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(54) WALL UNIT WITH MOBILE FRAME

(57) A wall unit (100) comprises: walls (1), at least one support surface (2) and one actuating unit (3) to actuate the support surface (2); the actuating unit (3) comprises: a mobile frame (4) and a lever mechanism (5) of parallelogram type, comprising at least one pair of levers (50, 51) that are directly or indirectly connected to a wall of the wall unit (100) and to the mobile frame (4) to rotate-translate said mobile frame (4) relative to the walls of the wall unit (100), in such a way that said mobile frame (4) can be in a raised position, wherein the mobile frame (4) is inside the compartment (10), and a lowered position, wherein the mobile frame (4) is outside the compartment (10) and is at least partially disposed in lower position relative to a bottom wall of the wall unit (100).

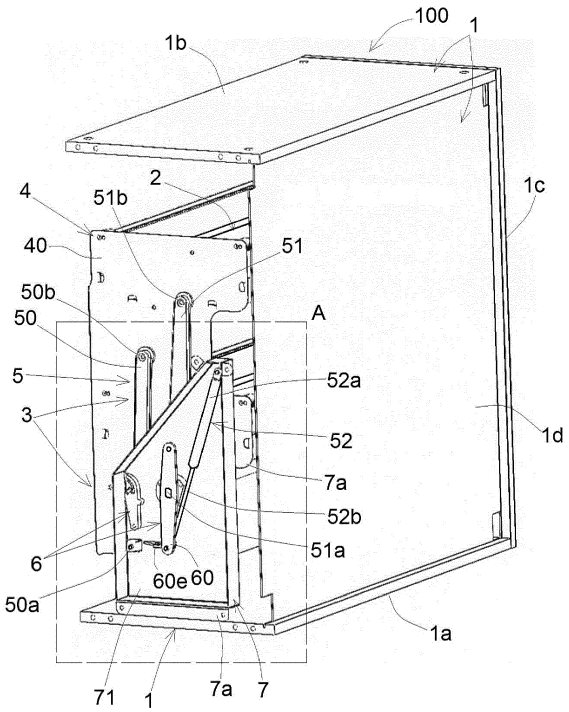

FIG. 2

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Description

[0001] The present patent application for utility model relates to a wall unit that comprises a mobile frame. The wall unit of the present patent application will find its main use in the field of kitchen furniture as wall unit.

[0002] Wall units are known, which comprise a parallelepiped external frame and a plurality of shelves disposed in parallel position inside the wall unit. Said shelves are fixed to the external frame and act as support surfaces for objects.

[0003] The wall units may be very tall in order to comprise a large number of horizontal shelves disposed one above the other. The wall units are fixed to the wall in such a way that the bottom wall of the external frame is disposed at a height of approximately 130-140 cm from the ground. In other words, the shelves that support the objects are disposed at a height of at least 130-140 cm from the ground.

[0004] Said wall units are impaired by the fact that the objects disposed on the shelves, especially the top ones, are very difficult to reach.

[0005] In order to remedy such a drawback, the user often needs to climb stools or small ladders in order to reach the objects that are not within reach. In spite of permitting the storage/collection of objects on/from the top shelves, such a solution is dangerous and not very practical because the user risks losing balance and fall. Moreover, such a solution is especially unsuitable for elder users with reduced mobility.

[0006] Furthermore, such a solution is quite unpractical because the user has to move the stool or the ladder in front of the wall unit, climb the stool or the ladder, collect the desired object from the wall unit and finally store the stool or the ladder. These operations have to be repeated every time the user needs to collect an object from a shelf at a height that cannot be reached by the user.

[0007] Finally, in case of disabled users on wheelchairs, it is evidently impossible to collect the objects that are disposed on the shelves of the wall unit.

[0008] The purpose of the present invention is to eliminate the drawbacks of the prior art by devising a wall unit with mobile frame that permits to reach the objects stored on the shelves of the wall unit easily and safely.

[0009] Another purpose of the present invention is to devise a wall unit that is practical, handy to use and simple to make.

[0010] These purposes are achieved according to the present invention with the characteristics of the independent claim 1.

[0011] Advantageous embodiments will appear from the dependent claims.

[0012] The wall unit of the invention comprises a plurality of walls that define a compartment accessed from a front opening. The wall unit comprises at least one support surface.

[0013] The peculiarity of the wall unit according to the present invention consists in the fact that it comprises an actuating unit in order to actuate said at least one support surface. The actuating unit comprises a mobile frame with two sides between which said at least one support surface is disposed and fixed.

[0014] The actuating unit comprises a lever mechanism of articulated parallelogram type comprising at least one pair of levers that are directly or indirectly connected to a wall of the wall unit and to the mobile frame in order to roto-translate said mobile frame relative to the walls of the wall unit, in such a way that said mobile frame can be in a raised position, wherein the mobile frame is inside the compartment, and a lowered position, wherein the mobile frame is outside the compartment and is at least partially disposed in lower position relative to a bottom wall of the wall unit.

[0015] Additional features of the invention will appear manifest from the detailed description below, which refers to a merely illustrative, not limiting embodiment, as illustrated in the attached figures, wherein:

Fig. 1 is a perspective view of the wall unit according to the invention;
Fig. 2 is a perspective view of the wall unit of Fig. 1, seen from a different angle and without a lateral wall;
Fig. 2A is an enlarged view of the detail enclosed in the rectangle A of Fig.2;
Fig. 3 is a side view of a retention device of the wall unit according to the invention, wherein a mobile frame of the wall unit is in raised position;
Fig. 4 is the same as Fig. 3, except for it shows the mobile frame of the wall unit in lowered position;
Fig. 4A is an enlarged view of the detail enclosed in the circle A of Fig. 4.

