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(54) **CLOSING SYSTEM FOR FOLDING DOORS**

FALTTÜRSCHLIESSSYSTEM

SYSTÈME DE FERMETURE POUR PORTES PLIANTES

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**EP 3 418 480 B1**

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## Description

**[0001]** The following patent application for industrial invention relates to a closing system for door panels, in particular for folding doors, windows, cabinet door panels and the like.

**[0002]** Folding doors are largely known on the market, which comprise one or more door panels that are hinged mutually in order to open or close an opening obtained in a wall. When the door panels are in open position, they are stacked along an orthogonal plane relative to the wall. When the door panels are in close position, they are disposed on a parallel plane relative to the wall in order to close the opening.

**[0003]** Two versions of folding doors are known:

- 1) a version of folding doors wherein the door panels are centered relative to the opening defined on the wall; and
- 2) a version of folding doors wherein the door panels are external relative to the plane defined by the wall.

**[0004]** However, in both versions the volume of the door panels stacked in open position partially reduces the width of the passage through the opening of the door. Otherwise said, the passage is not completely free. Moreover, the door panels project both in the front and in the back, or only in the front relative to the wall, with a cumbersome volume caused by the width of the door panel.

**[0005]** Such a drawback is at least partially solved in EP2839099, wherein a special mechanism moves the two folded stacked wings to the closure position, substantially flush with the wall where the opening is obtained.

**[0006]** EP2839099 discloses a closure system that comprises two wings and one single mechanism composed of an articulated quadrilateral mechanism connected to the fixed structure, to the first wing and to the second wing.

**[0007]** The fact that such a closure system comprises one single mechanism involves several drawbacks in terms of construction and reliability because the articulated quadrilateral mechanism is formed of multiple parts that are joined together.

**[0008]** Moreover, such a closure system is not versatile; in fact, it must provide for a different right-hand mechanism or a different left-hand mechanism according to the position of the opening on the right-hand side or on the left-hand side. Such a type of mechanism is designed for operating with a given measurement (the width of the door opening) and cannot be adapted to different measurements.

**[0009]** Moreover, such an articulated quadrilateral mechanism needs to be provided with a connective rod that is hinged on two plates that are respectively fixed to the second door panel and to an upper crosspiece of the fixed structure. The hinging points of the connective rod are

imposed by the dimensions of the articulated quadrilateral mechanism.

**[0010]** DE202015003214 discloses a hinge mechanism used to open and close two door panels. The hinge mechanism comprises a first hinge that connects a first door panel to the fixed frame, a second hinge that connects a second door panel to the first door panel, and an articulated unit that connects the second door panel to the fixed frame. The articulated unit comprises a shelf that projects from one side of the second door panel in such a way to face the opening defined by the fixed frame when the door panels are in open position. Moreover, the articulated unit comprises a lever that is hinged to the fixed frame and to the shelf.

**[0011]** The first hinge, the second hinge and the articulated unit are disconnected. However, the door panels of the door disclosed in DE202015003214 are not completely closed one on top of the other. Such a drawback is caused by the provision of the shelf that projects from one side of the second door panel in such a way as to face the opening defined by the fixed frame when the door panels are in open position. Moreover, the width of the second door panel is larger than the width of the first door panel to permit a connection between the shelf and the fixed frame. Therefore, when in open position, the second door panel partially closes the opening defined by the fixed frame.

**[0012]** FR2448615 discloses an articulated mechanism for moving a folding door, comprising a first hinge that connects a first door panel to a fixed frame, a second hinge that connects a second door panel to the first door panel, and an articulated unit that connects the second door panel to the fixed frame. The first hinge, the second hinge and the articulated unit are not connected. The articulated unit comprises a shelf that projects from one side of the second door panel in such a way to face the opening defined by the fixed frame when the door panels are in open position, a first lever connected to the fixed frame and a second lever hinged to the first lever and to the shelf. The first lever and the second lever are disposed in such a way as to protrude from the opposite side relative to the door panels when the door panels are closed one on top of the other.

**[0013]** Just like DE202015003214, also FR2448615 is impaired by the fact that the door panels do not close completely one on top of the other because of the provision of the shelf. Moreover, because of the fact that the levers project from the opposite side compared to the door panels when the door panels are closed one on top of the other, the mechanism is cumbersome and aesthetically unpleasant.

**[0014]** The purpose of the present invention is to eliminate the drawbacks of the prior art by disclosing a closing system for door panels that is characterized by a reduced volume when the door panels are closed, being at the same time reliable, versatile, easy to make and install.

**[0015]** These purposes are achieved according to the invention with the characteristics of the independent

claim 1.

**[0016]** Advantageous embodiments of the invention appear from the dependent claims.

**[0017]** The closing system for door panels according to the invention is defined by claim 1.

**[0018]** Because of the provision of such a mechanism, when the door panels are in close position, they are stacked and flush to the wall where the fixed frame that defines the opening is mounted, thereby having a reduced volume, being aesthetically pleasant and leaving the opening free.

**[0019]** In particular, the first hinge unit, the second hinge unit and the articulated unit are not connected.

**[0020]** Such a mechanism can operate also for different widths of the opening defined by the fixed frame. The parts of the mechanism (first hinge unit, second hinge unit and articulated unit) do not have a predefined direction and can be indifferently used for door panels that open towards the right-hand side or the left-hand side.

**[0021]** Additional features of the invention will appear manifest from the detailed description below, which refers to merely illustrative, not limiting embodiments, wherein:

Fig. 1 is a perspective view of the closing system of the invention, wherein the door panels are open and the parts of the mechanism are shown in an exploded view;

Fig. 2 is the same view as Fig. 1, with the parts of the mechanism in assembled condition;

Fig. 3 is a perspective view of the upper parts of the mechanism;

Fig. 4 is a perspective view of the lower parts of the mechanism;

Fig. 5 is a top view of the closing system of Fig. 2;

Fig. 6 is a bottom view of the closing system of Fig. 2;

Fig. 7 is a perspective view of the closing system with the door panels in close position;

Fig. 8 is a perspective view of the upper portion of the closing system with the door panels in close position; and

Fig. 9 is a perspective view of the lower portion of the closing system with the door panels in close position.

**[0022]** With reference to the Figures, the closing system of the invention is described, which is generally indicated with reference numeral (100).

**[0023]** The closing system (100) comprises:

- a fixed frame (1),
- a first door panel (2) connected to the fixed frame, and
- a second door panel (3) connected to the first door panel.

**[0024]** The fixed frame (1) is intended to be fixed to a wall wherein a rectangular opening is obtained. The fixed frame (1) generally comprises a crosspiece (10) and an

upright (11) and defines the perimeter of the opening of the wall.

**[0025]** Generally, the door panels (2, 3) are rectangular and identical, with an area that is equal to half of the area of the opening defined by the fixed frame (1).

**[0026]** A mechanism connects the first door panel (2) to the fixed frame and the second door panel (3) to the first door panel, in such a way that the door panels (2, 3) can go from an open position (Fig. 2), wherein the door panels leave the opening defined by the fixed frame (1) open, to a close position (Fig. 7), wherein the door panels close the opening defined by the fixed frame (1).

