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(54) **AN INNOVATIVE DOOR DECELERATION MECHANISM**

INNOVATIVER TÜRENTSCHLEUNIGUNGSMECHANISMUS

MÉCANISME DE DÉCÉLÉRATION DE PORTE INNOVANT

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Description

Field of the Invention

[0001] The present invention relates to an innovative door deceleration mechanism which prevents the doors from closing too fast in built-in fridges and similar household appliances, and which elongates their operating life.

Background of the Invention

[0002] The doors placed on the volume to be used especially in built-in household appliances and similar devices differ according to their opening directions. The doors in built-in household appliances (fridge, oven, etc.) perform upward or horizontal opening movement. The door completes the closing movement by performing rotary movement centered around its edge on which it is connected with the pushing force applied by the user or the weight force of the door. The door hits on the body rapidly in closing movements realized with weight force of the door or the force of the user. The door can be deformed upon the door hitting harshly on the body, and there can be serious injuries if the limb of the user is left under the door. Furthermore, heat transfer may increase between the outer environment and inside the inner volume of the appliance as a result of opening the door after it is closed, and this situation negatively affects the operation of the appliance. A force should be applied on the appliance body for keeping the door closed after it is closed.

[0003] In the background art, there are various spring mechanisms in order to prevent the door from hitting hardly on the body on which it is to be closed and enable the door to remain closed on the appliance body. The moment occurring due to the weight of the door or the user applying force in closing direction of the door is enabled to be absorbed on the spring, and thus the door is enabled to be closed slowly. However, its desired absorbing ratio with desired angular position could not be determined; a solution for protecting with an additional elastic member against excess loads could not be provided. Furthermore, in systems wherein the door is enabled to be closed slowly with a spring, the compression spring used for force generation is installed in all angular positions during closing and opening of the door, and it is continuously subjected to internal tension. In open positions of the door wherein force-moment generation for closing the door is not required, the installed position of the spring, its internal tension continues. This situation causes an unnecessary fatigue on the spring, and then it negatively affects the life of the spring; and this creates the risk of the mechanism losing its function completely as a result of the deformation that can occur in the spring. Furthermore, in spring door mechanism used in the current technique, a plurality of intermediate members (the parts on which two ends of the compression spring abuts, structural members preventing the compression spring from shifting left and right, transmission components to which the compression spring transfers force, cam forms, etc.) are required so that the position of the compression spring is maintained stably and it generates the necessary forces in the required ratio and transfers in the desired direction. The presence of the said intermediate members takes up space in limited volume inside the mechanism, and this creates a negative situation in terms of cost.

[0004] The United States patent document no. US2010101052, an application in the state of the art, discloses a hinge mechanism with multiple connections. The inventive multiple connection hinge comprises a fixing member, and a rotatable door shaft bearing is attached movably relative to the fixing member. A spring placed between the fixing member and the door shaft bearing applies pre-tension to the door shaft bearing while the door is in closed position. The inventive multiple connection hinge mechanism can especially be applied to the fridge doors in order to prevent hitting.

[0005] Patent document no. DE29918559 U1 discloses a wide-angle hinge, in particular for furniture, wherein a body-side hinge part side and a wing fixed to one another by a plurality of pivot tabs, is accessible to an angle of substantially greater than 90 °, wherein the usable angle is reduced by a spacer, the spacer element is U-shaped profile in cross section and that the lateral legs of the U-shaped spacer with parallel or substantially parallel to the central web slots extending are provided and that the spacer in its width to a serial link is pushed, in the inserted state with the wider area the articulated lever in the longitudinal slot of the lateral legs of the spacer engages.

The Problems Solved with the Invention

[0006] The objective of the present invention is to provide an innovative and long-lasting door deceleration mechanism which enables the doors of the household appliances such as built-in fridge and like to be closed by decelerating.

[0007] The objective of the present invention is to provide an innovative door deceleration mechanism which enables the doors of the household appliances such as built-in fridge and like to be closed by decelerating without using spring member.

[0008] The objective of the present invention is to provide an innovative door deceleration mechanism wherein damping mechanism is used for closing doors of the household appliances such as built-in fridge and like by decelerating.

[0009] Another objective of the present invention is to provide an innovative door deceleration mechanism which comprises several precautions against damages that can occur due to internal and external forces and which provides long operating time.

Detailed Description of the Invention

[0010] An innovative door deceleration mechanism developed to fulfill the objective of the present invention is illustrated in the accompanying figures wherein:

Figure 1 is the front perspective view of the inventive innovative door deceleration mechanism.
Figure 2 is the front perspective view of the inventive innovative door deceleration mechanism when the door is in open position.
Figure 3 is the front view of the inventive innovative door deceleration mechanism.
Figure 4 is the front view of the inventive innovative door deceleration mechanism in the closing position of the door.
Figure 5 is the front detailed view of the damping arm and pin in the inventive innovative door deceleration mechanism.
Figure 6 is the front detailed view of the inventive innovative door deceleration mechanism in the closing position of the door.
Figure 7 is the front view of the inventive innovative door deceleration mechanism in closed position of the door.
Figure 8 is the front perspective view of the guide arm present in the inventive innovative door deceleration mechanism.
Figure 9 is the front perspective view of the damping arm present in the inventive innovative door deceleration mechanism.
Figure 10 is the front perspective view of another version of the damping arm present in the inventive innovative door deceleration mechanism.
Figure 11 is the front perspective view of another version of the damping arm present in the inventive innovative door deceleration mechanism.
Figure 12 is the front perspective view of the piston mechanism present in the inventive innovative door deceleration mechanism.
Figure 13 is the front perspective view of the piston mechanism mounted on the fixed bracket present in the inventive innovative door deceleration mechanism.

