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(54) **HINGE SYSTEM**

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(72) Inventors:

- **LOVATI, Stefano**  
**20083 Gaggiano (Milano) (IT)**
- **ALBERTI, Alessandro**  
**20083 Gaggiano (Milano) (IT)**

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(74) Representative: **Inchingalo, Simona**

**Bugnion S.p.A.**  
**Viale Lancetti, 17**  
**20158 Milano (IT)**

(73) Proprietor: **Sguinzi Pietro S.p.A.**

**20083 Gaggiano (MI) (IT)**

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## Description

**[0001]** The present invention relates to a hinge system configured to move a door, shutter or similar element.

**[0002]** In particular, the present invention relates to a hinge system configured to move a door from a closed configuration to an open configuration and vice versa. In more detail, the present invention relates to a hinge system configured to move a flush type of door. for example, in the case of a door of a sunroof of a car or a door of a storage compartment of a motorhome, caravan or boat.

**[0003]** The term door, shutter or similar element refers here to an element for closing an opening or a passage in a wall, for example, of a motor or self-propelled vehicle where there is the need for a closure that meets certain aesthetic criteria in addition to those of efficiency and comfort. Hinge systems for moving doors and shutters of an opening that substantially comprise two fastening plates or elements, fixed, respectively, one to the door and one to the fixed frame of the opening and joined to one another by means of a pin so as to form the pivotal joint to permit a pivotal movement of the door with respect to a fixed frame, are known in the prior art. Some known hinges are described in DE 19902897, US 3183548, GB 789980 and GB 242136.

**[0004]** The prior art hinge systems may have a somewhat complex architecture and comprise numerous components to enable the equally complex kinematic control of doors which must perform rotational-translational movements when opened/closed.

**[0005]** The prior art hinge systems are generally large with an overdimensioned structural architecture, also to improve the mechanical strength of the components.

**[0006]** Also in view of the characteristics mentioned above, the prior art hinge systems have a number of drawbacks which limit their use and reliability.

**[0007]** In particular, the prior art hinge systems are never completely hidden from view, that is to say, they are configured in such a way that when the door is open or closed some elements of the system are always visible or exposed on the outside of the door.

**[0008]** The fact that the prior art hinge systems are visible and/or exposed on the outside certainly spoils their aesthetic appearance but above all gives rise to functional complications. The parts of the hinge that are not enclosed between the frame and the door and remain exposed to the outside are exposed to environmental conditions and deteriorate prematurely, spoiling the appearance and the aerodynamics of the surface from which they protrude (as mentioned above in the case of a self-propelled vehicle such as a caravan or boat), and may constitute a hazardous protuberance and a surface that is not easily visible which could be inadvertently struck or could accidentally hit people or things during a manoeuvre or when moved.

**[0009]** In more detail, the prior art hinge systems are also rather delicate and fragile: if one of the external, exposed components of the system is hit or damaged, it

might prevent the correct closing and/or opening of the door.

**[0010]** It is worth noting that flush hinge systems have been developed, that is hinge systems which are aligned with the window or door surface without protruding externally from this surface, but these have a number of drawbacks including, for instance, the fact that they cannot guarantee a perfectly watertight and dust-proof seal and are not theft and/or sabotage-proof.

**[0011]** In more detail, flush type hinge systems are known in the prior art which do not prevent the ingress of water, especially the fine water spray generated by high-pressure washers and/or fixed automatic washing plants. The buildup and penetration of water through the known flush hinge system results in damage to the parts close to the door and oxidation of the mechanical components of said hinge system.

**[0012]** Moreover, as already mentioned, in the known flush hinge systems, the abundant openings between the fixed frame and the door make it possible for ill-intentioned people to insert levers or other tools in order to force the door.

**[0013]** The purpose of the present invention is to overcome the problems that have been found in the prior art by proposing a hinge system configured to move a door that is compact and completely enclosed.

**[0014]** In particular, the purpose of the present invention is to provide a hinge system configured to move a door that comprises only a few elements which are easy to produce, so as to limit production costs.

**[0015]** A further purpose of the present invention is to provide a hinge system configured to move a door which makes it possible to reduce the costs and time required for maintenance.

**[0016]** In particular, the present invention relates to a hinge system configured to move a door, shutter or similar element from a closed configuration to an open configuration and vice versa, comprising: a plurality of coupling elements comprising at least

- a first coupling element operatively attached to a fixed frame of the door;
- and at least a second coupling element operatively attached to a portion of the door. The hinge system further comprises a connecting body placed side by side and operatively connected to the first coupling element and the second coupling element. The connecting body presenting a longitudinal extension, parallelepiped with a quadrilateral section substantially C-shaped.

**[0017]** The hinge system comprises at least a first pin extending along a first axis of the connecting body and configured to provide a pivotal connection about the first axis between the first coupling element and the connecting body. The hinge system comprises a second pin extending along a second axis configured to provide a pivotal connection about the second axis between the sec-

ond coupling element and the connecting body. The first axis and the second axis are staggered so as to be arranged at respective different distances from a closing plane defined by the door and by the fixed frame in a closed configuration of said door.

**[0018]** The hinge system further comprises a protrusion, positioned on the first coupling element proximal to the first pin and next to an area facing the outside and/or facing and in line with the closing plane, which is configured to cover at least partially a passage opening between the door and the fixed frame in a closed configuration of the door. The closed configuration of the door is a flush configuration with the closing plane of the door aligned with the fixed frame.

**[0019]** In order to move relative to each other without interfering with each other, the door and the fixed frame, in a closed configuration of the door, present a passage or little distance between them. This distance is, in some parts along the perimeter of the door, filled by the hinged system of which only the top profile is visible, while remaining in a flush configuration with the closing plane of the door aligned with the fixed frame.

**[0020]** In further detail, the connecting body is configured in such a way that the hinge system can be fully enclosed in a volume delimited by the fixed frame on one side and by a portion of the door on the other side, remaining external to them, so that the hinge system remains in any case tucked inside the distance between the fixed frame and the portion of the door, when in a closed configuration of the door itself, as previously explained.

**[0021]** The dependent claims describe alternative embodiments of the invention. This description is provided with reference to the accompanying Figures, which are also intended as non-limiting examples, in which:

- Figure 1A is a section view of a hinge system installed on a door according to the present invention;
- Figure 1B is a section view of the hinge system according to an alternative embodiment of the present invention;
- Figure 2 is a perspective section view of the hinge system of Figure 1A;
- Figure 3 is a perspective view of the hinge system of Figure 1A with some parts hidden to reveal others that would otherwise not have been visible;
- Figure 4A is another perspective view of the hinge system of Figure 1A with some parts hidden to reveal others that would otherwise not have been visible;
- Figure 4B is another perspective view of the hinge system of Figure 1B with some parts hidden to reveal others that would otherwise not have been visible;
- Figure 5 is another and different perspective view of the hinge system of Figure 1A with some parts hidden to reveal others that would otherwise not have been visible;
- Figures 6A-6C are section views of a possible opening sequence of the hinge system of Figure 1A ac-

ording to the present invention.

**[0022]** The present invention, as already mentioned, relates to a hinge system 1 configured to move a door 100, shutter or similar element from a closed configuration to an open configuration and vice versa with respect to a fixed frame 200 of an opening 110, as illustrated by way of non-limiting example in the accompanying Figures 1A-6C in which the opening 100 is defined by said fixed frame 200.

**[0023]** By way of non-limiting example, the door and the fixed frame 200 of the opening 110 are not part of the present invention and may be installed on an opening 110 to access a luggage compartment of a motorhome or of a boat, which are not illustrated.

**[0024]** With reference to the accompanying Figure 3, the hinge system 1 comprises at least a plurality of coupling elements 10 comprising at least a first coupling element 11a operatively attached to the fixed frame 200 of the door 100 and at least a second coupling element 12a operatively attached to a portion of the door 100 to permit the movement thereof.

**[0025]** In detail, the first coupling element 11a can be attached to a portion of the fixed frame 200 using fastening means not illustrated in detail in the accompanying figures. The second coupling element 12a can be attached to a portion of the door 100 using fastening means described in more detail below and illustrated by way of example in the accompanying Figures 1A- 6C.

**[0026]** The hinge system 1 further comprises a connecting body 20 placed side by side to the first coupling element 11a and the second coupling element 12a: the connecting body 20 is moreover operatively attached to the first coupling element 11a and to the second coupling element 12a.

**[0027]** If considered in a section view, for example as in figure 1a or 1b, the connecting body 20 can be seen as interposed between the first coupling element 11a and the second coupling element 12a.

**[0028]** Preferably, the connecting body 20 extends in a mainly longitudinal direction along a first axis "X", presenting a parallelepiped configuration and having a quadrilateral C-shaped cross section.

**[0029]** As illustrated in Figures 1a and 1b, which show sectional views along an axis orthogonal to the first axis "X" of two different embodiments, the connecting body 20 is completely contained, in a closed configuration of the door, in a space substantially delimited by two planes which are parallel to each other and to the first axis "X" and which are orthogonal to a closing plane "F" realized by the door 100 and by the fixed frame 200, when in a closed configuration of the door 100; each planes being tangent externally respectively to the first coupling element 11a and To the second coupling element 12a.

**[0030]** In other words, the connecting body 20 is configured so that the hinge system is fully enclosed in a volume comprised and delimited by the fixed frame 200 on one side and by a portion of the door 100 on the other

side, remaining external to them and without being inserted laterally into the fixed frame or the door. In this way the hinge system 1 remains tucked within the distance realized, in a closed configuration of the door, between the fixed frame 200 and the door 100. From the outside, in a closed configuration of the door, the hinge system 1 is only partially visible, in particular only a head portion of the first coupling element 11a and the second coupling element 12a are visible, which remain threaded with the closing plane "F", thus maintaining a continuity of the surface between door 100 and the fixed frame 200. Said closing plane "F" is defined by the door 100 and by the fixed frame 200 in a closed configuration of the door 100, as schematically illustrated by way of example in the accompanying Figure 1. The hinge system 1 comprises at least a first pin 30 extending along the first axis "X" of the connecting body 20.

**[0031]** The first pin 30 of the hinge system 1 is configured to provide a pivotal connection between the first coupling element 11a and the connecting body 20 about the first axis "X".

**[0032]** A possible opening movement of the door 100 with the hinge system 1 described so far is schematically illustrated by way of example in Figures 6A and 6B, where in sequence, starting from a configuration in which the door 100 is closed on the fixed frame 200, the hinge system 1 permits the movement of the door 100 with respect to the fixed frame 200 by means of a rotation about the first axis "X" with an amplitude of rotation preferably comprised between 0 and about 90 degrees. Vice versa for a closing movement of the door 100 on the fixed frame 200, starting from an open configuration of the door 100, for example at 90 degrees with respect to the fixed frame 200.

**[0033]** The configuration of the hinge system 1 comprising the first pin "X" is such that the hinge system 1 can be completely enclosed between the fixed frame 200 and the portion of the door 100, in particular enclosed in the opening present between the respective lateral walls and remaining external and confined inside this volume and tucked between the fixed frame 200 and the portion of the door 100 to which the system 1 is fixed, in a configuration in which the door 100 is closed on the frame 200.

**[0034]** In other words, the hinge system 1 in the mechanical configuration described above is complete with the elements that substantially make it up and enable the installation and the movement of the door 100 on the fixed frame 200 and is completely isolated from the outside, for example out of sight of the user, in a configuration with the door 100 closed.

**[0035]** Only the upper head portions of the first coupling element 11a and the second coupling element 12a are visible externally, always and in any case flush with the closing plane "F".

**[0036]** For greater detail, the closing of the door 100 towards the fixed frame 200 of the opening 110 also results, preferably with the door 100 completely closed, in

the complete enclosure of the hinge system 1 between the door 100 and the fixed frame 200 so that none of the elements of said system 1 are visible and protrude on an external side "E" or on an opposite internal side "I" of the opening 110. The opening or distance between the fixed frame 200 and the door 100, when in the door closure configuration, is filled by a sealing profile which is interrupted at the hinge system 1, which, however, gives continuity to the gasket itself.

**[0037]** According to the invention, the hinge system 1 comprises a second pin 40 extending along a second axis "Y" configured to provide a pivotal connection about the second axis "Y" between the second coupling element 12a and the connecting body 20.

**[0038]** Preferably, the second axis "Y" is parallel to the first axis "X".

**[0039]** The hinge system 1 thus provided with the second rotation pin 40 permits the movement of the door 100 with respect to the fixed frame 200 by means of a separate and independent rotation about the first axis "X" and/or about the second axis "Y".

**[0040]** The first coupling element 11a and the second coupling element 12a present both holes for inserting respectively the first rotation pin 30 and the second rotation pin 40. The first coupling element 11a and the second coupling element 12a extend along the aforementioned axes "X" and "Y", respectively, and partially away from the respective rotation pin 30 and 40, remaining parallel to each other in the configuration of closed door. In other words, when the door 100 is closed, the body of the first coupling element 11a is parallel to the body of the second coupling element 12a. The connecting body 20, according to the invention, is C-shaped so as to have, at the two ends of the C-shaped profile, respective through holes coaxial with the first axis "X" and the second axis "Y" and suitable to attach (by means of interference or using other means not described here) the first pin 30 and the second pin 40 divided into pairs with respect to said median plane "M".

