(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 583 592 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
08.10.2014 Bulletin 2014/41

(51) Int Cl.:
A47C 17/86 *(2006.01)* ***A47C 19/04*** *(2006.01)*

(21) Application number: **12169629.8**

(22) Date of filing: **25.05.2012**

(54) **Device for moving a mattress support and storage furniture unit comprising such device**

Vorrichtung zur Bewegung einer Matratze und Stauraummöbeleinheit mit solch einer Vorrichtung

Dispositif pour déplacer un matelas et unité de meuble de stockage comprenant ledit dispositif

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **18.10.2011 EP 11425256**

(43) Date of publication of application:
24.04.2013 Bulletin 2013/17

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EP-A2- 2 387 915 **ES-A1- 2 194 561**

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EP 2 583 592 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] . The present invention relates to a device for moving a mattress support in relation to a frame, and a storage furniture unit comprising such device.

[0002] . Storage furniture of various kinds is known of in the art, comprising a frame and a base, movable in relation to the frame, which acts as a support or stand for a mattress or for a user. Such a furniture is known for example from EP 2 387 915 A2.

[0003] . The known furniture units comprise devices for tipping the base in relation to the frame, so as to move the former between different configurations; in particular, a specific type of device envisages an open configuration of the container and a configuration with the base raised.

[0004] . Often conversion assistance means are provided, acting on the device mechanisms to simplify achievement of the various configurations.

[0005] . The movement devices used in the prior art however present a number of drawbacks.

[0006] . In particular, in such devices, the mechanisms and relative assistance means are continuously subject to mechanical stresses, which may be significant, so that relatively premature wear of the device occurs with a foreseeably short life of the storage furniture unit.

[0007] . The present invention thus sets out to overcome the problems of the prior art and, in particular, those referred to above.

[0008] . Such objective is achieved by a movement device according to claim 1, and by a storage furniture unit according to claim 13. The dependent claims show preferred embodiment variations.

[0009] . The present invention will now be described in detail with the help of the attached figures, wherein:

- figures 1a and 1b show longitudinal cross-sections of a storage bed fitted with a movement device, according to the example in figure 2, respectively in a rest configuration and a working configuration;
- figures 2, 3 and 4 show the movement device of figure 1, without the furniture unit for greater clarity, in three different functioning configurations;
- figures 5, 6 and 7 show a movement device, according to a different variation of the proximal articulation arm, positioned in the three different functioning steps;
- figures 8a, 8b, 9a, 9b and 10a, 10b show in pairs, in a lateral and perspective view, a movement device according to a further embodiment, positioned in three different functioning configurations;
- figure 11 shows the device according to the last variation shown, in a rear view from the side of the headboard of the storage furniture unit.

[0010] It is to be noted that figures 1-7 do not represent embodiments according to the invention. These figures serve illustrative purposes only.

[0011] . With reference to the aforesaid drawings, reference numeral 6 globally denotes a storage furniture unit, preferably a storage bed or a sofa-bed

[0012] . The storage furniture unit 6 comprises a furniture frame 4 and a mattress support 2, joined to the furniture frame 4 and which presents a support surface 8 positioned in a base plane X.

[0013] . The mattress support 2 is therefore supported by the furniture frame 4 which in turn preferably rests on the ground.

[0014] . The storage furniture unit 6 further comprises at least one movement device 1, shown below, connected to the frame 4 and to the mattress support 2 to permit movements of the mattress support.

[0015] . Advantageously, a pair of devices is provided, positioned on the opposite sides of the frame and/or of the mattress support.

[0016] . According to a particularly advantageous embodiment, the aforesaid pair of devices 1 is mechanically connected by at least one torsion bar 32, shown only in cross-section (rectangular or square) in the appended figures 1a-7, while partially visible in cross-section in the perspective view in figures 8b, 9b and 10b.

[0017] . Preferably, the furniture frame 4 defines a storage compartment 34 which houses the movement device 1 in at least one functioning configuration of the same, preferably in the configuration shown in figures 2, 5 and 8a, 8b.

[0018] . According to the embodiment shown in figure 1, the furniture frame defines upwards an access aperture 44 to the storage compartment, for example to put in or take out items from the container, on which the mattress support is suitable for being at least partially superposed. That way the mattress support, depending on the configuration, permits or prevents access to the storage compartment 34.

[0019] . The movement device 1 comprises a frame element 10 and a base element 12, respectively connected to the furniture frame 4 and to the mattress support 2 in a movable manner; this way, the base element can be moved between a rest configuration and an inclined configuration, wherein a first element end 12' is distanced further from the frame element 10 (therefore from the furniture frame 4) than an opposite element end 12", and furthermore between the inclined configuration and a working configuration, wherein the opposite element end 12" is raised in relation to the inclined configuration.

[0020] . In other words, in the working configuration the difference in height (for example in relation to a main extension axis of the frame element 10 or in relation to a ground plane) between the first element end 12' and the opposite element end 12" is reduced compared to the inclined configuration by virtue, precisely, of the raising of the opposite element end 12".

[0021] . Preferably, in the working configuration the base plane X is raised and substantially parallel to the rest configuration.

[0022] . Alternatively, for example as schematised in the appended drawings, in the working configuration the

base plane X presents a considerable inclination in relation to a horizontal plane S so that the base element lies in a slightly inclined position towards a headboard 36 of the storage container.

[0023] . For example, the angle A delimited between the base plane X and the horizontal plane S is within the range 1-16°, preferably in the range 1-11°, advantageously in the range 1-7°.

[0024] . As a result, the frame element 10 and the base element 12 are the components of the device suitable to mechanically couple to the furniture frame and to the mattress support, so as to conduct the aforesaid movements.

[0025] . In fact, while the frame element 10 is firmly fixed to the furniture frame, the base element (and therefore the mattress support connected to it) is suitable for being moved between the rest configuration, for example shown in figures 2, 5 and 8b, and the inclined configuration, wherein the access aperture 44 is free from the mattress support by virtue of a raising of its distal end 8'. For example, such configuration is shown in figure 3, 6 or 9a/9b, without the mattress support which in any case constitutes a virtual extension of the base element.

[0026] . For example, the frame element 10 comprises a plate, generally of a rectangular or square shape, which has a plurality of attachment points with the furniture frame 4, such as holes or soldering areas. According to a further variation, the base element 12 is a component with a generally L- or T-shaped cross section for coupling to the lower surface of the mattress support 2 or with a counter-frame.

[0027] . Preferably, when the base element 12 is positioned in the rest configuration, the mattress support 2 rests on a plurality of struts 46 connected to the frame, for example opposite to each other, so that the device is not subject to stress also in such configuration.

[0028] . Within this description, the term "proximal" is taken to mean the components facing or positioned towards a headboard 36 of the storage furniture unit; conversely, the term "distal" indicates the components facing or positioned towards a footboard 38 or towards a lateral rim of such unit 6.

[0029] . In addition, the device 1 enables the base element to be converted from the inclined configuration to the working configuration, wherein, as mentioned above, the opposite element end 12" is raised in relation to the inclined configuration and wherein, preferably, the base plane X is substantially translated parallel to the same plane in the rest configuration (figure 4 or 7) or, alternatively, has a slight inclination by the angle A according to some embodiments (as schematised for example in figure 10a). For the variants in which the storage furniture unit is a storage (sofa-)bed, the working configuration usually provides an extremely convenient position for the bed making-up.

[0030] . According to one advantageous embodiment, the conversion between the working configuration and the rest configuration takes place passing through the inclined configuration, so that to reach the rest configuration from the working configuration the same steps taken to open the compartment are performed in reverse order.

[0031] . The device further comprises a distal articulation arm 14, hinged to the frame element 10 and to the base element 1 to realise the conversion between the rest configuration and the inclined configuration.

[0032] . In fact, during such conversion, the distal arm 14 rotates in relation to the frame element 10 (around a first fulcrum Z) and the base element 12 (around a second fulcrum L) allowing the raising of the first element end 2'. As will be explained in further detail below, this conversion is advantageously accompanied by a distal shift of the base element 12.

[0033] . According to one embodiment, the distal articulation arm 14 extends in an wavy manner between the frame element 10 and the base element 12.

[0034] . According to a further embodiment, in a position included between the hinged ends of the distal articulation arm 14, exactly at the fulcrums Z, L, the distal articulation arm 14 comprises a plurality of segments 48, 50, 52 which form a broken line in at least one point. In other words, such variant envisages that the various segments 48, 50, 52 are each directed along their main axis, the orientation of each pair of axes being incident to each other so as to form the aforesaid broken line.

[0035] . According to possible variants, the fulcrums Y, Z of the proximal arm 16 and of the distal articulation arm 14 on the frame element 10 may be misaligned or aligned with each other.

[0036] . The device 1 further comprises a proximal articulation arm 16 rotatable between the frame element 10 and the base element 12 for the conversion between the inclined configuration and the working configuration.

[0037] . In particular, the proximal arm 16 is hinged to the frame element 10 at a third fulcrum Y, while it is preferably connected in a rotatable manner to the base element 12 by means of a joint component 30. Such component is preferably suitable for causing a distal shift of the base element 12, and in particular of its element end 2".

[0038] . In other words, the joint component 30 is connected so as to rotate to the base element and to the proximal arm 16. This way a raising of the first element end 12' corresponds to an advancement of the opposite element end 12" in a distal direction. Such advancement, as may be seen from the comparison between the pairs of figures 2-3, 5-6, 8a-9a is due mainly to the rotation of the joint component 30 in relation to the proximal articulation arm 16.

[0039] . Consequently, by virtue of the previous arrangement, it is possible to prevent the head portion of such mattress support 2 from accidentally hitting against the headboard 36 of the frame 4 which, in the rest configuration, is in a location extremely adjacent to the head portion 8".

[0040] . According to a preferred embodiment, the proximal articulation arm 16 and the joint component 30

interact in the absence of reciprocal blocks.

[0041] . The arrangement of the lever mechanisms described has in fact been designed so that the angle defined between the proximal arm 16 and the joint component 30 increases during the conversion between the inclined configuration and the working configuration, without however exceeding 180°, beyond which the movement towards the rest configuration would be made impossible.