**[0027]** The mechanism comprises:

- a first hinge unit (C1) connecting the first door panel (2) to the fixed frame (1),
- a second hinge unit (C2) that connects the second door panel (3) to the first door panel, and
- an articulated unit (6) that connects the second door panel (3) to the fixed frame (1).

**[0028]** The first hinge unit (C1), the second hinge unit (C2) and the articulated unit (6) are not connected.

**[0029]** The first hinge unit (C1) comprises an upper hinge (4) disposed above an upper edge of the first door panel (2) and a lower hinge (7) disposed under a lower edge of the first door panel.

**[0030]** With reference to Figs. 1, 3 and 5, the upper hinge (4) of the first hinge unit comprises a first plate (40) and a second plate (41). Each plate (40, 41) has an "L" shape and comprises a long arm and a short arm. The short arms of the two plates (40, 41) are mutually hinged by means of a pin (P1).

**[0031]** The first plate (40) is fixed under the crosspiece (10) of the fixed frame near the upright (11). The second plate (41) is fixed on an upper edge of the first door panel (2) near a lateral end of the first door panel (2) in such a way that the pin (P1) is disposed near the lateral end of the first door panel. In view of the above, the upper hinge (4) permits the rotation of the first door panel (2) relative to the fixed frame (1) around the pin (P1).

**[0032]** With reference to Figs. 1, 4 and 6, the lower hinge (7) of the first hinge unit comprises a first plate (70) and a second plate (71). The first plate (70) has an "L"-shaped section with a wing (72) disposed on an orthogonal plane relative to the first plate (70). The second plate (71) has an "L"-shape in plan view and comprises a long arm and a short arm. The short arm of the second plate (71) is hinged to the wing (72) of the first plate by means of a pin (P5).

**[0033]** The first plate (70) is fixed to the upright (11) of the fixed frame near a lower end of the upright. The second plate (71) is fixed under a lower edge of the first door panel (2) near a lateral end of the first door panel (2), in such a way that the pin (P5) of the lower hinge is disposed near the lateral end of the first door panel and is vertically aligned with the axis of the pin (P1) of the upper hinge of the first hinge unit. In view of the above,

the first door panel (2) can rotate in a balanced manner relative to the fixed frame (1) around the axis of the pins (P1 and P5) of the lower hinge and of the upper hinge.

**[0034]** The second hinge unit (C2) comprises an upper hinge (5) disposed above an upper edge of the first door panel (2) and of the second door panel (3), and a lower hinge (8) disposed under a lower edge of the first door panel and the second door panel.

**[0035]** With reference to Figs. 1, 3 and 5, the upper hinge (5) of the second hinge unit comprises a first plate (50) and a second plate (51). Each plate (50, 51) has an "L" shape in plan view and comprises a long arm and a short arm. The short arms of the two plates (50, 51) are rounded and mutually hinged by means of a pin (P2).

**[0036]** The first plate (50) of the upper hinge of the second hinge unit is fixed on the upper edge of the first door panel (2) near a lateral end of the first door panel (2) in distal position relative to the upper hinge (4) of the first hinge unit. In view of the above, the upper hinge (5) of the second hinge unit permits a rotation of the second door panel (3) relative to the first door panel (2) around the pin (P2).

**[0037]** With reference to Figs. 1, 4 and 6, the lower hinge (8) of the second hinge unit is substantially identical to the upper hinge (5) of the second hinge unit.

**[0038]** The lower hinge (8) of the second hinge unit comprises a first plate (80) and a second plate (81). Each plate (80, 81) has an "L" shape and comprises a long arm and a short arm. The short arms of the two plates (80, 81) are rounded and mutually hinged by means of a pin (P6).

**[0039]** The first plate (80) of the lower hinge is fixed under the lower edge of the first door panel (2) near a lateral end of the first door panel (2) in distal position relative to the lower hinge (7) of the first hinge unit, in such a way that the axis of the pin (P6) of the lower hinge coincides with the axis of the pin (P2) of the upper hinge of the second hinge unit. In view of the above, the second door panel (3) can rotate in a balanced manner relative to the first door panel (2) around the axis of the pins (P2 and P6) of the upper hinge and of the lower hinge of the second hinge unit.

**[0040]** With reference to Figs. 1, 3 and 5, the articulated unit (6) of the mechanism comprises:

- a first plate (60) intended to be fixed to the crosspiece (10) of the fixed frame;
- a second plate (61) intended to be fixed to the second door panel (3); and
- a connective rod (62) pivoted to the first plate (60) by means of a first pin (P3) and to the second plate (63) by means of a second pin (P4).

**[0041]** In view of the above, the articulated unit (6) of the upper mechanism is provided with two hinges, in the first pin (P3) and in the second pin (P4), in such a way as to follow the movement of the second door panel (3) from the open position of the door panels (Fig. 2) to the close position of the door panels (Fig. 7).

**[0042]** The second plate (61) of the articulated unit is fixed on the upper edge of the second door panel (3) near a lateral end of the second door panel (3) in distal position relative to the upper hinge (5) of the second hinge unit, in such a way that the second door panel is stopped against the first door panel when the door panels are in open position.

**[0043]** In fact, such a position of the second plate (61) of the articulated unit avoids the use of shelves for connecting the connective rod (62) with the second door panel, as it occurs with the opening mechanisms of the prior art. Because of such a position of the second plate (61) on the upper edge of the second door panel (3), the second door panel can be completely closed on the first door panel. Moreover, two door panels with the same width can be used in such a way that the door panels do not close the opening defined by the fixed frame when they are closed one on top of the other.

**[0044]** It must be noted that when the door panels (2, 3) are in open position, the door panels (2, 3) are stacked one behind the other, and the two plates of the upper and lower hinges of the second hinge unit are in parallel position. In such a situation, the two door panels (2, 3) have a reduced volume and are substantially flush with the wall whereon the fixed frame (1) is mounted, without hindering the opening defined by the fixed frame (1).

**[0045]** On the contrary, with reference to Figs. 8 and 9, when the door panels (2, 3) are in close position, the door panels (2, 3) are aligned on a plane and the two plates of the upper and lower hinges of the second hinge unit are aligned.

**[0046]** The length of the connective rod (62) is chosen in such a way that the first plate (60) is fixed to the crosspiece (10) in an intermediate position of the crosspiece.

**[0047]** In view of the above, the design and the mounting of the mechanism is easy and fast because no complicated calculations are needed to design the first plate (60), with reference to the hinging point of said first plate (60) relative to the crosspiece (10).

**[0048]** Numerous variations and modifications can be made to the present embodiment of the invention, which are within the reach of an expert of the field, falling in any case within the scope of the appended claims defining the invention.

