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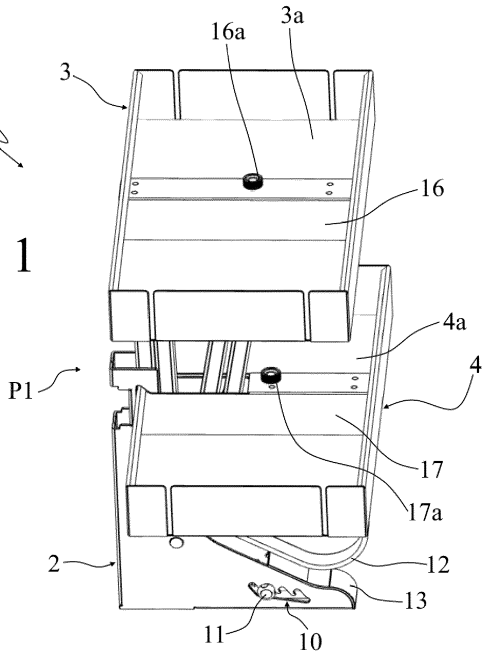
(54) DEVICE FOR SUPPORTING AND LOADING AND/OR UNLOADING OBJECTS

(57) A device (1) for supporting and loading and/or unloading objects which includes a support component or bracket (2) fixed, in use, on a wall (W), at least a first support element (3) of objects, at least a second support element (4) of objects as well as first movement means (5) operatively connected with the support component or bracket (2) and with the at least one first support element (3). This device (1) also includes second movement means (6) operatively connected with the first support element (3) and with at least one second support element (4), and transmission and adjustment means (7), operatively connected with or between the first movement means (5) and the second movement means (6), configured to transmit and regulate the movement between the first movement means (5) and the second movement means (6). In particular, the at least one first support element (3) and the at least one second support element (4) are movable or displaceable, respectively by means of the first movement means (5) and the second movement means (6), between a first position or rest position (P1) in which the at least one second support element (4) is vertically aligned with the at least one first support element (3) and at least a second position or loading and/or unloading position (P2) wherein the at least one second support element (4) is vertically offset with the at least one first support element (3) to facilitate loading and/or unloading of objects.

Fig. 1



EP 4 349 219 A1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention concerns a device for supporting and loading and/or unloading objects, particularly suitable for being fixed within a piece of furniture, for example a kitchen cabinet, to be used as an up-and-down device for objects.

[0002] The present invention also refers to a piece of furniture, for example, but not exclusively, a kitchen wall unit, which includes the aforementioned device.

STATE OF THE PRIOR ART

[0003] In the prior art, various devices for supporting and loading and/or unloading objects are known.

[0004] With reference to the technical sector of equipment and devices that can be fixed within a piece of furniture, for example a kitchen cabinet, one of the main objectives has always been to use the available space in the most optimal way possible.

[0005] For this reason, the prior art foresees the fixing, inside such pieces of furniture, of up-and-down devices, which can even reach up to the ceiling.

[0006] As can be understood, access to the upper area of the piece of furniture is often not possible for a person of normal height without external aids. Devices have therefore been designed which allow the support elements of the piece of furniture, such as drawers, shelves or similar, to be rotated between an inserted position and an extracted and lowered position with respect to the inserted position, so as to allow easier accessibility to the aforementioned support elements.

[0007] Solutions according to the prior art are described in patents EP1880636B1 and US9055813B2.

[0008] In general, such devices have several drawbacks.

[0009] Firstly, they present a plurality of support elements which are aligned vertically and, therefore, hinder the loading and/or unloading operations of objects. In particular, as the size of the object to be loaded and/or unloaded increases, the difficulty of loading and/or unloading the latter increases, especially in the case in which the object must be loaded into and/or unloaded from a support element having further support elements positioned above.

[0010] Secondly, such devices are mechanically quite complex and complicated, as well as expensive.

[0011] Furthermore, it should be considered that devices according to the prior art are often subject to instability and/or breakages generated by inadequate compensation of the forces caused by the weight of the objects positioned on the support elements.

[0012] Moreover, the devices according to the prior art, in case of need for installation or fixing of the device on furniture of different sizes and/or with walls of different thicknesses, present little versatility and a rather laborious adaptation.

[0013] It is therefore necessary and advantageous to design and manufacture a device for supporting and loading and/or unloading objects which allows the disadvantages of the prior art listed above to be overcome.

OBJECTS OF THE INVENTION

[0014] The technical aim of the present invention is to improve the state of the prior art relating to devices for supporting and loading and/or unloading objects.

[0015] Within the scope of this aim, it is an object of the present invention to provide a device for supporting and loading and/or unloading objects which improves and optimizes the loading and/or unloading operations of objects.

[0016] Another object of the present invention is to provide a mechanically simple device for supporting and loading and/or unloading objects.

[0017] Yet another object of the present invention is to provide a device for supporting and loading and/or unloading objects which is inexpensive.

[0018] A further object of the present invention is to provide a device for supporting and loading and/or unloading objects which allows the forces generated by its movement to be adequately compensated according to the weight of the objects supported by it.

[0019] This aim and these objects are achieved by a device for supporting and loading and/or unloading objects according to claim 1.

[0020] Furthermore, these aims and these objects are also achieved by a piece of furniture according to claim 25.

[0021] The dependent claims refer to preferred and advantageous embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Other features and advantages of the invention will be more evident from the description of an embodiment of a device for supporting and loading and/or unloading objects, illustrated for indicative purposes in the attached drawings in which:

figures 1 and 2 are perspective views of a device for supporting and loading and/or unloading objects according to an embodiment of the present invention in a first position or rest position and in a second position or loading and/or unloading position respectively;
figures 3 and 4 are perspective views of a device for supporting and loading and/or unloading objects according to the embodiment of the present invention shown in figures 1 and 2, both with some darkened components;
figures 5 and 6 are perspective views of a device for supporting and loading and/or unloading objects according to the embodiment of the present invention shown in figures 1 and 2, both with further darkened components;
figures 7 and 8 are perspective views of a device for supporting and loading and/or unloading objects according to the embodiment of the present invention shown in figures 1 and 2, both with still other darkened components;
figures 9, 10 and 11 are enlargements showing some details of a device for supporting and loading and/or unloading objects according to the embodiment of the present invention shown in figures 1 and 2;
figures 12 and 13 are perspective views of a piece of furniture according to an embodiment of the present invention in an inserted position and in an extracted position respectively; and
figures 14 and 15 are front views of part of a piece of furniture according to the embodiment of the present invention shown in figures 12 and 13 in an inserted position and in an extracted position respectively,
figures 16, 17 and 18 respectively show a perspective view and two details of a device for supporting and loading and/or unloading objects according to a further embodiment of the present invention.

[0023] In the attached drawings, identical parts or components are identified by the same reference numbers.

EMBODIMENTS OF THE INVENTION

[0024] With reference to the attached figures, the number 1 indicates as a whole a device for supporting and loading and/or unloading objects according to a non-limiting embodiment of the present invention.

[0025] The device 1 for supporting and loading and/or unloading objects according to the present invention is particularly suitable for being mounted or installed inside a piece of furniture, such as a kitchen cabinet, for example placed in an elevated position with respect to the ground, if desired proximal to the ceiling, i.e., for a kitchen wall unit.

[0026] However, the device 1 for supporting and loading and/or unloading objects could also be mounted or installed on a wall or walls that do not necessarily forms or form part of a piece of furniture.

[0027] The device 1 for supporting and loading and/or unloading objects according to the present invention comprises a support component or bracket 2 operatively connected, in use, with walls W, at least a first support element 3 for objects, for example a first drawer, at least a second support element 4 for objects, for example a second drawer, as well as first movement means 5 operatively connected with the support component or bracket 2 and with the at least one first support element 3.

[0028] Preferably, the device 1 includes a coupling component 2c configured to allow, in use, the connection of the support component or bracket 2 with walls W, for example the side walls W of a kitchen cabinet or wall unit.

[0029] In this regard, the support component or bracket 2 includes, according to the non-limiting embodiment shown in figures 1 and 2, two opposite side walls 2a, 2b which can be fixed by means of suitable connective means, such as for example screws or rivets, to the coupling component 2c, preferably centrally to the latter. A non-limiting example of fixing the coupling component 2c with the opposite side walls 2a, 2b of the support component or bracket 2 is visible in figures 14 and 15.

[0030] According to the non-limiting embodiment of the present invention shown in figures 14 and 15, the coupling component 2c includes one or more lateral adjustment elements 2c1, for example coupling brackets, connected to walls W, for example side walls W of a kitchen cabinet or wall unit, as well as a central adjustment element 2c2, for example a tubular element, if desired having a C-shaped section, slidably engaged at its ends with the one or more lateral adjustment elements 2c 1.

[0031] In essence, the central adjustment element 2c2 constitutes a telescopic bracket configured to allow the adjustment of the fixing of the support component or bracket 2 with the walls W, for example the lateral walls W of a kitchen cabinet or wall unit.

[0032] Preferably, the central adjustment element 2c2, when used for connecting the component or support bracket 2 with a piece of furniture, for example a kitchen cabinet or wall unit, is arranged horizontally with respect to the walls W of the latter, thus to allow the addition of any shelves or further support elements or drawers to the piece of furniture,

avoiding interference with the latter and effectively limiting the overall size of the device 1.

[0033] According to the non-limiting embodiment of the present invention shown in figures 12 and 13, the central adjustment element 2c2 includes or delimits a slotted hole 2c3 while the one or more lateral adjustment elements 2c1 include or delimit at least one hole or opening 2c4 which can be used together with the slotted hole 2c3 for the insertion of a locking element, such as a pin, a screw or similar, so as to determine the overall length of the coupling component 2c and, therefore, also the adjustment of the fixing of the support component or bracket 2 with the walls W of a piece of furniture, for example the side walls W of a kitchen cabinet or wall unit.

[0034] Optionally, the lateral adjustment elements 2c1 can also include covering elements 2d, for example made of plastic material, and shaped in a similar way to the lateral adjustment elements 2c1, as shown in the non-limiting embodiment of the present invention of figure 16.