[0042] . Advantageously, the torsion bar 32 connects the joint components 30 of a pair of devices 1 distanced along the mattress support 2 (and/or along the furniture frame 4) or, as shown in the drawings, joins the distal articulation arms 14.

[0043] . With reference for example to the variant in figure 10a, the torsion bar 32 is positioned on each distal articulation arm 14 next to the mattress support element 12, therefore the second fulcrum L; to such purpose one embodiment variation envisages that the distal articulation arm 14 may comprise a specially thickened or widened attachment zone 54 so as to better anchor the torsion bar 32.

[0044] . According to a further embodiment, the torsion bar joins a pair of opposite proximal articulation arms 16, for example at the opposite end of the frame element 10.

[0045] . Preferably, the proximal arm 16 and the distal 14 articulation arms are both hinged to the frame element 10 at their head portions 14', 16'.

[0046] . According to an advantageous embodiment, the proximal articulation arm 16 comprises a pair of longitudinal sections 22, 24, staggered to each other and preferably parallel, joined by a connection loop 26.

[0047] . Consequently, the longitudinal sections 22, 24 of the proximal arm 16 are joined to each other by the loop 26, which substantially represents a sinuous section of the arm between two preferably rectilinear sections, and are staggered lengthwise so that a tail of the first longitudinal section 22 couples to the head of the second longitudinal section 24, by means of the loop.

[0048] . According to one advantageous embodiment, for example shown in figure 10a, an end portion 16" of the proximal articulation arm 16 is generally arched.

[0049] . This way, since for some variants a joint component 30 is envisaged, the latter is connected precisely in that position of the proximal articulation arm 16; in the rest configuration such component is therefore kept in a raised position in relation to such arm 16 in relation to the supporting shelf 40 which will be described below.

[0050] . In addition, preferably, when the base element 12 is positioned in the rest configuration, the junction component 30 is directed substantially in the same direction as the arched end portion 16" of the proximal articulation arm 16.

[0051] . In addition, a first 18 and a second 20 elastic assembly are provided, respectively joined to the proximal 16 and distal articulation arm 14 to facilitate the conversion between the configurations described.

[0052] . Preferably, at least one of the first 18 and/or second 20 elastic assembly, advantageously both, comprises a gas spring.

[0053] . For example, respective working directions V, H are identifiable for the first 18 and for the second elastic assemblies.

[0054] . Advantageously, the first elastic assembly 18 acts on the proximal articulation arm 16 at the connection loop 26, that is, in an intermediate position of such arm 16.

[0055] . According to the invention, the first elastic assembly 18 acts on the proximal articulation arm 16 indirectly, by means of an intermediate organ 60.

[0056] . According to the invention, the intermediate organ 60 is connected to the first elastic assembly 18 and to the proximal articulation arm 16; this way, in achieving the inclined configuration such organ 60 acts on the first elastic body to solicit it, preferably in compression.

[0057] . According to such embodiment, as may for example be noted by comparing figures 8a and 9a, in the rest configuration the first elastic assembly 18 is in an elongated configuration (that is to say completely stretched out) while conversely, after the base element 12 has been moved towards the inclined configuration, such assembly 18 is partially compressed under the effect of the intermediate organ 60.

[0058] . As a result, while the base element remains in the rest configuration, the first elastic assembly 18 proves totally free of stresses.

[0059] . The intermediate organ 60 is of variable length and connects the proximal articulation arm 16 and the junction component 30.

[0060] . In other words, since the distances and orientation between the proximal articulation arm and the junction component 30 change in the various functioning configurations of the device 1, this embodiment envisages that the intermediate organ 60 is adaptable to the various dispositions of the base element.

[0061] . Consequently, since the respective attachment points 66, 68 of the intermediate organ 60 to the junction component 30 and to the proximal articulation arm 16 are preferably fixed (in that such organ 60 is advantageously pivoted to both), this variation envisages that the intermediate body permits an adaptation of the distances and of the orientations by virtue of its elongations /contractions along the conjunction line between the components on which it interacts.

[0062] . For example, the intermediate organ 60 may comprise a body joint 70 to ensure such mobility.

[0063] . According to an embodiment not shown, the intermediate body comprises an elastically deformable portion, a cylinder-piston group, a pair of telescopic segments or reciprocally sliding segments to adapt itself to the distance between the articulation arm 16 and the intermediate component in any functioning configuration.

[0064] . In the embodiment shown, the intermediate organ 60 comprises at least a first 62 and a second 64 lever or rod, which are preferably jointed to each other.

[0065] . In detail, one end of the first lever 62 is hinged,

for example in an intermediate position to the proximal articulation arm 16, while an opposite end is joined to the second lever 64.

[0066] . As regards the second lever, one embodiment envisages that its second end is connected to the first lever 62 (at a fourth fulcrum J), and that an opposite end is connected in a rotatable manner to the junction component 30.

[0067] . This way, advantageously, the first 62 and the second 64 lever form with the proximal articulation arm 16 and with the junction component 30 an articulated quadrilateral. According to the variant shown, such quadrilateral is inscribed in a polygon delimited by the frame element 10, by the proximal articulation arm 16, by the junction component 30, by the base element 12 and by the distal articulation arm 14.

[0068] . The first elastic assembly 18 works on the intermediate organ 60 or on a portion thereof to facilitate the conversion between at least one pair of the aforementioned configurations. Preferably, the first elastic assembly 18 acts on one of the levers 62, 64 and, advantageously, is connected to the first lever 62, for example between its two joints 70, 68 with the second lever 64 and to the proximal articulation arm 16.

[0069] . According to a particularly advantageous embodiment, the proximal articulation arm 16, the junction component 30 and the intermediate organ 60 identify an articulation plane B of the device 1, in which the articulated quadrilateral described above is advantageously movable.

[0070] . For example, such plane B is positioned orthogonally to the fourth fulcrum J, or in any case in relation to any of the fulcrums 66, 68, 72 which allow the articulation of the quadrilateral or of the proximal articulation arm 16 with the junction component 30.

[0071] . Preferably, the working direction V of the first elastic assembly 18 lies in the articulation plane B.

[0072] . According to an advantageous embodiment, the torsion bar 32 join the first 62 or the second 64 lever of a pair of opposite movement devices 1.

[0073] . A further variation envisages that the first elastic assembly 18, preferably at its end opposite the end connected to or acting on the proximal arm, is hinged to the frame element 10 at an axis M included between the fulcra Y, Z of the proximal 16 and of the distal 14 articulation arm.

[0074] . For example, with reference to figures 4, 7 and 8a, such axis M is transversally staggered, for example upwardly, in relation to the conjunction line between said fulcra Y, Z.

[0075] . Advantageously, in the rest configuration, the distal articulation arm 14 rests on a rotation pin directed along such axis M.

[0076] . Even more advantageously, the frame element 10 presents, for example at its lower end portion, a shelf 40 for supporting the proximal articulation arm 16 in the rest configuration.

[0077] . According to a convenient aspect of such variation, during the assembly of the device 1, the proximal articulation arm 16 abuts against the shelf 40 so that the first elastic assembly 18 can be precompressed, i.e. finds itself in a state of partial tension/compression.

[0078] . In addition or alternatively, the shelf 40 forms a limit stop for the proximal articulation arm 16 in the rest configuration

[0079] . According to a further embodiment, at the frame element, the second elastic assembly 20, and in particular the gas spring, has a rotation axis Z in common with the distal articulation arm 14.

[0080] . In other words, on the frame element, the second elastic assembly and the distal arm are guided by the same rotation pin.

[0081] . Thereby, in the inclined configuration and in the working configuration the second elastic assembly 20 and the distal articulation arm 14 conserve the same reciprocal position.

[0082] . It is not essential, however, for the second elastic assembly 20 and the distal articulation arm 14 to share the rotation axis Z, in that further embodiment variants (not shown) may envisage that a first end 20' of the elastic assembly is either fixed directly to the frame element 10, for example in a staggered position in relation to the aforesaid rotation axis, or on the distal articulation arm 14, for example above said axis, that is to say in a position between the first 14' and a second 14" head portion of such arm.

[0083] . According to yet a further embodiment, one end of the second elastic assembly 20 (for example of the gas spring) is hinged to the base element 12 distally to the second fulcrum L of the distal arm 14, that is to say in a position N between the second fulcrum L and the footboard 38, when the device 1 is joined to the unit 6.

[0084] . Preferably, the proximal articulation arm 16 defines, in a zone of overlap with the frame element 10, an abutment surface 28 with a rotation pin of the first elastic assembly 18, which forms an end-stroke to the working configuration.

[0085] . For example, the surface 28 is recessed (for example see figure 6), so that it is substantially placed in the thickness of the proximal articulation arm 16.

[0086] . In particular, the surface 28 is preferably suitable for housing the zone of the first elastic assembly 18 adjacent to the axis M, that is to say at least one portion of the aforesaid rotation pin which finds itself directed along such axis.

[0087] . According to a further embodiment, the abutment surface 28 is delimited by a section of arm 74 which extends transversally from such arm 16, for example substantially parallel to the rotation axis M of the first elastic assembly.

[0088] . Preferably, the arm section 74 extends towards the frame element 10, preferably so as to partially cover the rotation pin around which the proximal rotation arm 16 is rotatable. For example, the section 74 may be created by folding a portion of the arm 16.

[0089] . As a result, the arm section 74 forms a trans-

versal abutment wall 76 with the rotation pin of the first elastic assembly 18; such wall 76 advantageously bears the abutment surface 28.

[0090] . Preferably, when positioned in the rest configuration, the first elastic assembly 18 is positioned above the proximal articulation arm 16, that is it lies in a position included (in a side view) between such proximal arm 16 and the base element 12.

[0091] . Consequently, in the light of the embodiments illustrated above, it may be appreciated how a plurality of components contribute to maintaining the working configuration: first of all, when the proximal articulation arm 16 reaches abutment with the rotation pin at the axis M, any further advancement of the arm is prevented. As mentioned earlier, the achievement of this position prevents the further rotation of the joint component 30 in relation to the proximal arm in the absence of blocks.