## Claims

1. Closing system (100) for door panels comprising:

- a fixed frame (1) that defines an opening,
- a first door panel (2) connected to the fixed frame,
- a second door panel (3) connected to the first door panel, and
- a mechanism connecting the first door panel (2) to the fixed frame (1) and the second door

panel (3) to the first door panel, in such manner that the door panels (2, 3) can go from an open position, wherein the door panels leave the opening defined by the fixed frame (1) open, to a close position, wherein the door panels close the opening defined by the fixed frame (1); said mechanism comprising:

- a first hinge unit (C1) that connects the first door panel (2) to the fixed frame,
- a second hinge unit (C2) that connects the second door panel (3) to the first door panel, and
- an articulated unit (6) that connects the second door panel (3) to the fixed frame (1);

said articulated unit (6) comprising:

- a first plate (60) intended to be fixed to the fixed frame (1),
- a second plate (61) intended to be fixed to the second door panel (3), and
- a connective rod (62) pivoted to the first plate (60) by means of a first pin (P3) and to the second plate (63) by means of a second pin (P4);

wherein the second plate (61) of the articulated unit is fixed to an upper edge of the second door panel (3) in such a way as to stop the second door panel against said first door, when the door panels are in open position;

said second plate (61) of the articulated unit is fixed to an upper edge of the second door panel (3) near a lateral end of the second door panel and the first plate (60) of the articulated unit is fixed to a crosspiece (10) of the fixed frame in an intermediate position of said crosspiece; wherein said first hinge unit (C1) comprises an upper hinge (4) disposed above an upper edge of the first door panel (2) and a lower hinge (7) disposed under a lower edge of the first door panel,

**characterized in that**

said first hinge unit (C1), second hinge unit (C2) and articulated unit (6) are mutually not connected;

wherein said upper hinge (4) comprises a first plate (40) intended to be fixed to the crosspiece (10) of the fixed frame and a second plate (41) intended to be fixed to the upper edge of the first door panel, said plates (40, 41) of the upper hinge having an "L"-shape with a long arm and a short arm, wherein the short arms are pivoted by means of a pin (P1).

2. The closing system (100) of claim 1, wherein said lower hinge (7) comprises a first plate (70) intended

to be fixed to an upright (11) of the fixed frame and a second plate (71) intended to be fixed to the lower edge of the first door panel; the first plate (70) having an "L"-shaped section with a wing (72) that is orthogonal to the first plate and the second plate (71) of the lower hinge having an "L"-shape in plan view with a long arm and a short arm, wherein the short arm of the second plate is pivoted to the wing (72) of the first plate by means of a pin (P5).

3. The closing system (100) of any one of the preceding claims, wherein said second hinge unit (C2) comprises an upper hinge (5) disposed above an upper edge of the first and the second door panel (2,3) and a lower hinge (8) disposed under a lower edge of the first and second door panel (2,3).

4. The closing system (100) of claim 3, wherein said upper hinge (5) of the second hinge unit comprises a first plate (50) intended to be fixed to the upper edge of the first door panel and a second plate (51) intended to be fixed to the upper edge of the second door panel, said plates (50, 51) of the upper hinge having an "L"-shape with a long arm and a short rounded arm, wherein the short rounded arms are pivoted by means of a pin (P2).

5. The closing system (100) of claim 3 or 4, wherein said lower hinge (8) of the second hinge unit comprises a first plate (80) intended to be fixed to the lower edge of the first door panel and a second plate (81) intended to be fixed to the lower edge of the second door panel, said plates (80, 81) of the lower hinge having an "L"-shape with a long arm and a short rounded arm, wherein the short rounded arms are pivoted by means of a pin (P6).

**Patentansprüche**

1. Schließsystem (100) für Türpaneele, umfassend:
  - einen festen Rahmen (1), der eine Öffnung definiert,
  - ein erstes Türpaneel (2), das mit dem festen Rahmen verbunden ist,
  - ein zweites Türpaneel (3), das mit dem ersten Türpaneel verbunden ist, und
  - einen Mechanismus, der das erste Türpaneel (2) mit dem festen Rahmen (1) und das zweite Türpaneel (3) mit dem ersten Türpaneel verbindet, so dass die Türpaneele (2, 3) von einer Offenstellung, in der die Türpaneele die vom festen Rahmen (1) definierte Öffnung offenlassen, in eine Geschlossenstellung übergehen können, in der die Türpaneele die von dem festen Rahmen (1) definierte Öffnung schließen;

wobei der Mechanismus umfasst:

- eine erste Scharniereinheit (C1), die das erste Türpaneel (2) mit dem festen Rahmen verbindet,
- eine zweite Scharniereinheit (C2), die das zweite Türpaneel (3) mit dem ersten Türpaneel verbindet, und
- eine Gelenkeinheit (6), die das zweite Türpaneel (3) mit dem festen Rahmen (1) verbindet;

wobei die Gelenkeinheit (6) umfasst:

- eine erste Platte (60), die dazu bestimmt ist, an dem festen Rahmen (1) befestigt zu werden,
- eine zweite Platte (61), die dazu bestimmt ist, an dem zweiten Türpaneel (3) befestigt zu werden, und
- eine Verbindungsstange (62), die an der ersten Platte (60) mittels eines ersten Stiftes (P3) und an der zweiten Platte (63) mittels eines zweiten Stiftes (P4) angelenkt ist;

wobei die zweite Platte (61) der Gelenkeinheit an einer oberen Kante des zweiten Türpaneels (3) verbunden ist, so dass das zweite Türpaneel an der ersten Tür in Anschlag kommt, wenn die Türpaneele sich in Offenstellung befinden; die zweite Platte (61) der Gelenkeinheit ist an einer oberen Kante des zweiten Türpaneels (3) nahe einem seitlichen Ende des zweiten Türpaneels befestigt und die erste Platte (60) der Gelenkeinheit ist an einem Querträger (10) des festen Rahmens in einer Zwischenstellung des Querträgers befestigt;

wobei die Scharniereinheit (C1) ein oberes Scharnier (4) umfasst, das über einer oberen Kante des ersten Türpaneels (2) angeordnet ist und ein unteres Scharnier (7), das unter einer unteren Kante der ersten Türpaneels angeordnet ist,

**dadurch gekennzeichnet, dass**

die erste Scharniereinheit (C1), die zweite Scharniereinheit (C2) und die Gelenkeinheit (6) nicht miteinander verbunden sind; wobei das obere Scharnier (4) eine erste Platte (40) umfasst, die dazu bestimmt ist, an dem Querträger (10) des festen Rahmens befestigt zu werden, und eine zweite Platte (41), die dazu bestimmt ist, an der oberen Kante des ersten Türpaneels befestigt zu werden, wobei die Platten (40, 41) des oberen Scharniers eine L-förmige Form mit einem langen und einem kurzen Arm aufweisen, wobei die kurzen Arme mittels eines Stifts (P1) miteinander verbunden sind.

2. Schließsystem (100) nach Anspruch 1, wobei das untere Scharnier (7) eine erste Platte (70) umfasst, die dazu bestimmt ist, an einem Pfosten (11) des festen Rahmens befestigt zu werden, und eine zweite Platte (71), die dazu bestimmt ist, an der unteren Kante des ersten Türpaneels befestigt zu werden; wobei die erste Platte (70) im Querschnitt L-förmig ist, mit einem zur ersten Platte rechtwinkligen Flügel (72), und die zweite Platte (71) des unteren Scharniers im Grundriss L-förmig ist, mit einem langen Arm und einem kurzen Arm, wobei der kurze Arm der zweiten Platte an dem Flügel (72) der ersten Platte mittels eines Stifts (P5) angelenkt ist.