[0016] With reference to Figs. 1 and 2, a wall unit according to the invention is disclosed, which is generally indicated with reference numeral (100).

[0017] The wall unit (100) comprises a plurality of walls (1) that define a compartment (10) accessed from a front opening (11). More precisely, the wall unit (100) has a parallelepiped shape and comprises a bottom wall (1a), an upper wall (1b), two lateral walls (1c) and one back wall (1d).

[0018] The wall unit (100) comprises one or more support surfaces (2) to support objects, preferably provided with anti-fall rails (2a). The support surfaces (2) are disposed in horizontal position, one above the other.

[0019] The wall unit (100) comprises an actuating unit (3) to actuate the support surfaces (2).

[0020] With reference to Fig. 2, the actuating unit (3) comprises a mobile frame (4), comprising an opposite pair of sides (40) between which the support surfaces are disposed and fixed in horizontal position. The lateral walls (40) of the mobile frame (4) can roto-translate jointly relative to the lateral walls (1c) of the wall unit (100), constantly keeping the support surfaces in horizontal position.

[0021] Optionally, as shown in the figures, the actuat-

ing unit (3) comprises a fixed frame (7) with two sides (71), each of them provided with anchoring flanges (7a) for fixing to the lateral walls (1c) of the wall unit (100). Each side (71) of the fixed frame (7) is disposed between a lateral wall (1c) of the wall unit (100) and a side (40) of the mobile frame (4). Evidently, the provision of said fixed frame (7) is optional and, in lack of it, the components connected to the fixed frame (7) are connected to the lateral walls (1c) of the wall unit (100), which are suitable reinforced.

[0022] The actuating unit (3) comprises a lever mechanism (5) of articulated parallelogram type, comprising at least one pair of levers (50, 51) directly or indirectly connected to a wall of the wall unit (100) and to the mobile frame (4) by means of pivoting pins for roto-translating the mobile frame (4) relative to the walls (1) of the wall unit (100), in such a way that the mobile frame (4) can be in a raised position, shown in Fig. 2, wherein the mobile frame (4) is inside the compartment (10), and a lowered position, shown in Fig. 4, wherein the mobile frame (4) is outside the compartment (10) and is at least partially disposed in lower position relative to the wall unit (100).

[0023] More precisely, the lever mechanism (5) comprises two pairs of levers (50, 51), respectively arranged on the exterior of the sides (40) of the mobile frame (4).

[0024] In particular, each pair of levers (50, 51) comprises a first lever (50) comprising a first end that is pivoted at one of the two sides (71) of the fixed frame (7) by means of a first pin (50a) that is joined with the first lever (50), and a second end that is connected to one of the two sides (40) of the mobile frame (4) by means of a second pin (50b) that is joined with the first lever (50). Each pair of levers (50, 51) comprises a second lever (51) comprising a first end that is pivoted at one of the two sides (71) of the fixed frame (7) by means of a first pin (51a) that is joined with the second lever (51), and a second end connected to one of the two sides (40) of the mobile frame (4) by means of a second pin (51b) that is joined with the second lever (51). The second lever (51) of each pair of levers (50, 51) is parallel to the first lever (50) of the same set of levers.

[0025] Advantageously, the second pin (51b) of the second lever (51) of each pair of levers (50, 51) is disposed in higher position on the back relative to the second pin (50b) of the first lever (50) of the same pair.

[0026] When the mobile frame (4) is inside the compartment (10), the levers (50, 51) are in substantially vertical position, whereas when the mobile frame (4) is in lowered position, the levers (50, 51) are in substantially horizontal position.

[0027] As shown in Fig. 1, a handle (8) is connected to the mobile frame (4) in a point where said handle (8) can be grabbed by the user by simply lifting his or her arms in order to lower the mobile frame (4) and collect the objects that are stored on the support surfaces (2), while always resting with his or her feet on the ground.

[0028] With reference to Figs. 2 and 2A, the actuating unit (3) also comprises, advantageously:

- a compensation device (52) of the weight of the mobile frame (4) that is rotationally connected directly or indirectly to a wall of the wall unit, on one side, and directly or indirectly connected to the second lever (51) of a pair of levers, on the other side; said compensation device (52) is devised in such a way as to constantly push said second lever (51) downwards, which is forced to make a rotation that corresponds to a roto-translation from down up of the mobile frame (4);
- a retention device (6) connected to the second lever (51) of the lever mechanism (5) to temporarily stop the mobile frame (4) in lowered position.

[0029] Advantageously, the compensation device (52) can be, for example, a gas compensation spring or a precompressed helical spring.

[0030] In Figs. 2 to 4 the compensation device (52) is a gas compensation spring. The gas compensation spring comprises a cylinder (52a) that is pivoted on top to the side (71) of the fixed frame (7) and a piston slidably mounted inside the cylinder (52a); the piston ends with a stem (52b) that is directly or indirectly connected in lower position to the second lever (51).

[0031] When the mobile frame (4) is actuated from the lowered position to the raised position (see Fig. 2A), the stem (52b) of the gas compensation spring is in maximum ejection position from the cylinder (52a) and vice versa, when the mobile frame (4) is actuated from the raised position to the lowered position (see Fig. 4). It must be noted that the mobile frame (4) is moved from the raised position to the lowered position by means of a downward force that is exerted by the user on the mobile frame (4), in such a way as to overcome the force exerted by the gas compensation spring on the second lever (51).

[0032] With reference to Figs. 2 to 4, the retention device (6) comprises a rocker am (60) connected to the second lever (51) of the lever mechanism (5).The rocker arm (60) of the retention device (6) comprises a first end (60c) wherein the stem (52b) of the gas compensation spring is hinged by means of a pin (60f) and a second end (60d) provided with a projecting peg (60b), shown in Fig. 4A.