[0092] . Moreover, in the working configuration, the second elastic assembly 20 acts as a tie-rod between the base element and the frame element, in that it is in the configuration of maximum extension.

[0093] . Moreover, during conversion between the rest configuration and the inclined configuration, the first elastic assembly 18 works on the proximal arm 16 to keep it substantially static. As said, such action is performed under the effect of the intermediate organ 60.

[0094] . In other words, when the base element is moved between the rest configuration and the inclined configuration, the proximal arm 16 remains passive inasmuch as kept in such position by the first elastic assembly 18.

[0095] . The device according to the invention thereby makes it possible to delay wear on its components given that for each raising and lowering only the mechanisms strictly necessary work, both during such movement and preferably also during the conversion between the inclined configuration and the working configuration.

[0096] . Preferably, in the rest configuration, the first elastic assembly 18 (or in the case in point the gas spring) is in an elongated conformation, for example pre-loaded in extension.

[0097] . According to a further embodiment, in the rest configuration, the second elastic assembly 20 (or the relative gas spring) is in a compressed conformation.

[0098] . Innovatively, the device and unit which the present invention relates to make it possible to prevent precocious wear of the components, in that the latter are divided into groups, each delegated to perform a single operation or movement. The present invention thereby provides a more reliable structure than the structures available in the prior art.

[0099] . Furthermore, the means used for raising or tipping the mattress support are suitable to position themselves in intermediate or final configurations in which the mechanical stresses are markedly reduced.

[0100] . Advantageously, the device according to the present invention is extremely compact, since only a small fraction of the storage compartment space is lost because occupied by the mechanisms delegated to move the mattress support.

[0101] . Advantageously, the device according to the present invention makes it possible, during closure of the compartment, to retrace the same steps as during the opening so as to provide an extremely safe functioning; in fact the present device does not run the risk of a sudden conversion from the working configuration to the rest configuration which could surprise, or worse injure, a user.

[0102] . Such effect is even more marked for the variants which envisage an intermediate body, in that in such embodiments the elastic means oppose the return to the inclined configuration.

[0103] . Advantageously, the device according to the present invention is suitable for functioning in an extremely silent and gradual manner, especially by virtue of the assembly tolerances.

[0104] . Advantageously, the device according to the present invention can also be used with beds with high footboards or in any case higher than average, since the engagement and disengagement of the mattress support from the frame occurs always maintaining a safety gap, suitable for preventing contact between the components.

[0105] . Advantageously, when the device according to the present invention is in the working configuration, it is designed to withstand even considerable stresses on the free end of the mattress support.

[0106] . Advantageously, the arrangement of the joints and actuation directions of the device which the present invention relates to are suitable for permitting a longer duration of use than the traditional devices, in that the mechanism has a reduced tendency to deformation even after a large number of functioning cycles.

[0107] . It is in fact a common drawback that, after a limited number of cycles of use, the prior art mechanisms undergo deformations such as to cause friction between the moving components and the edges of the storage furniture.

[0108] . Advantageously, the device which the present invention relates to makes it possible to keep some of the elastic assemblies totally disabled when the mechanism performs conversions in which they are not required.

[0109] . Advantageously, the storage unit which the present invention relates to makes it possible to optimise the internal space of the container also for those variants which envisage a synchronisation of a plurality of mechanisms.

[0110] . Advantageously, in some of the variants illustrated, the first elastic assembly makes it possible both to keep the proximal articulation arm still during the first functioning configurations, and to dampen the movements of the junction lever, thereby making the overall movement smoother.

[0111] . This gives the structure a feeling of greater solidity and reliability.

[0112] . A person skilled in the art may make variations or replacements of elements with other functionally

equivalent to the aforementioned embodiments of the device and unit so as to satisfy specific requirements.

[0113] . Such variations are also contained within the scope of protection as defined by the following claims.

Claims

1. Device for moving (1, 1') a mattress support (2) in relation to a furniture frame (4) associable to a storage furniture unit (6), said unit (6) comprising a furniture frame (4) and the mattress support (2), supported by said frame (4) and having a support surface (8), e.g. for a mattress (42), positioned on a base plane (X);
said device for moving (1, 1') comprising:

a) a frame element (10) and a base element (12), respectively connectable to the furniture frame (4) and to the mattress support (2) in a movable manner, between a rest configuration and an inclined configuration, wherein a first element end (12') is distanced further from the furniture frame (4) than an opposite element end (12"), and between the inclined configuration and a working configuration, wherein the opposite element end (12") is raised in relation to the inclined configuration;
b) a distal articulation arm (14), hinged to the frame element (10) and to the base element (12) to perform the conversion between the rest configuration and the inclined configuration; and
c) a proximal articulation arm (16) rotatable between the frame element (10) and the base element (12) for the conversion between the inclined configuration and the working configuration; and
d) a first (18) and a second (20) elastic assembly, respectively associated to the proximal (16) and distal (14) articulation arm to facilitate the conversion between said configurations;
wherein, during the conversion between the rest configuration and the inclined configuration, the first elastic assembly (18) works on the proximal arm (16) to keep it substantially static; and
e) a junction component (30), through which the proximal articulation arm (16) is hinged to the base element (12); said device (1, 1') being **characterized in** comprising a variable length intermediate organ (60) which connects said junction component (30), said proximal articulation arm (16) and the first elastic assembly (18), wherein, in achieving the inclined configuration, said organ (60) acts in compression on the first elastic assembly (18).

2. Device according to claim 1 or 2, wherein the intermediate organ comprises an elastically deformable portion, a cylinder-piston group, a pair of telescopic segments or reciprocally sliding segments to adapt to the distance between the articulation arm (16) and the junction component (30) in said configurations.

3. Device according to any of the previous claims, wherein the intermediate organ (60) comprises at least a first (62) and a second (64) lever or rod which form an articulated quadrilateral with the proximal articulation arm (16) and with the junction component (30).

4. Device according to claim 4, wherein said quadrilateral is inscribed in a polygon delimited by the frame element (10), by the proximal articulation arm (16), by the junction component (30), by the base element (12) and by the distal articulation arm (14).

5. Device according to any of the claims from 3 to 5, wherein an articulation plane (B) of said device (1, 1') is identified between the proximal articulation arm (16), the junction component (30) and the intermediate organ (60), the working direction (V) of the first elastic assembly (18) lying in said plane (B).

6. Device according to any of the claims from 3 to 6, wherein the junction component (30) is suitable for causing a distal shift of the base element (12).

7. Device according to any of the previous claims, wherein the first elastic assembly (18) works on a portion or lever (62, 64) of the intermediate organ (60) to facilitate the conversion between at least a pair of said configurations.

8. Device according to any of the previous claims, wherein the proximal articulation arm (16) defines, in a overlapping zone with the frame element (10), an abutment surface (28) for a rotation pin of the first elastic assembly (18), which forms an end stroke for the working configuration, said surface (28) being delimited by an arm section (74) which extends transversally from such arm (16) towards the frame element (10).

9. Device according to any of the previous claims, wherein the proximal and the distal articulation arms are both hinged to the frame element (10) at their head portions (14', 16').

10. Device according to any of the previous claims, wherein at least one of the first (18) and second (20) elastic assemblies comprise a gas spring.

11. Device according to any of the previous claims, wherein, in the working configuration, the base plane (X) is raised and substantially parallel in relation to the rest configuration.

12. Device according to any of the claims 1-11, wherein, in the working configuration, the base plane (X) defines an angle (A) with a horizontal plane (S) comprised in a range 1-16°.

13. Storage furniture unit (6), preferably a storage bed or sofa-bed, comprising:

- a furniture frame (4);
- a mattress support (2), joined to the furniture frame (4) and having a support surface (8) positioned on a base plane (X);
- at least one device for moving (1, 1') according to any of the previous claims;

where the furniture frame (4) defines a containment compartment (34) which, in the rest configuration, houses the movement device (1, 1').

14. Storage furniture unit according to claim 14, wherein at least one torsion bar (32) joins:

i) the distal articulation arms (14); and/or
ii) the rods or the levers (62; 64);

of a pair of opposite movement devices (1, 1').

Patentansprüche

1. Vorrichtung zum Bewegen (1, 1') eines Matratzenträgers (2) bezüglich eines Möbelrahmens (4), welcher einer Aufbewahrungsmöbel-Einheit (6) zuordenbar ist, wobei die Einheit (6) einen Möbelrahmen (4) und den Matratzenträger (2) umfasst, welcher von dem Rahmen (4) getragen ist und eine Tragefläche (8) aufweist, beispielsweise für eine Matratze (42), welche an einer Grundebene (X) positioniert ist; wobei die Vorrichtung zum Bewegen (1, 1') umfasst:

a) ein Rahmenelement (10) und ein Grundelement (12), welche mit dem Möbelrahmen (4) beziehungsweise dem Matratzenträger (2) auf eine bewegbare Weise verbunden sind, und zwar zwischen einer Ruhe-Konfiguration und einer geneigten Konfiguration, wobei ein erstes Elementende (12') weiter von dem Möbelrahmen (4) entfernt ist als ein gegenüberliegendes Elementende (12"), und zwischen der geneigten Konfiguration und einer Arbeits-Konfiguration, wobei das gegenüberliegende Elementende (12'') bezüglich der geneigten Konfiguration angehoben ist;
b) einen distalen Gelenkarm (14), welcher an dem Rahmenelement (10) und an dem Grundelement (12) angelenkt ist, um den Übergang zwischen der Ruhe-Konfiguration und der geneigten Konfiguration auszuführen; und
c) einen proximalen Gelenkarm (16), welcher drehbar zwischen dem Rahmenelement (10) und dem Grundelement (12) für den Übergang zwischen der geneigten Konfiguration und der Arbeits-Konfiguration ist; und
d) eine erste (18) und eine zweite (20) elastische Anordnung, welche dem proximalen (16) beziehungsweise distalen (14) Gelenkarm zugeordnet sind, um den Übergang zwischen den Konfigurationen zu erleichtern;
wobei während des Übergangs zwischen der Ruhe-Konfiguration und der geneigten Konfiguration die erste elastische Anordnung (18) an dem proximalen Arm (16) wirkt, um ihn im Wesentlichen statisch zu halten; und
e) eine Übergangs-Komponente (30), durch welche der proximale Gelenkarm (16) an des Grundelement (12) angelenkt ist; wobei die Vorrichtung (1, 1') **dadurch gekennzeichnet ist, dass** sie ein Zwischenorgan von variabler Länge (60) umfasst, welches die Übergangs-Komponente (30), den proximalen Gelenkarm (16) und die erste elastische Anordnung (18) verbindet,
wobei bei Erreichen der geneigten Konfiguration das Organ (60) komprimierend auf die erste elastische Anordnung (18) wirkt.