[0011] The components given in the figures are individually numbered where the numbers refer to the following.

1. Door deceleration mechanism
2. Fixed bracket
3. Upper bracket
4. First arm
5. Second arm
  51. Pin
6. Third arm
7. Guide arm
  71. Bump
8. Damping arm
  81. Slot
  82. Spring
  83. Fold
9. Damping system
  91. Connection piece
  911. First extension
  912. Second extension
  92. Force damper

[0012] A door deceleration mechanism (1), which prevents the doors especially in built-in fridges and the like from closing too fast, essentially comprises

- at least one fixed bracket (2) which is fixed on the volume on which the door is closed,
- at least one upper bracket (3) which is fixed on the door and moves together with the door,
- at least one first arm (4) which is connected on the fixed bracket (2) from one side, and which can freely rotate centered around the connection point,
- at least one second arm (5) which is connected on the upper bracket (3) from one side and on the first arm (4) from the other side, which can freely rotate from the connection points of the first arm (4) and the upper bracket (3), and which has a fixed pin (51) thereon,
- at least one third arm (6) which is connected on the upper bracket (3) from one side and on the part of the first arm (4) that is closer to the fixed bracket (2), which can freely rotate from the connection points of the first arm (4) and the upper bracket (3),
- at least one guide arm (7) which is connected to the fixed bracket (2) from one side and to the third arm (6) from the other side, which can freely rotate through the connection points, and which guides the third arm (6) during the opening and closing movement of the door,

- at least one damping arm (8) which is connected on the third arm (3) from one side such that it can rotate freely and to the second arm (5) by the pin (51) passing inside a linear channel shaped slot (81) provided thereon from the other side, which makes rotary motion centered around the third arm (6) during the closing movement of the door, and which decelerates the closing movement of the cover with a flexing motion after the movement of the slot (81) towards the pin (51) ends.

[0013] The inventive door deceleration mechanism (1) is in form of five arms which enable the loads originating from door weight and the internal parts of the hinge to be distributed and a slow closing movement to be realized. The distribution of the loads increases the static and dynamic strength of the mechanism and also increases its operating life. The door deceleration mechanism (1) is

comprised of an upper bracket (3) fixed on the door, a fixed bracket (2) fixed on the body on which the door will be closed, a first arm (4), a second arm (5) and a third arm (6) enabling the door to realize opening and closing movements by making folding movement, a guide arm (7) preventing the door from closing too fast, and a damping arm (8).

[0014] In the inventive door deceleration mechanism (1), the fixed bracket (2) is provided fixed on the body on which the door will be closed. There is an upper bracket (3) which is fixed on the door. The five arm mechanisms are provided between the fixed bracket (2) and the upper bracket (3). The first arm (4) provided on the fixed bracket (2) makes rotary movement centered around the connection point of the fixed bracket (2). The second arm (5) and the third arm (6) provided between the first arm (4) and the upper bracket (3) realize a folding movement together with the first arm (4) in opening and closing movement of the door. There is a guide arm (7) which enables the first arm (4), second arm (5) and the third arm (6) to move in desired closing and opening directions in opening and closing movements of the door. The guide arm (7) makes rotary movement on the fixed bracket (2) to which it is connected in opening movement of the door, and enables the third arm (6) to which it is connected and thus the first arm (4) and the second arm (5) to move in a certain direction. There is a damping arm (8), guide arm (7) and damping system (9) for preventing the door from closing too fast. The damping arm (8) is attached on the third arm (6) from one side such that it can rotate freely, and it is attached on the second arm (5) from the other side. The damping arm (8) has a slot (81) in form of a channel the connection of which to the second arm (5) passes onto a pin (51) and which can move on the fixed pin (51). It transfers the loads that come during closing of the door on to the body on which the door closes through the fixed bracket (2).

[0015] In the inventive door deceleration mechanism (1) upon the door starting to pass from open position (Figure 3) to closed position (Figure 6), the damping arm (8) makes rotary motion on the third arm (6) to which it is connected, and the slot (81) provided on its other end moves on the fixed pin (51). The movement of the fixed pin (51) inside the slot (81) continues until closing movement comes to the position where it is wanted to be slowed down. The pin (51) contacts around the slot (81) when the closing movement comes to the level where it is desired to be slowed down, and the slot (81) is prevented from moving in direction of the fixed pin (51). In case the closing movement continues, the slot (81) cannot move on the pin (51), and the damping arm (8) realizes a flexing movement. As a result of the flexing movement that is realized, the damping arm (8) provided between the second arm (5) and the third arm (6) slows down the movement of the second arm (5) and the third arm (6), and enables the door to complete its closing movement slowly.

[0016] In one embodiment of the invention, the guide arm (7) and the damping arm (8) are manufactured from a flexible material. The guide arm (7) and the damping arm (8) become more suitable for absorbing the loads coming thereon thanks to being manufactured from a flexible material, they return to initial positions and forms upon lifting the loads. In one embodiment of the invention, the guide arm (7) and the damping arm (8) are manufactured from a plastic material.

[0017] In one embodiment of the invention, there is at least one bump (71) on the guide arm (7), extending towards the fixed bracket (2) and in form of a height.