[0033] The rocker arm (60) of the retention device (6) is pivoted at one of the two sides (71) of the fixed frame (7) by means of a pin that coincides with the first pin (51a) of the second lever (51). It must be noted that said first pin (51a) of the second lever (51) ends with a faceted end that is coupled with a corresponding slot provided on the rocker arm (60), so that the idle rotations of the first pin (51a) of the second lever (51), in its seat obtained on the side (71) of the fixed frame (7), determine simultaneous rotations of the rocker arm (60) in the same direction and vice versa, exactly because of said prismatic coupling between said faceted slot and said faceted end of the first pin (51a) of the second lever (51).

[0034] Therefore, the rocker arm (60) comprises a first arm (b1) that extends from the first pin (51a) of the second

lever (51) to the pivoting pin (60f) of the rocker arm (60) to the gas compression spring, and a second arm (b2) that extends from the first pin (51a) of the second lever (51) to the peg (60b) of the rocker arm (60).

[0035] The first arm (b1) is the power arm, whereon the gas compensation spring actuates. The second arm (b2) is the resistance arm, which has a lower length than the power arm (b1). Therefore, the rocker arm (60) is an advantageous first-class lever.

[0036] A stop element (60e) is directly or indirectly fixed to a wall of the wall unit (100) in such a way to act as stop to stop the rotation of the rocker arm (60) when the mobile frame (4) reaches its maximum raised position. In particular, the stop element (60e) is fixed to a side of the fixed frame (7).

[0037] The retention device (6) comprises a link hook (61) that is directly or indirectly pivoted at its base to a wall of the wall unit (100) by means of a pin (61a) in such a way as to oscillate around said pin (61a). More precisely, the hook (61) is pivoted at a side (71) of the fixed frame (7).

[0038] The retention device (6) comprises stop means (70) to reduce the oscillation of said hook (61). As shown in Fig. 4A, the stop means (70) of the retention device (6) comprise a fixed peg that is directly or indirectly applied to a wall of the wall unit (100) and slidably inserted in a curvilinear slot (61b) of the hook (61). More precisely, the fixed peg protrudes from the side (71) of the fixed frame (7).

[0039] The hook (61) comprises a guide channel (62) suitable for being crossed by the peg (60b) of the rocker arm (60). The channel (62) comprises:

- a first inlet (62a) for the insertion and passage of the peg (60b) in communication with the external border of the hook (61) and having an upward-opened "U"-like shape;
- a second inlet (62b) in communication with the first inlet (62a) and having a downward-opened inverted "U"-like shape;
- a third inlet (62c) for the passage of the peg (60b) in communication with the second inlet (62b) and having an upward-opened "U"-like shape and disposed under the second inlet (62b);
- an ascending outlet duct (62d) for the peg (60b) in communication with the third inlet (62c) and with the external border of the hook (61).

[0040] The second inlet (62b) is disposed above the first inlet (62a) and above the third inlet (62c), astride said first inlet (62a) and said third inlet (62c). The second inlet (62b) is suitable for receiving the peg (60b) when the mobile frame (4) is in lowered position.

[0041] The third inlet (62c) is defined by a wall provided with a slide that forces the peg (60b) of the rocker arm (60) to pass from the second inlet (62b) to the third inlet (62c), preventing said peg (60) from passing from the second inlet (62b) to the first inlet (62a).

[0042] The outlet duct (62d) is suitable for receiving the peg (60b) when the mobile frame (4) roto-translates to the raised position.

[0043] When the user pushes the mobile frame (4) downwards, overcoming the resistance of the gas compensation spring, in such a way to move the mobile frame (4) to the lowered position, the levers (50, 51) rotate downwards from a vertical position to a horizontal position. Consequently, the rocker arm (60), which is joined with the second lever (51) of one of the two sets of levers, is actuated in such a way that the second arm (b2) rotates downwards until the peg (60b) is inserted in the channel (62) of the hook.

[0044] More precisely, the peg (60b) of the rocker arm is inserted in the first inlet (62a) of the channel (62), abutting against the walls that define said first inlet (62a), and stopping the rotation of the rocker arm (60) and, indirectly, the downward roto-translation of the mobile frame (4). The walls that define the first inlet (62a) of the channel (62) act as stop for the oscillation of the rocker arm (60).

[0045] When the user stops the downward thrust of the mobile frame (4), the gas compensation spring pushes the first arm (b1) of the rocker arm (60) downwards, so that the second arm (b2) of the rocker arm (60) rotates upwards and the peg (60b) of the rocker arm (60) is inserted and stopped in the second inlet (62b) of the channel (62). In view of the above, after reaching its lower stop, the mobile frame (4) is slightly raised and locked in lowered position.

[0046] When the mobile frame (4) is in lowered position, the user can easily reach the objects stored on the support surfaces (2).

[0047] In order to bring the mobile frame (4) back to the raised position inside the compartment (10), the user simply needs to push the handle (8) of the mobile frame (4) downwards, so that the peg (60b) comes out of the second inlet (62b) in order to be inserted in the third inlet (62c) and, from here, cross the ascending outlet duct (62d) of the channel (62), coming out of the channel (62). The ejection of the peg (60b) from the channel (62) permits the rocker arm (60) to oscillate under the thrust of the gas compensation spring that is discharged on said second lever (51) by means of the first pin (51a) of the second lever (51).

[0048] In this way, the mobile frame (4) is moved from the lowered position to the raised position, without any effort from the user, simply because of the thrust of the gas compression spring.

[0049] Although not shown in the figures, the actuation unit (3) optionally comprises two retention devices (6), each of them being connected to one of the two pairs of levers of the lever mechanism.

[0050] Numerous variations and modifications can be made to the present embodiment of the invention, which are within the reach of an expert of the field, falling in any case within the scope of the invention as disclosed by the attached claims.