2. Vorrichtung nach Anspruch 1 oder 2, wobei das Zwischenorgan einen elastisch deformierbaren Abschnitt, eine Zylinder-Kolben-Gruppe, ein Paar von Teleskopsegmenten oder wechselseitig gleitenden Segmenten zum Anpassen an den Abstand zwischen dem Gelenkarm (16) und der Übergangs-Komponente (30) in den Konfigurationen umfasst.

3. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei das Zwischenorgan (60) wenigstens einen ersten (62) und einen zweiten (64) Hebel oder Stab umfasst, welcher ein Gelenk-Viereck mit dem proximalen Gelenkarm (16) und der Übergangs-Komponente (30) bildet.

4. Vorrichtung nach Anspruch 4, wobei das Viereck in einem Polygon eingenommen ist, welches von dem Rahmenelement (10), von dem proximalen Gelenkarm (16), von der Übergangs-Komponente (30), von dem Grundelement (12) und von dem distalen Gelenkarm (14) begrenzt ist.

5. Vorrichtung nach einem der Ansprüche 3 bis 5, wobei eine Gelenkebene (B) der Vorrichtung (1, 1') zwischen dem proximalen Gelenkarm (16), der Übergangs-Komponente (30) und dem Zwischenorgan (60) definiert ist, wobei die Arbeitsrichtung (V) der ersten elastischen Anordnung (18) in der Ebene (B) liegt.

6. Vorrichtung nach einem der Ansprüche 3 bis 6, wo-

bei die Übergangs-Komponente (30) dazu geeignet ist, eine distale Verschiebung des Grundelements (12) hervorzurufen.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die erste elastische Anordnung (18) an einem Abschnitt oder Hebel (62, 64) des Zwischenorgans (60) wirkt, um den Übergang zwischen wenigstens einem Paar der Konfigurationen zu erleichtern.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der proximale Gelenkarm (18) in einer Überlappungszone mit dem Rahmenelement (10) eine Anlagefläche (28) für einen Drehstift der ersten elastischen Anordnung (18) definiert, welche einen Endanschlag für die Arbeits-Konfiguration bildet, wobei die Fläche (28) von einem Armabschnitt (74) begrenzt ist, welcher sich transversal von dem Arm (16) in Richtung des Rahmenelements (10) erstreckt.

9. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der proximale und der distale Gelenkarm beide an das Rahmenelement (10) an ihren Kopfabschnitten (14', 16') angelenkt sind.

10. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei wenigstens eine von der ersten (18) und zweiten (20) elastischen Anordnung eine Gasfeder umfasst.

11. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei in der Arbeits-Konfiguration die Grundebene (X) angehoben und im Wesentlichen parallel bezüglich der Ruhe-Konfiguration ist.

12. Vorrichtung nach einem der Ansprüche 1 bis 11, wobei in der Arbeits-Konfiguration die Grundebene (X) einen Winkel (A) mit einer horizontalen Ebene (S) definiert, welcher in einem Bereich zwischen 1-16° liegt.

13. Aufbewahrungsmöbel-Einheit (6), vorzugsweise ein Aufbewahrungsbett oder Sofa-Bett, umfassend:

- einen Möbelrahmen (4);
- einen Matratzenträger (2), welcher mit dem Möbelrahmen (4) verbunden ist und eine Tragefläche (8) aufweist, welche an einer Grundebene (X) positioniert ist;
- wenigstens eine Vorrichtung zum Bewegen (1, 1') nach einem der vorhergehenden Ansprüche;

wobei der Möbelrahmen (4) ein Aufbewahrungsfach (34) definiert, welches in der Ruhe-Konfiguration die Bewegungs-Vorrichtung (1, 1') aufnimmt.

14. Aufbewahrungsmöbel-Einheit nach Anspruch 14, wobei wenigstens ein Torsionsstab (32)

i) die distalen Gelenkarme (14); oder/und
ii) die Stäbe oder Hebel (62; 64)

eines Paars von gegenüberliegenden Bewegungs-Vorrichtungen (1, 1') verbindet.

Revendications

1. Dispositif de déplacement (1, 1') d'un support de matelas (2) par rapport à un châssis de meuble (4) pouvant être associé à une unité de meuble de rangement (6), ladite unité (6) comprenant un châssis de meuble (4) et le support de matelas (2), supporté par ledit châssis (4) et ayant une surface de support (8), par exemple, pour un matelas (42), positionnée sur un plan de base (X);
ledit dispositif de déplacement (1, 1') comprenant:

a) un élément de châssis (10) et un élément de base (12), pouvant être reliés respectivement au châssis de meuble (4) et au support de matelas (2) d'une manière mobile, entre une configuration de repos et une configuration inclinée, dans laquelle une première extrémité d'élément (12') est plus éloignée du châssis de meuble (4) qu'une extrémité d'élément opposée (12"), et entre la configuration inclinée et une configuration d'utilisation, dans laquelle l'extrémité d'élément opposée (12") est relevée par rapport à la configuration inclinée;
b) un bras d'articulation distal (14), articulé par rapport à l'élément de châssis (10) et à l'élément de base (12) pour effectuer la conversion entre la configuration de repos et la configuration inclinée; et
c) un bras d'articulation proximal (16) rotatif entre l'élément de châssis (10) et l'élément de base (12) pour la conversion entre la configuration inclinée et la configuration d'utilisation; et
d) un premier (18) et un second (20) ensemble élastique, associés respectivement aux bras d'articulation proximal (16) et distal (14) afin de faciliter la conversion entre lesdites configurations;
dans lequel, lors de la conversion entre la configuration de repos et la configuration inclinée, le premier ensemble élastique (18) agit sur le bras proximal (16) pour le maintenir sensiblement statique; et
e) un élément de liaison (30), au moyen duquel le bras d'articulation proximal (16) est articulé par rapport à l'élément de base (12);
ledit dispositif (1, 1') étant **caractérisé en ce qu'**il comprend un organe intermédiaire de lon-

gueur variable (60) qui relie ledit élément de liaison (30), ledit bras d'articulation proximal (16) et le premier ensemble élastique (18), dans lequel, en accomplissant la configuration inclinée, ledit organe (60) agit en compression sur le premier ensemble élastique (18).

2. Dispositif selon la revendication 1 ou 2, dans lequel l'organe intermédiaire comprend une partie élastiquement déformable, un groupe cylindre-piston, une paire de segments télescopiques ou de segments coulissant réciproquement pour s'adapter à la distance entre le bras d'articulation (16) et l'élément liaison (30) dans lesdites configurations.

3. Dispositif selon l'une quelconque des revendications précédentes, dans lequel l'organe intermédiaire (60) comprend au moins un premier (62) et un second (64) levier ou une première (62) et une seconde (64) tige qui forment un quadrilatère articulé avec le bras d'articulation proximal (16) et avec l'élément de liaison (30).

4. Dispositif selon la revendication 4, dans lequel ledit quadrilatère est inscrit dans un polygone délimité par l'élément de châssis (10), par le bras d'articulation proximal (16), par l'élément de liaison (30), par l'élément de base (12) et par le bras d'articulation distal (14).

5. Dispositif selon l'une quelconque des revendications 3 à 5, dans lequel un plan d'articulation (B) dudit dispositif (1, 1') est identifié entre le bras d'articulation proximal (16), l'élément de liaison (30) et l'organe intermédiaire (60), la direction d'utilisation (V) du premier ensemble élastique (18) se trouvant dans ledit plan (B).

6. Dispositif selon l'une quelconque des revendications 3 à 6, dans lequel l'élément de liaison (30) est approprié pour provoquer un déplacement distal de l'élément de base (12).

7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le premier ensemble élastique (18) agit sur une partie ou un levier (62, 64) de l'organe intermédiaire (60) pour faciliter la conversion entre au moins une paire desdites configurations.

8. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le bras d'articulation proximal (16) définit, dans une zone de chevauchement avec l'élément de châssis (10), une surface de butée (28) pour un axe de rotation du premier ensemble élastique (18), qui forme une fin de course pour la configuration d'utilisation, ladite surface (28) étant délimitée par une section de bras (74) qui s'étend transversalement à partir d'un tel bras (16) vers l'élément de châssis (10).

9. Dispositif selon l'une quelconque des revendications précédentes, dans lequel les bras d'articulation proximal et distal sont tous les deux articulés par rapport à l'élément de châssis (10) au niveau de leurs parties de tête (14', 16').

10. Dispositif selon l'une quelconque des revendications précédentes, dans lequel au moins l'un des premier (18) et second (20) ensembles élastiques comprend un ressort à gaz.

11. Dispositif selon l'une quelconque des revendications précédentes, dans lequel, dans la configuration d'utilisation, le plan de base (X) est relevé et sensiblement parallèle par rapport à la configuration de repos.

12. Dispositif selon l'une quelconque des revendications 1 à 11, dans lequel, dans la configuration d'utilisation, le plan de base (X) définit un angle (A) avec un plan horizontal (S) compris dans une gamme allant de 1 à 16°.

13. Unité de meuble de rangement (6), de préférence un lit à tiroirs ou un canapé-lit, comprenant:

- un châssis de meuble (4);
- un support de matelas (2), relié au châssis de meuble (4) et ayant une surface de support (8) positionnée sur un plan de base (X);
- au moins un dispositif de déplacement (1, 1') selon l'une quelconque des revendications précédentes;

où le châssis de meuble (4) définit un compartiment de confinement (34) qui, dans la configuration de repos, abrite le dispositif de déplacement (1, 1').