[0018] In one embodiment of the invention, there is a damping system (9) which is activated during closing movement of the door. The said damping system (9) essentially comprises

- at least one connection piece (91) which is fixed on the fixed bracket (2) such that it can freely rotate around its own axis, and which comprises
  - at least one first extension (911) in form of a protrusion on which the bump (71) on the guide arm (7) contacts during closing movement of the door, and
  - at least one second extension (912) in form of a protrusion preferably on the opposite side of the first extension (911), and which makes rotary motion around its own axis upon a force coming on the first extension (911),
- at least one force damper (92) which is attached on the first arm (4) from one side such that it can rotate freely and which is fixed on the second extension (912) from its other side, and which enables the door to slow down by damping the rotary force coming from the second extension (912) as a result of the connection piece (91) making its rotary motion.

[0019] The damping system (9) essentially transfers the force it receives from the guide arm (7) on the force damper (92) with a rotary movement depending on the cam form of the bump (71), and thus decelerates the door. Upon the door starts its closing movement, the guide arm (7) starts to make rotary motion centered around the fixed bracket (2). When the door reaches a certain open position, the bump (71) provided on the guide arm (7) contacts the first extension (911) provided on the connection piece (91), and transfers the closing force of the door to the first extension (911). The force coming on the first extension drives the connection piece (91) for rotating around its own axis, and it is transferred to the force damper (92) through the second extension (912) provided on the connection piece (91).

[0020] In one embodiment of the invention, during closing movement of the door, the loads generated due to inertial moment of the door are enabled to be transferred to the damping system (9) first by the guide arm (7) in a certain angular position and depending on the cam form

provided on top of the bump (71), and then to the fixed bracket (2) by the damping system (9).

[0021] In one embodiment of the invention, the guide arm (7) transfers the loads coming during closing of the door to the fixed bracket (2) through the damping system (9) depending on the cam form (71). These loads are transferred on the body on which the door is closed by means of the fixed bracket (2). The excessive loads that can occur due to closing the door faster than required are absorbed by the guide arm (7) flexing in opposite direction relative to the cam form (71), and the piston (92) provided on the damping system (9) is prevented from being deformed due to excessive loads.

[0022] In one embodiment of the invention, the force damper (92) is a piston. In this way, the forces coming on the connection piece (91) are absorbed with a piston, and the door is enabled to close slowly.

[0023] In one embodiment of the invention, the force damper (92) is a spring. In this way, the forces coming on the connection piece (91) are absorbed with a spring, and the door is enabled to close slowly.

[0024] In one embodiment of the invention, the guide arm (7) is flexible. In excessive loads that can occur in case the door is closed too fast, the guide arm makes flexing movement in opposite direction of the incoming force and absorbs the force, and thus the force damping (92) piece is prevented from being deformed under excessive loads.

[0025] In case the damping system (9) is used together with slowing down of the damping arm (8), it is activated in case an excessive load comes on the door in closing direction. In another embodiment of the invention, the damping system (9) is used instead of spring, and it realizes the slow closing movement of the door all by itself.

[0026] In one embodiment of the invention, the guide arm (7) and the damping arm (8) are connected on the third arm (6) such that they will rotate freely on the same shaft. In this way, both guide arm (7) and the damping arm (8) can realize rotary motion centered around a single shaft by means of using a single shaft.

[0027] In one embodiment of the invention, there is at least one spring (82) which is provided on the damping arm (8) and helps the damping arm to make flexing movement.

[0028] In one embodiment of the invention, there is a fold (83) provided on the damping arm (8) body, enabling the damping arm (8) to show better flexing feature, and formed by twisting the damping arm (8).

[0029] There is at least one damping arm (8) which is connected on the third arm (6) from one side such that it will freely rotate, and which is connected on the second arm (5) from its other end upon the pin (51) passing inside a linear channel shaped slot (81) provided thereon, which slows down the closing movement of the door by means of a rotary movement centered around the third arm (6) during closing movement of the door and a flexing movement after the movement of the slot (81) towards the pin (51) ends, the flexing movement of which continues up to a certain angular position, which transfers force to the second arm (5) and the third arm (6) to which it is connected due to the flexing movement it performs in closed position of the door, and which helps the door to remain in closed position by means of the force it transfers.

[0030] There is at least one damping arm (8) which is connected on the third arm (3) from one side such that it can rotate freely and to the second arm (5) by the pin (51) passing inside a linear channel shaped slot (81) provided thereon from the other side, which makes rotary motion centered around the third arm (6) during the opening movement of the door, and which preserves its current form due to the movement of the slot (81) towards the pin (51), and therefore which is not subjected to any elastic-plastic deformation, fatigue during opening movement of the door.

Claims

1. A door deceleration mechanism (1), which prevents the doors especially in built-in fridges and the like from closing too fast, essentially **comprising**

   - at least one fixed bracket (2) which is fixed on the volume on which the door is closed,
   - at least one upper bracket (3) which is fixed on the door and moves together with the door,
   - at least one first arm (4) which is connected on the fixed bracket (2) from one side, and which can freely rotate centered around the connection point,
   - at least one second arm (5) which is connected on the upper bracket (3) from one side and on the first arm (4) from the other side, which can freely rotate from the connection points of the first arm (4) and the upper bracket (3), and
   - at least one third arm (6) which is connected on the upper bracket (3) from one side and on the part of the first arm (4) that is closer to the fixed bracket (2), which can freely rotate from the connection points of the first arm (4) and the upper bracket (3),
   - at least one guide arm (7) which is connected to the fixed bracket (2) from one side and to the third arm (6) from the other side, which can freely rotate through the connection points, and which guides the third arm (6) during the opening and closing movement of the door,
   - at least one pin (51) which is fixed on the second arm (5). and **characterized in**
   - at least one damping arm (8) which is connected on the third arm (6) from one side such that it can rotate freely and to the second arm (5) by the pin (51) passing inside a linear channel shaped slot (81) provided on said damping arm (8) from the other side, which makes rotary motion centered around the third arm (6) during the

closing movement of the door, and which decelerates the closing movement of the cover with a flexing motion after the movement of the slot (81) towards the pin (51) ends.