Claims

1. Wall unit (100) comprising:

   - a plurality of walls (1) that define a compartment (10) accessed from a front opening (11);
   - at least one support surface (2);

   characterized in that it comprises an actuating unit (3) to actuate said at least one support surface (2), comprising:

   - a mobile frame (4) comprising two sides (40) between which said at least one support surface (2) is positioned and fixed;
   - a lever mechanism (5) of articulated parallelogram type, comprising at least one pair of levers (50, 51) that are directly or indirectly connected to a wall of the wall unit (100) and to the mobile frame (4) to move said mobile frame (4) in roto-translation relative to the walls of the wall unit (100), in such a way that said mobile frame (4) can be in a raised position, wherein the mobile frame (4) is inside the compartment (10), and a lowered position, wherein the mobile frame (4) is outside the compartment (10) and is at least partially disposed in lower position relative to a bottom wall of the wall unit (100).

2. The wall unit (100) of claim 1, wherein said actuating unit (3) comprises:

   - a compensation device (52) that is directly or indirectly connected to a wall of the wall unit (100) on one side, and is directly or indirectly connected to a lever (51) of the pair of levers (50, 51) on the other side, in order to push said lever (51) in such a way that the mobile frame (4) roto-translates to the raised position;
   - a retention device (6) connected to a lever (51) of the lever mechanism (5) to temporarily stop the mobile frame (4) in lowered position.

3. The wall unit (100) of claim 2, wherein said compensation device (52) is a gas compensation spring that comprises:

   - a cylinder (52a) that is directly or indirectly connected on top to a wall of the wall unit (100);
   - a piston that is slidably mounted in the cylinder (52a) and ends with a stem (52b) that is directly or indirectly connected in lower position to a lever (51) of the lever mechanism.

4. The wall unit (100) of claim 3, wherein said retention device (6) comprises:

   - a rocker arm (60) that is prismatically coupled with a pin (51a) of a second lever (51) of the pair of levers (50, 51) and connected at the end of the stem (52b) by means of a pin (60f); said rocker arm (60) comprising a peg (60b);
   - a link hook (61) that is directly or indirectly pivoted at a wall of the wall unit by means of a pin (61a) in such a way as to oscillate around said pin (61a); said hook (61) comprising a guide channel (62) suitable for being crossed by the peg (60b) of the rocker arm (60); said channel (62) comprising:
   - a first inlet (62a) for the passage of the peg (60b) in communication with the external border of the hook (61);
   - a second inlet (62b) in communication with the first inlet (62a) and suitable for receiving the peg (60b) when the mobile frame (4) is in lowered position;
   - a third inlet (62c) for the passage of the peg (60b) in communication with the second inlet (62b);
   - an ascending outlet duct (62d) in communication with the third inlet (62c) and with the external border of the hook; said outlet duct (62d) being suitable for being crossed by the peg (60b) when the mobile frame (4) roto-translates to the raised position.

5. The wall unit (100) of claim 4, wherein said retention device (6) comprises stop means (70) comprising a fixed peg that is directly or indirectly applied to a wall of the wall unit (100) and slidably inserted into a curvilinear slot (61b) of the hook (61).

6. The wall unit (100) of claim 5, wherein said actuating unit (3) comprises a fixed frame (7) comprising two sides (71) that are joined to the lateral walls (1c) of the wall unit (100); said levers (50, 51) of the lever mechanism (5), said compensation device (52) and said hook (61) being pivoted at said fixed frame (7); said peg of the stop means (70) projecting from said fixed frame (7).

7. The wall unit (100) of any one of claims 4 to 6, wherein the rocker arm (60) comprises:

   - a first arm (b1) that extends from the pin (51a) of the second lever (51) to the pivoting pin (60f) of the rocker arm (60) to the compensation device (52);
   - a second arm (b2) that extends from the pin (51a) of the second lever (51) to the peg (60b) of the rocker arm (60);

   said first arm (b1) having a higher length than the second arm (b2).

8. The wall unit (100) of any one of claims 4 to 7, where-

in a stop element (60e) is directly or indirectly fixed to a wall of the wall unit (100) in such a way to act as stop to stop the rotation of the rocker arm (60) when the mobile frame (4) reaches its maximum raised position.

9. The wall unit (100) of any one of the preceding claims, comprising a handle (8) connected to the mobile frame (4).

10. The wall unit (100) of any one of the preceding claims, wherein the lever mechanism (5) comprises two pairs of levers, each of them disposed on one side of the wall unit (100).