14. Unité de meuble de rangement selon la revendication 14, dans laquelle au moins une barre de torsion (32) joint:

i) les bras d'articulation distaux (14); et/ou
ii) les tiges ou les leviers (62, 64);

d'une paire de dispositifs de déplacement opposés (1, 1').

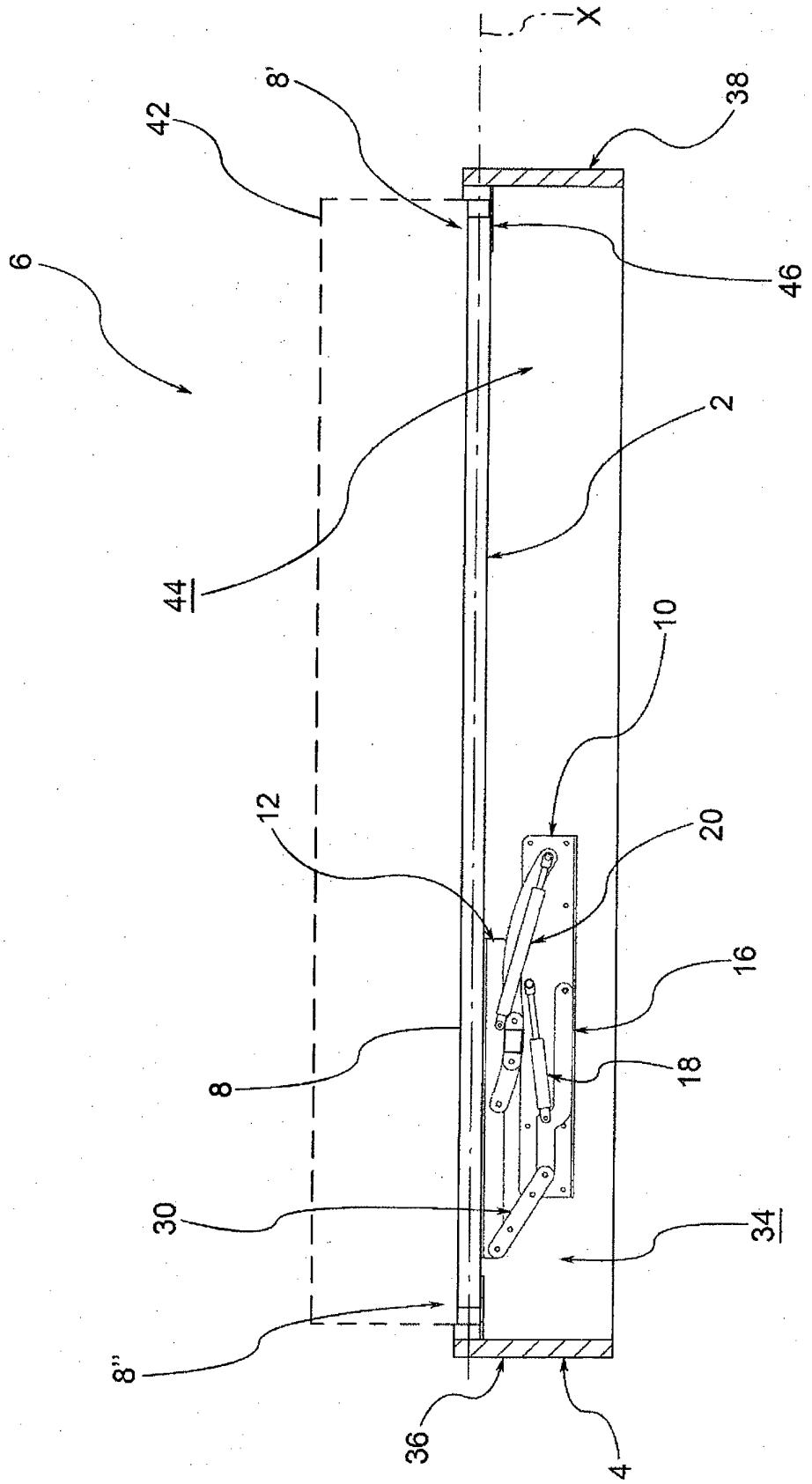