[0035] The device 1 for supporting and loading and/or unloading objects according to the present invention also includes second movement means 6 operatively connected with the first support element 3 and with the at least one second support element 4 as well as transmission and adjustment means 7, operatively connected with or between the first movement means 5 and the second movement means 6, configured to transmit and regulate the movement between the first movement means 5 and the second movement means 6.

[0036] More in detail, the at least one first support element 3 and the at least one second support element 4 are movable or displaceable, respectively by means of the first movement means 5 and the second movement means 6, between a first position or rest position P1 in which the at least one second support element 4 is vertically aligned with the at least one first support element 3 and at least one second position or loading and/or unloading position P2 in which the at least one second support element 4 is vertically offset with the at least one first support element 3 to facilitate the loading and/or unloading of objects.

[0037] Preferably, in the at least one second position or loading and/or unloading position P2, the rear, in use, end or wall of the second support element 4 or support element most proximal to the ground is positioned forward of the front, in use, end or wall of the first support element 3.

[0038] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the second support element 4 is positioned lower than the first support element 3.

[0039] As can be understood, in the second position or loading and/or unloading position P2, the access both to the first support element 3 and, above all, to the second support element 4 is facilitated since the latter is vertically offset with or with respect to the first support element 3 and, consequently, the loading and/or unloading of objects is not hindered by the bulk of the latter.

[0040] Preferably, the first support element 3 and the second support element 4, when in the first position or rest position P1, are positioned respectively at a first level or height with respect to the ground and at a second level or height with respect to the ground while, when they are in the second position or loading and/or unloading position P2, they are positioned respectively at a third level or height above the ground which is lower than the first level or height and at a fourth level or height above the ground which is lower to the second level or height.

[0041] In this regard, the reduction or lowering of the level or height with respect to the ground of the first support element 3 and of the second support element 4 in the passage from the first position or rest position P1 to the second position or loading and/or unloading position P2 makes it easier for the user to load and/or unload objects, especially if the device 1 is fixed or installed in a particularly high position.

[0042] In order to obtain the vertical offset of the second support element 4 with the first support element 3 in their passage from the first position or rest position P1 to the second position or loading and/or unloading position P2, the transmission and adjustment means 7 preferably comprise a gear 7a which includes at least a first wheel or toothed circular sector 7a1 which meshes with at least a second wheel or toothed circular sector 7a2 to transmit and regulate the motion between the first movement means 5 and the second movement means 6.

[0043] In another non-limiting embodiment of the present invention not shown in the figures, the first wheel or toothed circular sector 7a1 and the second wheel or toothed circular sector 7a2 could be respectively replaced with a first friction wheel and with a second friction wheel.

[0044] In yet another non-limiting embodiment of the present invention not shown in the figures, the first wheel or toothed circular sector 7a1 and the second wheel or toothed circular sector 7a2 could be replaced with a kinematic chain for transmission and regulation of motion, such as an articulated quadrilateral, for example an articulated antiparallelogram.

[0045] In particular, the transmission and regulation of the motion between the first movement means 5 and the second movement means 6 by means of the transmission and adjustment means 7 can take place by setting a specific transmission ratio.

[0046] In this regard, the setting of the transmission ratio can be defined, as is known, by selecting a certain number of teeth and/or diameter for the first wheel or toothed circular sector 7a1 and for the second wheel or toothed circular sector 7a2.

[0047] In this regard, the first wheel or toothed circular sector 7a1 and the second wheel or toothed circular sector

7a2 are preferably configured so that the meshing between them determines a reducing transmission ratio.

[0048] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the reducing transmission ratio is between 0.80 and 0.95, for example equal to approximately 0.875, where this transmission ratio has been calculated, by way of example, with the following equation (1):

$$T = \frac{z_2}{z_1}, \qquad (1)$$

where z2 corresponds to the number of teeth of the first wheel or toothed circular sector 7a1 while z1 corresponds to the number of teeth of the second wheel or toothed circular sector 7a2.

[0049] Clearly, the transmission ratio could also be calculated in a similar way as the ratio between the diameter of the first wheel or toothed circular sector 7a1 and the diameter of the second wheel or toothed circular sector 7a2 or even as the ratio between the angular speed of the second wheel or toothed circular sector 7a2 and the angular velocity of the first wheel or toothed circular sector 7a1.

[0050] Preferably, the first movement means 5 comprise a first rod or arm 5a, for example configured as a hollow elongated element, tubular if desired, for example with a rectangular, square, circular or similar section, and a second rod or arm 5b, for example configured as a hollow elongated element, if desired tubular, for example with a square, circular or similar rectangular section, operatively connected, for example pivoted, in their respective first ends 5a1, 5b1 with the support component or bracket 2 and in their respective second ends 5a2, 5b2 with the first support element 3 so as to configure a first kinematic movement chain, such as an articulated quadrilateral, for example an articulated parallelogram.

[0051] In this case, the first wheel or toothed circular sector 7a1 can be operatively connected integrally in movement or rotation with the second end 5b2 of the second rod or arm 5b, for example connected by means of interlocking or keying to or in it.

[0052] According to the non-limiting embodiment example of the present invention shown in figures 1 and 2, the second rod or arm 5b is vertically aligned and positioned lower than the first rod or arm 5a, taking as reference the second position or loading and/or unloading position P2.

[0053] Always preferably, the second movement means 6 comprise a third rod or arm 6a, for example configured as a hollow elongated element, tubular if desired, for example with a rectangular, square, circular or similar section, and a fourth rod or arm 6b, for example configured as a hollow elongated element, tubular if desired, for example with a rectangular, square, circular or similar section, operatively connected, for example pivoted, in their respective first ends 6a1, 6b1 with the first support element 3 and in their respective second ends 6a2, 5b2 with the second support element 4 so as to configure a second kinematic movement chain, such as an articulated quadrilateral, for example an articulated parallelogram.

[0054] In this case, the second wheel or toothed circular sector 7a2 is operatively connected integrally in movement or rotation with the first end 6b1 of the fourth rod or arm 6b, for example connected by interlocking or keying to or in it.

[0055] According to the non-limiting embodiment example of the present invention shown in figures 1 and 2, the fourth rod or arm 6b is aligned vertically and positioned lower than the third rod or arm 6a, taking as reference the second position or loading and/or unloading position P2.

[0056] From a geometric point of view, the first movement means 5, which according to the non-limiting embodiment of the present invention shown in figures 1 and 2, are pivoted with the support component or bracket 2 in their respective first ends 5a1, 5b1 and with the first support element 3 in their respective second ends 5a2, 5b2, can move angularly or can rotate by an angle equal to approximately 95° in the passage from the first position or rest position P1 to the second position or loading and/or unloading position P2.

[0057] Again from a geometric point of view, the second movement means 6, which according to the non-limiting embodiment of the present invention shown in figures 1 and 2, are pivoted with the first support element 3 in their first ends 6a1, 6b1 and with the second support element 4 in their second ends 6a2, 6b2, can move angularly or can rotate by an angle equal to approximately 80° in the passage from the first position or rest position P1 to the second position or loading and/or unloading position P2.

[0058] The first and second movement kinematic chains, if present, formed respectively by the first movement means 5 and the second movement means 6 and the transmission and adjustment means 7 are advantageously capable of maintaining, first of all, the support elements 3, 4 horizontal with respect to the ground, avoiding the fall of any objects supported by them, allowing at the same time, following the passage of the latter from the first position or rest position P1 to the second position or loading position and/or unloading P2, a vertical offset of the second support element 4 with respect to the first support element 3 as well as a lowering of the level or height of the support elements 3, 4 to facilitate access to the latter and the loading and/or unloading of objects.

[0059] From a functional point of view, as shown by way of example in figures 2, 4, 6 and 8, the vertical offset of the

second support element 4 with respect to the first support element 3 takes place advantageously thanks to the transmission ratio set by the gear 7a which determines, in the passage from the first position or rest position P1 to the second position or loading and/or unloading position P2, a rotation or angular displacement of the first rod or arm 5a and of the second rod or arm 5b equal to approximately 95°, for example clockwise, and a rotation or angular displacement of the third rod or arm 6a and of the fourth rod or arm 6b equal to approximately 80°, for example anticlockwise, i.e., in the second position or loading and/or unloading position P2 the third rod or arm 6a and the fourth rod or arm 6b are advantageously inclined, for example they have an angle greater than about 15°, downwards with respect to the first rod or arm 5a and the second rod or arm 5b.

[0060] Preferably, the device 1 for supporting and loading and/or unloading objects comprises cushioning and thrust means 8 configured to cushion the passage of the first support element 3 and the second support element 4 from the first position or rest position P1 to the second position or loading and/or unloading position P2 and to push the first support element 3 and the second support element 4 from the second position or loading and/or unloading position P2 to the first position or rest position P1.

[0061] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the cushioning and thrust means 8 are or comprise a gas spring 8a placed between the first rod or arm 5a and the second rod or arm 5b.

[0062] More in detail, the gas spring 8a includes a cylinder 8a1 operatively connected with the first rod or arm 5a, a piston enclosed in the cylinder 8a1 and a rod 8b having a first end 8b1 operatively connected to the piston and a second end 8b2 operatively connected with the second rod or arm 5b.

[0063] In general, the compressed gas with which the cylinder 8a1 can be filled is nitrogen: inside the cylinder, the gas, at equal pressure, acts on both the upper and lower faces of the piston, which, having different sections, create a force in the extension direction. This extension force can be precisely defined by selecting the right filling gas pressure. Furthermore, hydraulic damping can be provided, obtained with a certain quantity of oil inside the cylinder 8a1 which passes through specially provided holes in the piston, allowing a damped and regular extension movement useful for preventing from falling, during use, objects supported by the support elements 3, 4.

[0064] In essence, the gas spring 8a makes it possible to facilitate the user in operating the passage of the first support element 4 and the second support element 5 between the first position or rest position P1 and the second position or loading and/or unloading position P2 and vice versa.