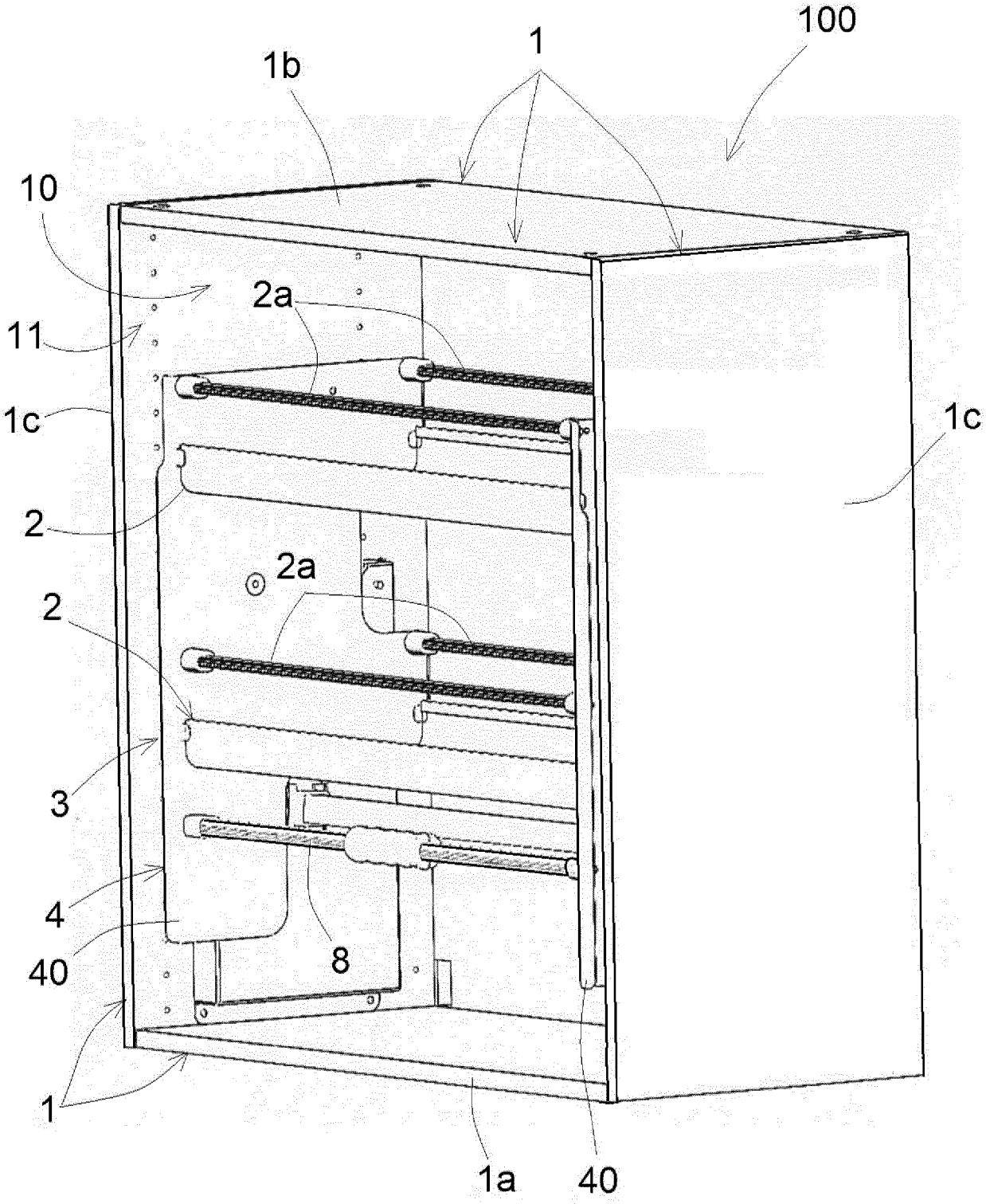

FIG. 1

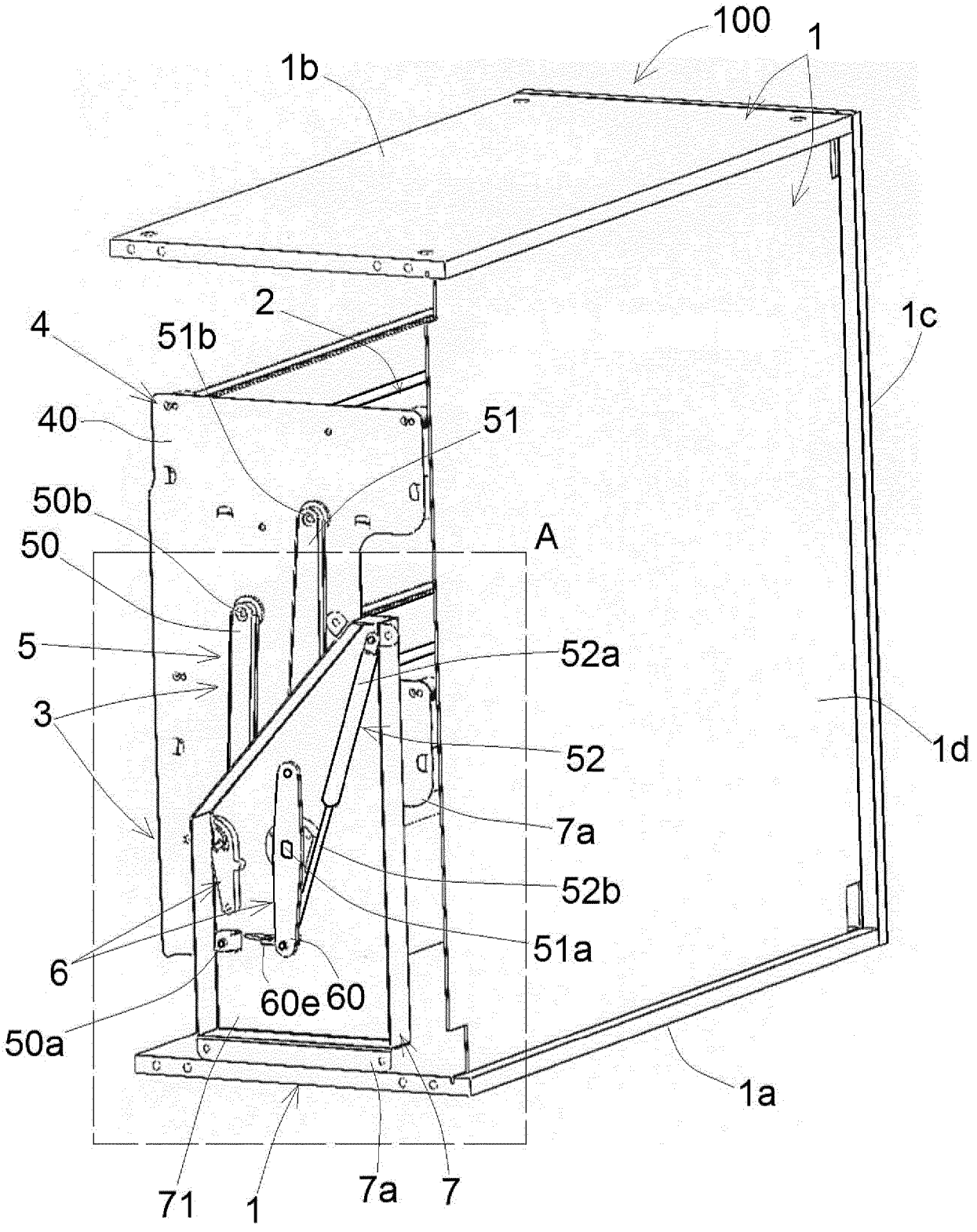
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FIG. 2