2. A door deceleration mechanism (1) according to claim 1 wherein said at least one damping arm (8) makes flexing movement upon the movement of the slot (81) towards the pin (51) ends and the door comes to closed position, transfers force to the second arm (5) and the third arm (6) due to the flexing movement it performs in closed position of the door, and helps the door to remain in closed position with the force it transfers.

3. A door deceleration mechanism (1) according to claim 1 wherein said at least one damping arm (8) makes rotary motion centered around the third arm (6) during the opening movement of the door, and preserves its current form due to the movement of the slot (81) towards the pin (51), and therefore is not subjected to any elastic-plastic deformation, fatigue during opening movement of the door.

4. A door deceleration mechanism (1) according to claim 1 **comprising** at least one spring (82) which is provided on the damping arm (8) and helps the damping arm (8) to make flexing movement.

5. A door deceleration mechanism (1) according to claim 1 **comprising** a fold (83) which is provided on the damping arm (8), which enables the damping arm (8) to show better flexing feature, and which is formed by twisting the damping arm body.

6. A door deceleration mechanism (1) according to claim 1 **comprising** at least one cam formed bump (71) which is provided on the guide arm (7) and extends in direction of the fixed bracket (2).

7. A door deceleration mechanism (1) according to claim 1 and 6, further comprising a damping system, activated during closing movement of the door, **comprising**

- at least one connection piece (91) which is fixed on the fixed bracket (2) such that it can freely rotate around its own axis, and which comprises
  - at least one first extension (911) in form of a protrusion on which the bump (71) on the guide arm (7) contacts during closing movement of the door, and
  - at least one second extension (912) in form of a protrusion preferably on the opposite side of the first extension (911), and which makes rotary motion around its own axis upon a force coming on the first extension (911),
- at least one force damper (92) which is attached on the first arm (4) from one side such that it can rotate freely and which is fixed on the second extension (912) from its other side, and which enables the door to slow down by damping the rotary force coming from the second extension (912) as a result of the connection piece (91) making its rotary motion.

8. A door deceleration mechanism (1) according to claim 7, wherein said force damper (92) is a piston formed of a body and arm.

9. A door deceleration mechanism (1) according to claim 7, wherein said force damper (92) is a spring with flexing feature.

10. A door deceleration mechanism (1) according to claim 1 wherein the damping arm (8) is manufactured from plastic material.

11. A door deceleration mechanism (1) according to claim 1 and 8, wherein the guide arm (7) absorbs the excessive loads that can reach said damping system by means of its flexing feature and to prevent the piston (92) from being damaged.

12. A door deceleration mechanism (1) according to claim 1 and 7, wherein said guide arm (7) transfers the forces occurring during closing to the damping system (9) by means of the cam form (71), and thus enables the door to move slowly.

Patentansprüche

1. Türverzögerungsmechanismus (1), der verhindert, dass die Türen, insbesondere bei Einbaukühlschränken und dergleichen, zu schnell schließen, im Wesentlichen **bestehend aus**

- mindestens eine feste Klammer (2), die an dem Umfang befestigt ist, an dem die Tür geschlossen wird,
- mindestens eine obere Klammer (3), die an die Tür befestigt ist und sich mit der Tür mitbewegt,
- mindestens ein erster Arm (4), der von einer Seite an die feste Klammer (2) angeschlossen ist, und der sich frei um den Verbindungspunkt zentriert drehen kann,
- mindestens ein zweiter Arm (5), der von einer Seite an die obere Klammer (3) und von der anderen Seite an dem ersten Arm (4) angeschlossen ist, der sich von den Verbindungspunkten des ersten Arms (4) und der oberen Klammer (3) aus frei drehen kann, und

- mindestens ein dritter Arm (6), der von einer Seite an die obere Klammer (3) und auf dem Teil des ersten Arms (4), das der festen Klammer (2) näher ist, angeschlossen ist, der sich von den Verbindungspunkten des ersten Arms (4) und der oberen Klammer (3) aus frei drehen kann,
- mindestens ein Führungsarm (7), der von einer Seite zu der festen Klammer (2) und von der anderen Seite zu dem dritten Arm (6) angeschlossen ist, der sich durch die Verbindungspunkte frei drehen kann, und der den dritten Arm (6) während der Öffnungs- und Schließbewegung der Tür führt,
- mindestens ein Zapfen (51), der an dem zweiten Arm (5) befestigt ist, und

gekennzeichnet durch

- mindestens ein Dämpfungsarm (8), der von einer Seite so dass er sich frei drehen kann an dem dritten Arm (6) und der zu dem zweiten Arm (5) durch den Zapfen (51) angeschlossen ist, der von der anderen Seite in einem linearen, kanalförmigen, an dem Dämpfungsarm (8) vorgesehenen Nut (81) verläuft; der während der Schließbewegung der Tür eine um den dritten Arm (6) zentrierte Drehbewegung ausführt, und der die Schließbewegung der Abdeckung mit einer Biegebewegung nach der Bewegung der Nute (81) in Richtung des Zapfens (51) verzögert.