[0065] If desired, for a better positioning of the cushioning and thrust means 8, housing channels 5a4, 5b4 can be provided respectively defined on the first rod or arm 5a or, more particularly, on its lower, in use, surface 5a3 and on the second rod or arm 5b or, more particularly, on its upper, in use, surface 5b3.

[0066] These housing channels 5a4, 5b4, if provided, are useful for housing the cushioning and thrust means 8 when the first support element 3 and the second support element 4 are in the first position or operating rest position P1.

[0067] Preferably, the device 1 for supporting and loading and/or unloading objects also includes elastic means 9 adjustable, in use, by the user according to the weight of the objects to be supported or, in use, supported by the first support element support 3 and/or by the second support element 4.

[0068] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the elastic means 9 are or include a compensation spring 9a configured to facilitate the passage of the first support element 3 and the second support element 4 from the second loading and/or unloading position or position P2 to the first position or rest position P1 and to dampen or slow down the passage of the first support element 3 and the second support element 4 from the first position or rest position P1 to the second position or loading and/or unloading position P2.

[0069] Advantageously, the device 1 can comprise an adjustment component 11 and the support component or bracket 2 can comprise or delimit at least one slot or groove 10 which defines a plurality of widened or hollowed portions 10a in which each widened or hollowed portion 10a is engageable, in use, with the adjustment component 11 to define a respective adjustment position of the elastic means 9.

[0070] As shown in the non-limiting embodiment of the present invention in figures 1 and 2, a slot or groove 10 is delimited on each opposite side wall 2a, 2b of the component or support bracket 2 in corresponding positions with respect to a vertical center plane of the latter.

[0071] More in detail, the elastic means 9 can include a first end 9a1 operatively connected with the adjustment component 11 and a second end 9a2 operatively connected with the first movement means 5 so as to preload the latter with a compensation force that varies as a function of the adjustment position.

[0072] In essence, it is possible to move the adjustment component 11, engaged in at least one slot or groove 10, between the plurality of enlarged or hollowed portions 10a thereof to increase or decrease the compensation force of the elastic means 9.

[0073] This compensation force is advantageously selected by the user based on the weight of the objects to be supported or, in use, supported by the first support element 3 and/or by the second support element 4.

[0074] In this regard, as the weight of the objects positioned on the first support element 3 and/or on the second support element 4 increases, both the force necessary to operate the passage of the first support element 3 and the second support element 4 from the second position or loading and/or unloading position P2 to the first position or rest

position P1 and the passage speed of the first support element 3 and the second support element 4 from the first position or rest position P1 to the second position or loading and/or unloading position P2 increase, therefore, it is useful and advantageous for the user to select the compensation force of the elastic means 9 according to this.

[0075] Thus, for example, by engaging the adjustment component 11 in the enlarged or hollowed portion 10a furthest from the first ends 5a1, 5b1 of the first movement means 5, there will be a greater compensation force, or a greater preload, of the elastic means 9 while by engaging the adjustment component in the enlarged or hollowed portion 10a closest to the first ends 5a1, 5b 1 of the first movement means 5, there will be a lower compensation force, or a lower preload of the elastic means 9.

[0076] Advantageously, the device 1 can include a first stop or limit switch component 13 configured to abut with the first movement means 5 so as to stop the movement of the latter and/or a second stop or limit switch component 18 configured to abut with the second movement means 6 so as to stop the movement of the latter.

[0077] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the first stop or limit switch component 13 is defined by a abutment portion, for example a shaped plate, delimited on the support component or bracket 2 while the second stop or limit switch component 18 is or includes an abutment element, for example a cylinder, included in the first support element 3.

[0078] Alternatively, according to the non-limiting embodiment of the present invention shown in figures 16, 17 and 18, the device 1 can comprise an adjusting element 19, a guide 21, for example fixed on a base plate 22 included in the support component or bracket 2, if desired by means of suitable connection means, such as screws or rivets, which guide 21 defines a sliding track 21a, and a cursor 20, operatively coupled with the adjusting element 19 and with the elastic means 9 or, more particularly, with the first end 9a1 of the same, mobile along the sliding track 21a so that, by acting on the adjusting element 19, the cursor 20 moves along the sliding track 21a to define a plurality of adjustment positions of the elastic means 9.

[0079] Preferably, the adjusting element 19 comprises a threaded pin 19a, inserted through a hole or opening 23 defined on the support component or bracket 2, and a knob 19b, connected to a first end of the pin 19a, which can be rotated in clockwise or anticlockwise by the user to move the cursor 20 and, consequently, adjust the compensation force of the elastic means 9. Optionally, for this purpose, it can be provided on the support component or bracket 2, for example above or below the knob 19b, a written or graphic information GI designed to indicate the direction of rotation of the knob 19b associated with an increase and/or decrease in the compensation force of the elastic means 9, as shown by way of example in figure 18.

[0080] More in detail, the pin 19a is advantageously engaged in a first threaded tunnel 20a, for example longitudinal, delimited on the cursor 20 and, for example at its second end, in a hole or opening 21b delimited on the guide 21 while the first end 9a1 of the elastic means 9 is engaged in a second tunnel 20b, for example transverse, delimited on the cursor 20.

[0081] In essence, from a functional point of view, the adjusting element 19 and the cursor 20 can advantageously constitute a screw-nut coupling useful for the user to simply and precisely adjust the compensation force of the elastic means 9.

[0082] Preferably, the device 1 for supporting and loading and/or unloading objects includes a handle component 12, operatively associated with the second support element 4, configured to facilitate the user's activation of the passage of the first support element 3 and of the second support element 4 from the first position or rest position P1 to the second position or loading and/or unloading position P2 and vice versa.

[0083] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the handle component 12 is or includes a handle connected by suitable connection means to the second support element 4, for example below it, if desired on a support 12a included in the handle component 12 locally fixed with the support element 4, for example by means of screws or rivets or welding.

[0084] As regards the first support element 3, it can include a base 3a which defines an opening or positioning compartment PO for the transmission and adjustment means 7.

[0085] According to the non-limiting embodiment of the present invention shown in figures 1 and 2, the first support element 3 includes a first protection component 14 of the transmission and adjustment means 13 positioned, for example engaged by means of interlocking, in the opening or positioning compartment PO.

[0086] In particular, the first protection component 14 is operatively connected in a first portion 14c proximal to the support component or bracket 2 with the first movement means 5 and in a second portion 14d distal from the support component or bracket 2 with the second movement means 6.

[0087] Structurally, the first protection component 14 can be or comprise two shaped plates 14a, 14b, for example made of metallic material, joined or operatively connected to each other to allow simpler assembly and/or replacement.

[0088] Alternatively, the protection component 14 could be or comprise a single piece shaped plate.

[0089] It should be considered that the first protection component 14, in addition to protecting the transmission and adjustment means 7, according to the non-limiting embodiment of the present invention shown in figures 1 and 2, is fixed to or mounted on the base 3a, therefore integral in movement to it, and also acts as a pivot point for the first

movement means 5 and for the second movement means 6 or, more particularly, respectively for the second ends 5a2, 5b2 and for the first ends 6a1, 6b1 of the same.

[0090] Advantageously, the first support element 3 can also include a covering component 16, for example substantially U-shaped, if desired made of metallic material, configured to be installed to cover the first protection component 14, for example fixed on it by a locking knob 16a.

[0091] Similarly to the first support element 3, the second support element 4 can also include a base 4a which defines an opening or positioning compartment PC for at least part of the second movement means 6.

[0092] Preferably, the second support element 4 includes a second protection component 15 operationally connected in a first portion 15a proximal to the support component or bracket 2 with the second movement means 6 and in a second portion 15b distal from the support component or bracket 2 with the handle component 12.

[0093] Structurally, the second protection component 16 can be or comprise a shaped plate, for example made in a single piece, if desired in metallic material, operatively connected to the handle component 12.

[0094] It should be considered that the second protection component 15, according to the non-limiting embodiment of the present invention shown in figures 1 and 2, is fixed to or mounted on the base 4a and therefore integral in movement with it, and also acts as a pivot point for the second movement means 6 or, more particularly, for its second ends 6a2, 6b2.

[0095] Advantageously, the second support element 4 can also include a covering component 17, for example substantially U-shaped, if desired made of metallic material, configured to be installed to cover the second protection component 15, for example fixed on it by a locking knob 17a.

[0096] A non-limiting example of operation of the present invention is described below according to the non-limiting embodiment shown in figures 1 and 2.

[0097] Assume that the device 1 or, more particularly, the first support element 3 and the second support element 4, are in the first position or rest position P1.

[0098] Firstly, the user can adjust the adjustment component 11 depending on the weight of the objects supported by the first support component 3 and/or the second support component 4.

[0099] The user can grasp the handle component 12 operatively connected below the second support component 4 to operate the passage of the latter and of the first support element 3 from the first position or rest position P1 to the second position or loading and/or unloading position P2.

[0100] The extraction force exerted by the user on the handle component 12 moves, along an extracting or approaching direction to the user, the second support element 4 whose movement is regulated by the transmission ratio of the gear 7a and constrained by the second movement means 6 or, more particularly, by the third rod or arm 6a and by the fourth rod or arm 6b which rotate pivoted in their respective first ends 6a1, 6b1 with the first support element 3 and in their respective second ends 6a2, 6b2 with the second support element 4. For this reason, the first support element 3 is also dragged into movement, the movement of which is constrained by the first movement means 5 or, more particularly, by the first rod or arm 5a and by the second rod or arm 5b which in turn rotate pivoted in their respective first ends 5a1, 5b1 with the support component or bracket 2 and in their respective second ends 5a2, 5b2 with the first support element 3.

[0101] During this passage, the compensation spring 9a and the gas spring 8a facilitate the movement of the first support element 3 and the second support element 4, slowing down and fluidizing the movement of the latter to avoid sudden impacts and possible breakages of the device 1.