Fig.1a

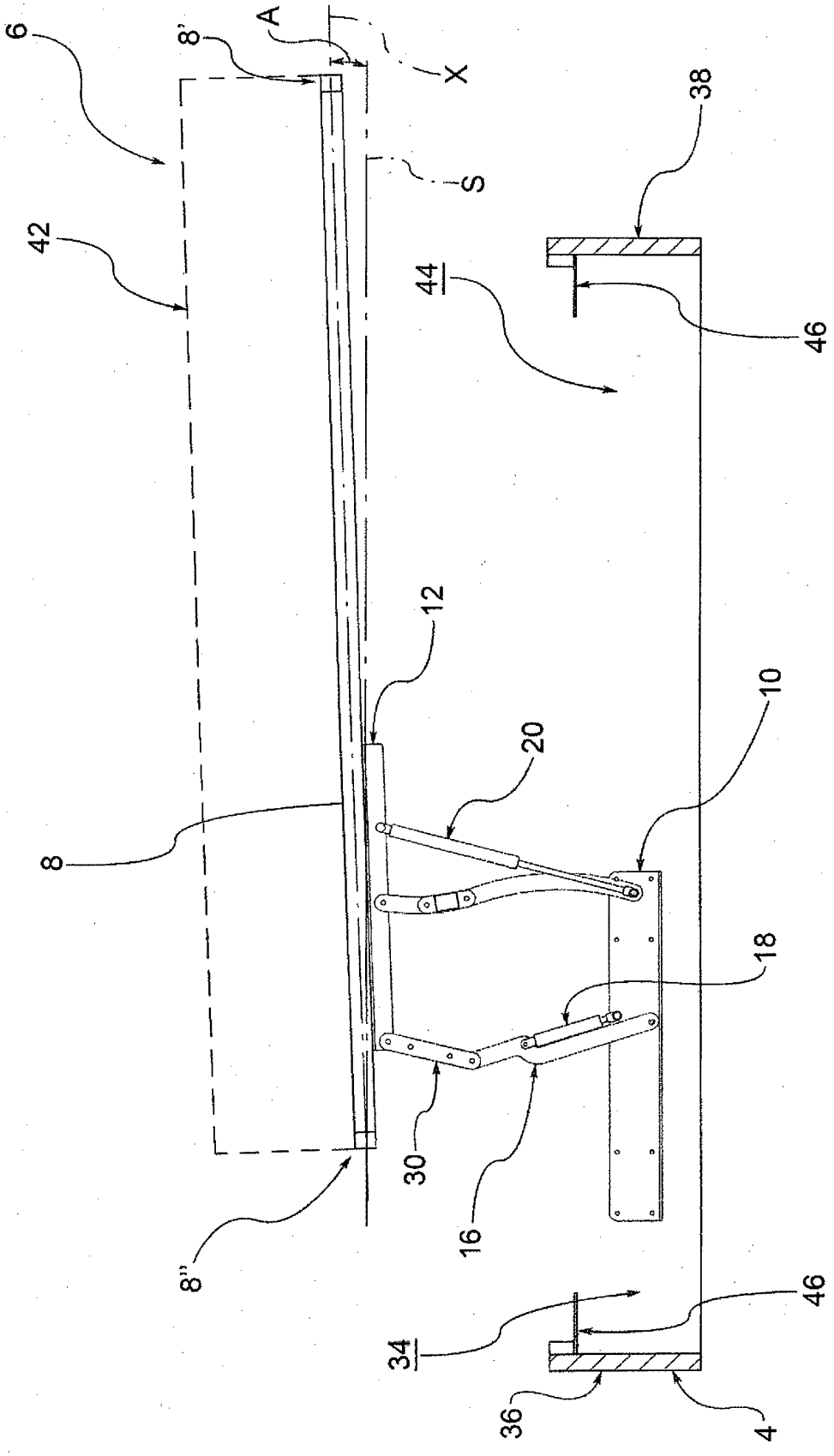


Fig.1b

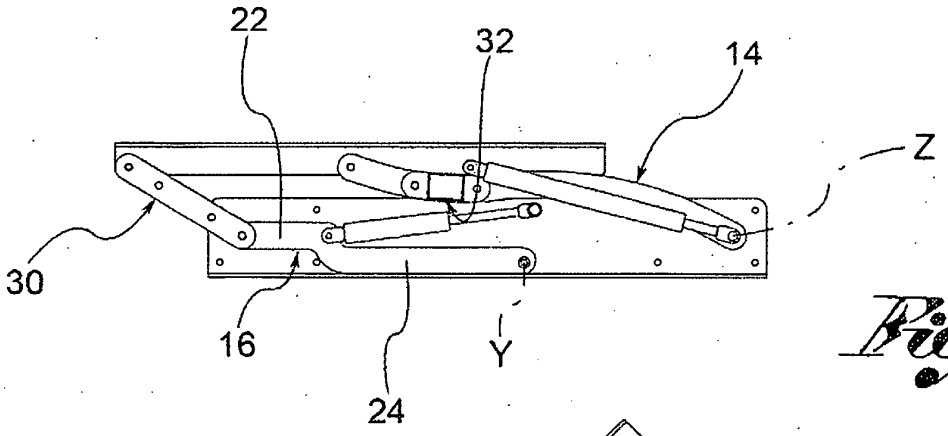


Fig. 2

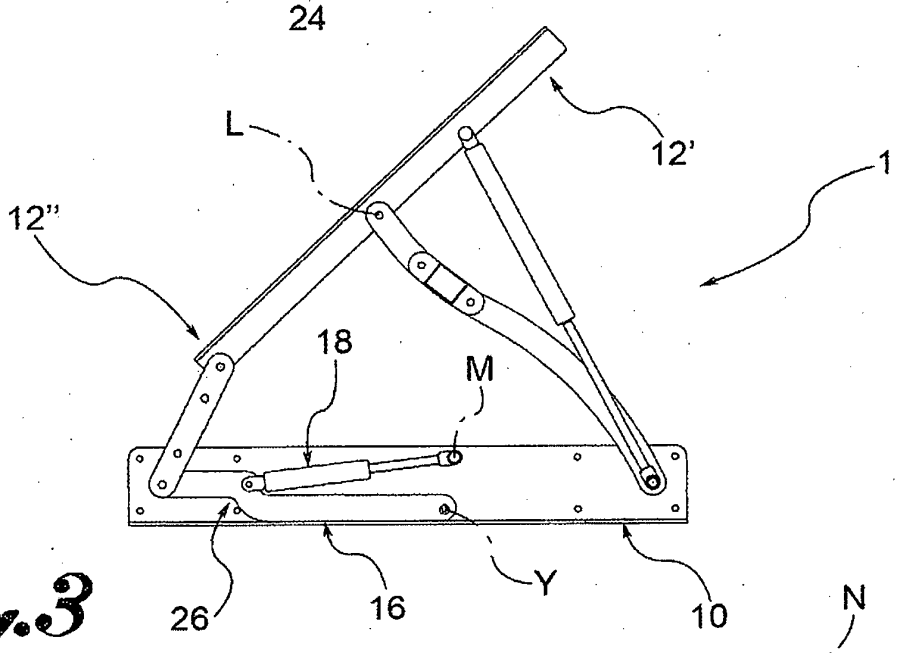


Fig. 3

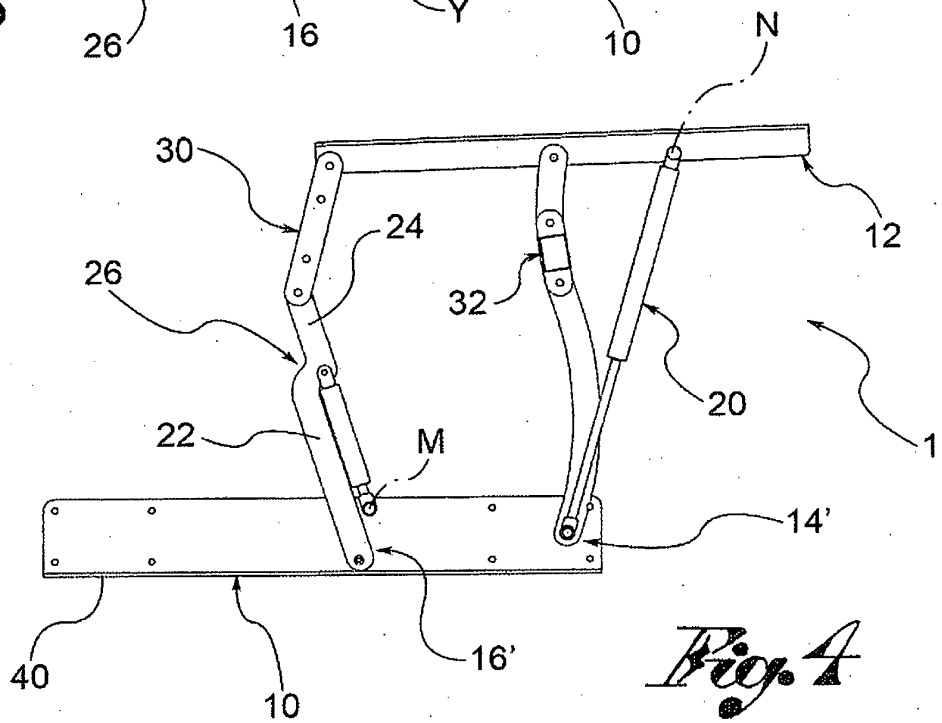


Fig. 4

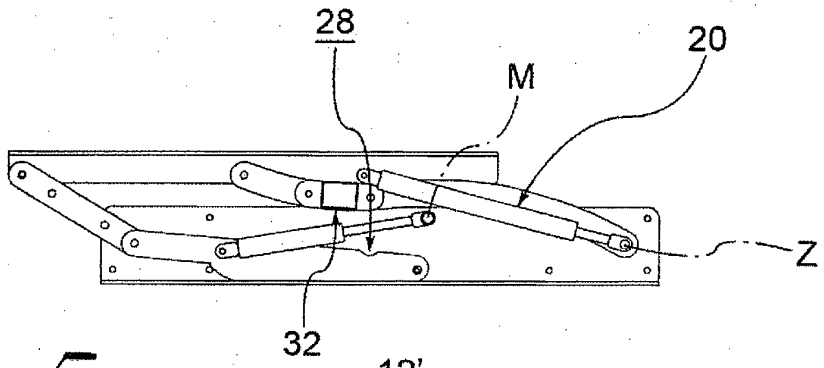


Fig.5

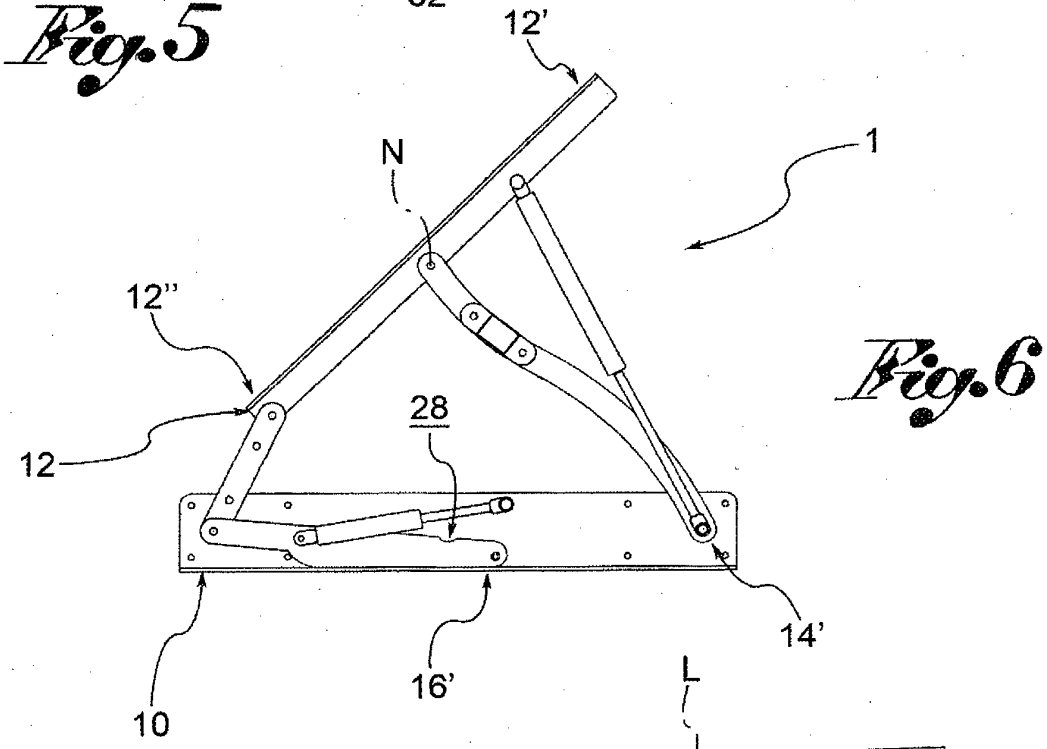


Fig.6