2. Türverzögerungsmechanismus (1) nach Anspruch 1, wobei mindestens ein Dämpfungsarm (8), nachdem die Bewegung der Nute (81) in Richtung des Zapfens (51) endet und die Tür in eine Scließposition kommt eine Biegebewegung ausführt, zu dem zweiten Arm (5) und dem dritten Arm (6), aufgrund der Biegebewegung, die er in der geschlossenen Stellung der Tür ausführt eine Kraft überträgt, und hilft der Tür mithilfe der Kraft, die er übertragt hat in der Schließposition zu bleiben.

3. Türverzögerungsmechanismus (1) nach Anspruch 1, wobei mindestens ein Dämpfungsarm (8) während der Öffnungsbewegung der Tür eine um den dritten Arm (6) zentrierte Drehbewegung ausführt, und aufgrund der Bewegung der Nute (81) in Richtung des Zapfens (51) seine derzeitige Form bewahrt, und ist daher keiner elastisch-plastischen Verformung, Ermüdung während der Öffnungsbewegung der Tür ausgesetzt.

4. Türverzögerungsmechanismus (1) nach Anspruch 1, **umfassend** mindestens eine Feder (82), die auf dem Dämpfungsarm (8) vorgesehen ist und dem Dämpfungarm (8) hilft die Biegebewegung auszuführen.

5. Türverzögerungsmechanismus (1) nach Anspruch 1, **umfassend** mindestens ein Falz (83), der auf dem Dämpfungsarm (8) vorgesehen ist, und der dem Dämpfungsarm (8) hilft bessere Biegeeigenschaften zu zeigen, und der durch Verdrehen des Dämpfungsarmkörpers gebildet wird.

6. Türverzögerungsmechanismus (1) nach Anspruch 1, **umfassend** mindestens eine nockenförmigen Beule (71), die auf dem Führungsarm (7) vorgesehen ist und in Richtung der festen Klammer (2) erweitert.

7. Türvezögerungsmechanismus (1), nach Anspruch 1 und 6, ferner umfassend ein Dämpfungssystem, aktiviert während der Schließbewegung der Tür, **umfassend**

- wenigstens ein Verbindungsstück (91), das auf die feste Klammer (2) befestigt ist, so dass es um die eigene Achse frei drehen kann, und das

  • mindestens eine erste Erweiterung (911) in Form eines, an dem bei der Schließbewgung der Tür die Beule (71) des Führungsarms (7) anliegendes Vorsprungs umfasst, und
  • mindestens eine zweite Erweiterung (912) beveorzugt in der Gegenseite der ersten Erweiterung (911) in Form eines Vorsprungs, und der um seine eige Achse eine Drehbewegung ausführt, wenn eine Kraft auf die erste Erweiterung (911) wirkt,

- mindestens ein Kraftdämpfer (92), der von einer Seite auf den ersten Arm (4) zugeführt ist, so dass er sich frei drehen kann und von der anderen Seite aus auf die zweite Erweiterung (912) befestigt ist, und der durch dämpfen der infolge der eigenen Drehbewegung des Verbindungsstückes (91) aus der zweiten Erweiterung (912) kommender Drehkraft die Tür ermöglicht zu verlangsamen.

8. Türverzögerungsmechanismus (1) nach Anspruch 7, wobei der Kraftdämpfer (92) ein Kolben ist, der aus einem Körper und einem Arm gebildet ist.

9. Türverzögerungsmechanismus (1) nach Anspruch 7, wobei der Kraftdämpfer (92) ein Kolben ist, der eine Biegeeigenschaft besitzt.

10. Türverzögerungsmechanismus (1) nach Anspruch 1, wobei der Dämpfungsarm (8) aus Kunststoffmaterial hergestellt ist.

11. Türverzögerungsmechanismus (1) nach Anspruch 1 und 8, wobei der Führungsarm (7) die übermäßi-

gen Belastungen, die das Dämpfungssystem erreichen können, durch seine Biegeeigenschaft und um zu verhindern, dass der Kolben (92) beschädigt wird absorbiert.

12. Türvezögerungsmechanismus (1) nach Anspruch 1 und 7, wobei der Führungsarm (7) die beim Schließen auftretenden Kräfte mittels der Nockenform (71) auf das Dämpfungssystem (9) überträgt und somit eine langsame Bewegung der Tür ermöglicht.