[0102] The configuration of the first and second kinematic chain respectively of the first movement means 5 and of the second movement means 6 as an articulated parallelogram generates, during the passage of the first support element 3 and the second support element 4 from the first position or position of rest P1 to the second position or loading and/or unloading position P2, a lowering of the level or height of the same, keeping the latter horizontal to the ground while the gear 7a transmits and regulates the motion with a specific transmission ratio which vertically offsets the second support element 4 with respect to the first support element 3, making it easier for the user to load and/or unload objects.

[0103] The user can then again grasp the handle component 12 operatively connected below to the second support component 4 to activate the passage of the latter and of the first support element 3 from the second position or loading and/or unloading position P2 to the first position or rest position P1.

[0104] The insertion force exerted by the user on the handle component 12 drags into movement, along a direction of insertion or away from the user, the second support element 4, the movement of which is regulated by the transmission ratio of the gear 7a constrained by the seconds movement means 6 or, more particularly, by the third rod or arm 6a and by the fourth rod or arm 6b which rotate pivoted in their respective first ends 6a1, 6b1 with the first support element 3 and in their respective second ends 6a2, 6b2 with the second support element 4. For this reason, the first support element 3 is also dragged into movement, the movement of which is constrained by the first movement means 5 or, more particularly, by the first rod or arm 5a and by the second rod or arm 5b which in turn rotate pivoted in their respective first ends 5a1, 5b1 with the support component or bracket 2 and in their respective second ends 5a2, 5b2 with the first support element 3.

[0105] During this passage, the compensation spring 9a and the gas spring 8a facilitate the movement of the first support element 3 and the second support element 4, pushing and supporting the displacement of the latter.

[0106] The configuration of the first and second kinematic chain respectively of the first movement means 5 and of the second movement means 6 as an articulated parallelogram generates, during the passage of the first support element 3 and the second support element 4 from the second position or position of loading and/or unloading P2 to the first position or rest position P1, a raising of the level or height of the same, keeping the latter horizontal to the ground while the gear 7a transmits and regulates the motion with a specific transmission ratio which vertically aligns the second support element 4 with respect to the first support element 3, making the device 1 for supporting and loading and/or unloading objects more compact and less bulky.

[0107] Subject-matter of the present invention is also a piece of furniture F comprising walls Wand a device 1, according to the present invention or according to non-limiting embodiments of the present invention, fixed to the walls W.

[0108] In particular, the device 1 of the piece of furniture F according to the present invention defines an inserted position IP corresponding to the first position or rest position P1 of the first support element 3 and of the second support element 4 and an extracted position EP corresponding to the second position or loading and/or unloading position P2 of the first support element 3 and of the second support element 4.

[0109] Preferably, the piece of furniture F is a kitchen cabinet or wall unit, for example placed in a position raised above the ground, preferably proximal to the ceiling.

[0110] The device 1 as well as the piece of furniture F according to the present invention allow improving and optimizing the loading and/or unloading operations of objects.

[0111] Furthermore, device 1 is mechanically simple, as well as inexpensive.

[0112] Moreover, the device 1 described above allows the forces generated by its movement to be adequately compensated according to the weight of the objects supported by it, obtaining a fluid and controlled movement at every moment of use.

[0113] It should be considered also that the device 1 provides the user with the opportunity to freely adjust the compensation force, i.e., the preload, to be used for the movement of the support elements 3, 4.

[0114] It has thus been seen how the invention fully achieves the proposed objects.

[0115] Modifications and variations of the invention are possible within the scope of protection defined by the following claims.

Claims

1. Device (1) for supporting and loading and/or unloading objects comprising:

- a support component or bracket (2) operatively connected, in use, with walls (W),
- at least a first support element (3) for objects and at least a second support element (4) for objects, and
- first movement means (5) operatively connected with said support component or bracket (2) and with said at least one first support element (3), **characterized in that** it comprises:
- second movement means (6) operatively connected with said first support element (3) and with said at least one second support element (4), and
- transmission and adjustment means (7), operatively connected with or between said first movement means (5) and said second movement means (6), configured to transmit and regulate the movement between said first movement means (5) and said second movement means (6),

wherein said at least one first support element (3) and said at least one second support element (4) are movable or displaceable, respectively by means of said first movement means (5) and said second movement means (6), between a first position or rest position (P1) in which said at least one second support element (4) is vertically aligned with said at least one first support element (3) and at least a second position or loading and/or unloading position (P2) in which said at least one second support element (4) is vertically offset with said at least one first support element (3) to facilitate the loading and/or unloading of objects.

2. Device (1) according to the previous claim, wherein in said at least one second position or loading and/or unloading position (P2), the rear, in use, end or wall of said second support element (4) or support element most proximal to the ground is positioned forward of the front, in use, end or wall of said first support element (3).

3. Device (1) according to claim 1 or 2, wherein said transmission and adjustment means (7) comprise a gear (7a) which includes at least a first wheel or toothed circular sector (7a1) which meshes with at least a second wheel or toothed circular sector (7a2) to transmit and regulate the motion between said first movement means (5) and said second movement means (6).

4. Device (1) according to any one of the preceding claims, wherein said first movement means (5) comprise a first rod or arm (5a) and a second rod or arm (5b) operatively connected in their respective first ends (5a1, 5b1) with said support component or bracket (2) and in their respective second ends (5a2, 5b2) with said first support element (3) so as to configure a first kinematic movement chain.

5. Device (1) according to any one of the preceding claims, wherein said second movement means (6) comprise a third rod or arm (6a) and a fourth rod or arm (6b) operatively connected in their respective first ends (6a1 , 6b1) with said first support element (3) and in their respective second ends (6a2, 5b2) with said second support element (4) so as to configure a second kinematic movement chain.

6. Device (1) according to any one of the preceding claims, comprising cushioning and thrust means (8) configured to cushion the passage of said first support element (3) and of said second support element (4) from said first position or rest position (P1) to said second position or loading and/or unloading position (P2) and to push said first support element (3) and said second support element (4) from said second position or loading and/or unloading position (P2) to said first position or rest position (P1).

7. Device (1) according to any one of the preceding claims, comprising elastic means (9) adjustable, in use, by the user according to the weight of the objects to be supported or, in use, supported by said first support element (3) and/or from said second support element (4).

8. Device (1) according to any one of the preceding claims, comprising an adjusting element (19), a guide (21) which defines a sliding track (21a) and a cursor (20), operatively coupled with said adjusting element (19) and with said elastic means (9), movable along said sliding track (21a) so that, by acting on said adjusting element (19), said cursor (20) moves along said sliding track (21a) to define a plurality of adjustment positions of said elastic means (9).

9. Device (1) according to any preceding claim, comprising:

- a first stop or limit switch component (13) configured to abut with said first movement means (5) so as to stop the movement of the latter, and/or
- a second stop or limit switch component (18) configured to abut with said second movement means (6) so as to stop the movement of the latter.

10. Device (1) according to any one of the preceding claims, wherein said first support element (3) comprises a base (3a) which defines an opening or positioning compartment (PO) for said transmission and adjustment means (7).

11. Device (1) according to the preceding claim, wherein said first support element (3) comprises a first protection component (14) of said transmission and adjustment means (13) positioned in said opening or positioning compartment (PO), said first protection component (14) being operatively connected in a first portion (14a) proximal to said support component or bracket (2) with said first movement means (5) and in a second portion (14b) distal from said support component or bracket (2) with said second movement means (6).

12. Device (1) according to any one of the preceding claims, comprising a coupling component (2c) configured to allow, in use, the connection of said support component or bracket (2) to walls (W) of a piece of furniture.

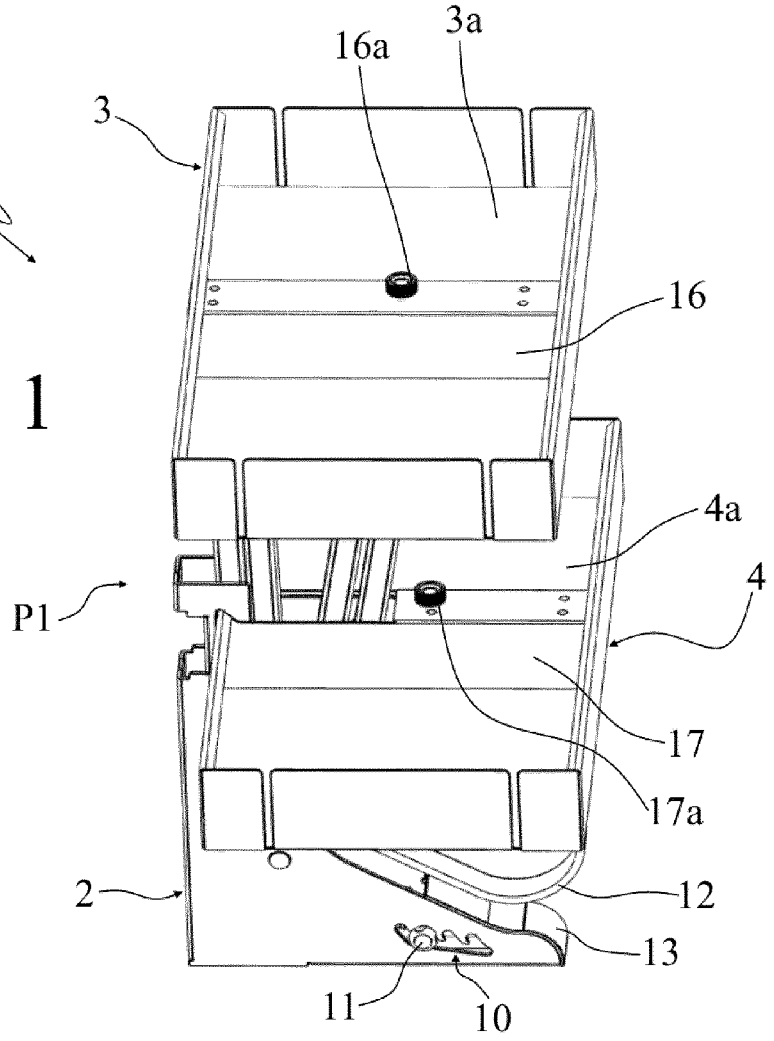
13. Device (1) according to the preceding claim, wherein said coupling component (2c) comprises one or more lateral adjustment elements (2c1) as well as a central adjustment element (2c2) slidingly engaged at its ends with said one or more lateral adjustment elements (2c1).