**[0041]** It is also possible to say that the connecting body 20 is substantially enclosed within the space between the first pin 30 and the second pin 40. The bulk of the hinge system 1, measured along a direction orthogonal both to the axes "X" and "Y" and parallel to the closing plane "F", is very small, and defined by the outer lateral surfaces of the first coupling element 11a and the second coupling element 12a parallel to each other, when the door is in the closure configuration. The connecting body 20 extends continuously from the first coupling element 11a and the second coupling element 12a along the "X" and "Y" extension.

**[0042]** Preferably, the hinge system 1 permits the movement of the door 100 with respect to the fixed frame 200 by means of a rotation about the first axis "X" and/or the second axis "Y" with an amplitude of rotation preferably comprised between 0 and about 180 degrees and vice versa.

**[0043]** A possible opening movement of the door 100

with the hinge system 1 described so far is schematically illustrated by way of example in Figures 6A, 6B and 6C where, in sequence, starting from a configuration in which the door 100 is closed on the fixed frame 200, the hinge system 1 permits the movement of the door 100 with respect to the fixed frame 200 by means of a rotation about the first axis "X" with an amplitude of rotation preferably comprised between 0 and about 90 degrees and then permits the movement of the door 100 with respect to the fixed frame 200 by means of a rotation about the second axis "Y" with a further amplitude of rotation preferably comprised between about 90 degrees and about 180 degrees. Vice versa for a closing movement of the door 100 on the fixed frame 200, starting from an open configuration of the door 100, for example at 180 degrees with respect to the fixed frame 200.

**[0044]** Also in this case, as mentioned above, the configuration of the hinge system 1 comprising the first pin "X" and the second pin "Y" is such that the hinge system 1 can be fully enclosed between the fixed frame 200 and the portion of the door 100 and tucked between the fixed frame 200 and the portion of the door 100 to which the system 1 is attached, in a configuration in which the door 100 is closed on the frame 200.

**[0045]** According to the invention, the first axis "X" and the second axis "Y" are staggered so as to be arranged at respective different distances "D1" and "D2" from the closing plane "F" defined by the door 100 and by the fixed frame 200 in a closed configuration of the door 100, as schematically illustrated by way of example in the accompanying Figure 1.

**[0046]** The staggered configuration of the first axis "X" and the second axis "Y" advantageously enables the closing and the opening of the door 100 with respect to the fixed frame 200 in a smaller space than with the prior art hinge systems. In detail, the closing plane "F" is substantially defined by the continuity of the external surface between the fixed frame 200 and the door 100 (including the attached glass or closing panel of the door 100), in a closed configuration of the door 100 on its fixed frame 200.

**[0047]** According to the present invention, an alternative embodiment of the hinge system configured to move a door 100 is configured so that the first axis "X" and the second axis "Y" are staggered so as to be arranged at respective different distances "d1" and "d2" from a central region 21 of the connecting body 20, as schematically illustrated by way of example in the accompanying Figure 1.

**[0048]** Preferably, the connecting body 20 is configured so that the aforesaid central region 21 is arranged and contained between a housing portion 22 of the first pin 30 and a further housing position 23 of the second pin 40.

**[0049]** Preferably, the central region 21 is a portion of junction between the housing portion 22 and the further housing portion 23, entirely contained within two planes parallels to each other and tangents externally to said

two housing portions 22 and 23.

**[0050]** According to the present invention, the first coupling element 11a comprises a protrusion 11c configured to cover at least partially a passage opening between the door 100 and the fixed frame 200 in a closed configuration of the door 100.

**[0051]** The protrusion 11c faces towards the outside and/or faces towards the closing plane "F".

**[0052]** According to a preferred embodiment of the invention, illustrated by way of non-limiting example in the accompanying figures 1A, 3, 4A, 6A-6C, the first coupling element 11a comprises a further protrusion 12c configured to be arranged towards the second coupling element 12a in a closed configuration of the door 100. According to the invention, the protrusion 11c is proximal to the first pin 30, whereas the further protrusion 12c is distal to the first pin 30 passing through the first coupling element 11a. The protrusion 11c and the further protrusion 12c are arranged so as to converge towards a first internal volume (V) of the hinge system 1 to cover at least partially a passage opening between said door 100 and the fixed frame 200 in a closed configuration of the door 100. Preferably, the further protrusion 12c is arranged on a same side of the first coupling element 11a from which the protrusion 11c protrudes, which faces the internal volume "V", as schematically illustrated by way of a non-limiting example in the accompanying Figures (with the exception of Figure 1B). In other words, in the embodiment illustrated and described here, the protrusion 11c and the further protrusion 12c are integral with the first coupling element 11a of the hinge system 1. Preferably, the second coupling element 12a has a substantially rectangular cross section, as illustrated by way of example in the accompanying Figure 1A.

**[0053]** According to the present invention, the protrusion 11c and the further protrusion 12c may differ from one another in shape.

**[0054]** According to another preferred embodiment of the present invention, illustrated by way of non-limiting example in the accompanying figures 1B and 4B, the second coupling element 12a also comprises a further protrusion 12c configured to be arranged towards the first coupling element 11a in a closed configuration of the door 100. According to the present invention, the protrusion 11c and the further protrusion 12c may differ from one another in shape. That stated, according to the present invention, the protrusion 11c and the further protrusion 12c may also be identical in shape. Preferably, the further protrusion 12c is arranged at one end of the second coupling element 12a and distal with respect to the closing plane "F".

**[0055]** According to the further embodiment described here, the protrusion 11c and the further protrusion 12c are arranged respectively on the first coupling element 11a and on the second coupling element 12a so as to converge towards the internal volume "V" of the hinge system 1 to cover, at least partially, a passage opening between said door 100 and the fixed frame 200 in a closed

configuration of the door 100.

**[0056]** Preferably, the protrusion 11c is arranged in an opposite position with respect to the further protrusion 12c, taking as the fixed reference said internal volume "V" of the hinge system 1, schematically illustrated by way of non-limiting example in the accompanying Figure 1B.

**[0057]** The connecting body 20 has, in correspondence to the housing portions 22 and 23, the same external profile respectively of the first coupling element 11a and of the second coupling element 12a. In other words, as shown in Figure 2, the housing portion 23 has an outer profile, facing the external side "E", rounded exactly as the external profile of the second coupling element 12a, while the first portion of the housing portion 22 has an outer profile, facing the external side "E", with a protrusion 11c, shaped exactly like the first coupling element 11a. This configuration is due to the fact that, looking from the outside, the coupling elements 11a and 12a shall continuously be connected with the union body 20.

**[0058]** Preferably, the plurality of coupling elements 10 comprise a further first coupling element 11b and a further second coupling element 12b arranged respectively on the first pin 30 and on the second pin 40 and arranged symmetrically with respect to the first coupling element 11a and to the second coupling element 12a with respect to a median plane "M" (accompanying Figures 3 and 4) of the connecting body 20 perpendicular to at least the first axis "X" and/or to the second axis "Y".

**[0059]** In other words, the first coupling element 11a and the second coupling element 12a and the respective further first coupling element 11b and further second coupling element 12b are arranged at opposite ends with respect to the connecting body 20. Preferably, the first coupling element 11a and the second coupling element 12a and the respective further first coupling element 11b and further second coupling element 12b are operatively connected to the connecting body 20 by means of a hinge on the external and opposite ends of the connecting body 20, as illustrated in the non-limiting example shown in the accompanying Figures 3 and 4. What has been said about the first coupling element 11a and the second coupling element 12a can be exactly applied also to the further first coupling element 11b and to the further second coupling element 12b.

**[0060]** The connecting body 20 is preferably C-shaped so as to have, at the two ends of the profile, through holes coaxial with the first axis "X" and the second axis "Y" and suitable to attach (by means of interference or using other means not described here) the first pin 30 and the second pin 40 divided in pairs with respect to said median plane "M".

**[0061]** It is worth noting that, for each of the alternative embodiments of the hinge system 1 described above, the connecting body 20 comprises a portion of the protrusion 11c arranged next to the housing portion 22 of the first pin 30. Preferably, the portion of the protrusion 11c is such as to create a continuity of profile with a re-

spective portion of the protrusion 11c present at least on the first coupling element 11a and/or on the further first coupling element 11b, arranged symmetrically with respect to the median plane "M" on the opposite side of the first coupling element 11a.

**[0062]** In the same way as described above, the further first coupling element 11a and the further second coupling element 12b are rotatable respectively about the first axis "X" and the second axis "Y" with respect to the connecting body 20.

**[0063]** Therefore, in an operational opening configuration of the door 100 up to about 180 degrees the connecting body 20, at least one second fastening element 12a, 12b and the door 100 rotate rigidly with respect to the axis "X" and, in particular, the connecting body 20 is such as to rotate in a direction away from the at least first coupling element 11a, 11b and at least a second coupling element 12a, 12b is such as to rotate in a direction away from the connecting body 20. The opening sequence described above is schematically illustrated by way of example in Figures 6A-6C.

**[0064]** According to the present invention, in an alternative embodiment that is not illustrated, the hinge system 1 comprises a first pin 30 and a second pin 40 having respective axes of rotation "X" and "Y" that are coincident. The connecting body 20 is configured so as to permit a mechanical connection between a first coupling element 11a and a second coupling element 12a which are rotatable respectively about the first axis "X" and the second axis "Y" so as to allow the door 100 to make a multiple rotation about the two coincident axes "X" and "Y" and or a rotational translation. Advantageously, according to the embodiment described above, the hinge system 1 is such that it can be fully enclosed between the fixed frame 200 and the portion of the door 100 and tucked between the fixed frame 200 and the portion of the door 100 to which the system 1 is attached, in a configuration in which the door 100 is closed on the frame 200. Preferably, the hinge system 1 comprises reversible locking means, not illustrated in the accompanying Figures, configured to make it possible to fix a relative position between at least one coupling element 11a of the plurality of coupling elements 10 and the connecting body 20 and/or to fix a relative position between at least another coupling element 12a of the plurality of coupling elements 10 and the connecting body 20.

**[0065]** Preferably, the reversible locking means are configured to lock the door 100 in an intermediate angular position comprised between about 0 degrees and about 90 degrees and/or comprised between about 90 degrees and about 180 degrees.

**[0066]** Preferably, the hinge system 1 comprises a stop element, not illustrated in the accompanying Figures, configured to abut against at least a portion of the connecting body 20 to determine the maximum relative angular rotation between a first coupling element 11a, 11b, the connecting body 20 and at least a second coupling element 12a, 12b. The stop element is configured to limit

the angular travel of the hinge system 1 by a predefined amplitude. According to the invention, the hinge system 1 comprises power assistance means 50 configured to assist a movement of opening and/or closing of the door 100 with respect to the fixed frame 200.

**[0067]** According to the invention, in one alternative embodiment of the power assistance means 50, illustrated by way of example in the accompanying Figures, they comprise at least a piston 53 connected to the connecting body 20 and configured to assist an opening and/or closing movement of the door 100 with respect to the fixed frame 200.

**[0068]** At least the piston 53 is movable along a transverse direction "P" with respect to said first axis "X" and/or the second axis "Y", preferably the direction of translation "P" and the first and second axes "X, Y" are oblique with respect to one another.

**[0069]** Preferably, the translation direction "P" of the piston 53 is arranged perpendicularly with respect to the first axis X and/or the second axis Y. Even more preferably, the translation direction "P" of the piston 53 is non-incident with the first axis X and/or the second axis Y.

**[0070]** In detail, the piston 53 is configured to be active between the connecting body 20 and a portion of the door 100 and/or of the fixed frame 200 and the piston 53 comprises elastic means 51 and a plunger element 53a, as illustrated by way of non-limiting example in the accompanying Figures 3-5. The plunger element 53a is operated by means of a force exerted by said elastic means 51 so as to assist the opening and/or closing movement of the door 100.

**[0071]** According to the present invention, the power assistance means 50 comprise two pistons 53 partially housed in respective cavities of the connecting body 20 and one head end of each piston 53 is configured to abut against a portion of the door 100 or a portion of the fixed frame 200 in an opening/closing configuration of the door 100. Preferably, the pistons 53 are arranged on opposite ends of the connecting body 20 symmetrically with respect to a median plane "M", as illustrated by way of non-limiting example in the accompanying Figures 3 and 4.

**[0072]** According to the invention, in an alternative embodiment of the power assistance means 50, not illustrated in the accompanying Figures, they comprise at least a first elastic element connected to the first pin 30 and/or to the second pin 40 and configured to assist an opening and/or closing movement of the door 100 with respect to the fixed frame 200.