Revendications

1. Mécanisme de décélération de la porte (1), qui empêche les portes, notamment dans les réfrigérateurs encastrés et autres, de se fermer trop rapidement, **comprenant** essentiellement

- au moins un support fixe (2) qui est fixé sur le volume sur lequel la porte est fermée,
- au moins un support supérieur (3) qui est fixé sur la porte et qui se déplace avec la porte,
- au moins un premier bras (4) qui est relié sur le support fixe (2) par un côté, et qui peut tourner librement autour du point de connexion,
- au moins un deuxième bras (5) qui est relié au support supérieure (3) d'un côté et au premier bras (4) de l'autre côté, qui peut tourner librement à partir des points de connexion du premier bras (4) et du support supérieur (3), et
- au moins un troisième bras (6) qui est relié sur le support supérieur (3) d'un côté et sur la partie du premier bras (4) qui est la plus proche du support fixe (2), qui peut tourner librement à partir des points de connexion du premier bras (4) et du support supérieur (3),
- au moins un bras de guidage (7) qui est relié au support fixe (2) d'un côté et au troisième bras (6) de l'autre côté, qui peut tourner librement à travers les points de connexion, et qui guide le troisième bras (6) pendant le mouvement d'ouverture et de fermeture de la porte,
- au moins une tige (51) qui est fixée sur le deuxième bras (5), et **caractérisé en ce que**
- au moins un bras amortisseur (8) qui est relié sur le troisième bras (6) d'un côté de manière à pouvoir tourner librement et au deuxième bras (5) par la tige (51) passant à l'intérieur d'une fente linéaire en forme de canal (81) prévue sur ledit bras amortisseur (8) de l'autre côté, qui effectue un mouvement de rotation centré autour du troisième bras (6) pendant le mouvement de fermeture de la porte, et qui décélère le mouvement de fermeture du couvercle avec un mouvement de flexion après que le mouvement de la fente (81) vers la tige (51) se termine.

2. Mécanisme de décélération de la porte (1) selon la revendication 1, dans lequel ledit au moins un bras amortisseur (8) effectue un mouvement de flexion lors du déplacement de la fente (81) vers les extrémités de la tige (51) et la porte vient en position fermée, transfère la force au deuxième bras (5) et au troisième bras (6) en raison du mouvement de flexion qu'il effectue en position fermée de la porte, et aide la porte à rester en position fermée grâce à la force qu'elle transfère.

3. Mécanisme de décélération de la porte (1) selon la revendication 1, dans lequel ledit au moins un bras amortisseur (8) effectue un mouvement de rotation centré autour du troisième bras (6) pendant le mouvement de l'ouverture de la porte, et conserve sa forme actuelle grâce au déplacement de la fente (81) vers la tige (51), et n'est donc pas soumis à une déformation élastique-plastique, à une fatigue lors du mouvement d'ouverture de la porte.

4. Mécanisme de décélération de la porte (1) selon la revendication 1, **comprenant** au moins un ressort (82) qui est prévu sur le bras amortisseur (8) et qui aide le bras amortisseur (8) à effectuer un mouvement de flexion.

5. Mécanisme de décélération de la porte (1) selon la revendication 1, **comprenant** un pli (83) qui est prévu sur le bras amortisseur (8), qui permet au bras amortisseur (8) de présenter une meilleure caractéristique de flexion, et qui est formé par la torsion du corps du bras amortisseur.

6. Mécanisme de décélération de la porte (1) selon la revendication 1, **comprenant** au moins une bosse (71) en forme de came qui est prévue sur le bras de guidage (7) et qui s'étend en direction du support fixe (2).

7. Mécanisme de décélération de la porte (1) selon la revendication 1 et 6, comprenant en outre un système d'amortissement, activé lors du mouvement de fermeture de la porte **comprenant**

- au moins une pièce de connexion (91) qui est fixée sur le support fixe (2) de manière à pouvoir tourner librement autour de son propre axe, et qui comprend

  • au moins une première extension (911) sous la forme d'une saillie sur laquelle la bosse (71) du bras de guidage (7) vient en contact lors du mouvement de fermeture de la porte, et
  • au moins une deuxième extension (912) sous la forme d'une saillie, de préférence du côté opposé à la première extension

(911), et qui effectue un mouvement de rotation autour de son propre axe à la suite d'une force exercée sur la première extension (911),

- au moins un amortisseur de force (92) qui est fixé sur le premier bras (4) d'un côté de manière à pouvoir tourner librement et qui est fixé sur la deuxième extension (912) de son autre côté, et qui permet de ralentir la porte en amortissant la force de rotation provenant de la deuxième extension (912) grâce au mouvement de rotation de la pièce de connexion (91).

8. Mécanisme de décélération de la porte (1) selon la revendication 7, dans lequel ledit amortisseur de force (92) est un piston formé d'un corps et d'un bras.

9. Mécanisme de décélération de la porte (1) selon la revendication 7, dans lequel ledit amortisseur de force (92) est un ressort avec une caractéristique de flexion.

10. Mécanisme de décélération de la porte (1) selon la revendication 1, dans lequel le bras amortisseur (8) est fabriqué en matière plastique.

11. Mécanisme de décélération de la porte (1) selon la revendication 1 et 8, dans lequel le bras de guidage (7) absorbe les charges excessives qui peuvent atteindre ledit système d'amortissement grâce à sa caractéristique de flexion et pour éviter que le piston (92) ne soit endommagé.

12. Mécanisme de décélération de la porte (1) selon la revendication 1 et 7, dans lequel ledit bras de guidage (7) transfère les forces se produisant lors de la fermeture au système d'amortissement (9) au moyen de la forme de came (71), et permet ainsi à la porte de se déplacer lentement.