14. Device (1) according to the preceding claim, wherein said central adjustment element (2c2) comprises or delimits a slotted hole (2c3) while said one or more lateral adjustment elements (2c1) comprise or delimit at least one hole or opening (2c4) which can be used, in use, together with said slotted hole (2c3) for the insertion of a locking element so as to determine the overall length of said coupling component (2c) and the adjustment of the fixing of said support component or bracket (2) with side walls (W) of a piece of furniture.

15. Piece of furniture (F) comprising walls (W) and a device (1) according to any one of the preceding claims fixed on said walls (W), said device (1) defining an inserted position (IP) corresponding to said first position or rest position (P1) of said first support element (3) and of said second support element (4) and an extracted position (EP) corresponding to said second position or loading and/or unloading position (P2) of said first element support (3) and said

second support element (4).

Fig. 1


16a
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3
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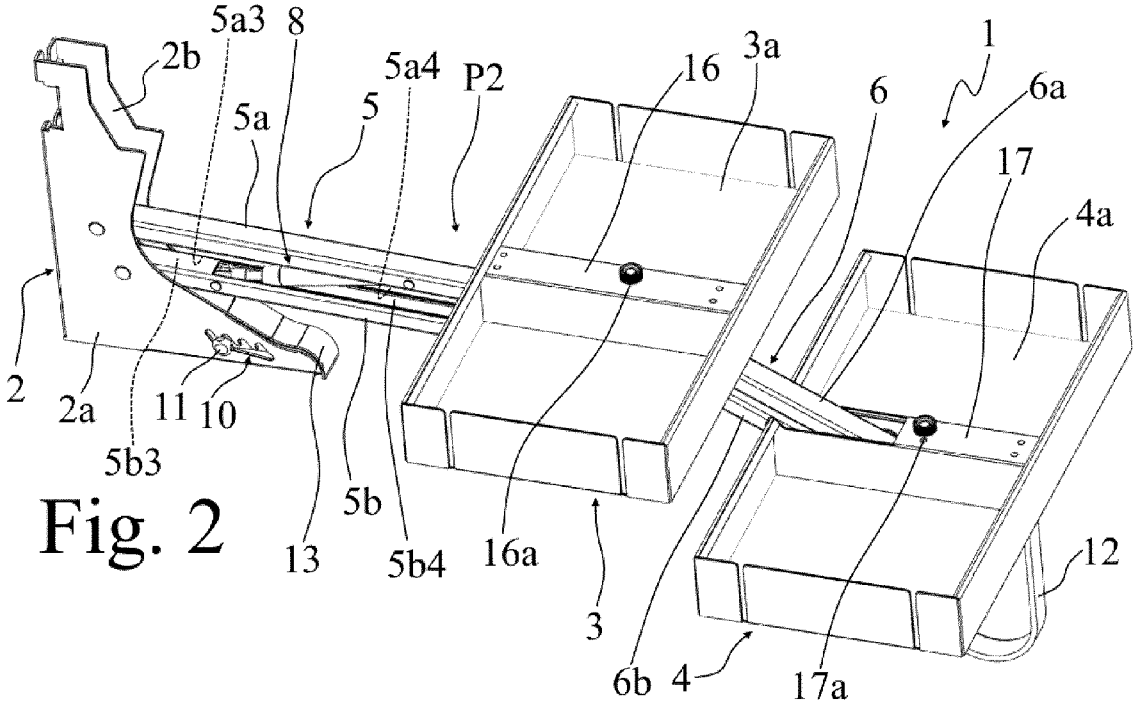
16
4a
4
P1
17
17a
2
12
13
11
10

Fig. 2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2b
5a4
P2
5a
5
16
3a
1
6
6a
17
4a
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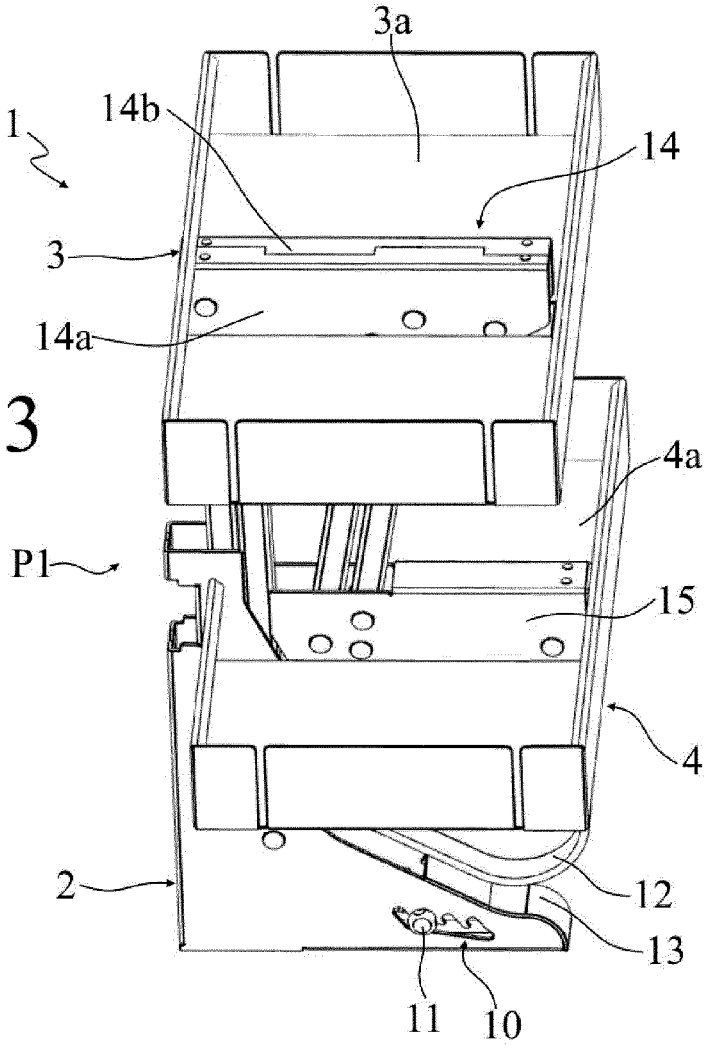
2a
11
10
5b3
5b
13
5b4
16a
3
6b
4
17a
12

Fig. 3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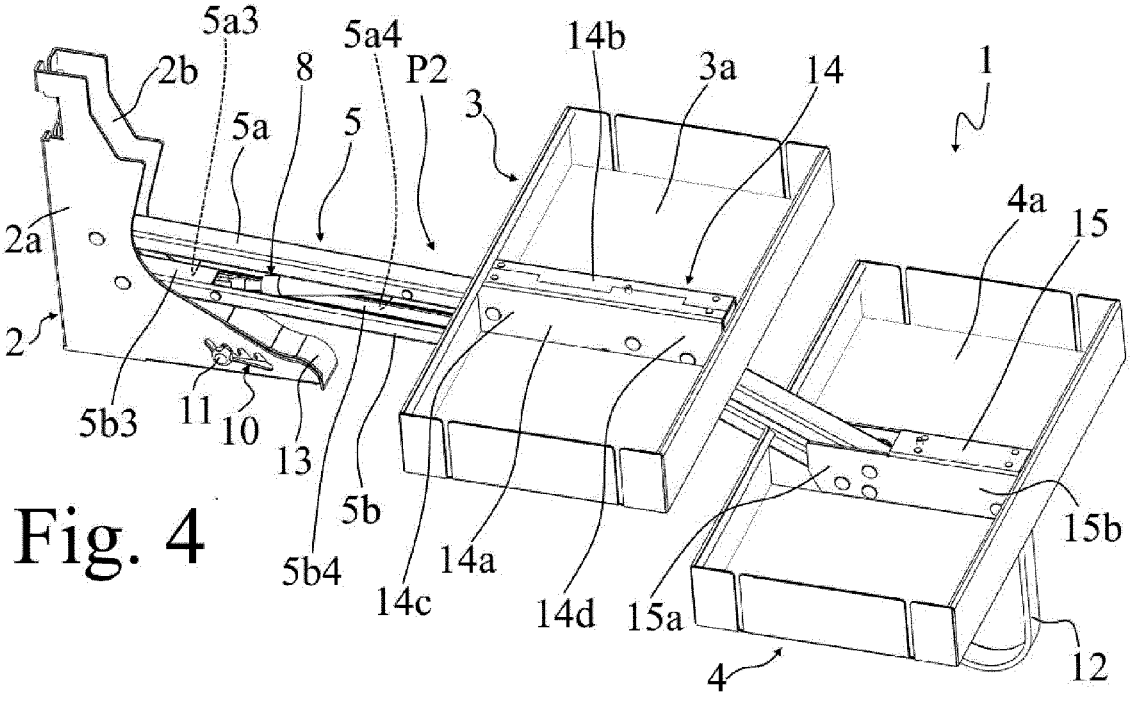
14
3
14a
4a
P1
15
4
2
12
13
11
10