**[0073]** Preferably, the first elastic element is connected to the first pin 30 and is active on the first axis "X" and interposed between at least a first coupling element 11a, 11b and the connecting body 20, and is configured to assist an opening rotation between the connecting body 20 and the first coupling element 11a, 11b from 0 up to about 90 degrees.

**[0074]** In other words, the first elastic element is configured to assist the opening of the door 100 from 0 up to about 90 degrees with respect to the fixed frame 200.

**[0075]** Preferably, the power assistance means 50 comprise at least a second elastic element active on the second axis "Y" and interposed between at least the second coupling element 12a, 12b and the connecting body 20.

**[0076]** The second elastic element is configured to assist a closing rotation from about 180 up to about 90 degrees between the connecting body 20 and the second coupling element 12a, 12b.

**[0077]** In more detail, preferably the first elastic element and the second elastic element each comprise a cylindrical coil spring fitted respectively on the first pin 30 coaxially with the first axis "X" and on the second pin 40 coaxially with the second axis "Y".

**[0078]** According to the invention, preferably the cylindrical coil spring of the first elastic element is fitted on the first pin 30 and has a first end connected to the first coupling element 11a, 11b and a second end connected to the connecting body 20.

**[0079]** Preferably, the cylindrical coil spring of the second elastic element is fitted on the second pin 40 and has a first end connected to the connecting body 20, and a second end connected to the second coupling element 12a, 12b. Preferably, the hinge system 1 comprises position adjustment means 60, illustrated in the accompanying Figures, configured to permit the adjustment of a relative position at least between the second coupling element 12a, 12b and the door 100, in a configuration in which the door 100 is attached at least to a second coupling element 12a, 12b of the hinge system 1. Advantageously, the adjustment means 60 of the hinge system 1 make it possible to find the correct position of the door 100 installed on the system 1 with respect to the fixed frame 200 in order to properly and uniformly adjust an opening between the mobile frame (of the door 100) and the fixed frame 200.

**[0080]** In particular, said adjustment means 60 are advantageously useful in the case of sealing means, such as gaskets or other elastic elements interposed between the door 100 and the fixed frame 200 and which must be able to adjust properly to cover any openings in order to guarantee the watertightness of the seal.

**[0081]** Preferably, the adjustment means 60 comprise a plurality of slotted through holes in a wall of the second coupling element 12a, 12b and suitable to permit the passage of threaded elements to be screwed into respective threaded holes provided in the door 100.

**[0082]** Preferably, the adjustment means 60 permit the positioning of the hinge system 1 at least with respect to the door 100, when installed on the second coupling element 12a, 12b, in at least two directions perpendicular to one another, one of which, for example, is parallel to the second axis "Y". According to the present invention, a door 100, shutter or similar element comprises a fixed frame 200 configured to be fixed to an opening 110 in a wall; a hinge system 1 as described above, configured to move the door 100 from a closed configuration to an open configuration and vice versa.

**[0083]** With reference to the accompanying Figures 6A-6C, in an operational opening configuration of the door 100 up to about 90 degrees (for example, starting from a configuration with the door 100 closed), the connecting body 20, at least a second coupling element 12a, 12b and the door 100 rotate rigidly with respect to the first axis "X" and the connecting body 20 is such as to rotate in a direction so as to move at least a portion thereof away from a first coupling element 11a, 11b.

**[0084]** In further detail, in an opening configuration of the door up to about 180 degrees (for example, starting from a position in which the door 100 is already open by 90 degrees), at least a second coupling element 12a, 12b and the door 100 rotate rigidly with respect to the second axis "Y" and at least a second coupling element 12a, 12b is such as to rotate, with respect to the second axis "Y", in a direction so as to move a portion thereof away from the connecting body 20.

**[0085]** According to the present invention, the door 100 defined above comprises fluid sealing means 120 arranged along a perimeter edge 100a of the door 100 and configured to determine a fluidtight seal preferably in a closed configuration of the door 100 on the frame 200.

**[0086]** The present invention achieves the related objectives.

**[0087]** Advantageously, the hinge system according to the present invention can be completely enclosed so that no components are visible in the configuration in which the door is closed on the frame.

**[0088]** Advantageously, the hinge system according to the present invention is composed of only a few components which are easy to produce, thus reducing the costs of production and sale.

**[0089]** Advantageously, the present invention provides an extremely robust yet compact hinge system.

**[0090]** Compared to the prior art hinge systems, the hinge system according to the present invention takes up very little space and so can even be fitted to/incorporated into the structure of small doors and/or where there is very little space between the door and the fixed frame. Moreover, the compact structure of the hinge system according to the present invention is extremely robust thanks to the arrangement of the coupling elements at the free ends of the connecting body of said hinge: the large distance between the coupling elements compared with the prior art hinges enables a better distribution of the forces and loads on the connecting body and on all the elements of said hinge, which is thus more resilient to any uncontrolled opening of the door, for example in the case of the door being pushed by a gust of wind.

**[0091]** Advantageously, the hinge system according to the present invention has a simplified structure which means production costs can be kept low despite achieving numerous advantages in terms of functionality and use, as listed below.

**[0092]** Advantageously, the hinge system according to the present invention has coupling elements with at least one point for fixing/assembly (by means of screws or oth-

er systems) and is therefore more robust and has a greater load capacity (in terms of weight of the movable door) than the prior art hinge systems.

**[0093]** Advantageously, the hinge system according to the present invention is more secure and resilient to possible break-ins and sabotage by ill-intentioned people attempting to force the door open, thanks to the very small opening between the door and the fixed frame.

**[0094]** Advantageously, the hinge system according to the present invention is configured to provide very good protection against bad weather conditions (rain, freezing conditions and draughts) and/or against high-pressure jets of water or water sprayed by automatic car-wash systems or high-pressure washers, thus also protecting the internal components of the system and other fittings of the door.

**[0095]** Moreover, the hinge system according to the present invention is configured to offer a high level of comfort in terms of airflow and other noises that could enter through the door. Thanks to the extremely limited opening between the movable door and the fixed frame, the annoying and undesirable aerodynamic and/or airflow noises, for example when the vehicle is travelling at high speed, can be considerably reduced and in some cases eliminated.

**[0096]** Advantageously, the hinge system according to the present invention incorporates effective power assistance means so that the user is required to apply less force when performing the manual operation to close and/or open a door of a luggage compartment or of an opening.

## Claims

1. Hinge system (1) configured to move a door (100), shutter or similar element from a closed configuration to an open configuration, and vice versa, comprising:

a plurality of coupling elements (10) comprising at least

- a first coupling element (11a) operatively attachable to a fixed frame (200) of said door (100);
- and at least one second coupling element (12a) operatively attachable to a portion of said door (100);

a connecting body (20) placed side by side to and operatively connected to both said first coupling element (11a) and said second coupling element (12a),

wherein said hinge system (1) comprises at least a first pin (30) extending along a first axis (X) of said connecting body (20) and configured to provide a pivotal connection about said first axis (X) between said first coupling element (11a) and

- said connecting body (20) and a second pin (40) extending along a second axis (Y) configured to provide a pivotal connection about said second axis (Y) between said second coupling element (12a) and said connecting body (20), said first axis (X) and said second axis (Y) being staggered so as to be arranged at respective different distances (D1, D2) from a closing plane (F) defined by said door (100) and said fixed frame (200) in a closed configuration of said door (100), wherein said closed configuration of the door (100) is a flush configuration with the closing plane (F) of the door aligned with the fixed frame (200), said hinge system (1) being **characterized in that** it comprises a protrusion (11c) positioned on said at least first coupling element (11a) proximal to said first pin (30) and next to an area facing the outside and/or facing and in line with said closing plane (F), and configured to cover at least partially a passage opening between said door (100) and said fixed frame (200) in a closed configuration of said door (100).
2. System (1) according to claim 1, wherein at least said connecting body (20) is configured in such a way that said hinge system (1) can be entirely enclosed between said fixed frame (200) and said portion of the door (100) and tucked between said fixed frame (200) and said portion of the door (100) in a closed configuration of said door (100).
  3. System (1) according to claim 1 or 2, wherein said connecting body (20) is configured in such a way that said central region (21) is arranged between a housing portion (22) of said first pin (30) and a further housing portion (23) of said second pin (40), preferably said central region (21) being a portion of junction between said housing portion (22) and said further housing portion (23).
  4. System (1) according to one or more of the preceding claims 1-3, wherein said hinge system (1) enables the movement of said door (100) with respect to said fixed frame (200) by a rotation about said first axis (X) with an amplitude of rotation preferably comprised between 0 and about 90 degrees and vice versa.
  5. System (1) according to claim 4, wherein said hinge system (1) enables the movement of said door (100) with respect to said fixed frame (200) by a rotation about said first axis (X) and/or said second axis (Y) with an amplitude of rotation preferably comprised between 0 and about 180 degrees and vice versa.
  6. System (1) according to claim 1, wherein said at least first coupling element (11a) comprises a further protrusion (12c) configured to be arranged towards said second coupling member (12a) in a closed configuration of said door (100), said protrusion (11c) being proximal to said first pin (30) while said further protrusion (12c) being distal to said first pin (30), preferably said protrusion (11c) and said further protrusion (12c) being arranged on a same side of said first coupling element (11a) facing an internal volume (V) of said hinge system (1) for covering at least partially a passage opening between said door (100) and said fixed frame (200) in a closed configuration of the door (100).
  7. System (1) according to claim 1, wherein said at least second coupling element (12a) comprises a further protrusion (12c) configured to face towards said first coupling element (11a) in a closed configuration of said door (100), preferably said further protrusion (12c) being arranged at one end of said first coupling element (12a) and distal with respect to said closing plane (F).
  8. System (1) according to claim 7, wherein said protrusion (11c) and said further protrusion (12c) are respectively arranged on said first coupling element (11a) and said second coupling element (12a) so as to converge towards an internal volume (V) of said hinge system (1) to cover, at least partially, a passage opening between said door (100) and said fixed frame (200) in a closed configuration of said door (100), said protrusion (11c) being arranged in an opposite position with respect to said further protrusion (12c).
  9. System (1) according to one or more of the preceding claims, wherein said plurality of coupling elements (10) comprise a further first coupling element (11b) and a further second coupling element (12b) respectively positioned on the first pin (30) and on the second pin (40) and arranged in a symmetrical position with respect to said first coupling element (11a) and said second coupling element (12a) with respect to a median plane (M) of said connecting body (20) perpendicular to at least said first axis (X) and/or said second axis (Y); said further first and second coupling elements (11b, 12b) being rotatable respectively about said first axis (X) and said second axis (Y) with respect to said connecting body (20).
  10. System (1) according to one or more of claims 3-9, wherein said connecting body (20) comprises a portion of said protrusion (11c) arranged in the vicinity of said housing portion (22) of the first pin (30), preferably said portion of the protrusion (11c) being such as to create a continuity of profile with a respective portion of said protrusion (11c) present at least on said first coupling element (11a).

11. System (1) according to one or more of the preceding claims, comprising reversible locking means configured to make it possible to fix a relative position between at least one coupling element (11a, 11b, 12a, 12b) of said plurality of coupling elements (10) and said connecting body (20) and/or to fix a relative position between at least another coupling element (11a, 11b, 12a, 12b) of said plurality of coupling elements (10) and said connecting body (20), preferably said reversible locking means being configured to lock said door (100) in an intermediate angular position comprised between about 0 degrees and about 90 degrees and/or between about 90 degrees and about 180 degrees.
12. System (1) according to one or more of the preceding claims, comprising power assistance means (50) comprising at least one first elastic element (51) connected to said first pin (30) and/or said second pin (40) and configured to assist a movement of opening and/or closing of the door (100) with respect to said fixed frame (200).
13. System (1) according to claim 12, comprising said first elastic element (51) active on said first axis (X) and interposed between at least one first coupling element (11a, 11b) and said connecting body (20) and configured to assist an opening rotation between said connecting body (20) and said first coupling element (11a, 11b) from 0 to about 90 degrees, at least one second elastic element (52) active on the second axis (Y) and interposed between at least the second coupling element (12a, 12b) and said connecting body (20) and configured to assist a closing rotation between said connecting body (20) and said second coupling element (12a, 12b) from about 180 up to about 90 degrees.
14. System (1) according to one or more of the preceding claims, comprising power assistance means (50) comprising at least one piston (53) connected to said connecting body (20) and configured to assist an opening and/or closing movement of the door (100) with respect to said fixed frame (200), said at least one piston (53) being movable along a direction transverse to said first axis (X) and/or said second axis (Y).
15. System according to claim 14, in which said piston (53) has a translation direction (P) arranged perpendicularly with respect to said first axis (X) and/or said second axis (Y), preferably said translation direction (P) of the piston (53) being non-incident with said first axis (X) and/or said second axis (Y).
16. System according to claim 14 or 15, wherein said at least one piston (53) is configured to be active between the connecting body (20) and a portion of said door (100) and/or said fixed frame (200) and in which said piston (53) comprises elastic means (51) and a plunger element (53a), said plunger element (53a) being operable by means of a force exerted by said elastic means (51) so as to assist said opening and/or closing movement of the door (100).
17. System according to claim 16, wherein said power assistance means (50) comprise two pistons (53) partially housed in respective cavities of said connecting body (20) and in which one head end of each piston (53) is configured to abut against a portion of said door (100) or against a portion of the fixed frame (200) in an opening/closing configuration of the door (100), preferably said pistons (53) being arranged on opposite ends of said connecting body (20) symmetrically with respect to a median plane (M).
18. Door (100), shutter or similar element comprising:
- a fixed frame (200) configured to be fixed on an opening (110) of a wall;
  - a hinge system (1) configured to move said door (100) from a closed configuration to an open configuration and vice versa in accordance with one or more of the preceding claims 1-17;
- wherein, in an operational opening configuration of the door (100) up to about 90 degrees of said connecting body (20), said at least one second coupling element (12a, 12b) and said door (100) rotate rigidly with respect to said first axis (X) and wherein said connecting body (20) is such as to rotate in a direction so that a portion thereof moves away from said at least first coupling element (11a, 11b).
19. Door (100) according to claim 18, wherein in an operational opening configuration of the door (100) to about 180 degrees, said connecting body (20), said at least one second coupling element (12a, 12b) and said door (100) rotate rigidly with respect to said second axis (Y) and said at least one second coupling element (12a, 12b) is such as to rotate in a direction so as to move a portion thereof away from said connecting body (20) with respect to the second axis (Y).