3. Schließsystem (100) nach einem der vorstehenden Ansprüche, wobei die zweite Scharniereinheit (C2) ein oberes Scharnier (5) umfasst, das über einer oberen Kante des ersten und des zweiten Türpaneels (2, 3) angeordnet ist, und ein unteres Scharnier (8), das unter einer unteren Kante des ersten und des zweiten Türpaneels (2, 3) angeordnet ist.

4. Schließsystem (100) nach Anspruch 3, wobei das obere Scharnier (5) der zweiten Scharniereinheit eine erste Platte (50) umfasst, die dazu bestimmt ist, an der oberen Kante des ersten Türpaneels befestigt zu werden, und eine zweite Platte (51), die dazu bestimmt ist, an der oberen Kante des zweiten Türpaneels befestigt zu werden, wobei die Platten (50, 51) des oberen Scharniers eine L-förmige Form mit einem langen und einem kurzen, abgerundeten Arm aufweisen, wobei die kurzen abgerundeten Arme mittels eines Stifts (P2) angelenkt sind.

5. Schließsystem (100) nach Anspruch 3 oder 4, wobei das untere Scharnier (8) der zweiten Scharniereinheit eine erste Platte (80) umfasst, die dazu bestimmt ist, an der unteren Kante des ersten Türpaneels befestigt zu werden, und eine zweite Platte (81), die dazu bestimmt ist, an der unteren Kante des zweiten Türpaneels befestigt zu werden, wobei die Platten (80, 81) des unteren Scharniers eine L-förmige Form mit einem langen und einem kurzen, abgerundeten Arm aufweisen, wobei die kurzen, abgerundeten Arme mittels eines Stifts (P6) angelenkt sind.

## 50 Revendications

1. Système de fermeture (100) pour panneaux de portes comprenant :
- un châssis fixe (1) qui définit une ouverture,
  - un premier panneau de porte (2) relié au châssis fixe,
  - un second panneau de porte (3) relié au pre-

mier panneau de porte, et

- un mécanisme qui relie le premier panneau de porte (2) au châssis fixe (1) et le second panneau de porte (3) au premier panneau de porte, de manière que les panneaux de portes (2, 3) puissent passer d'une position d'ouverture, où les panneaux de portes laissent ouverte l'ouverture définie par le châssis fixe (1), à une position de fermeture où les panneaux de portes ferment l'ouverture définie par le châssis fixe (1) ;  
ledit mécanisme comprenant :

- un premier groupe charnière (C1) qui relie le premier panneau de porte (2) au châssis fixe,
- un second groupe charnière (C2) qui relie le second panneau de porte (3) au premier panneau de porte, et
- un groupe articulé (6) qui relie le second panneau de porte (3) au châssis fixe (1) ;

ledit groupe articulé (6) comprenant :

- une première plaque (60) apte à être fixée au châssis fixe (1),
- une seconde plaque (61) apte à être fixée au second panneau de porte (3), et
- une tige de connexion (62) pivotée sur la première plaque (60) moyennant un premier axe (P3) et à la seconde plaque (63) moyennant un second axe (P4) ;

où la seconde plaque (61) du groupe articulé est fixée à un bord supérieur du second panneau de porte (3), afin que le second panneau de porte puisse se disposer en butée sur le premier panneau de porte quand les panneaux de portes sont en position d'ouverture ;

ladite seconde plaque (61) du groupe articulé est fixée à un bord supérieur du second panneau de porte (3), à proximité d'une extrémité latérale du second panneau de porte et la première plaque (60) du groupe articulé est fixée à un croisillon (10) du châssis fixe, sur une position intermédiaire du ledit croisillon ;

où ledit premier groupe charnière (C1) comprend une charnière supérieure (4) disposée sur un bord supérieur du premier panneau de porte (2) et une charnière inférieure (7) disposée sous un bord inférieur du premier panneau de porte,

**caractérisé en ce que**

ledit premier groupe charnière (C1), second groupe charnière (C2) et groupe articulé (6) ne sont pas reliés entre eux ;

où ladite charnière supérieure (4) comprend une première plaque (40) apte à être fixée au croisillon (10) du châssis fixe et une seconde plaque

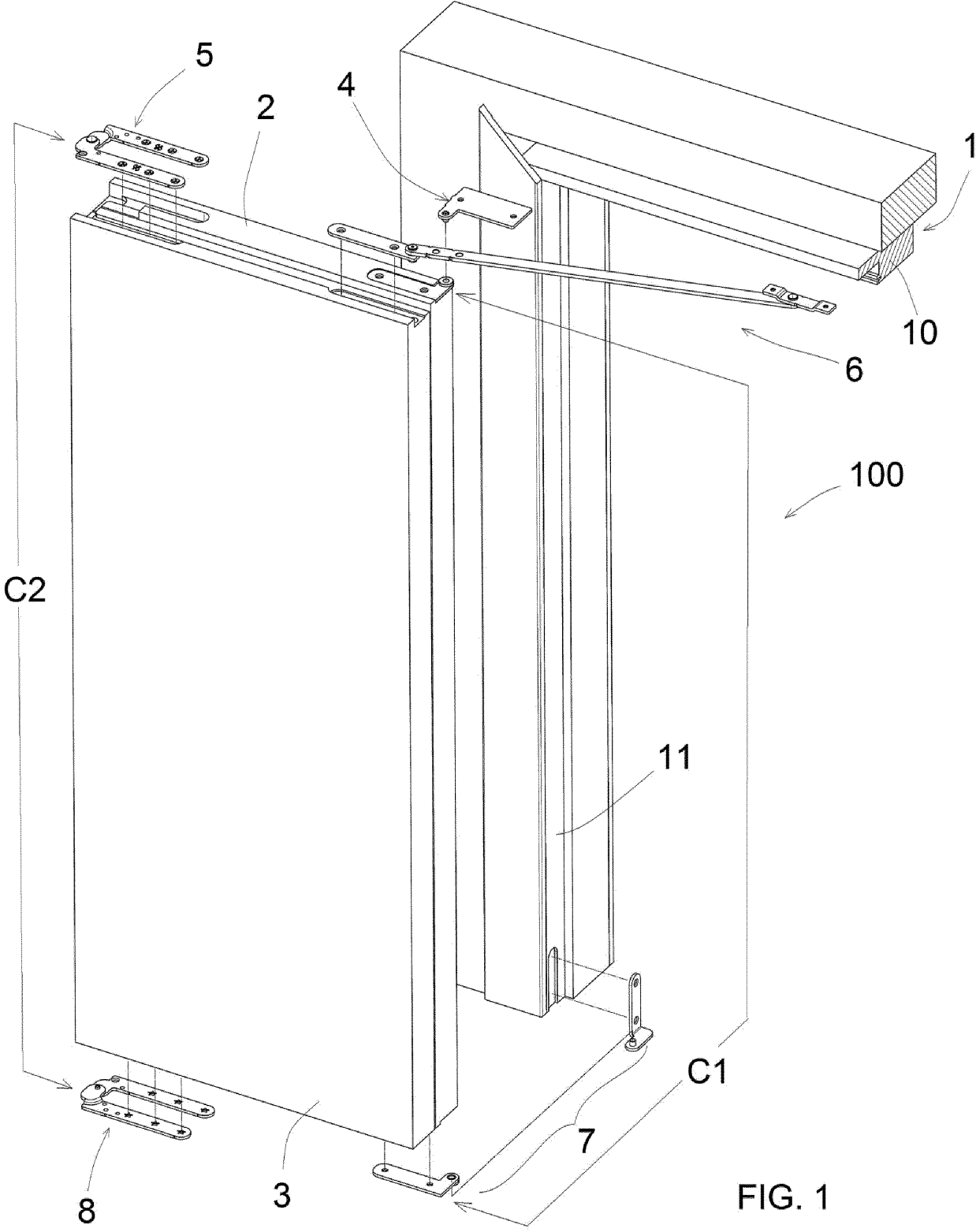
(41) apte à être fixée au bord supérieur du premier panneau de porte, lesdites plaques (40, 41) de la charnière supérieure ayant une forme en « L » avec un bras long et un bras court, où les bras courts sont pivotés entre eux moyennant un axe (P1).