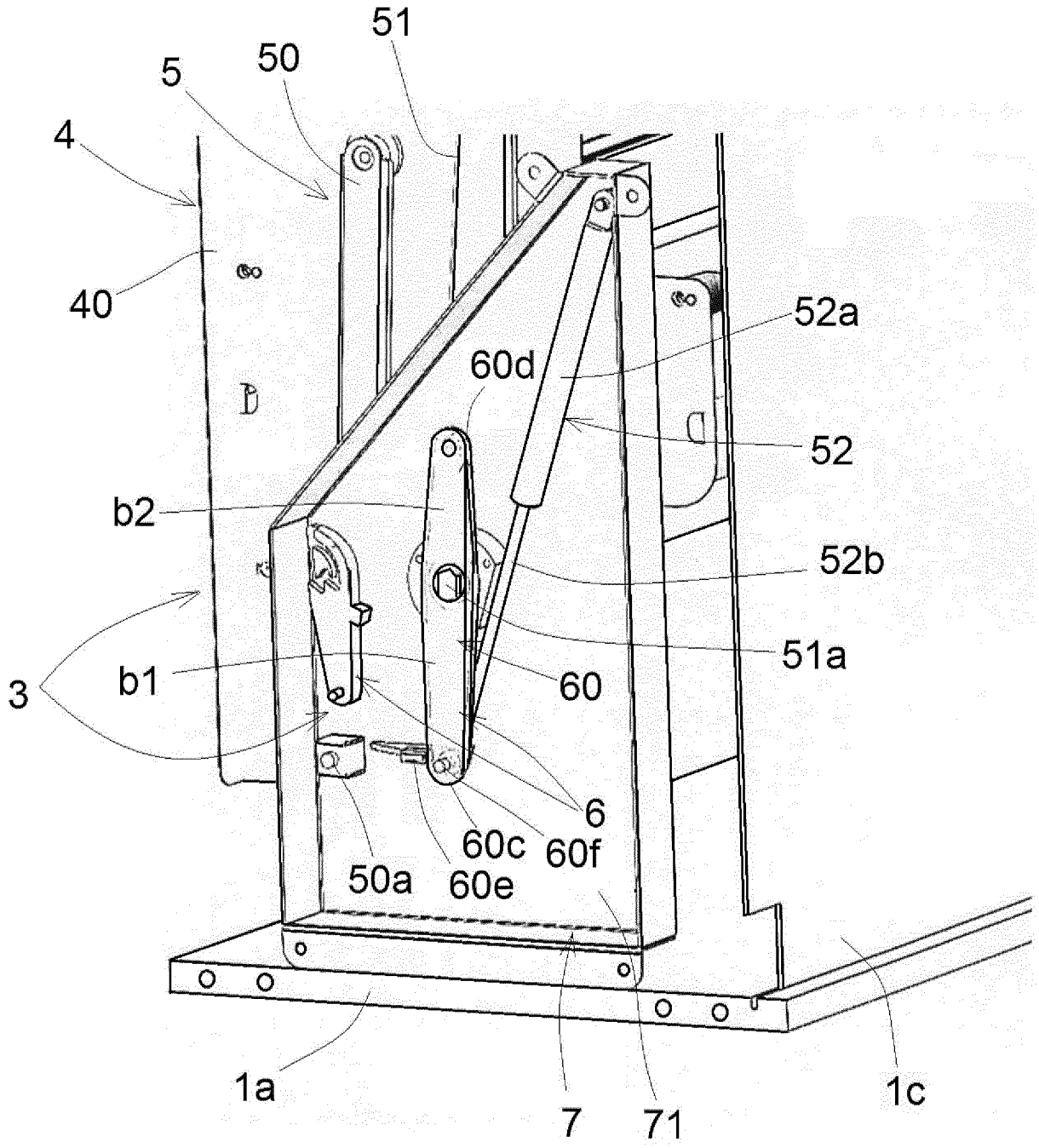

FIG. 2A

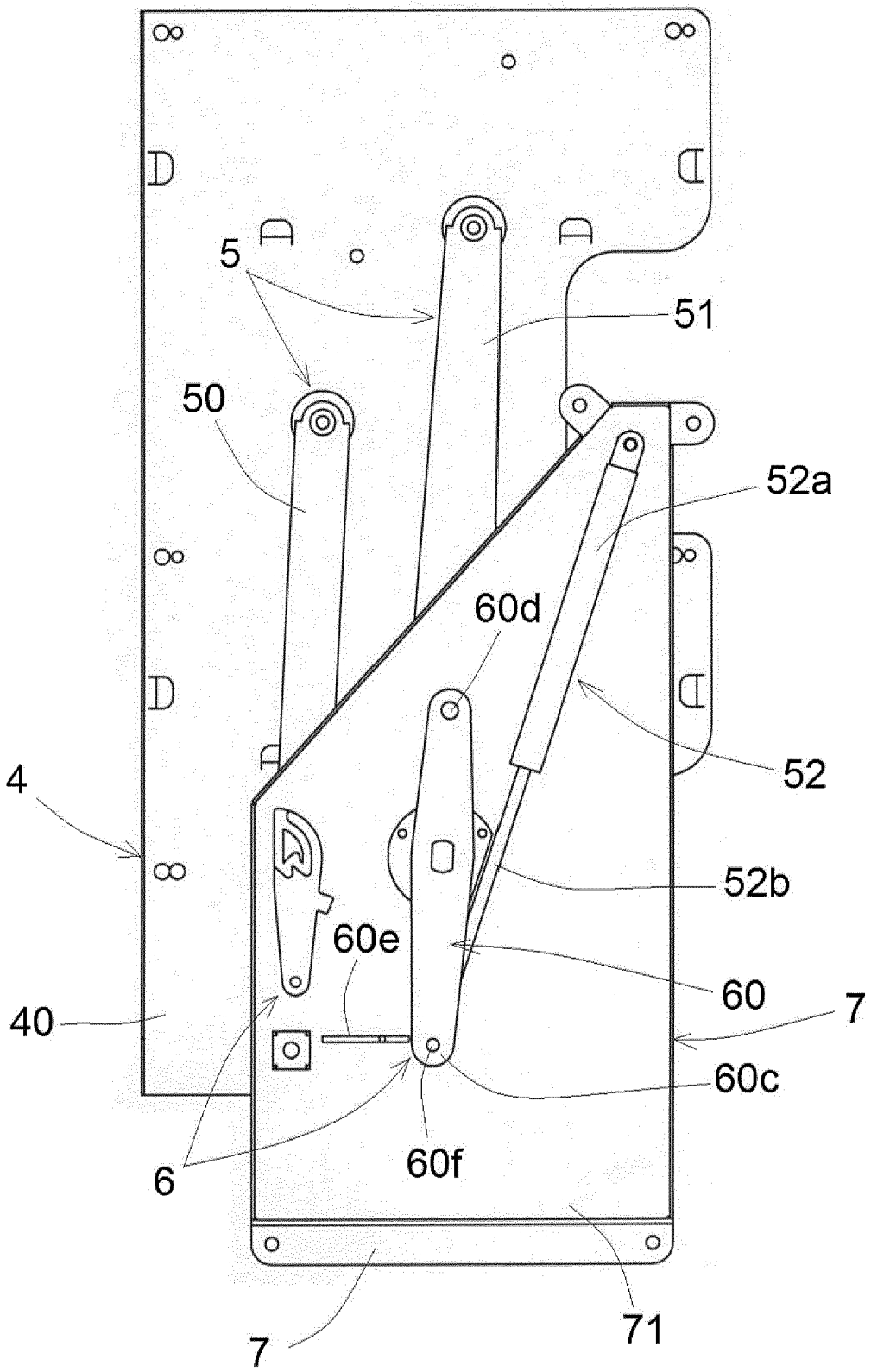

FIG. 3