#### Patentansprüche

1. Scharniersystem (1), das dazu ausgelegt ist, um eine Tür (100), einen Rollladen oder ein ähnliches Element von einer geschlossenen Auslegung in eine offene Auslegung und umgekehrt zu bewegen, umfassend:
- eine Vielzahl von Kopplungselementen (10), umfassend mindestens:

- ein erstes Kopplungselement (11a), das betriebswirksam an einem fixen Rahmen (200) der Tür (100) anbringbar ist;
- und mindestens ein zweites Kopplungselement (12a), das betriebswirksam an einem Abschnitt der Tür (100) anbringbar ist;

einen Verbindungskörper (20), der Seite an Seite an sowohl dem ersten Kopplungselement (11a) als auch dem zweiten Kopplungselement (12a) angeordnet und betriebswirksam damit verbunden ist,

wobei das Scharniersystem (1) mindestens einen ersten Stift (30), der sich entlang einer ersten Achse (X) des Verbindungskörpers (20) erstreckt und ausgelegt ist, um eine Schwenkverbindung um die erste Achse (X) zwischen dem ersten Kopplungselement (11a) und dem Verbindungskörper (20) bereitzustellen, und einen zweiten Stift (40), der sich entlang einer zweiten Achse (Y) erstreckt, der ausgelegt ist, um eine Schwenkverbindung um die zweite Achse (Y) zwischen dem zweiten Kopplungselement (12a) und dem Verbindungskörper (20) bereitzustellen, umfasst, wobei die erste Achse (X) und die zweite Achse (Y) versetzt sind, sodass sie in einer geschlossenen Auslegung der Tür (100) in jeweils unterschiedlichen Abständen (D1, D2) von einer durch die Tür (100) und den fixen Rahmen (200) definierten Schließebene (F) angeordnet sind, wobei die geschlossene Auslegung der Tür (100) eine bündige Auslegung mit der Schließebene (F) der Tür ist, die mit dem fixen Rahmen (200) ausgerichtet ist, wobei das Scharniersystem (1) **dadurch gekennzeichnet ist, dass** es einen Vorsprung (11c) umfasst, der am zumindest ersten Kopplungselement (11a) proximal zum ersten Stift (30) und neben einem Bereich positioniert ist, der der Außenseite zugewandt ist und/oder der der Schließebene (F) zugewandt ist und mit dieser fluchtet, und ausgelegt ist, um zumindest teilweise eine Durchgangsöffnung zwischen der Tür (100) und dem fixen Rahmen (200) in einer geschlossenen Auslegung der Tür (100) abzudecken.

2. System (1) nach Anspruch 1, wobei zumindest der Verbindungskörper (20) so ausgelegt ist, dass das Scharniersystem (1) vollständig zwischen dem fixen Rahmen (200) und dem Abschnitt der Tür (100) eingeschlossen werden kann und zwischen dem fixen Rahmen (200) und dem Abschnitt der Tür (100) in einer geschlossenen Auslegung der Tür (100) eingeschoben werden kann.
3. System (1) nach Anspruch 1 oder 2, wobei der Verbindungskörper (20) so ausgelegt ist, dass der zentrale Bereich (21) zwischen einem Gehäuseab-

schnitt (22) des ersten Stifts (30) und einem weiteren Gehäuseabschnitt (23) des zweiten Stifts (40) angeordnet ist, wobei vorzugsweise es sich beim zentralen Bereich (21) um einen Zusammenfügungsabschnitt zwischen dem Gehäuseabschnitt (22) und dem weiteren Gehäuseabschnitt (23) ist.

4. System (1) nach einem oder mehreren der vorhergehenden Ansprüche 1-3, wobei das Scharniersystem (1) die Bewegung der Tür (100) in Bezug auf den fixen Rahmen (200) durch eine Drehung um die erste Achse (X) mit einer Drehamplitude ermöglicht, die vorzugsweise zwischen 0 und etwa 90 Grad und umgekehrt liegt.
5. System (1) nach Anspruch 4, wobei das Scharniersystem (1) die Bewegung der Tür (100) in Bezug auf den fixen Rahmen (200) durch eine Drehung um die erste Achse (X) und/oder die zweite Achse (Y) mit einer Drehamplitude ermöglicht, die vorzugsweise zwischen 0 und etwa 180 Grad und umgekehrt liegt.
6. System (1) nach Anspruch 1, wobei das mindestens erste Kopplungselement (11a) einen weiteren Vorsprung (12c) umfasst, der so ausgelegt ist, dass er in Richtung des zweiten Kopplungselements (12a) in einer geschlossenen Auslegung der Tür (100) angeordnet ist, wobei der Vorsprung (11c) proximal zum ersten Stift (30) liegt, während der weitere Vorsprung (12c) distal zum ersten Stift (30) liegt, wobei vorzugsweise der Vorsprung (11c) und der weitere Vorsprung (12c) auf derselben Seite des ersten Kopplungselements (11a) angeordnet sind, das einem Innenvolumen (V) des Scharniersystems (1) zugewandt ist, um mindestens teilweise eine Durchgangsöffnung zwischen der Tür (100) und dem fixen Rahmen (200) in einer geschlossenen Auslegung der Tür (100) abzudecken.
7. System (1) nach Anspruch 1, wobei das mindestens zweite Kopplungselement (12a) einen weiteren Vorsprung (12c) umfasst, der so ausgelegt ist, dass er in einer geschlossenen Auslegung der Tür (100) dem ersten Kopplungselement (11a) zugewandt ist, wobei der weitere Vorsprung (12c) vorzugsweise an einem Ende des ersten Kopplungselements (12a) und distal in Bezug auf die Schließebene (F) angeordnet ist.
8. System (1) nach Anspruch 7, wobei der Vorsprung (11c) und der weitere Vorsprung (12c) jeweils an dem ersten Kopplungselement (11a) und dem zweiten Kopplungselement (12a) angeordnet sind, so dass sie zu einem Innenvolumen (V) des Scharniersystems (1) konvergieren, um zumindest teilweise eine Durchgangsöffnung zwischen der Tür (100) und dem fixen Rahmen (200) in einer geschlossenen Auslegung der Tür (100) abzudecken, wobei der

Vorsprung (11c) in einer gegenständigen Position in Bezug auf den weiteren Vorsprung (12c) angeordnet ist.

9. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, wobei die Vielzahl von Kopplungselementen (10) ein weiteres erstes Kopplungselement (11b) und ein weiteres zweites Kopplungselement (12b) umfasst, die jeweils auf dem ersten Stift (30) und auf dem zweiten Stift (40) positioniert sind und in einer symmetrischen Position in Bezug auf das erste Kopplungselement (11a) und das zweite Kopplungselement (12a) in Bezug auf eine Mittelebene (M) des Verbindungskörpers (20) senkrecht zu zumindest der ersten Achse (X) und/oder der zweiten Achse (Y) angeordnet sind; wobei das weitere erste und zweite Kopplungselement (11b, 12b) jeweils um die erste Achse (X) und die zweite Achse (Y) in Bezug auf den Verbindungskörper (20) drehbar sind. 5 10 15 20
10. System (1) nach einem oder mehreren der Ansprüche 3-9, wobei der Verbindungskörper (20) einen Abschnitt des Vorsprungs (11c) umfasst, der in der Nähe des Gehäuseabschnitts (22) des ersten Stifts (30) angeordnet ist, wobei vorzugsweise der Abschnitt des Vorsprungs (11c) so beschaffen ist, dass eine Kontinuität des Profils mit einem jeweiligen Abschnitt des Vorsprungs (11c) erzeugt wird, der zumindest am ersten Kopplungselement (11a) vorhanden ist. 25 30
11. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, umfassend reversible Verriegelungsmittel, die ausgelegt sind, um es zu ermöglichen, eine relative Position zwischen mindestens einem Kopplungselement (11a, 11b, 12a, 12b) aus der Vielzahl von Kopplungselementen (10) und dem Verbindungskörper (20) zu fixieren und/oder eine relative Position zwischen mindestens einem anderen Kopplungselement (11a, 11b, 12a, 12b) aus der Vielzahl von Kopplungselementen (10) und dem Verbindungskörper (20) zu fixieren, wobei vorzugsweise die reversiblen Verriegelungsmittel ausgelegt sind, um die Tür (100) in einer Zwischenwinkelposition zu verriegeln, die zwischen etwa 0 Grad und etwa 90 Grad und/oder zwischen etwa 90 Grad und etwa 180 Grad liegt. 35 40 45 50
12. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, umfassend Kraftunterstützungsmittel (50), die mindestens ein erstes elastisches Element (51) umfassen, das mit dem ersten Stift (30) und/oder dem zweiten Stift (40) verbunden ist und die ausgelegt sind, um eine Bewegung des Öffnens und/oder Schließens der Tür (100) in Bezug auf den fixen Rahmen (200) zu unterstützen. 55

13. System (1) nach Anspruch 12, umfassend das erste elastische Element (51), das auf die erste Achse (X) aktiv ist und zwischen mindestens einem ersten Kopplungselement (11a, 11b) und dem Verbindungskörper (20) angeordnet ist und ausgelegt ist, um eine Öffnungsdrehung zwischen dem Verbindungskörper (20) und dem ersten Kopplungselement (11a, 11b) von 0 bis etwa 90 Grad zu unterstützen, mindestens ein zweites elastisches Element (52), das auf die zweite Achse (Y) aktiv ist und zwischen mindestens dem zweiten Kopplungselement (12a, 12b) und dem Verbindungskörper (20) angeordnet ist und ausgelegt ist, um eine Schließdrehung zwischen dem Verbindungskörper (20) und dem zweiten Kopplungselement (12a, 12b) von etwa 180 bis etwa 90 Grad zu unterstützen.
14. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, umfassend Kraftunterstützungsmittel (50), die wenigstens einen Kolben (53) umfassen, der mit dem Verbindungskörper (20) verbunden und ausgelegt ist, um eine Öffnungs- und/oder Schließbewegung der Tür (100) in Bezug auf den fixen Rahmen (200) zu unterstützen, wobei der wenigstens eine Kolben (53) entlang einer Richtung quer zu der ersten Achse (X) und/oder der zweiten Achse (Y) bewegbar ist.
15. System nach Anspruch 14, wobei der Kolben (53) eine Translationsrichtung (P) aufweist, die senkrecht zu der ersten Achse (X) und/oder der zweiten Achse (Y) verläuft, wobei vorzugsweise die Translationsrichtung (P) des Kolbens (53) nicht mit der ersten Achse (X) und/oder der zweiten Achse (Y) zusammenfällt.
16. System nach Anspruch 14 oder 15, wobei der mindestens eine Kolben (53) so ausgelegt ist, dass er zwischen dem Verbindungskörper (20) und einem Abschnitt der Tür (100) und/oder dem fixen Rahmen (200) aktiv ist, und wobei der Kolben (53) elastische Mittel (51) und ein Stößelement (53a) umfasst, wobei das Stößelement (53a) mittels einer Kraft betätigbar ist, die durch die elastischen Mittel (51) ausgeübt wird, um die Öffnungs- und/oder Schließbewegung der Tür (100) zu unterstützen.
17. System nach Anspruch 16, wobei die Kraftunterstützungsmittel (50) zwei Kolben (53) umfassen, die teilweise in jeweiligen Hohlräumen des Verbindungskörpers (20) untergebracht sind, und in denen ein Kopfende eines jeden Kolbens (53) so ausgelegt ist, dass es an einem Abschnitt der Tür (100) oder an einem Abschnitt des fixen Rahmens (200) in einer Öffnungs-/Schließauslegung der Tür (100) anliegt, wobei vorzugsweise die Kolben (53) an gegenüberliegenden Enden des Verbindungskörpers (20) symmetrisch in Bezug auf eine Mittelebene (M) ange-

ordnet sind.