2. Système de fermeture (100) selon la revendication 1, où ladite charnière inférieure (7) comprend une première plaque (70) apte à être fixée à un montant (11) du châssis fixe et une seconde plaque (71) apte à être fixée au bord inférieur du premier panneau de porte ; la première plaque (70) ayant une forme en « L » en section avec une aile (72) orthogonale à la première plaque et la seconde plaque (71) de la charnière inférieure ayant une forme en « L » en plan avec un bras long et un bras court, où le bras court de la seconde plaque est pivoté à l'aile (72) de la première plaque moyennant un axe (P5).

3. Système de fermeture (100) selon l'une quelconque des revendications précédentes, où ledit second groupe charnière (C2) comprend une charnière supérieure (5) disposée sur un bord supérieur du premier et du second panneaux de portes (2, 3) et une charnière inférieure (8) disposée sous un bord inférieur du premier et du second panneaux de portes (2, 3).

4. Système de fermeture (100) selon la revendication 3, où ladite charnière supérieure (5) du second groupe charnière comprend une première plaque (50) apte à être fixée au bord supérieur du premier panneau de porte et une seconde plaque (51) apte à être fixée au bord supérieur du second panneau de porte ; lesdites plaques (50, 51) de la charnière supérieure ayant une forme en « L » avec un bras long et un bras court arrondi, où les bras courts arrondis sont pivotés entre eux moyennant un axe (P2).

5. Système de fermeture (100) selon la revendication 3 ou 4, où ladite charnière inférieure (8) du second groupe charnière comprend une première plaque (80) apte à être fixée au bord inférieur du premier panneau de porte et une seconde plaque (81) apte à être fixée au bord inférieur du second panneau de porte, lesdites plaques (80, 81) de la charnière inférieure ayant une forme en « L » avec un bras long et un bras court arrondi, où les bras courts arrondis sont pivotés entre eux moyennant un axe (P6).