Fig. 4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5a4
14b
2b
8
P2
3a
14
1
5a
5
3
4a
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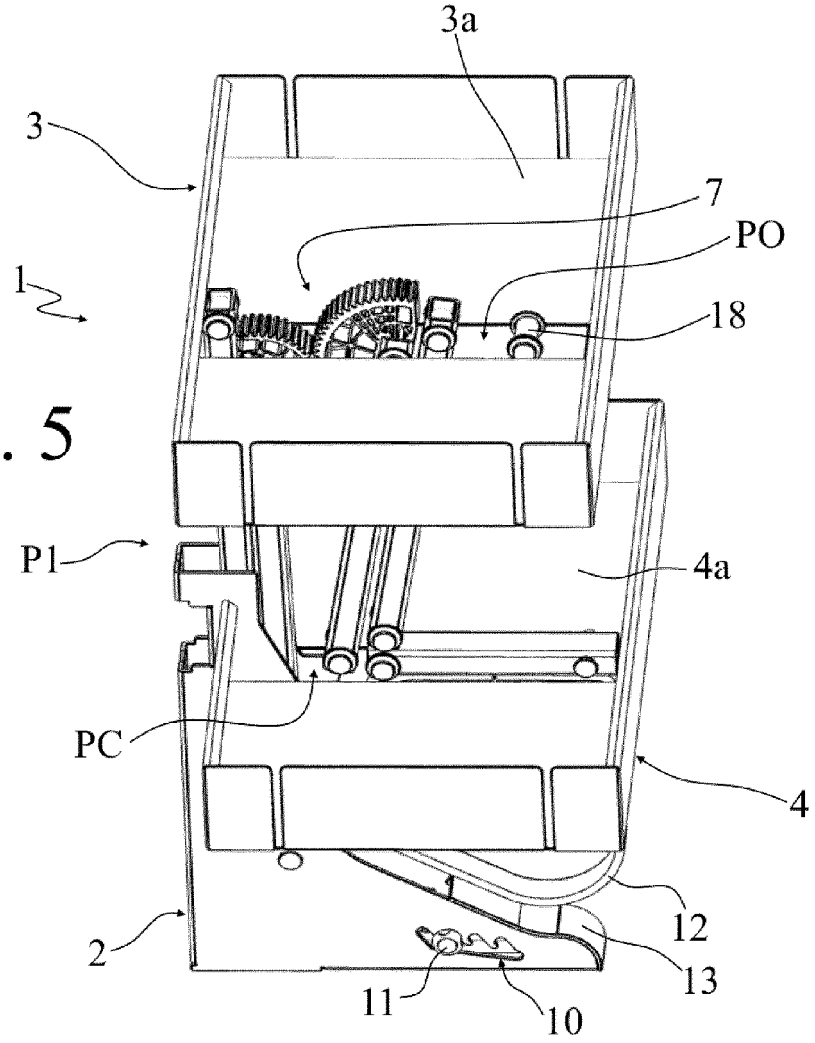
5b4
14a
14c
14d
15a
12
4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18
P1
4a
PC
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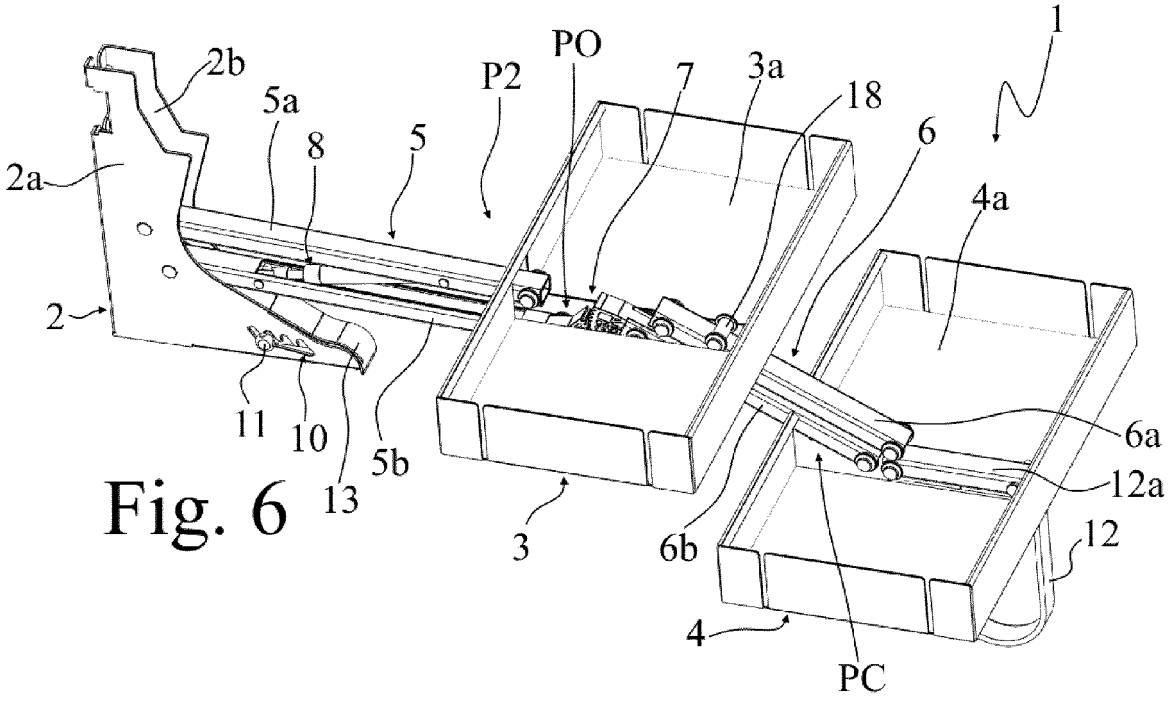
2
13
11
10

Fig. 5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PO
P2
7
3a
18
6
5a
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2
6a
12a
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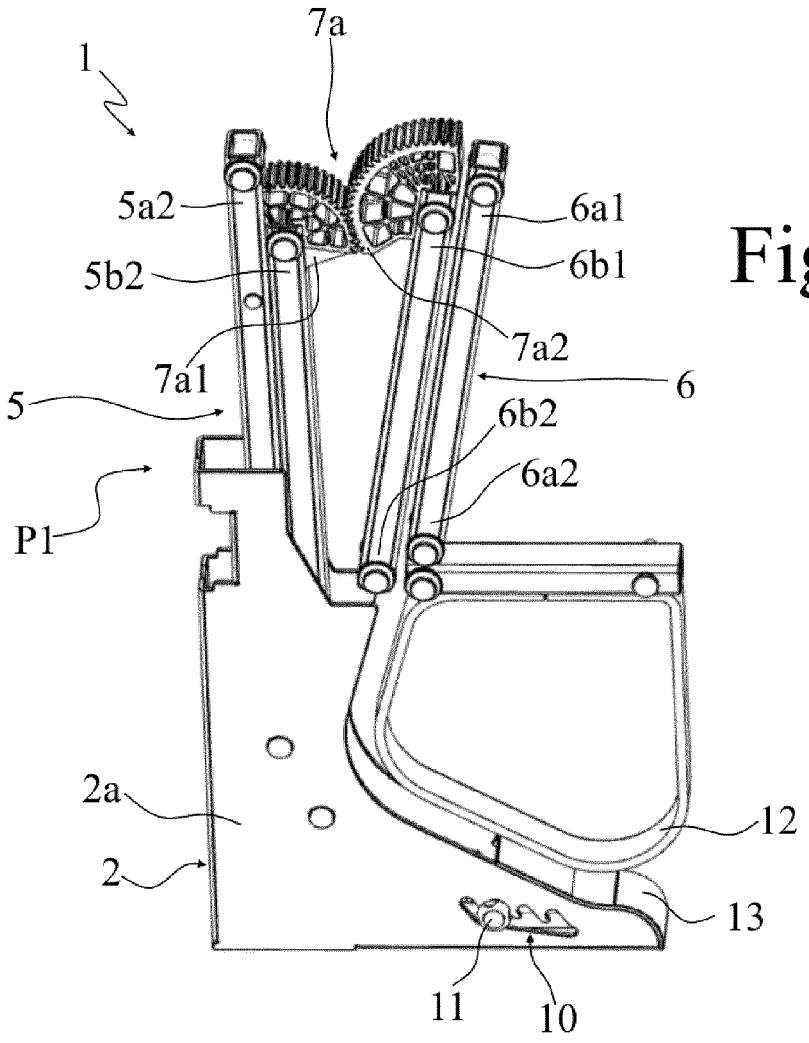
13
5b
3
6b
12
4
PC

Fig. 6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P1
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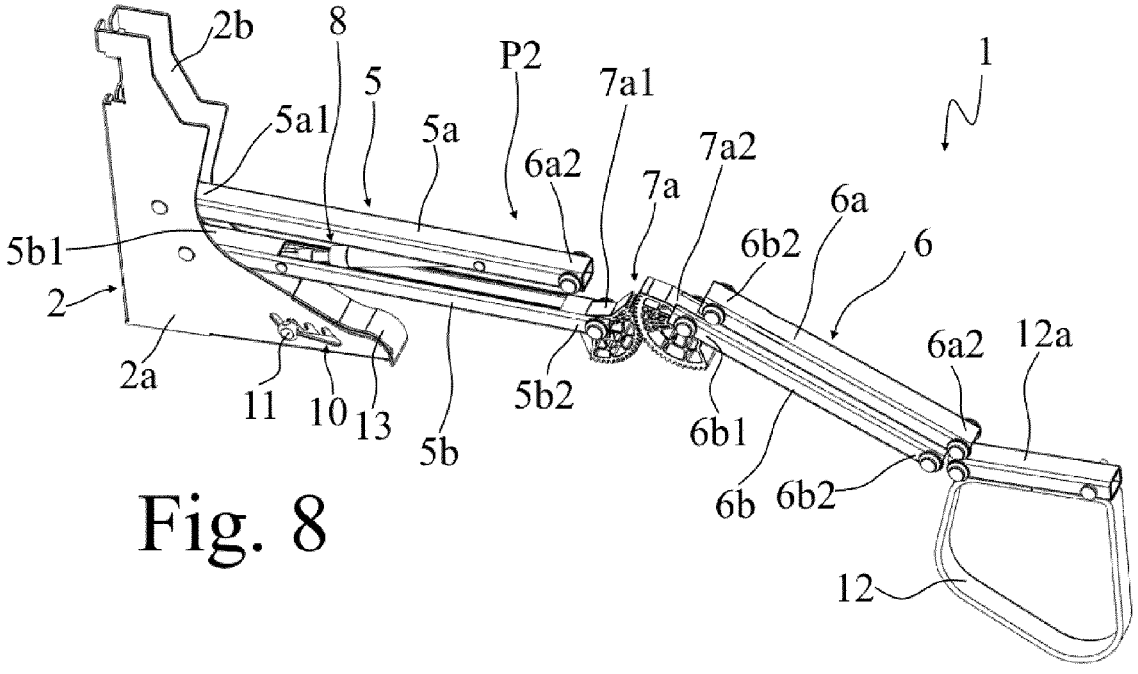
2
13
11
10