18. Tür (100), Rollladen oder ähnliches Element, umfassend:

- einen fixen Rahmen (200), der dazu ausgelegt ist, an einer Öffnung (110) einer Wand fixiert zu werden;  
- ein Scharniersystem (1), das dazu ausgelegt ist, die Tür (100) nach einem oder mehreren der vorhergehenden Ansprüche 1-17 von einer geschlossenen Auslegung in eine offene Auslegung und umgekehrt zu bewegen;

wobei in einer Betriebsöffnungsauslegung der Tür (100) bis zu etwa 90 Grad des Verbindungskörpers (20) sich das mindestens eine zweite Kopplungselement (12a, 12b) und die Tür (100) starr in Bezug auf die erste Achse (X) drehen und wobei der Verbindungskörper (20) so beschaffen ist, dass er sich in einer Richtung dreht, so dass sich ein Abschnitt davon vom mindestens ersten Kopplungselement (11a, 11b) wegführend bewegt.

19. Tür (100) nach Anspruch 18, wobei, in einer Betriebsöffnungsauslegung der Tür (100) auf etwa 180 Grad, der Verbindungskörper (20), das mindestens eine zweite Kopplungselement (12a, 12b) und die Tür (100) sich starr in Bezug auf die zweite Achse (Y) drehen und das mindestens eine zweite Kopplungselement (12a, 12b) so beschaffen ist, dass es sich in einer Richtung dreht, um einen Abschnitt davon vom Verbindungskörper (20) in Bezug auf die zweite Achse (Y) wegführend zu bewegen.

## Revendications

1. Système de charnière (1) configuré pour déplacer une porte (100), un volet ou un élément similaire d'une configuration de fermeture à une configuration d'ouverture, et vice versa, comprenant :

une pluralité d'éléments d'accouplement (10) comprenant au moins :

- un premier élément d'accouplement (11a) pouvant être attaché de manière fonctionnelle à un cadre fixe (200) de ladite porte (100) ;  
- et au moins un deuxième élément d'accouplement (12a) pouvant être fixé de manière fonctionnelle à une partie de ladite porte (100) ;

un corps de raccordement (20) placé côte à côte et raccordé de manière fonctionnelle à la fois audit premier élément d'accouplement (11a) et

audit deuxième élément d'accouplement (12a), dans lequel ledit système de charnière (1) comprend au moins une première broche (30) se prolongeant le long d'un premier axe (X) dudit corps de raccordement (20) et configurée pour fournir un raccordement pivotant autour dudit premier axe (X) entre ledit premier élément d'accouplement (11a) et ledit corps de raccordement (20) et une deuxième broche (40) se prolongeant le long d'un deuxième axe (Y) configurée pour fournir un raccordement pivotant autour dudit deuxième axe (Y) entre ledit deuxième élément d'accouplement (12a) et ledit corps de raccordement (20), ledit premier axe (X) et ledit deuxième axe (Y) étant décalés de manière à être disposés à des distances respectives (D1, D2) différentes à partir d'un plan de fermeture (F) défini par ladite porte (100) et ledit cadre fixe (200) dans une configuration de fermeture de ladite porte (100), dans lequel ladite configuration de fermeture de la porte (100) est une configuration affleurant avec le plan de fermeture (F) de la porte aligné avec le cadre fixe (200), ledit système de charnière (1) étant **caractérisé en ce qu'il** comprend une saillie (11c) positionnée sur ledit au moins premier élément d'accouplement (11a) à proximité de ladite première broche (30) et à côté d'une zone faisant face à l'extérieur et/ou faisant face et en ligne avec ledit plan de fermeture (F), et configurée pour couvrir au moins partiellement une ouverture de passage entre ladite porte (100) et ledit cadre fixe (200) dans une configuration de fermeture de ladite porte (100).

2. Système (1) selon la revendication 1, dans lequel au moins ledit corps de raccordement (20) est configuré de manière à ce que ledit système de charnière (1) puisse être entièrement renfermé entre ledit cadre fixe (200) et ladite partie de la porte (100) et replié entre ledit cadre fixe (200) et ladite partie de la porte (100) dans une configuration de fermeture de ladite porte (100).

3. Système (1) selon la revendication 1 ou 2, dans lequel ledit corps de raccordement (20) est configuré de telle sorte que ladite zone centrale (21) est disposée entre une partie de logement (22) de ladite première broche (30) et une partie de logement (23) supplémentaire de ladite deuxième broche (40), de préférence ladite zone centrale (21) étant une partie de jonction entre ladite partie de logement (22) et ladite partie de logement (23) supplémentaire.

4. Système (1) selon une ou plusieurs des revendications précédentes 1-3, dans lequel ledit système de charnière (1) permet le mouvement de ladite porte (100) par rapport audit cadre fixe (200) par une ro-

tation autour dudit premier axe (X) avec une amplitude de rotation comprise de préférence entre 0 et environ 90 degrés et vice versa.

5. Système (1) selon la revendication 4, dans lequel ledit système de charnière (1) permet le mouvement de ladite porte (100) par rapport audit cadre fixe (200) par une rotation autour dudit premier axe (X) et/ou dudit deuxième axe (Y) avec une amplitude de rotation comprise de préférence entre 0 et environ 180 degrés et vice versa. 5
6. Système (1) selon la revendication 1, dans lequel ledit au moins premier élément d'accouplement (11a) comprend une saillie supplémentaire (12c) configurée pour être disposée vers ledit deuxième élément d'accouplement (12a) dans une configuration de fermeture de ladite porte (100), ladite saillie (11c) étant proximale par rapport à ladite première broche (30) tandis que ladite saillie supplémentaire (12c) est distale par rapport à ladite première broche (30), de préférence, ladite saillie (11c) et ladite saillie supplémentaire (12c) étant disposées sur un même côté dudit premier élément d'accouplement (11a) faisant face à un volume interne (V) dudit système de charnière (1) pour recouvrir au moins partiellement une ouverture de passage entre ladite porte (100) et ledit cadre fixe (200) dans une configuration de fermeture de la porte (100). 10
7. Système (1) selon la revendication 1, dans lequel ledit au moins deuxième élément d'accouplement (12a) comprend une saillie supplémentaire (12c) configurée pour faire face audit premier élément d'accouplement (11a) dans une configuration de fermeture de ladite porte (100), de préférence ladite saillie supplémentaire (12c) étant disposée à une extrémité dudit premier élément d'accouplement (12a) et distale par rapport audit plan de fermeture (F). 20
8. Système (1) selon la revendication 7, dans lequel ladite saillie (11c) et ladite saillie supplémentaire (12c) sont respectivement disposées sur ledit premier élément d'accouplement (11a) et ledit deuxième élément d'accouplement (12a) de manière à converger vers un volume interne (V) dudit système de charnière (1) pour recouvrir, au moins partiellement, une ouverture de passage entre ladite porte (100) et ledit cadre fixe (200) dans une configuration de fermeture de ladite porte (100), ladite saillie (11c) étant disposée dans une position opposée par rapport à ladite saillie supplémentaire (12c). 25
9. Système (1) selon une ou plusieurs des revendications précédentes, dans lequel ladite pluralité d'éléments d'accouplement (10) comprend un premier élément d'accouplement (11b) supplémentaire et un 30

deuxième élément d'accouplement (12b) supplémentaire respectivement positionnés sur la première broche (30) et sur la deuxième broche (40) et disposés dans une position symétrique par rapport audit premier élément d'accouplement (11a) et audit deuxième élément d'accouplement (12a) par rapport à un plan médian (M) dudit corps de raccordement (20) perpendiculaire au moins audit premier axe (X) et/ou audit deuxième axe (Y); lesdits premier et deuxième éléments d'accouplement (11b, 12b) supplémentaires pouvant tourner respectivement autour dudit premier axe (X) et dudit deuxième axe (Y) par rapport audit corps de raccordement (20). 35

10. Système (1) selon une ou plusieurs des revendications 3-9, dans lequel ledit corps de raccordement (20) comprend une partie de ladite saillie (11c) disposée à proximité de ladite partie de logement (22) de la première broche (30), de préférence ladite partie de la saillie (11c) étant telle qu'elle crée une continuité de profil avec une partie respective de ladite saillie (11c) présente au moins sur ledit premier élément d'accouplement (11a). 40
11. Système (1) selon une ou plusieurs des revendications précédentes, comprenant des moyens de verrouillage réversibles configurés pour permettre de fixer une position relative entre au moins un élément d'accouplement (11a, 11b, 12a, 12b) de ladite pluralité d'éléments d'accouplement (10) et ledit corps de raccordement (20) et/ou de fixer une position relative entre au moins un élément d'accouplement (11a, 11b, 12a, 12b) supplémentaire de ladite pluralité d'éléments d'accouplement (10) et ledit corps de raccordement (20), de préférence lesdits moyens de verrouillage réversibles étant configurés pour verrouiller ladite porte (100) dans une position angulaire intermédiaire comprise entre environ 0 degré et environ 90 degrés et/ou entre environ 90 degrés et environ 180 degrés. 45
12. Système (1) selon une ou plusieurs des revendications précédentes, comprenant des moyens d'asservissement (50) comprenant au moins un premier élément élastique (51) relié à ladite première broche (30) et/ou à ladite deuxième broche (40) et configurés pour assister un mouvement d'ouverture et/ou de fermeture de la porte (100) par rapport audit cadre fixe (200). 50
13. Système (1) selon la revendication 12, comprenant ledit premier élément élastique (51) actif sur ledit premier axe (X) et interposé entre au moins un premier élément d'accouplement (11a, 11b) et ledit corps de raccordement (20) et configuré pour assister une rotation d'ouverture entre ledit corps de raccordement (20) et ledit premier élément d'accouplement (11a, 11b) de 0 à environ 90 degrés, au moins un deuxième 55

me élément élastique (52) actif sur le deuxième axe (Y) et interposé entre au moins le deuxième élément d'accouplement (12a, 12b) et ledit corps de raccordement (20) et configuré pour assister une rotation de fermeture entre ledit corps de raccordement (20) et ledit deuxième élément d'accouplement (12a, 12b) d'environ 180 à environ 90 degrés.

14. Système (1) selon une ou plusieurs des revendications précédentes, comprenant des moyens d'asservissement (50) comprenant au moins un piston (53) relié audit corps de raccordement (20) et configuré pour assister un mouvement d'ouverture et/ou de fermeture de la porte (100) par rapport audit cadre fixe (200), ledit au moins un piston (53) étant mobile le long d'une direction transversale audit premier axe (X) et/ou audit deuxième axe (Y).
15. Système selon la revendication 14, dans lequel ledit piston (53) comporte une direction de translation (P) disposée perpendiculairement par rapport audit premier axe (X) et/ou audit deuxième axe (Y), de préférence ladite direction de translation (P) du piston (53) étant non incidente avec ledit premier axe (X) et/ou ledit deuxième axe (Y).
16. Système selon la revendication 14 ou 15, dans lequel ledit au moins un piston (53) est configuré pour être actif entre le corps de raccordement (20) et une partie de ladite porte (100) et/ou dudit cadre fixe (200) et dans lequel ledit piston (53) comprend des moyens élastiques (51) et un élément poussoir (53a), ledit élément poussoir (53a) pouvant être actionné au moyen d'une force exercée par lesdits moyens élastiques (51) de manière à assister ledit mouvement d'ouverture et/ou de fermeture de la porte (100).
17. Système selon la revendication 16, dans lequel lesdits moyens d'asservissement (50) comprennent deux pistons (53) partiellement logés dans des cavités respectives dudit corps de raccordement (20) et dans lequel une extrémité de tête de chaque piston (53) est configurée pour venir se mettre en butée contre une partie de ladite porte (100) ou contre une partie du cadre fixe (200) dans une configuration d'ouverture/fermeture de la porte (100), de préférence lesdits pistons (53) étant disposés sur des extrémités opposées dudit corps de raccordement (20) de manière symétrique par rapport à un plan médian (M).
18. Porte (100), volet ou élément similaire, comprenant :
  - un cadre fixe (200) configuré pour être fixé sur une ouverture (110) d'un mur ;
  - un système de charnière (1) configuré pour faire passer ladite porte (100) d'une configura-

tion de fermeture à une configuration d'ouverture et vice versa, selon une ou plusieurs des revendications précédentes 1-17 ;

dans laquelle/lequel, dans une configuration d'ouverture fonctionnelle de la porte (100) jusqu'à environ 90 degrés dudit corps de raccordement (20), ledit au moins un deuxième élément d'accouplement (12a, 12b) et ladite porte (100) pivote de manière rigide par rapport audit premier axe (X) et dans laquelle/lequel ledit corps de raccordement (20) est tel qu'il pivote dans une direction telle qu'une partie de celui-ci s'éloigne dudit au moins un premier élément d'accouplement (11a, 11b).