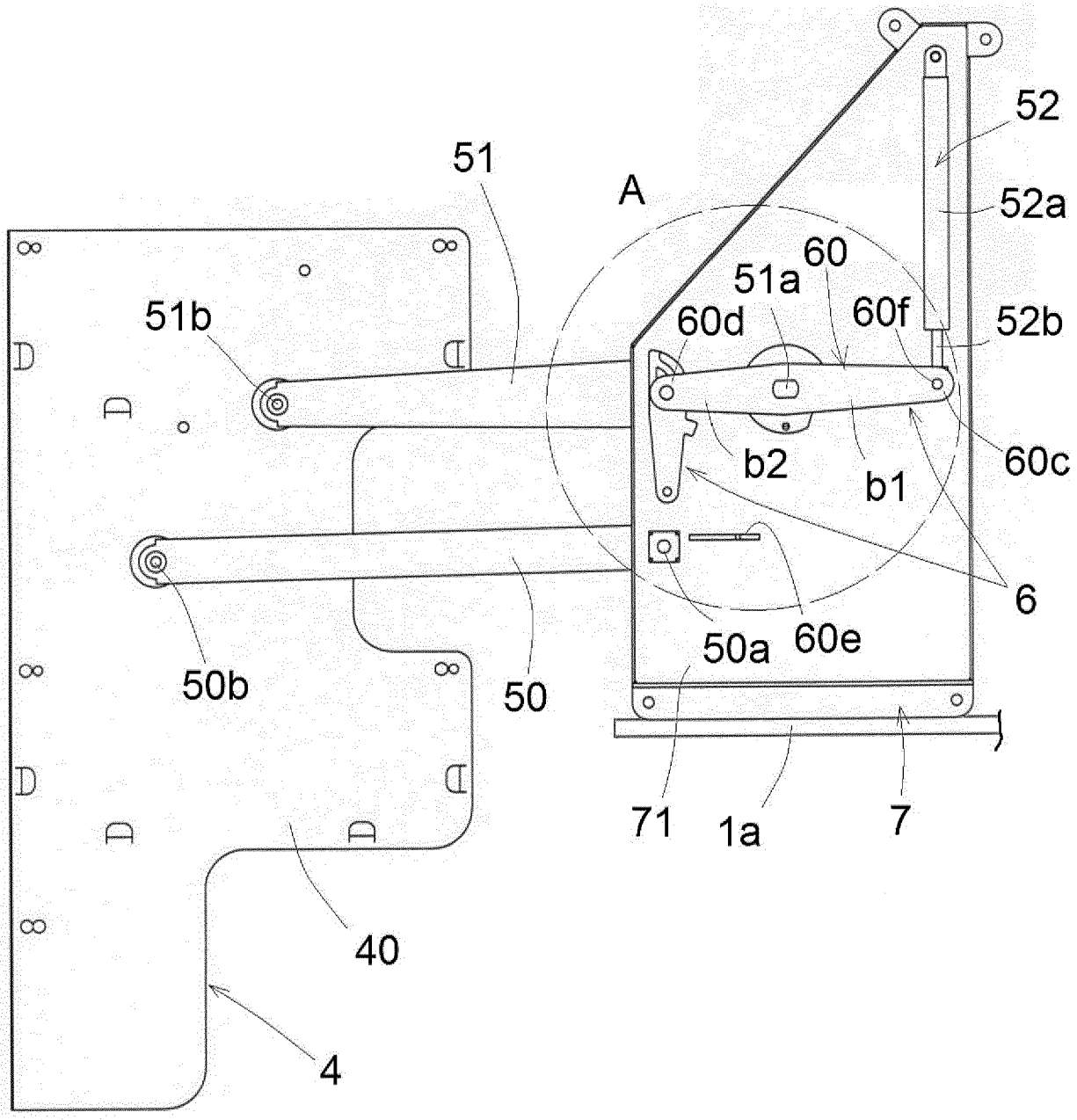
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FIG. 4