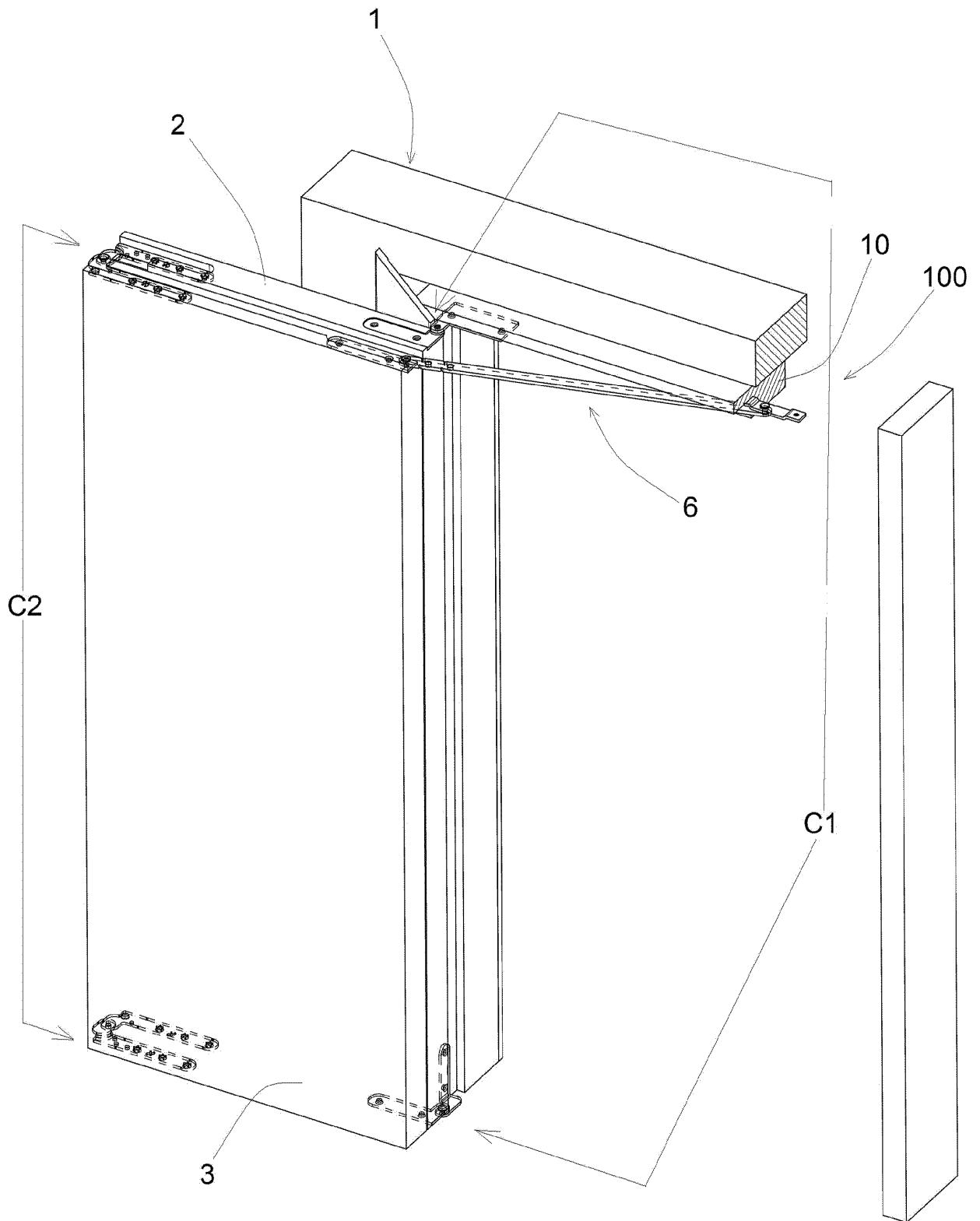


FIG. 2

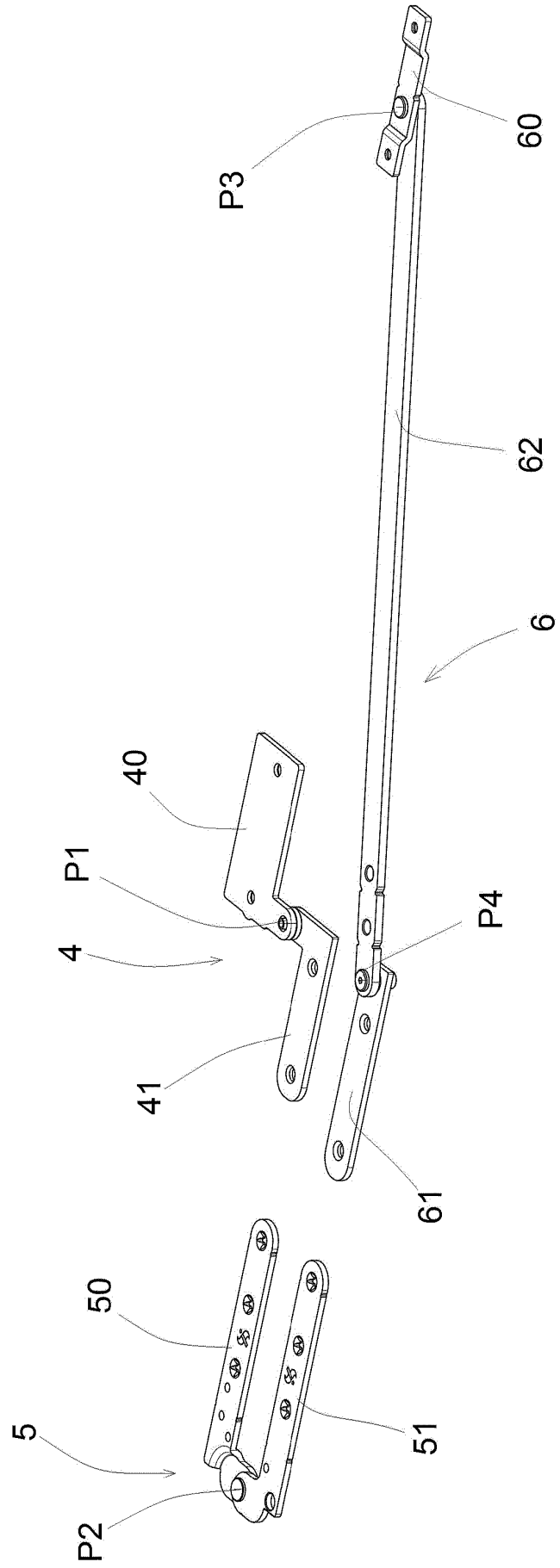


FIG. 3

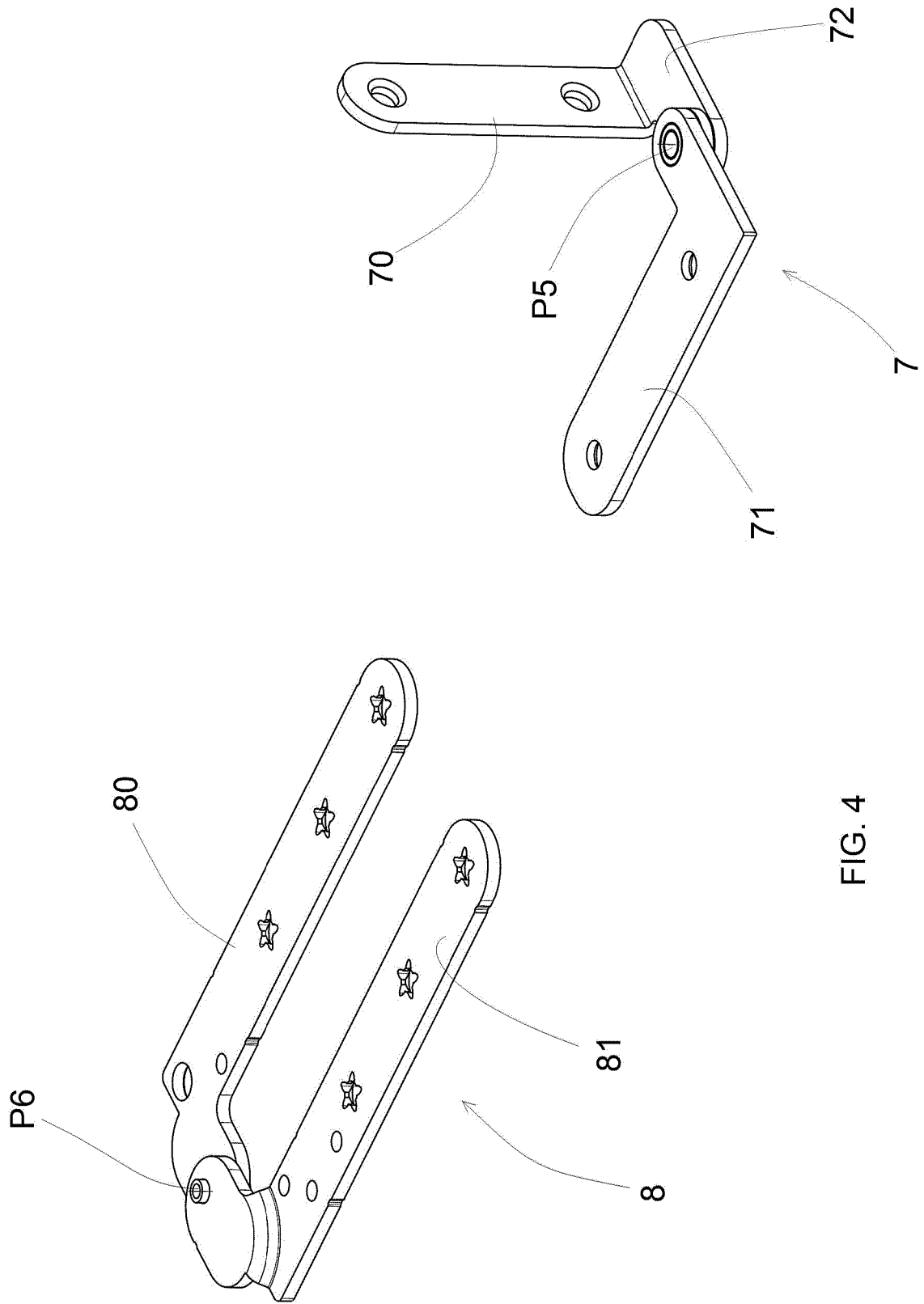


FIG. 4