19. Porte (100) selon la revendication 18, dans laquelle dans une configuration d'ouverture fonctionnelle de la porte (100) à environ 180 degrés, ledit corps de raccordement (20), ledit au moins un deuxième élément d'accouplement (12a, 12b) et ladite porte (100) pivotent de manière rigide par rapport audit deuxième axe (Y) et ledit au moins un deuxième élément d'accouplement (12a, 12b) est tel qu'il pivote dans une direction de manière à éloigner une partie de celui-ci dudit corps de raccordement (20) par rapport au deuxième axe (Y).

Fig. 1A

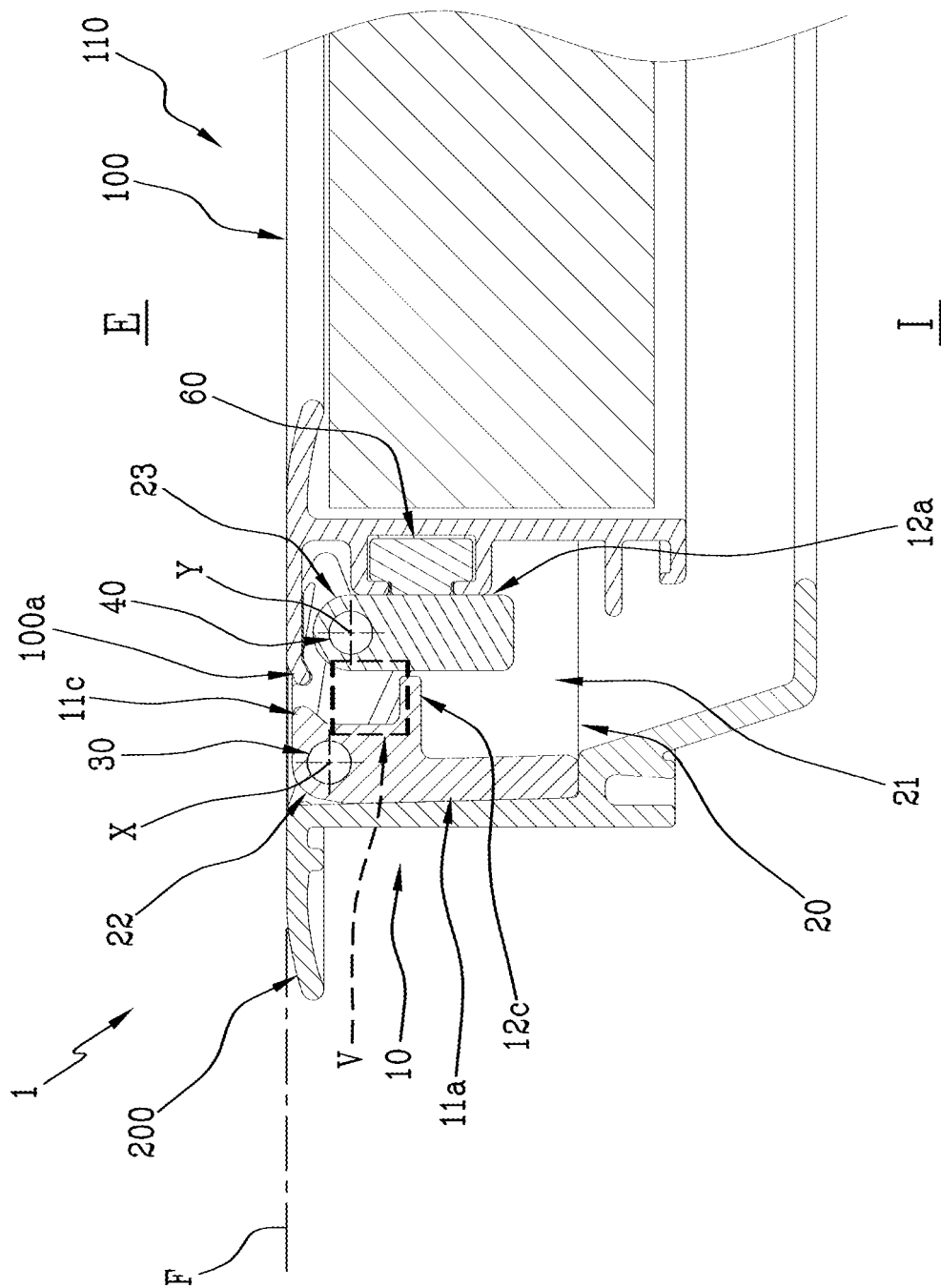


Exhibit 1B

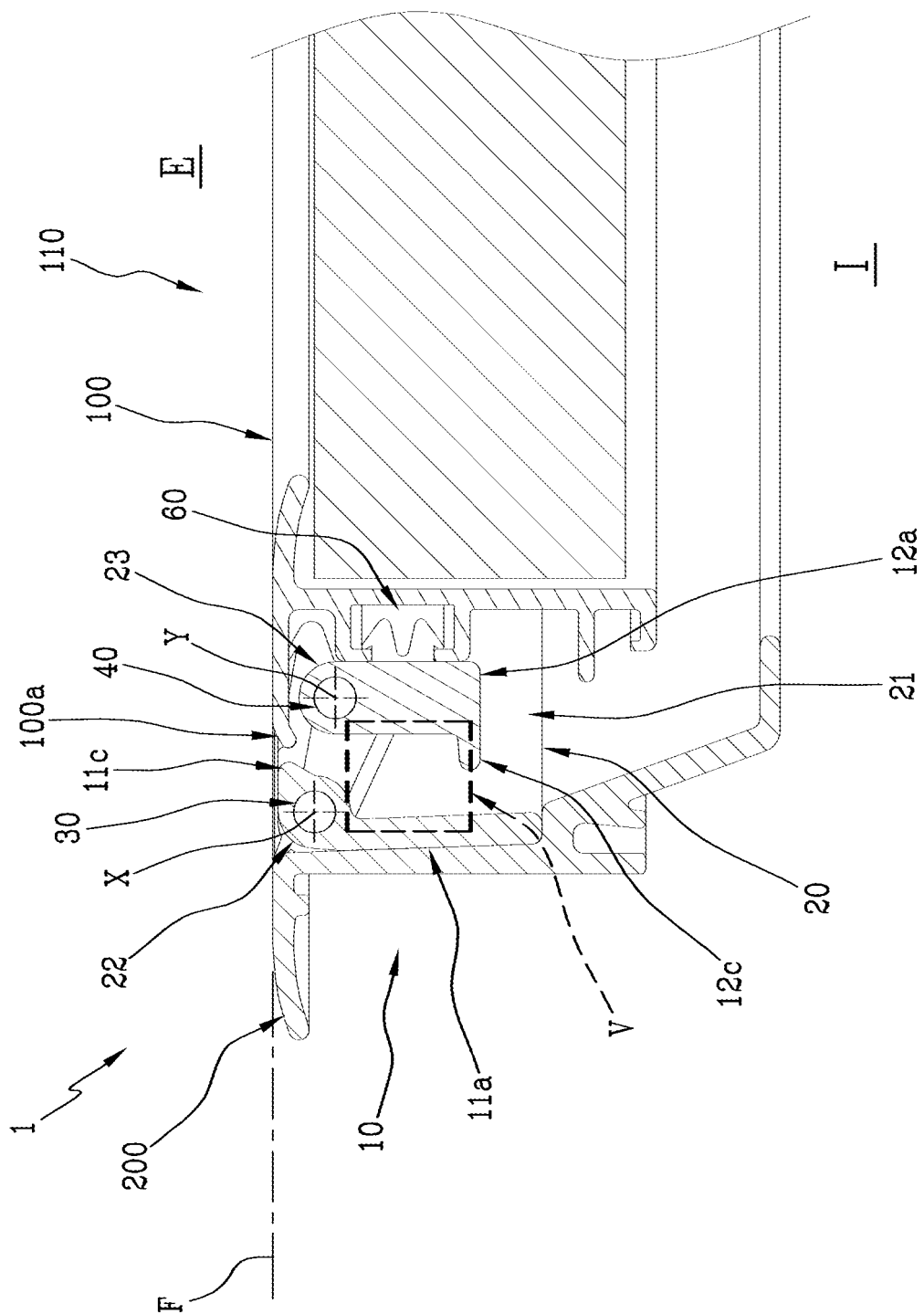
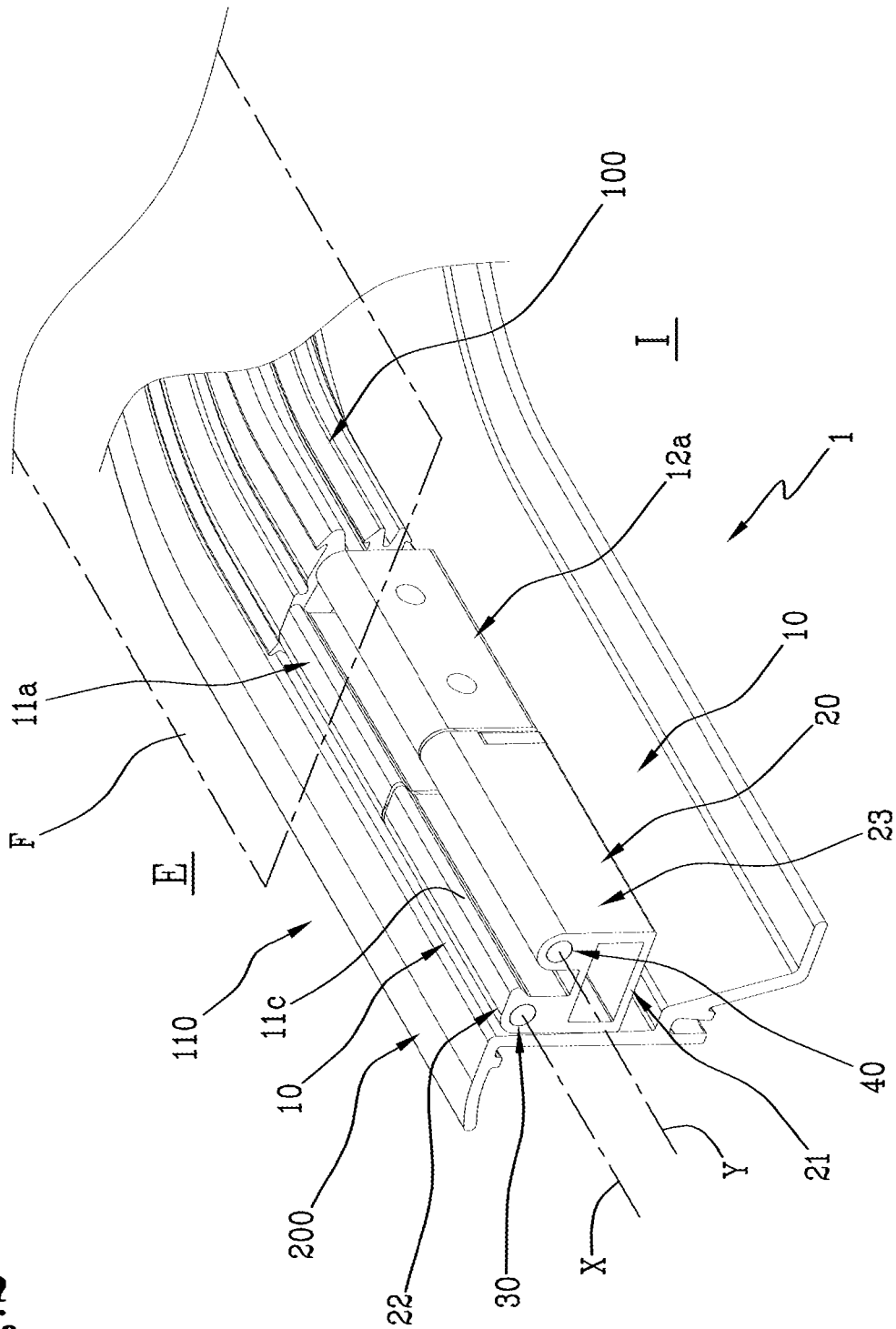
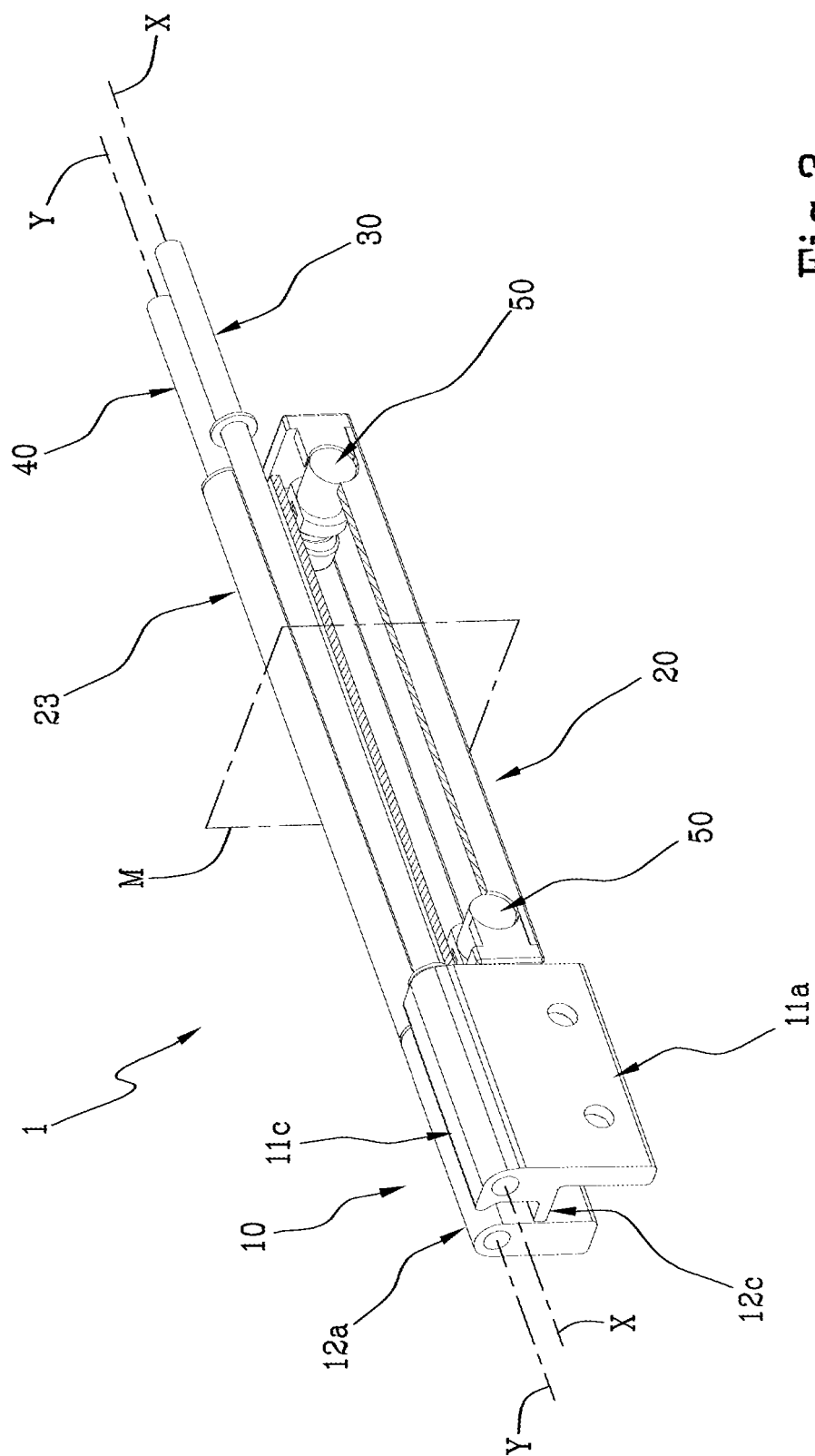