FIGURE 1

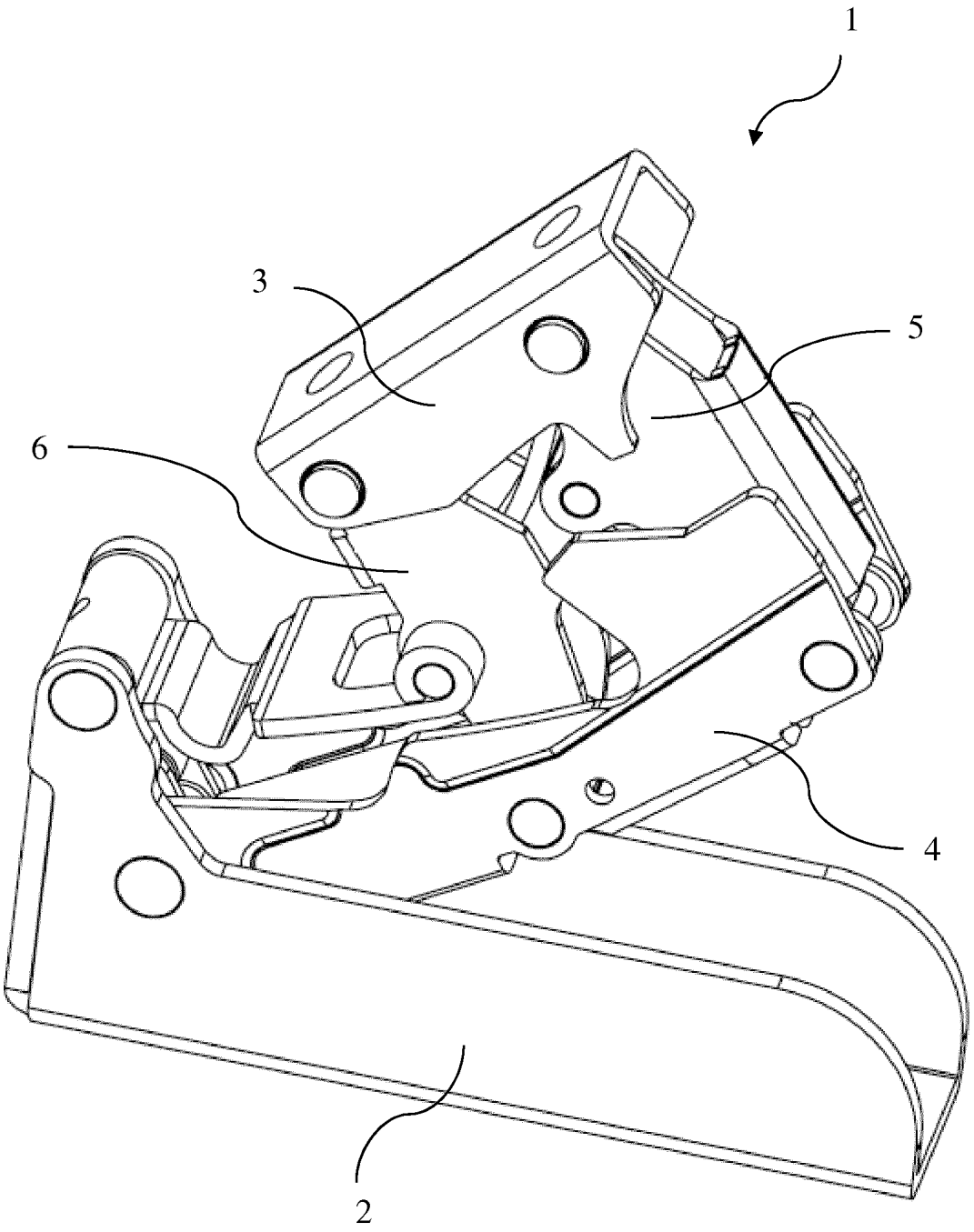


FIGURE 2

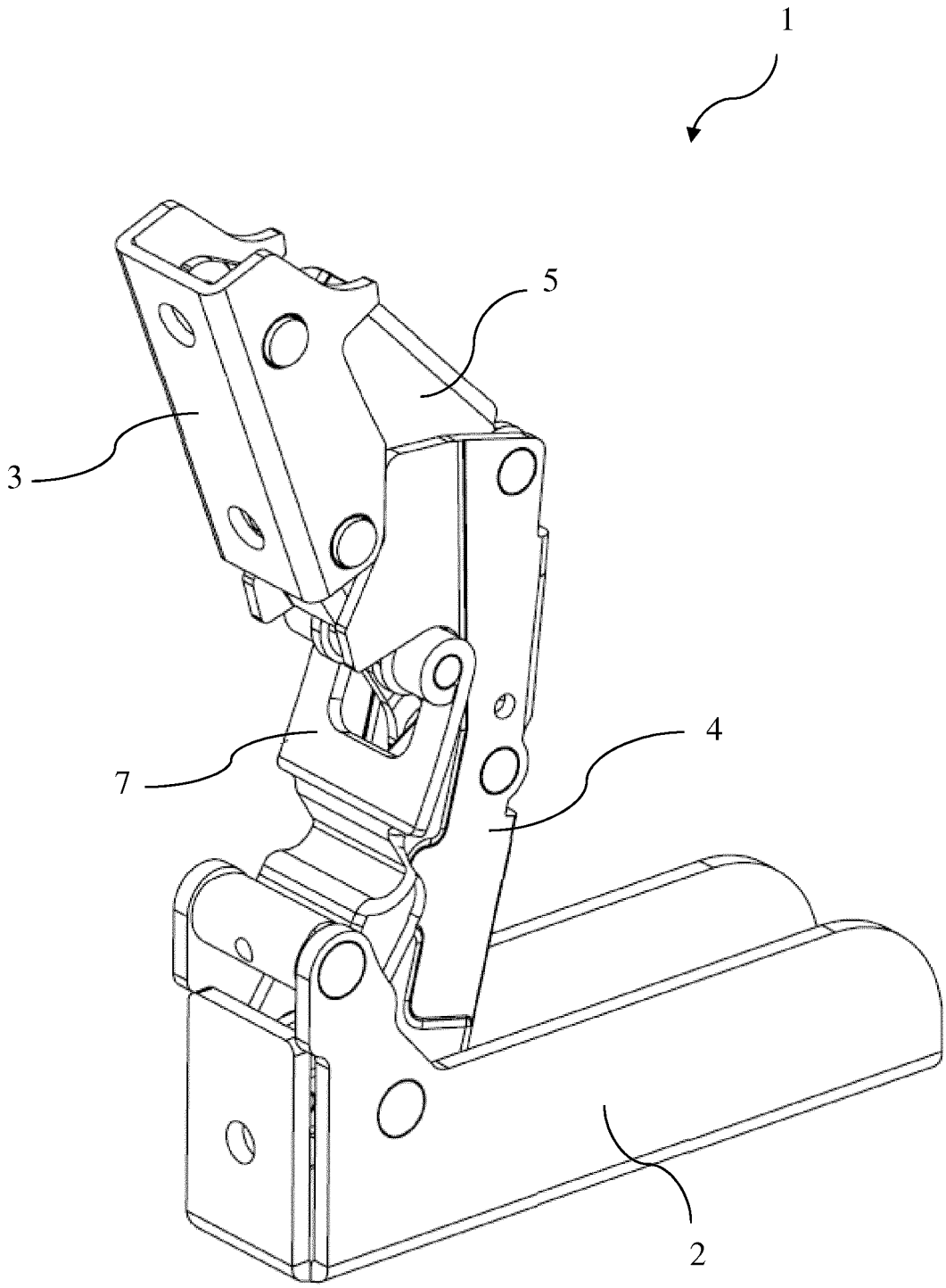