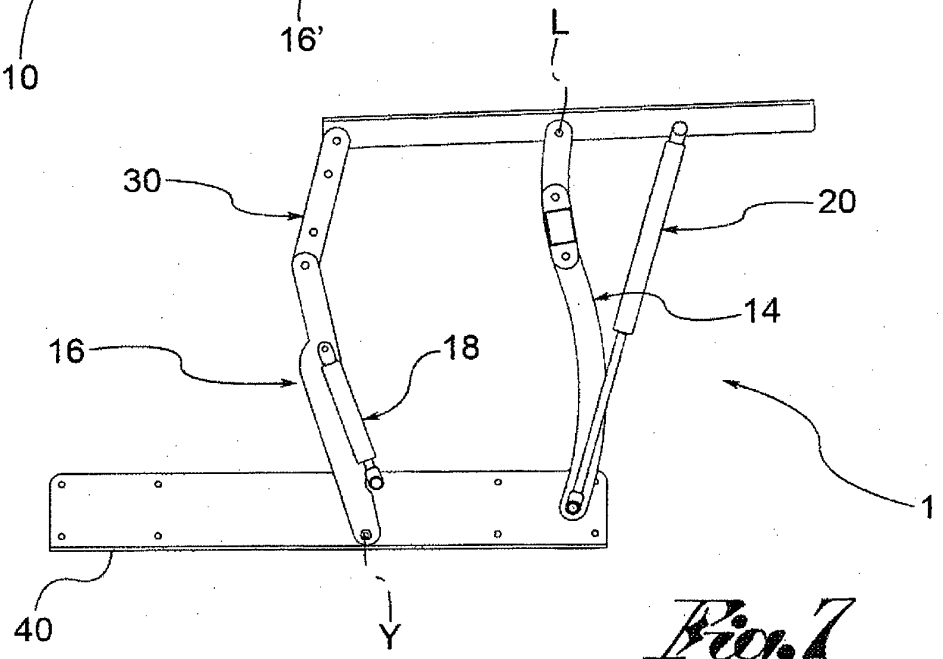


Fig.7

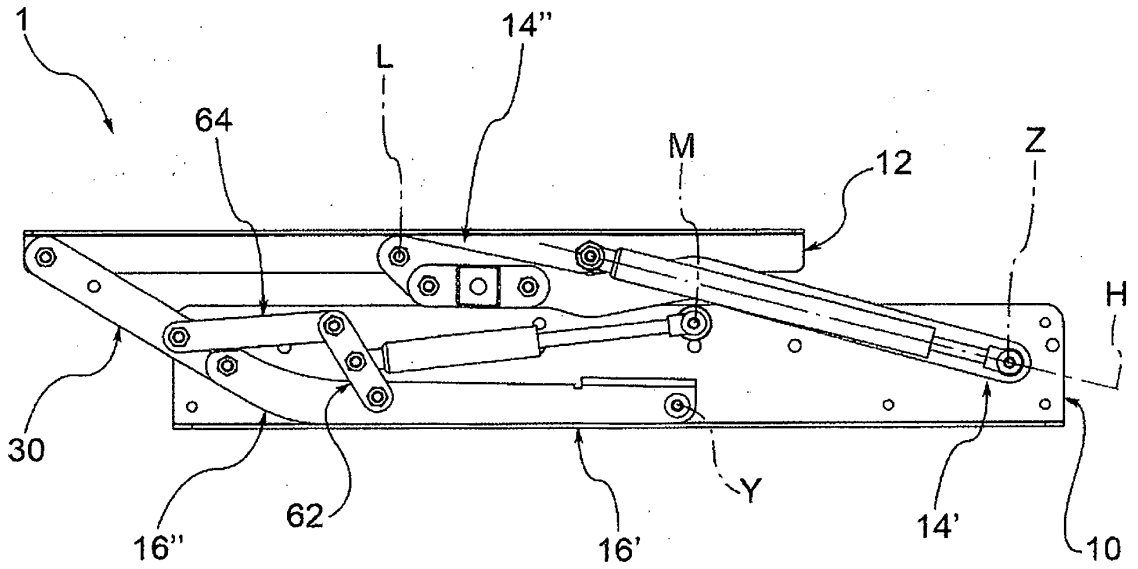

1
14"
L
64
M
12
Z
H
30
62
Y
14'
16"
16'
10

Fig. 8a

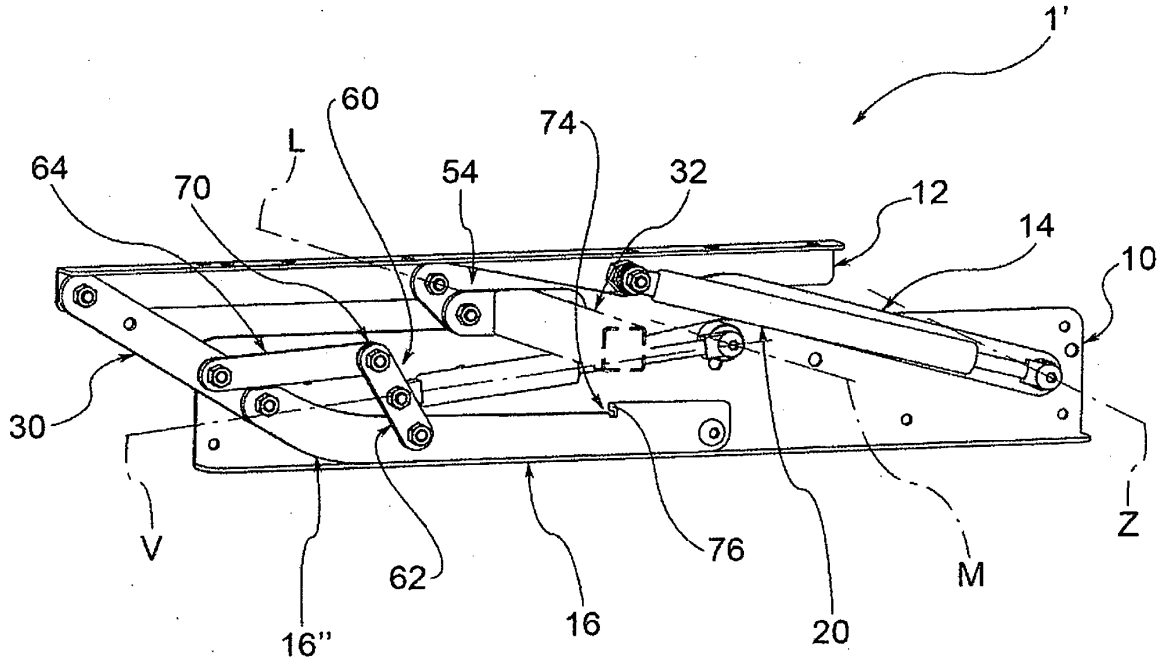

1'
60
74
L
64
70
54
32
12
14
10
30
V
62
76
M
Z
16"
16
20

Fig. 8b

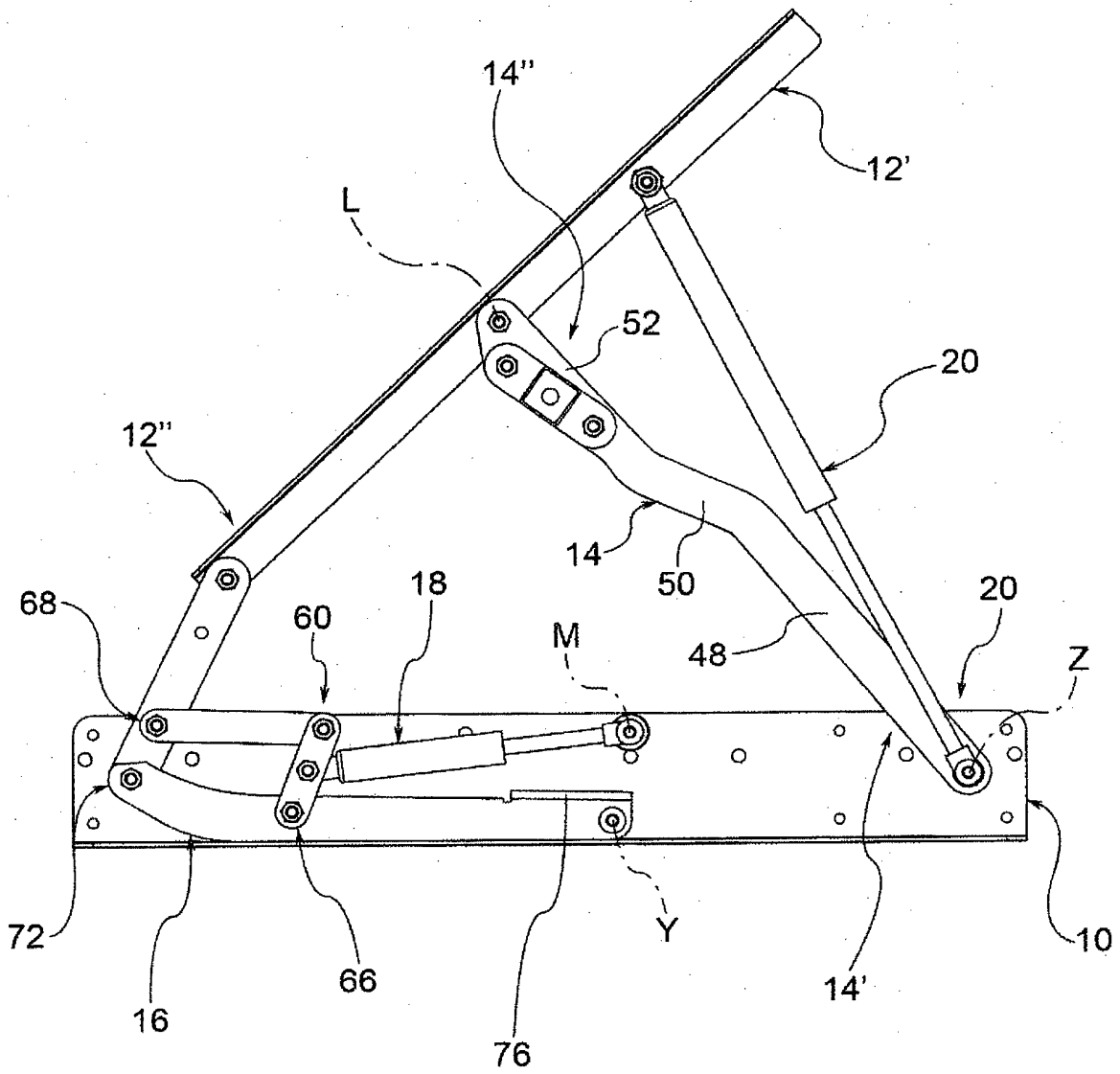


Fig.9a