Fig.2





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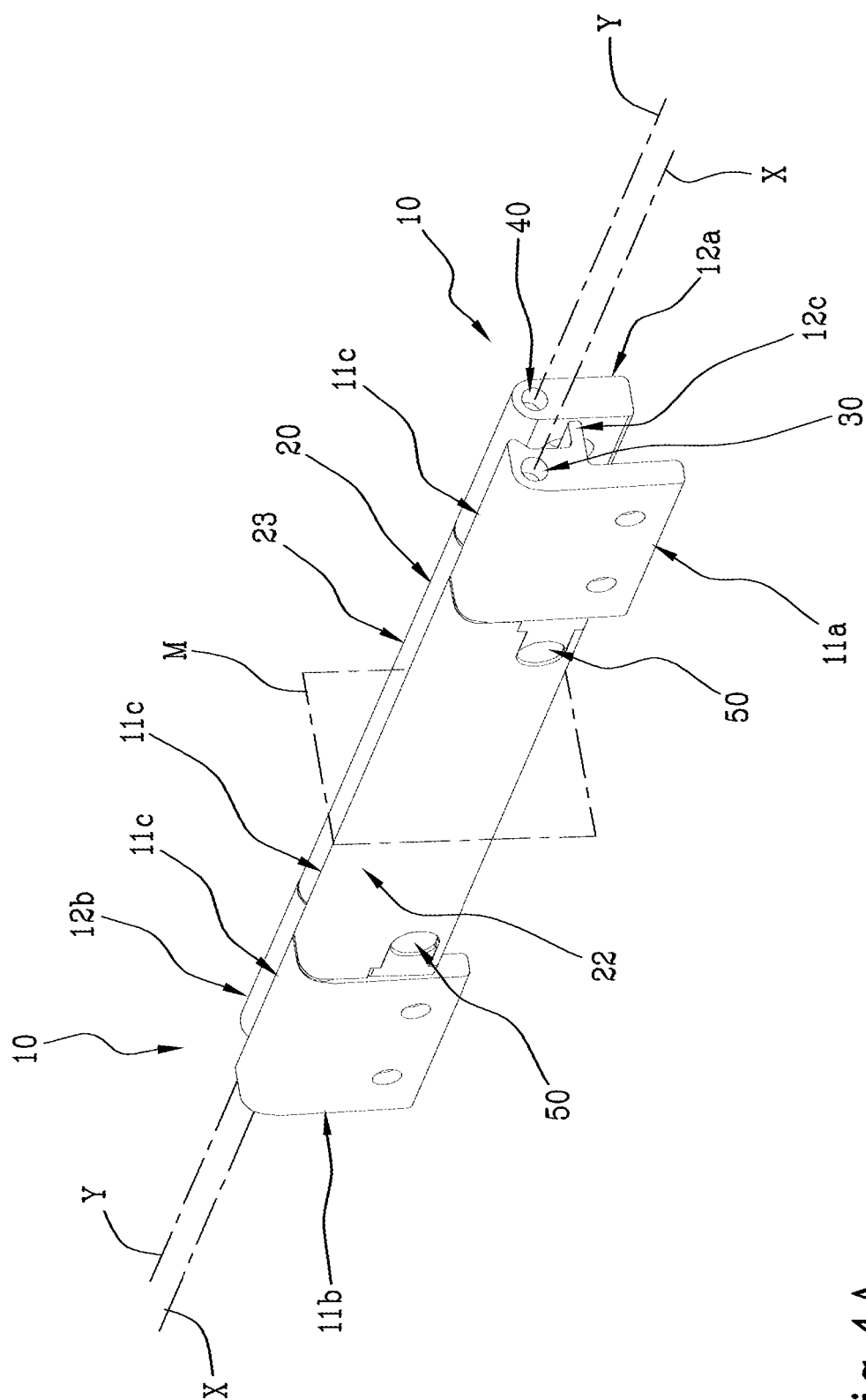


Fig. 4A

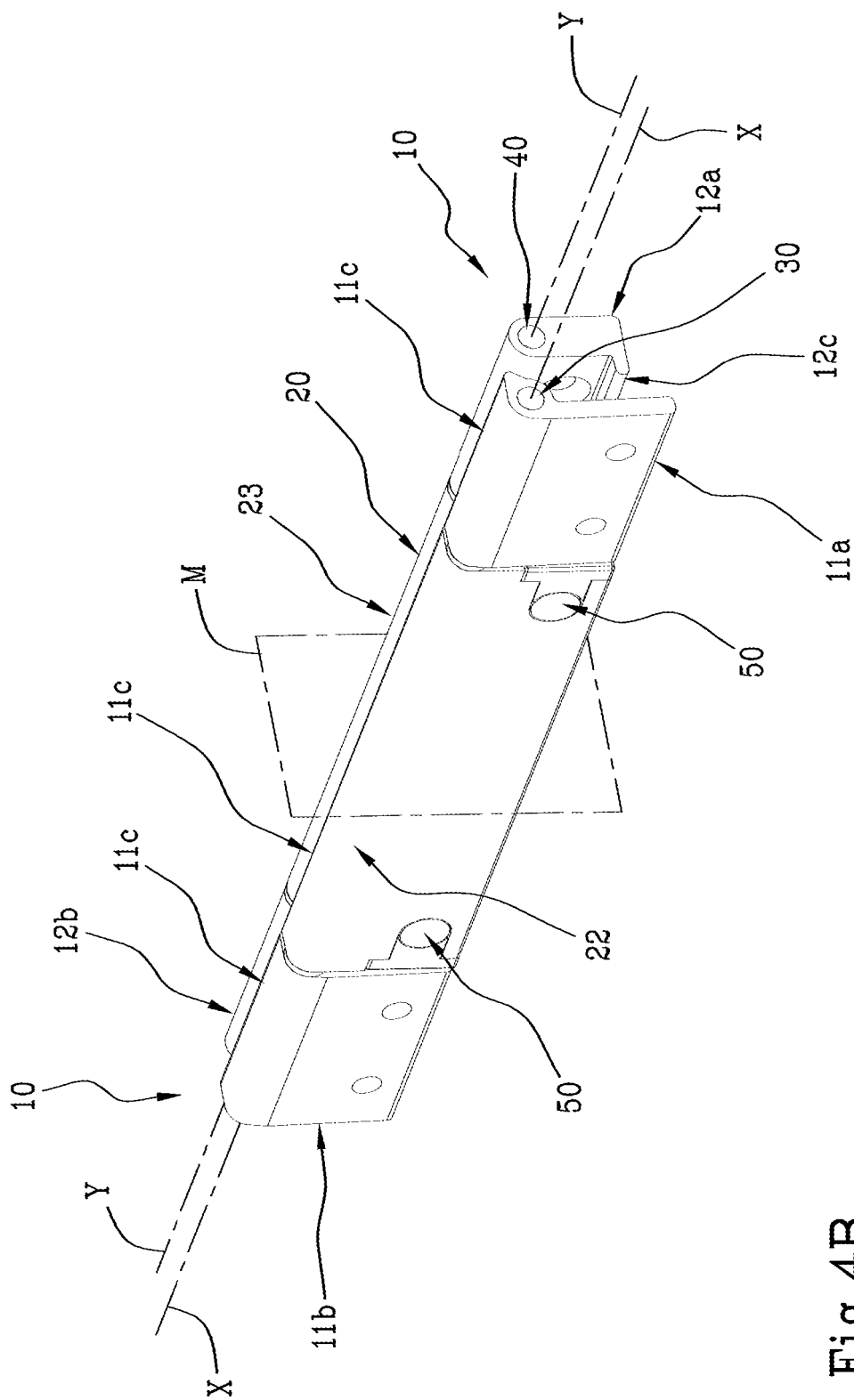
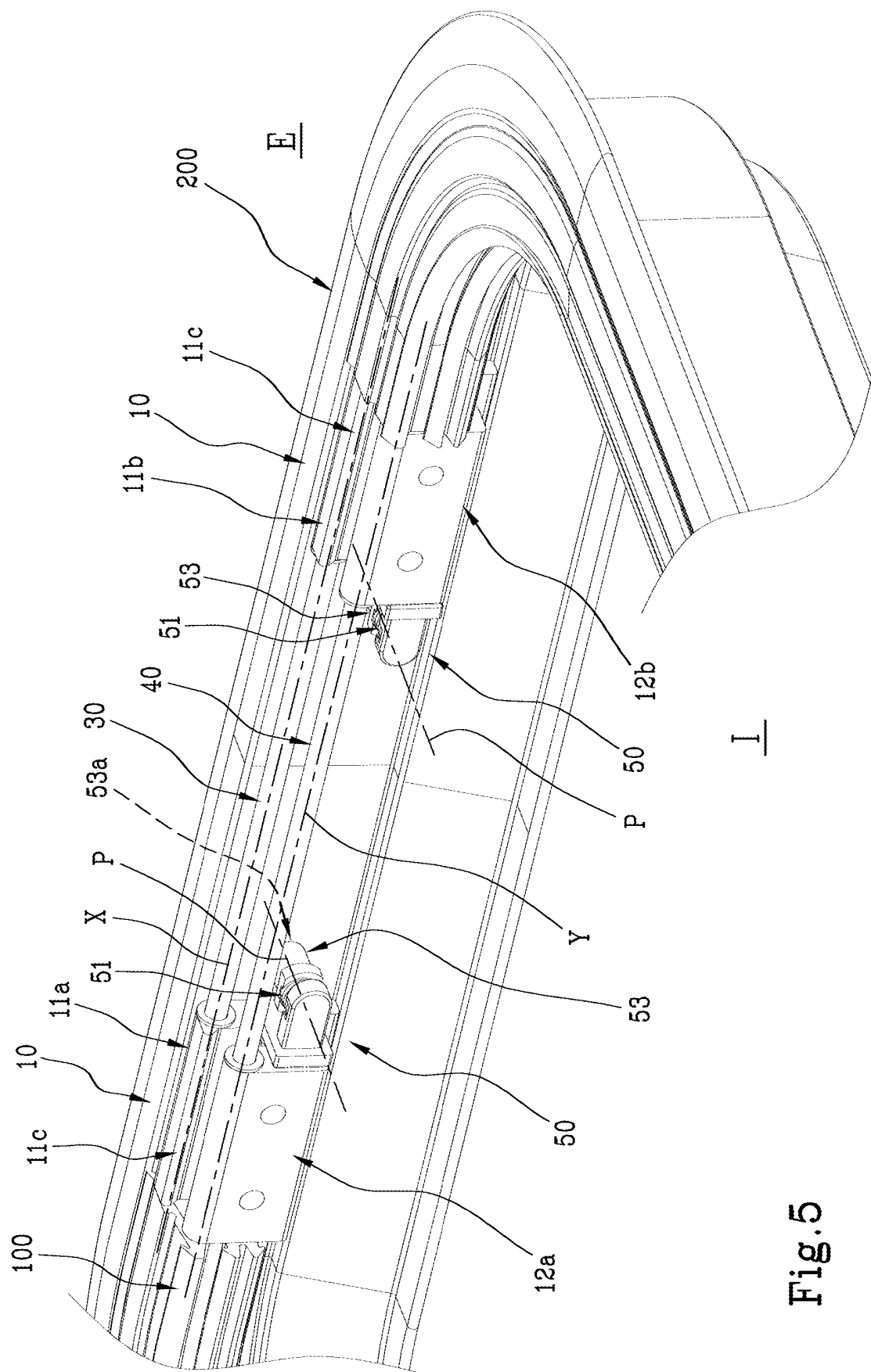
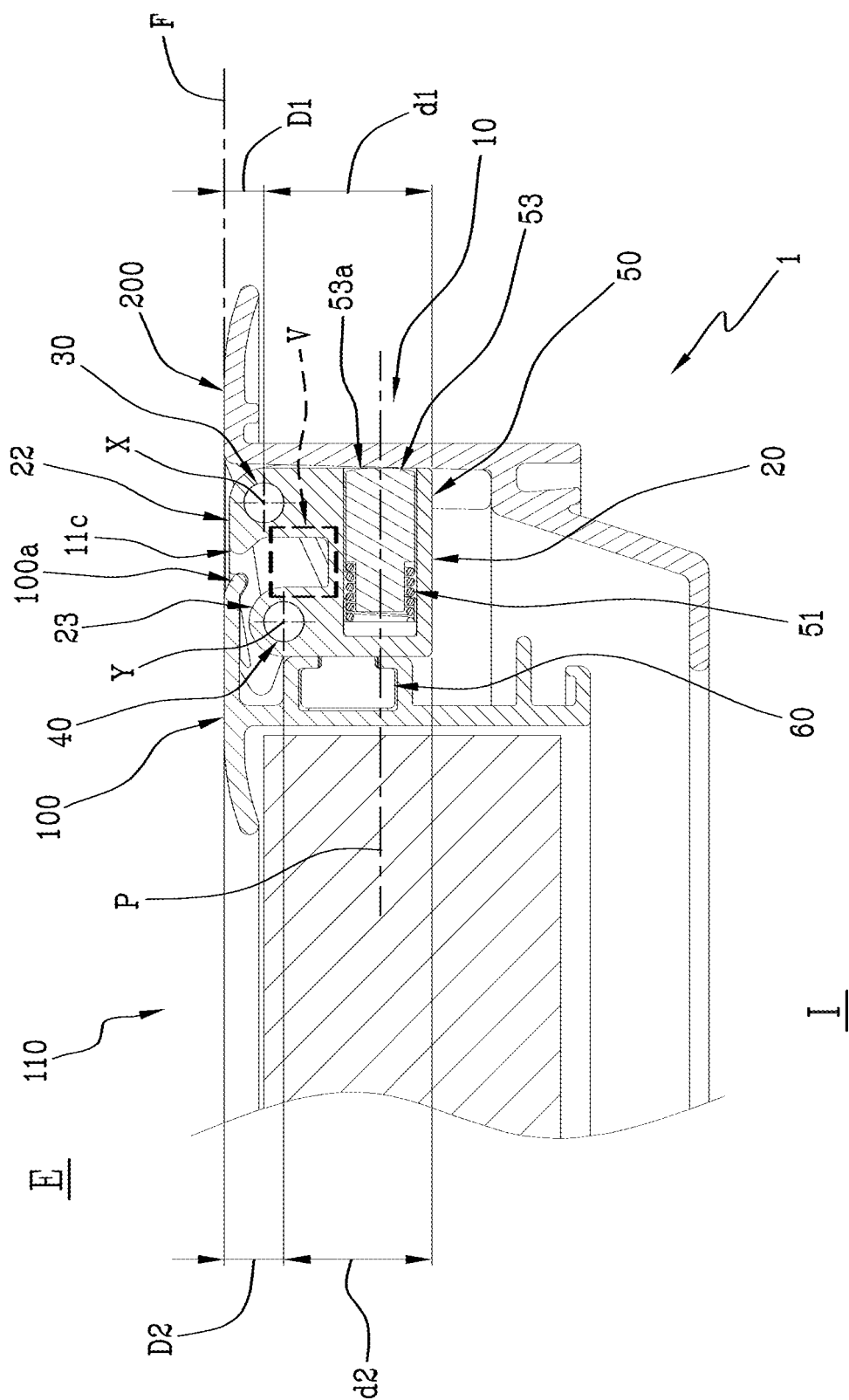