Fig. 7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P2
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10
13
5b2
6b1
5b
6b
6b2
12

Fig. 8

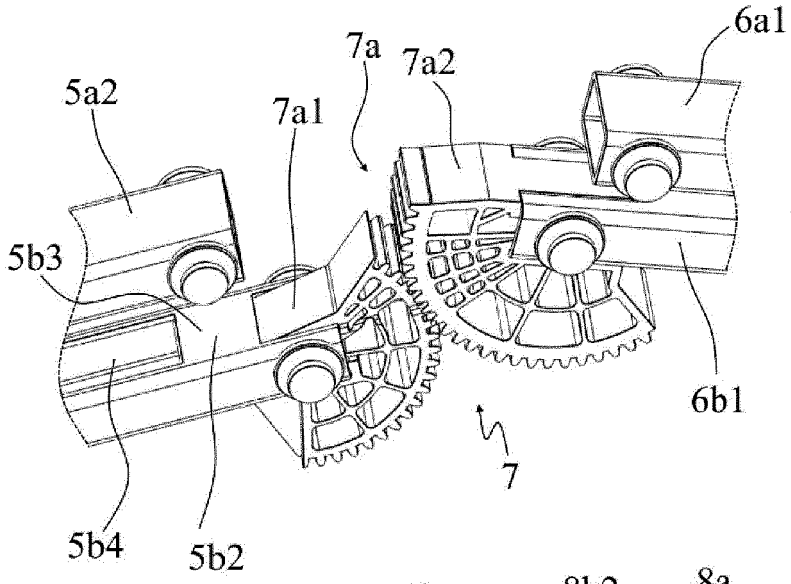


Fig. 9

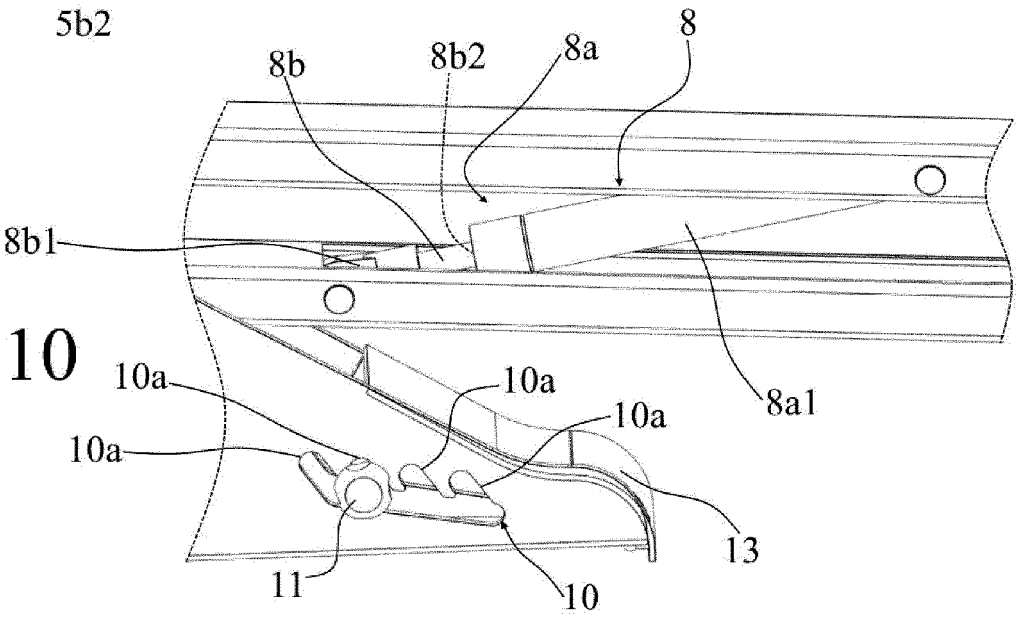


Fig. 10

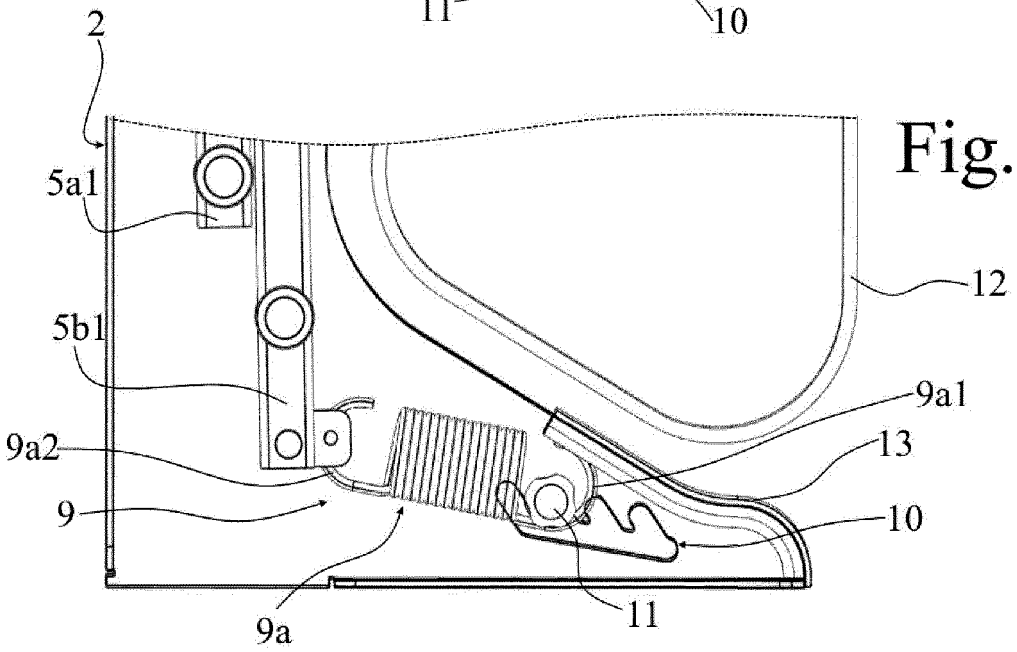


Fig. 11

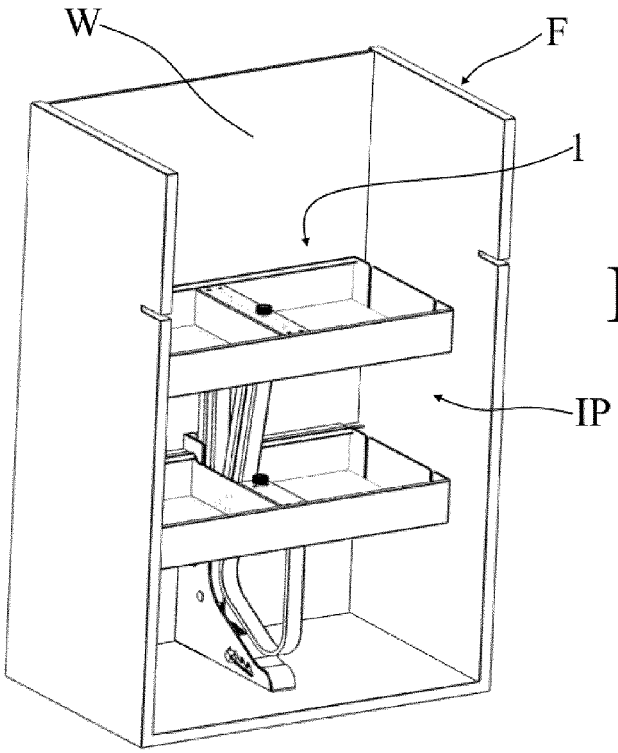


Fig. 12

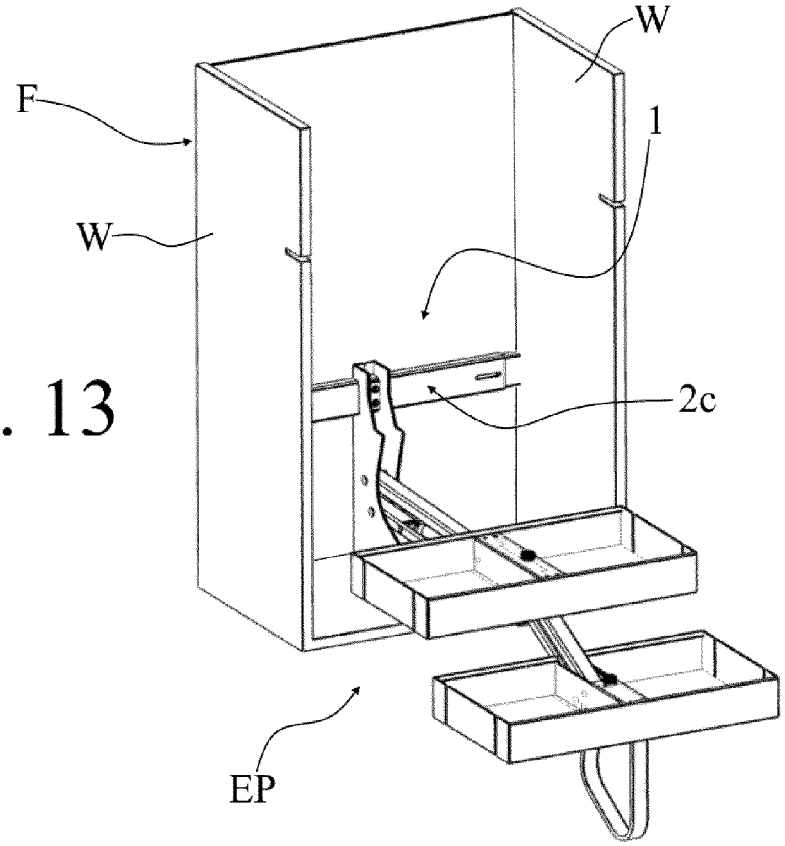
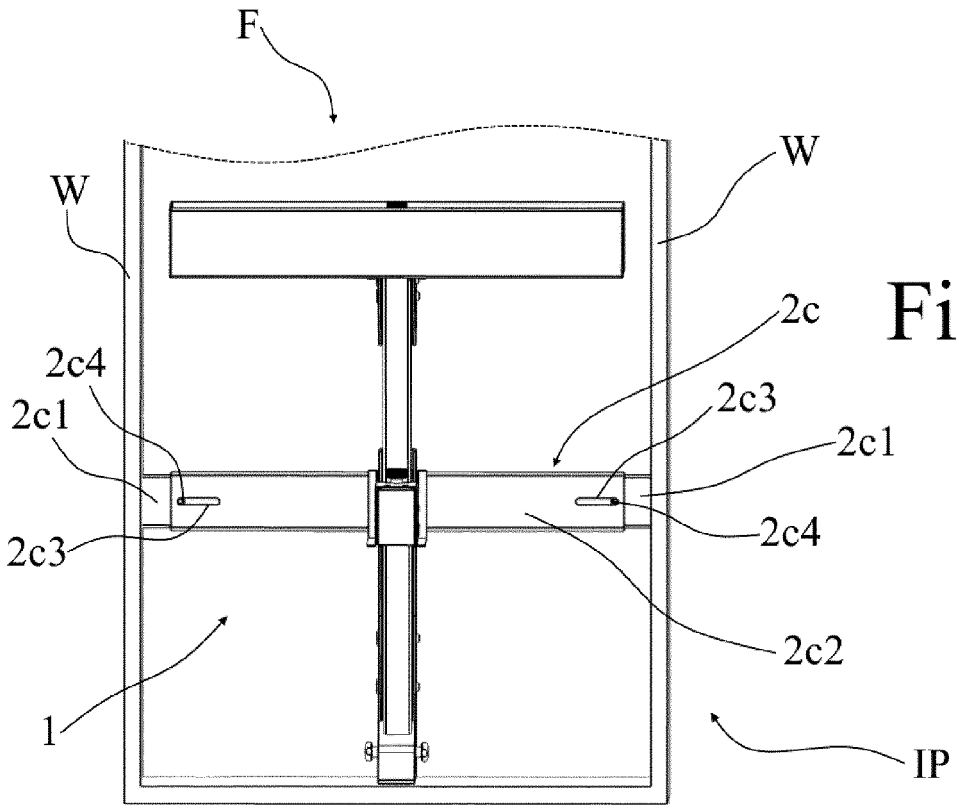


Fig. 13


F
W
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2c4
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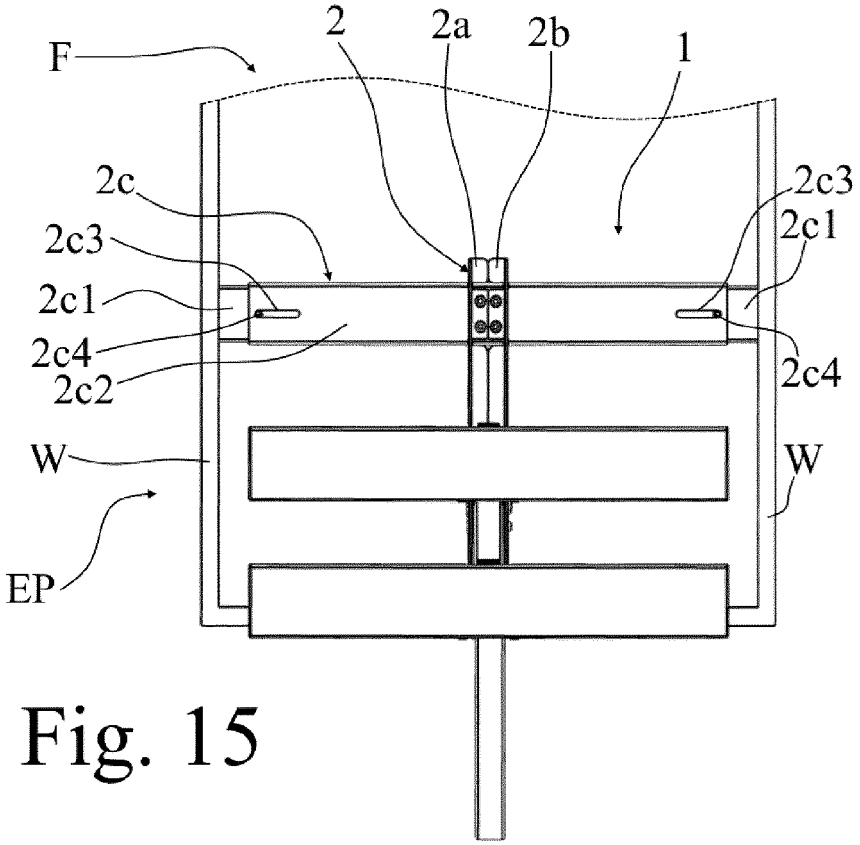
2c3
2c1
2c3
2c4
2c2
1
IP

Fig. 14


F
2
2a
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2c1
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2c4
2c4
2c2
W
W
EP

Fig. 15

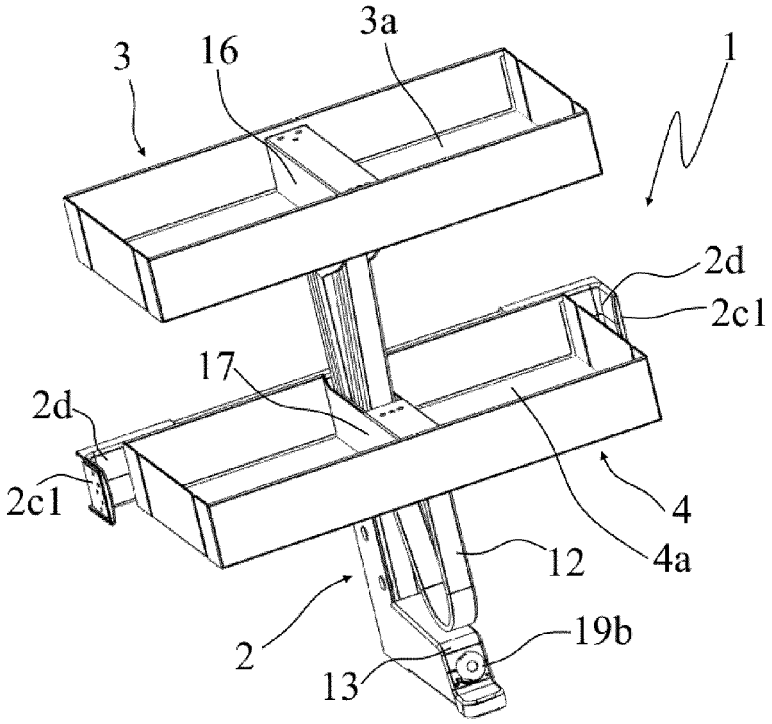

Fig. 16

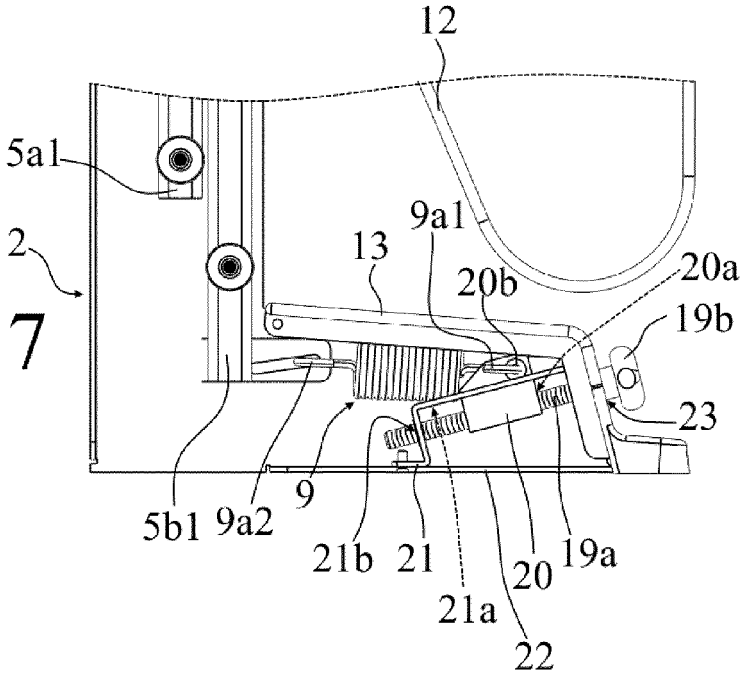

Fig. 17

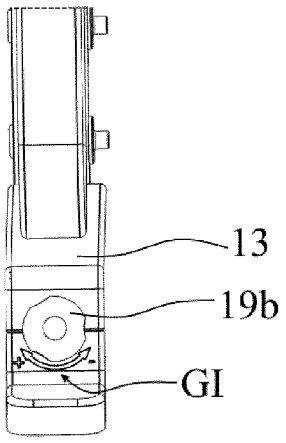

Fig. 18

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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 2108

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 2007 175333 A (SUN WAVE IND; DAIDOO KK) 12 July 2007 (2007-07-12)	1,2,4-6, 9,10, 12-15	INV. A47B46/00 A47B77/04
A	* paragraph [0001] - paragraph [0056]; figures 1-7 *	3,7,8,11	
A,D	EP 1 880 636 B1 (PEKA METALL AG [CH]) 7 April 2010 (2010-04-07) * paragraph [0005] - paragraph [0031]; figures 1-7 *	1-15	

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	12 February 2024	Kohler, Pierre

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EPO FORM 1503 03.82 (P04C01)

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12-02-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		EP 1880636 A1	23-01-2008
		PL 1880636 T3	30-09-2010

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- EP 1880636 B1 **[0007]**
- US 9055813 B2 **[0007]**