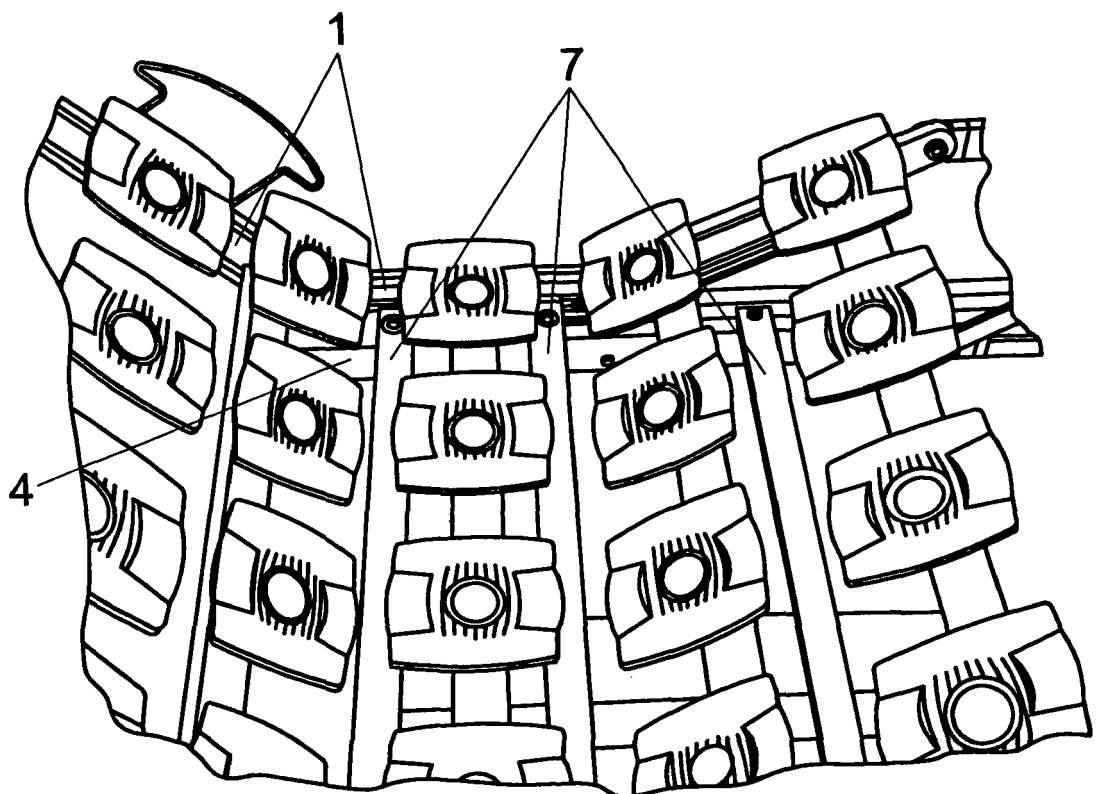


FIG. 3

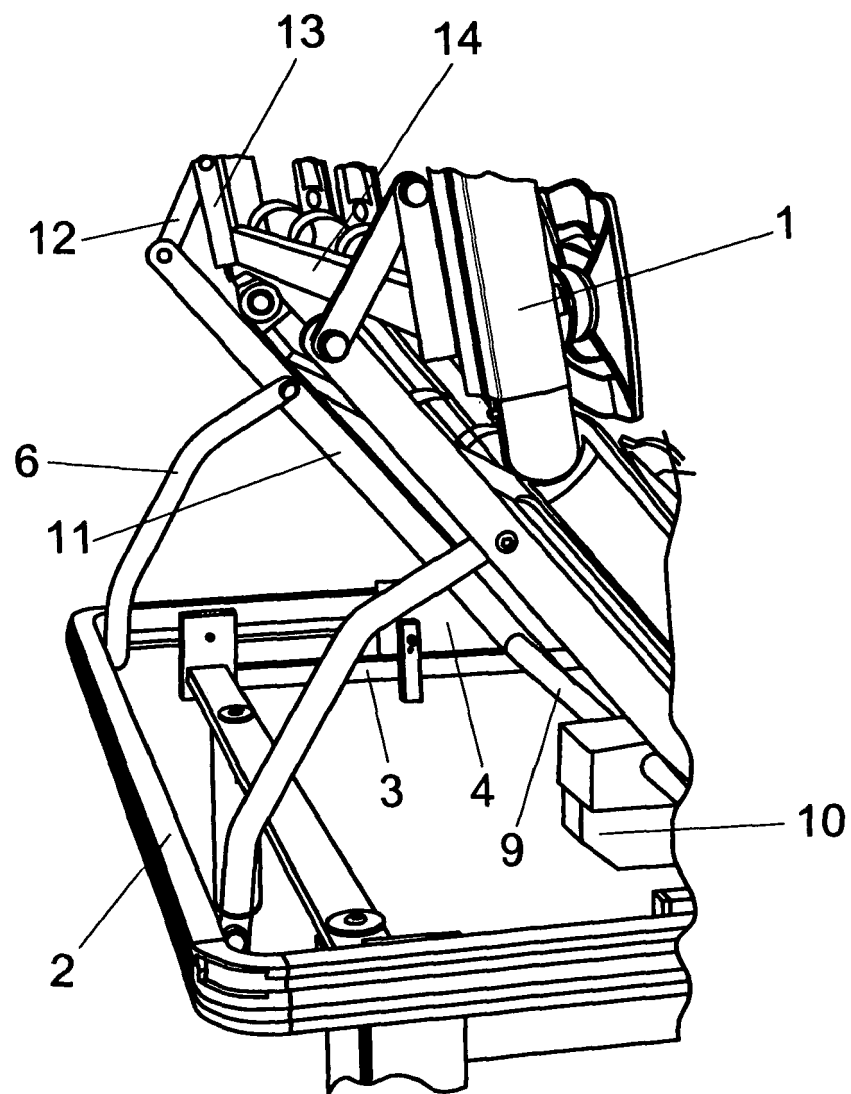


FIG. 4

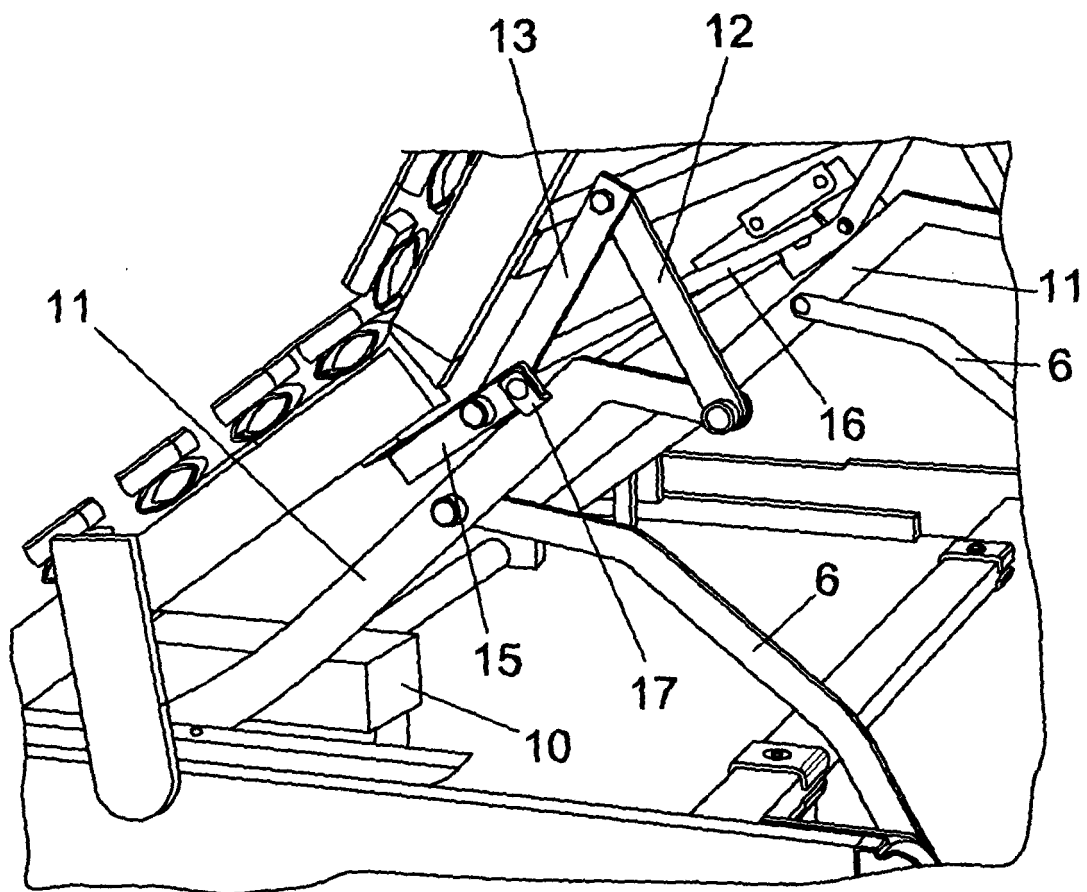


FIG. 5

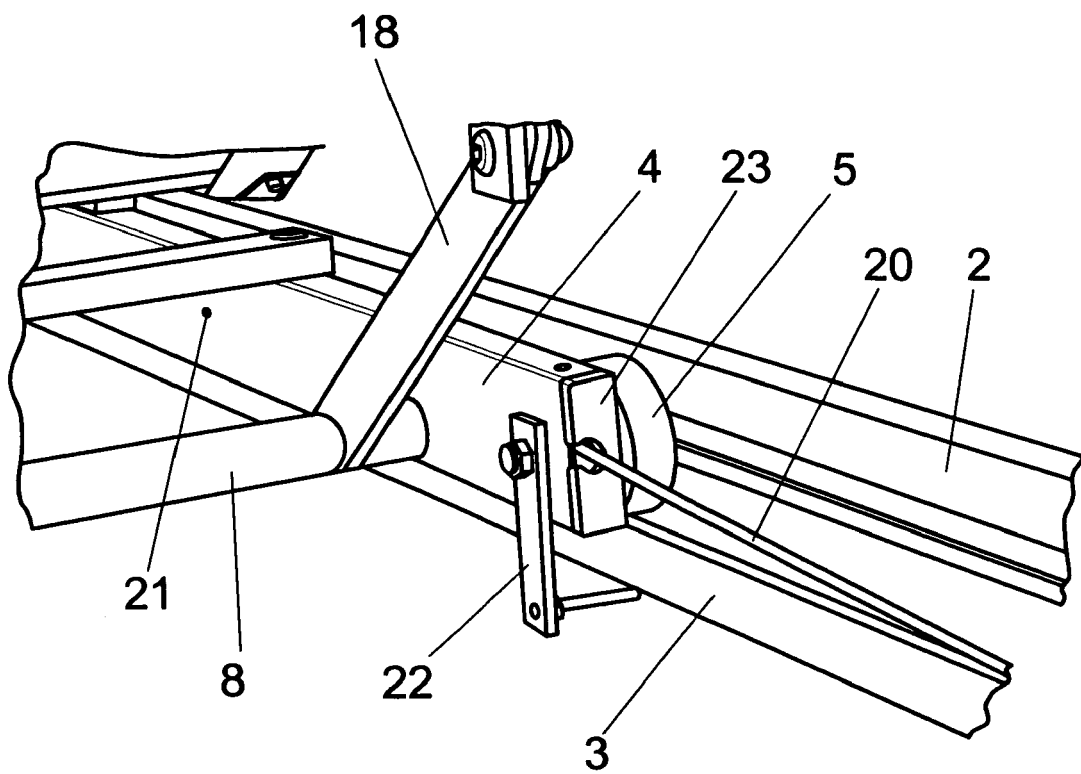


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 38 0277

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 June 2005	Examiner Amghar, N
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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EPO FORM 1503 03.02 (P04C01)

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

EP 04 38 0277

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
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13-06-2005

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