Fig. 4B



50  
51  
52  
53

Fig. 6A



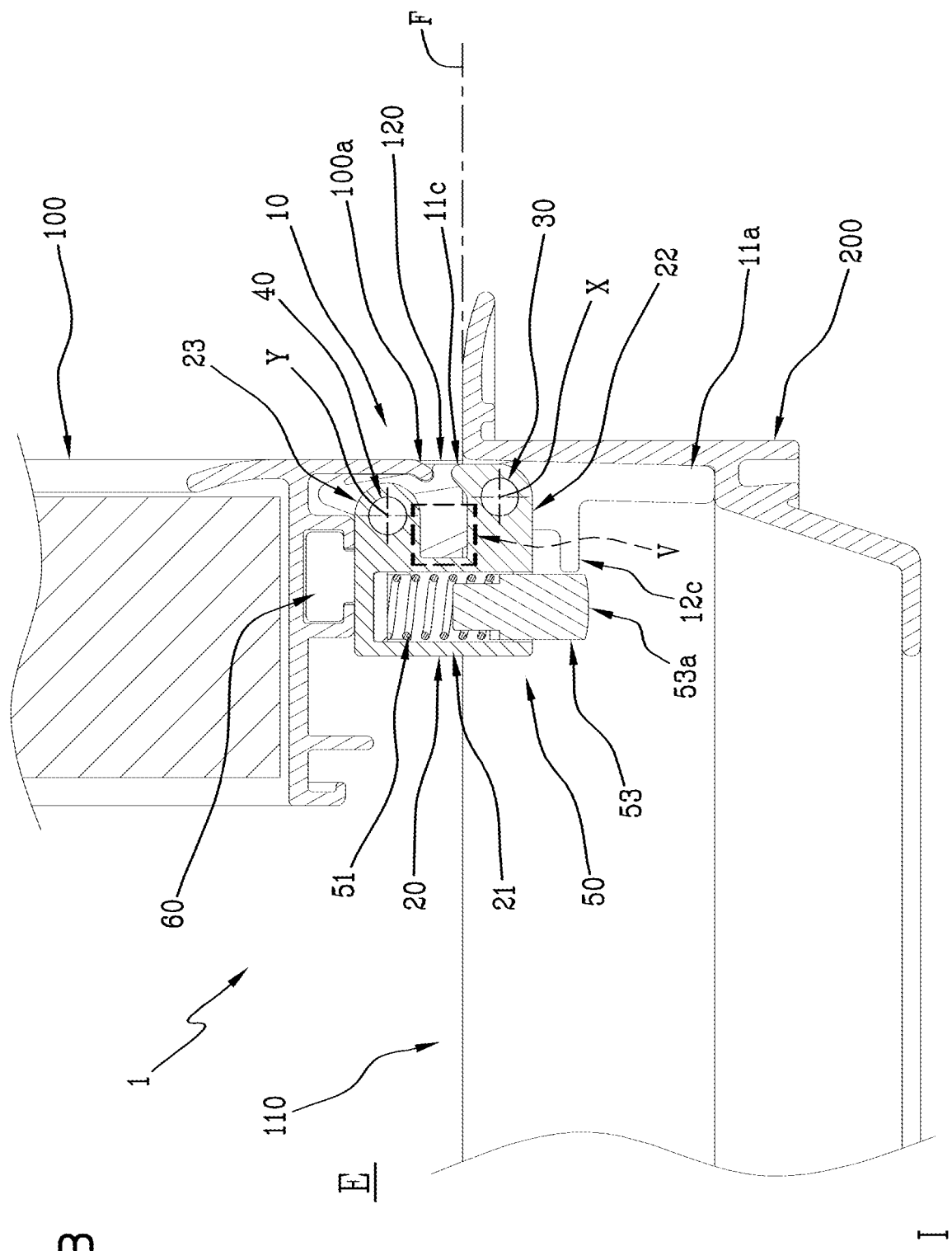
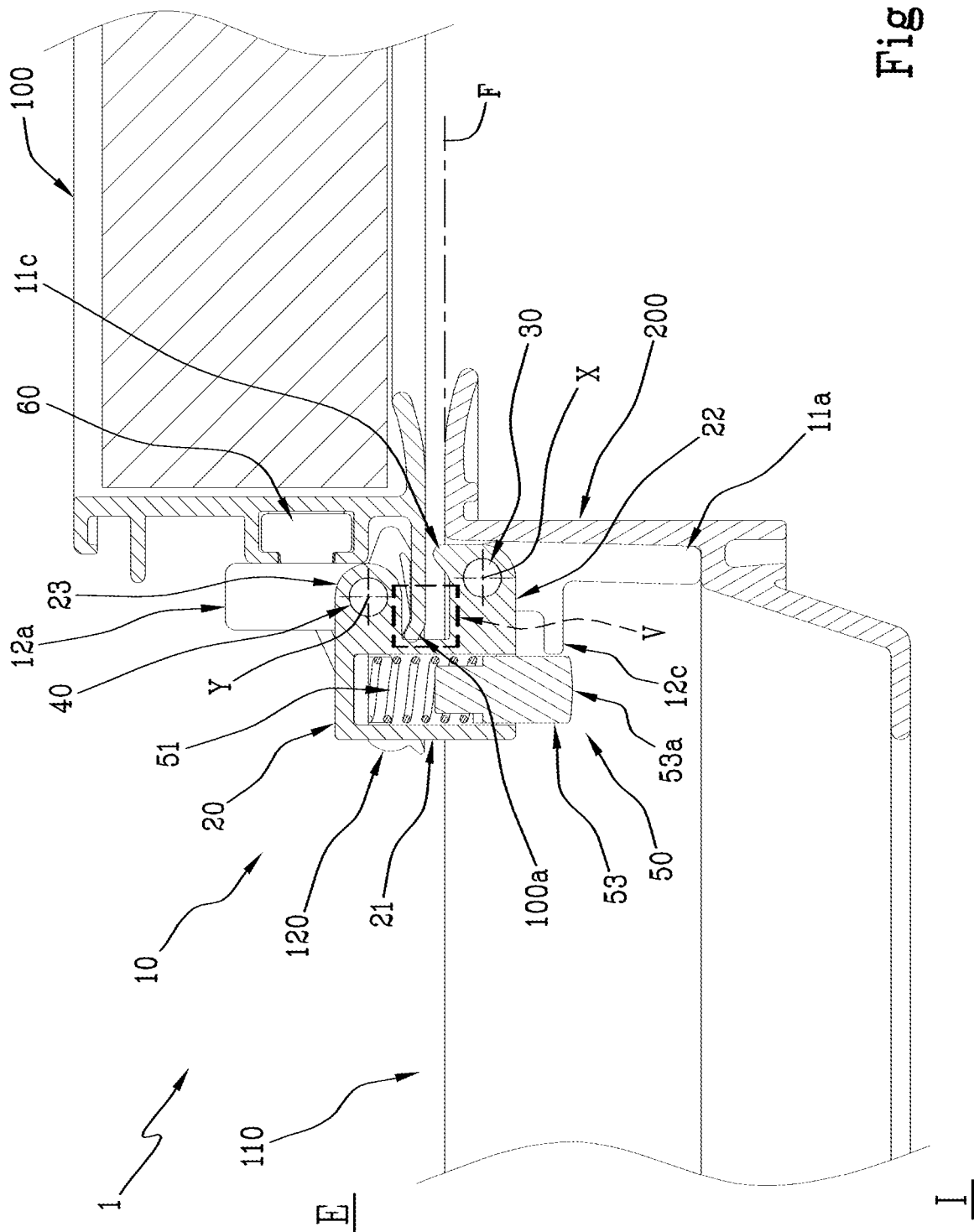


Fig. 6B



U  
C  
b.  
i.  
H

**REFERENCES CITED IN THE DESCRIPTION**

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