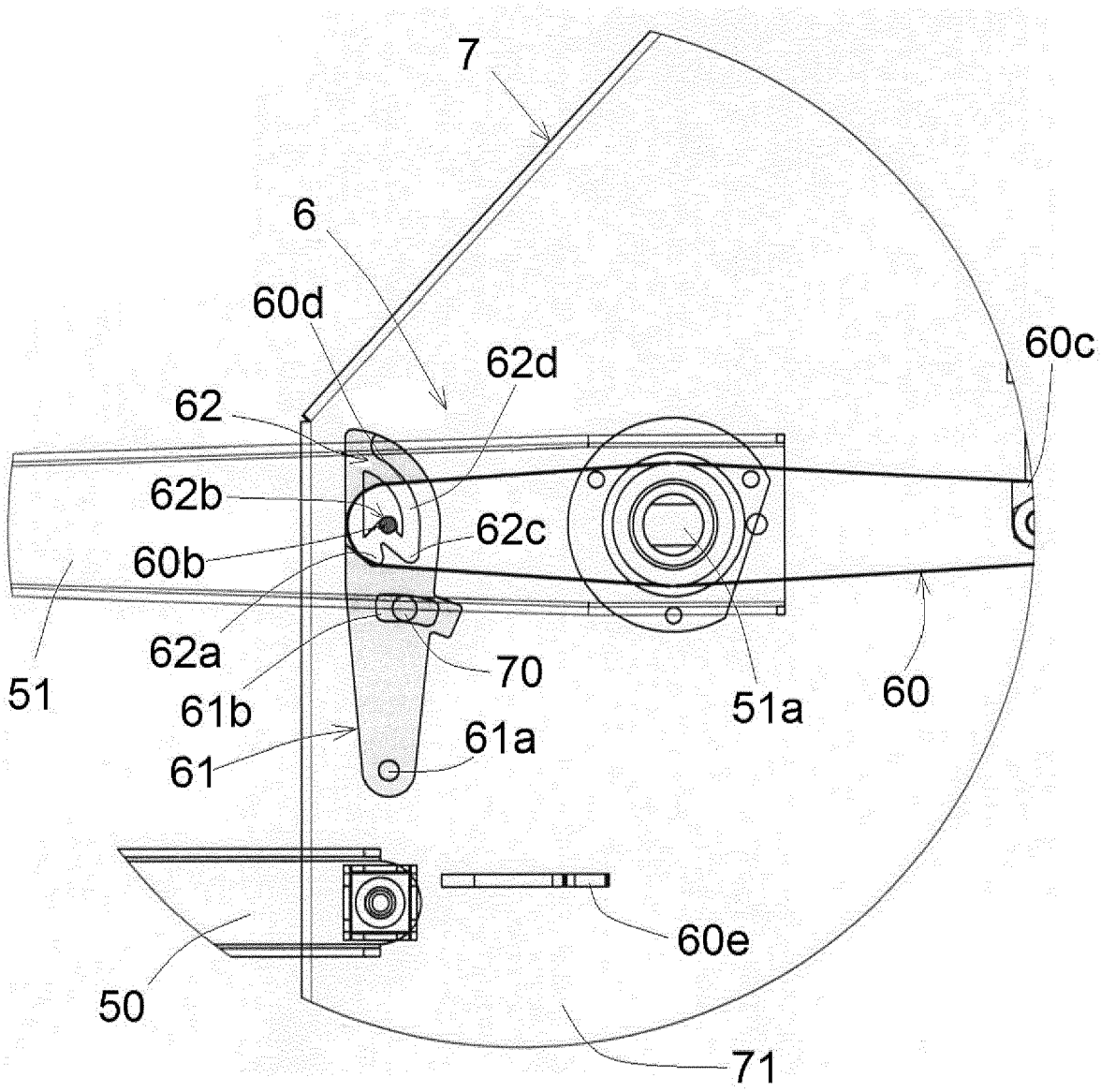

FIG. 4A

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 8767

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2005 168680 A (MATSUKINRII KK) 30 June 2005 (2005-06-30) * figures 3-6 * -----	1-3,9,10	INV. A47B46/00
X	JP S64 23231 U (UNKNOWN) 7 February 1989 (1989-02-07) * figures 1-4 * -----	1-3,9,10	
X	WO 94/23612 A1 (HAGON JEFFREY RICHARD [CA]; HAGON KEVIN THOMAS [CA]) 27 October 1994 (1994-10-27) * figures 6-12 * -----	1-3,9,10	

TECHNICAL FIELDS SEARCHED (IPC)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 December 2018	Martinez Valero, J

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 19 8767

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