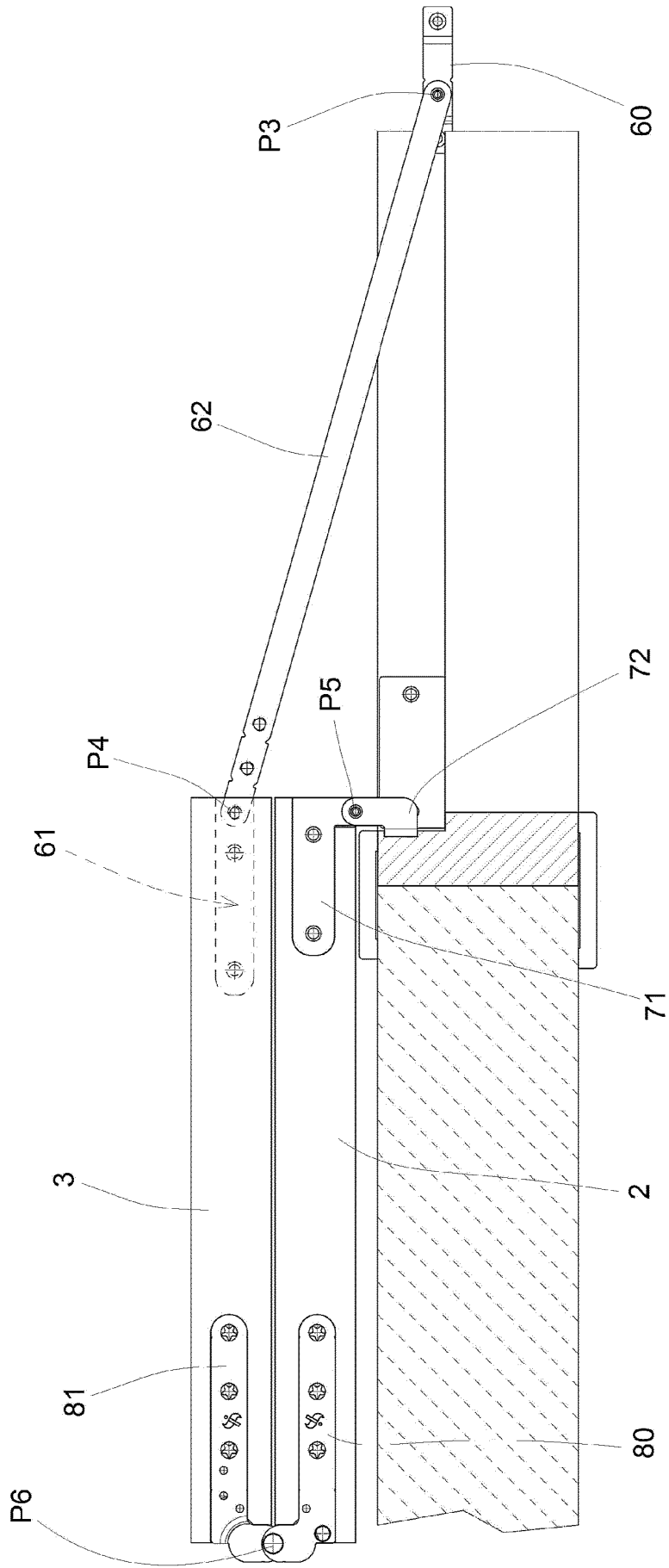


FIG. 6

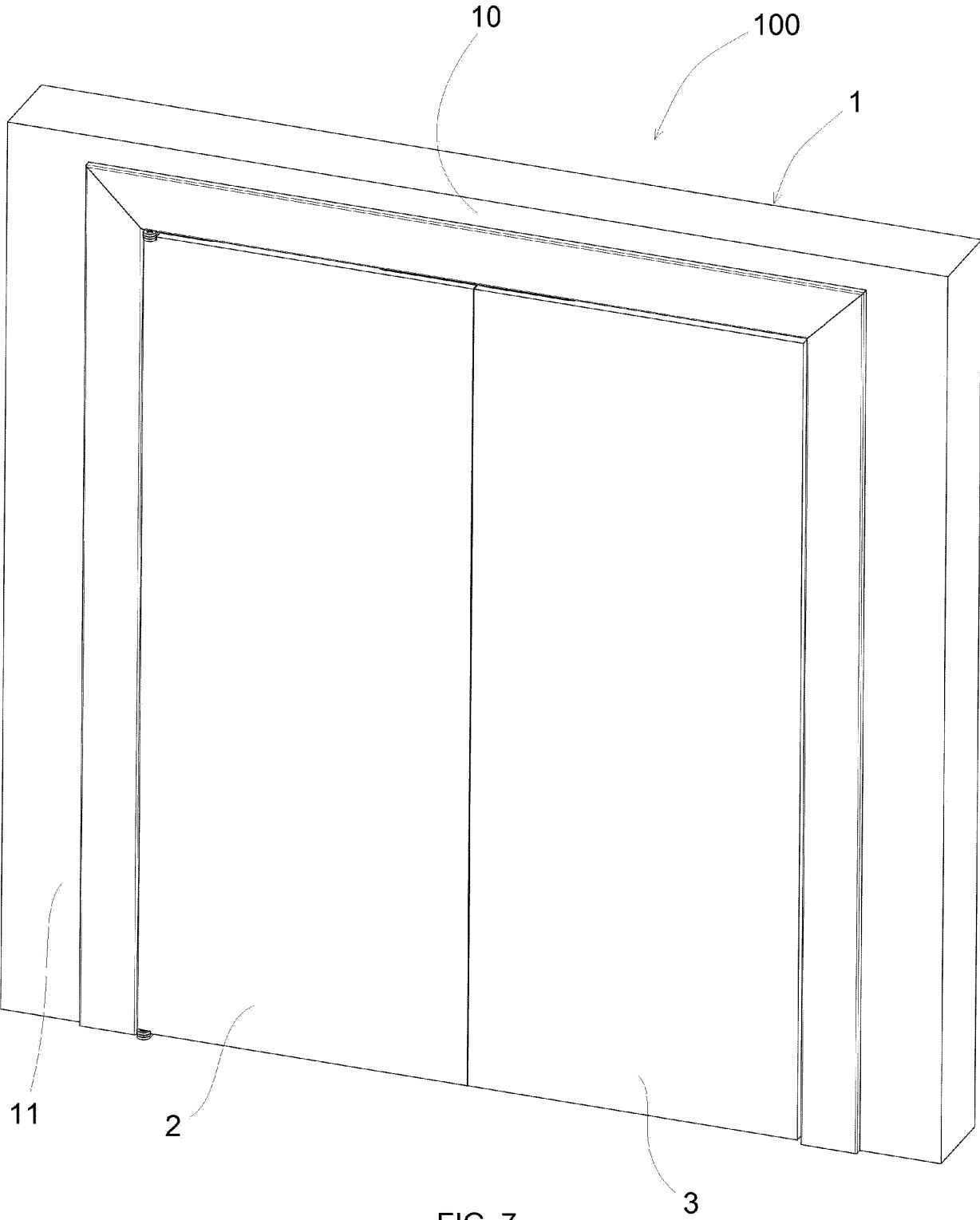


FIG. 7

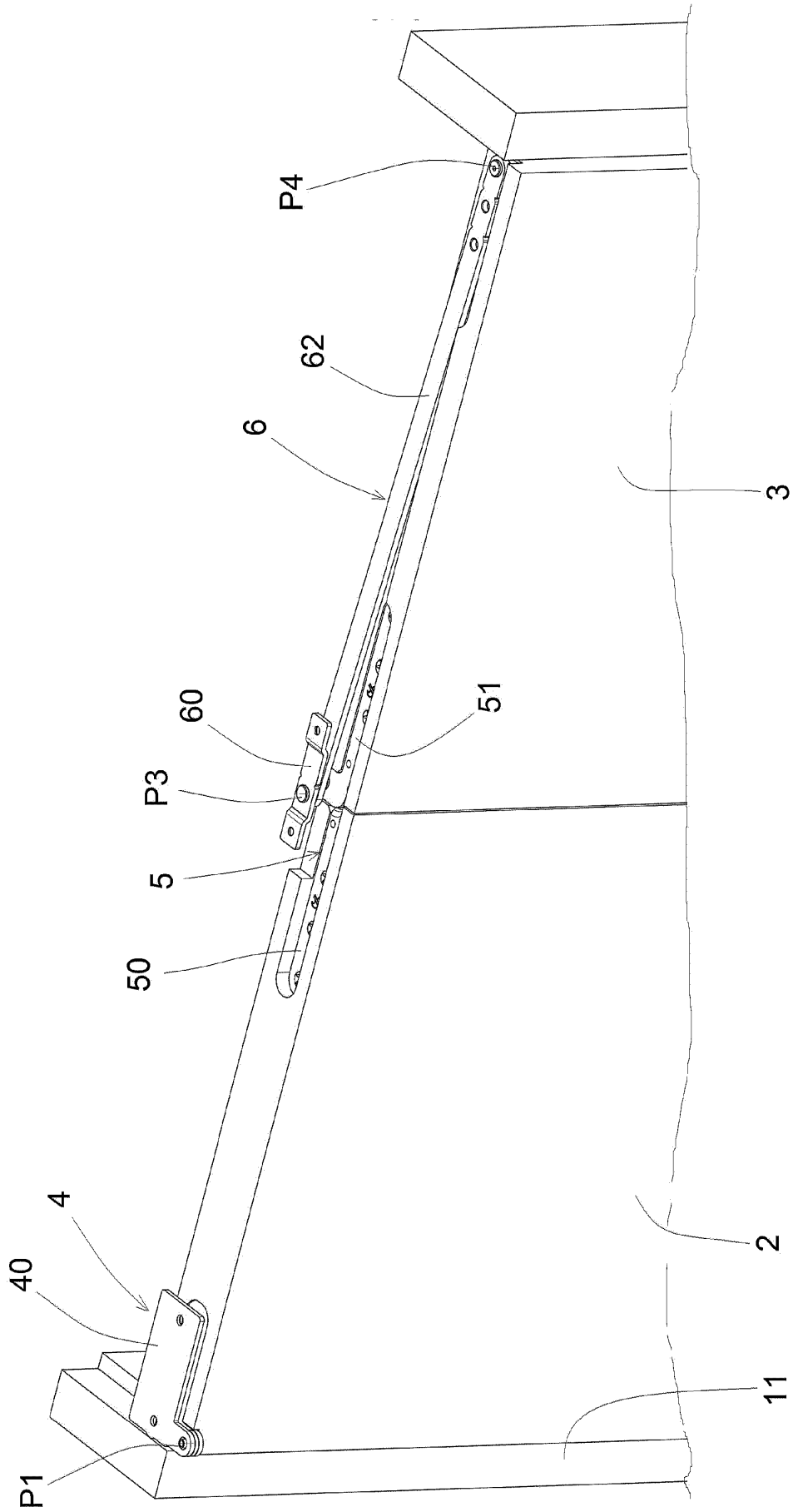