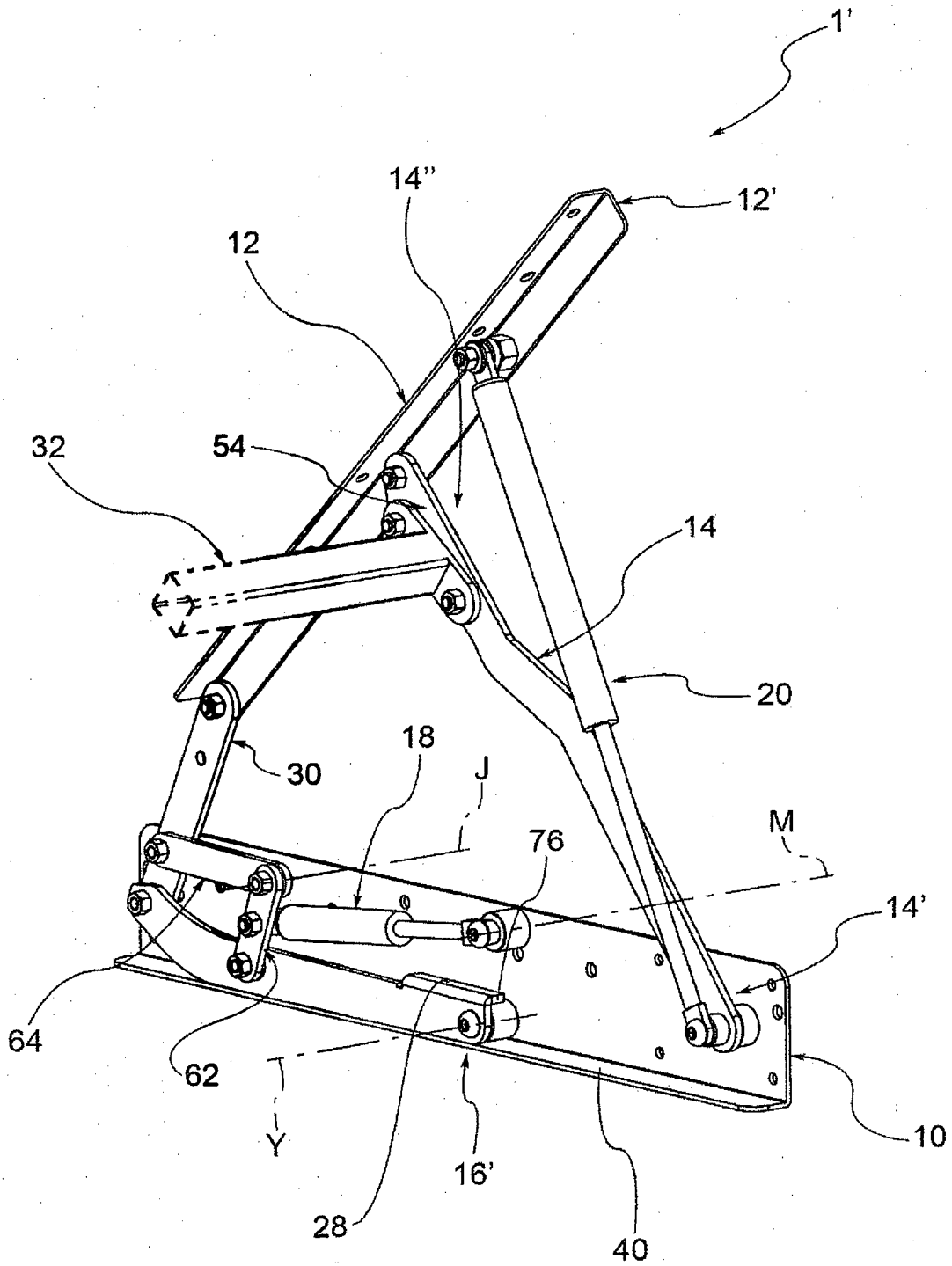


Fig.9b

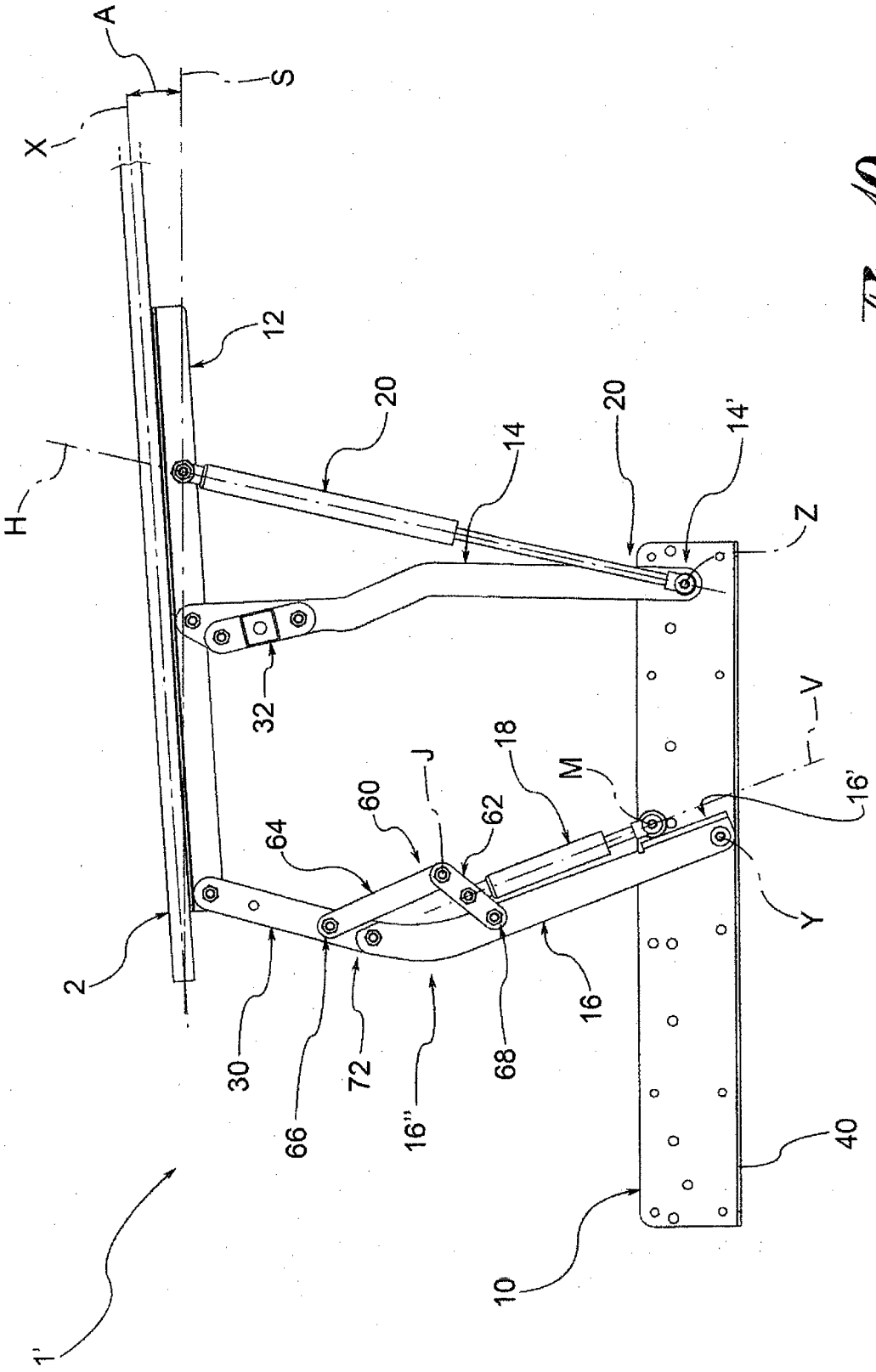


Fig.10a

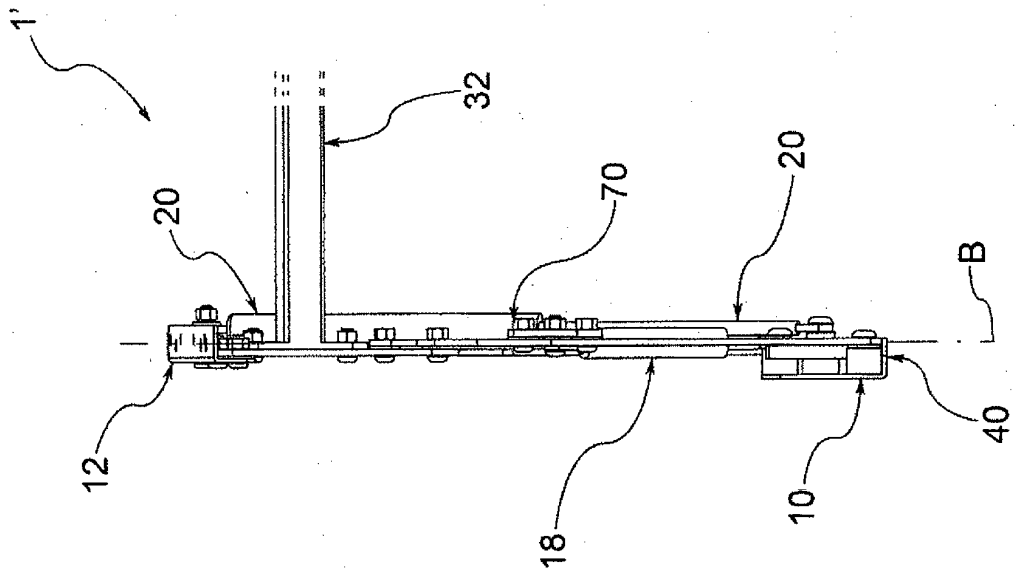


Fig.11

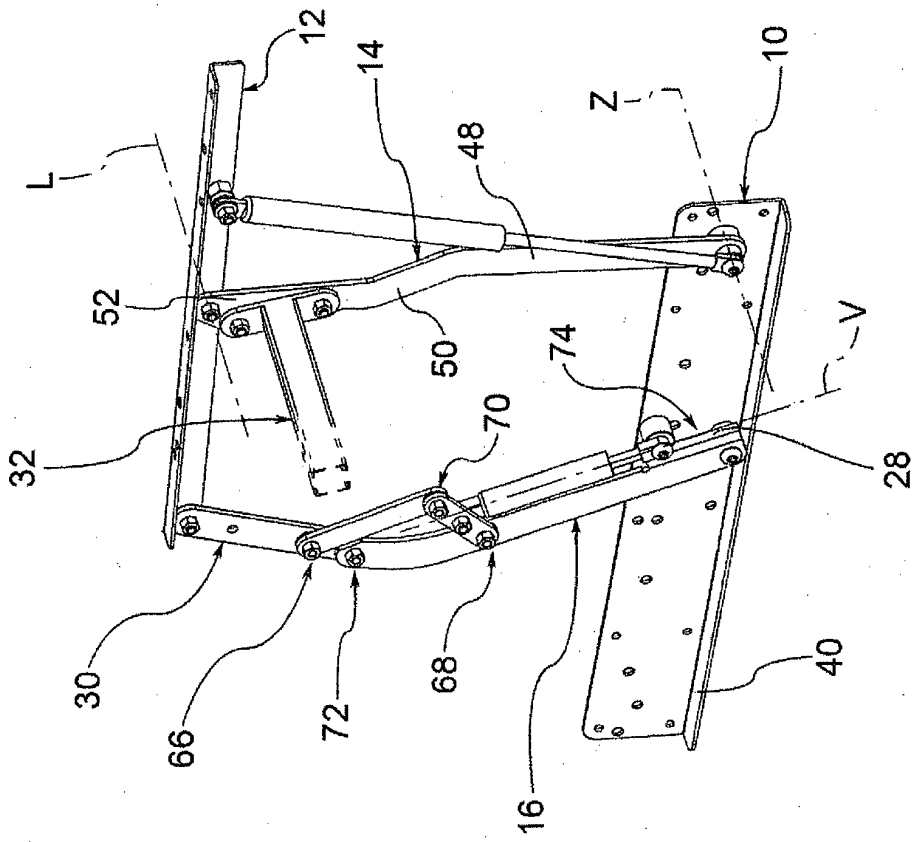


Fig.10b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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