FIG. 8

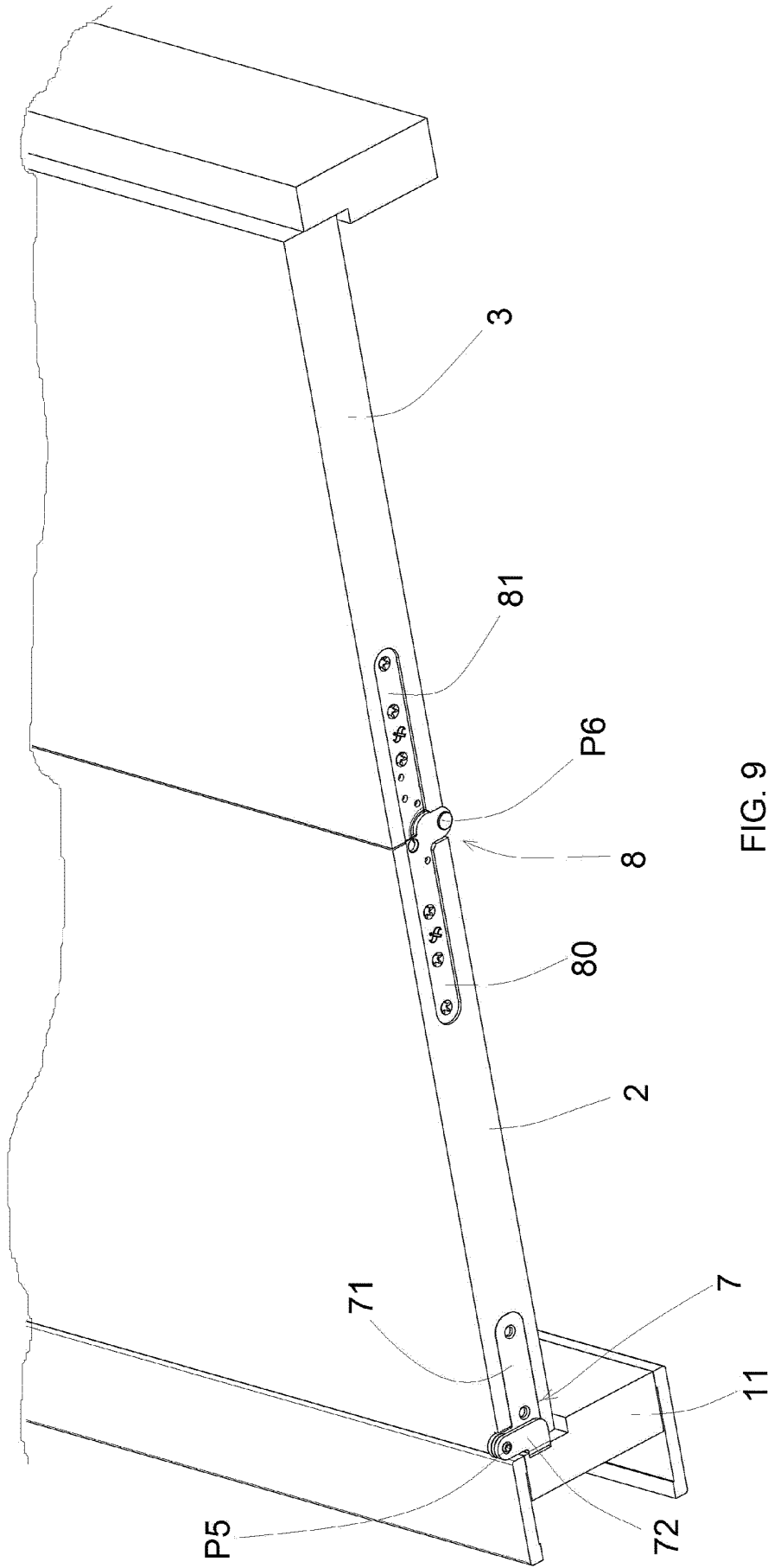


FIG. 9

**REFERENCES CITED IN THE DESCRIPTION**

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