FIGURE 3

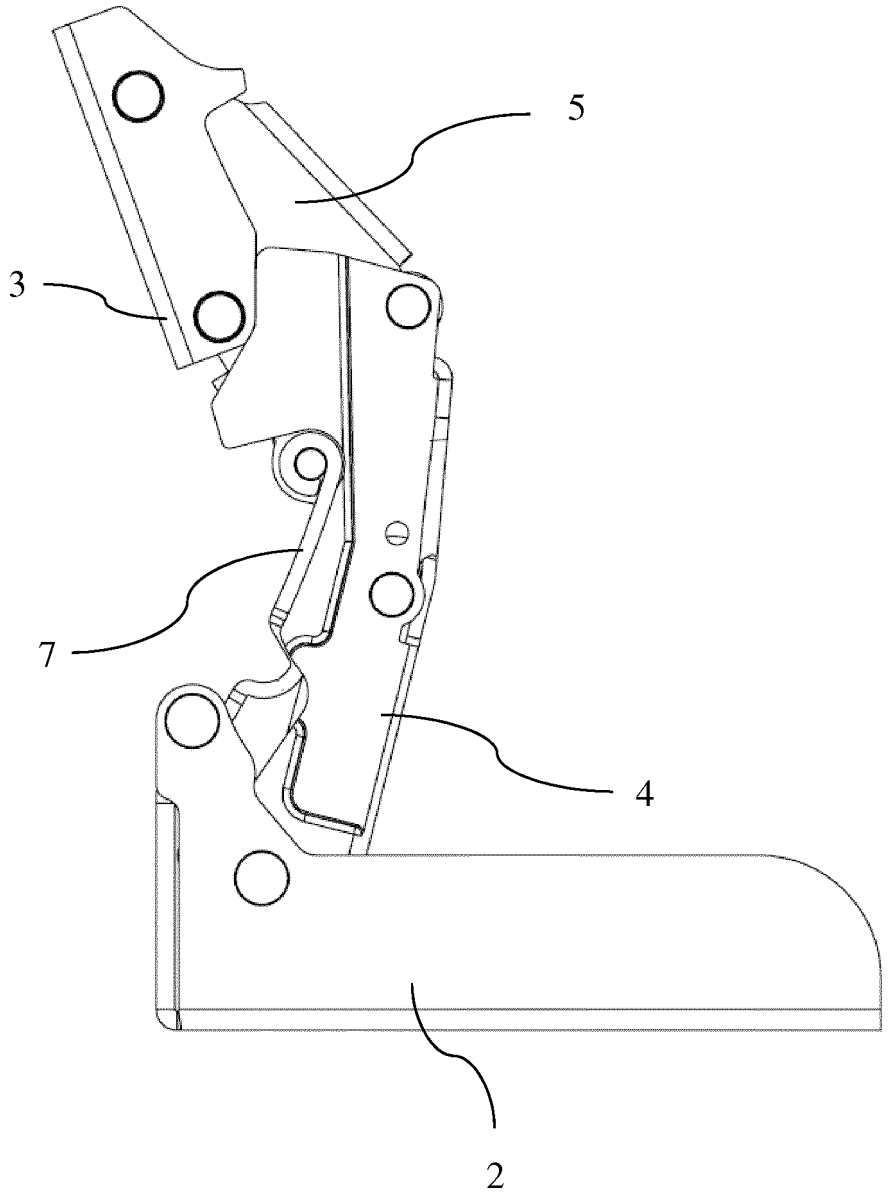


FIGURE 4

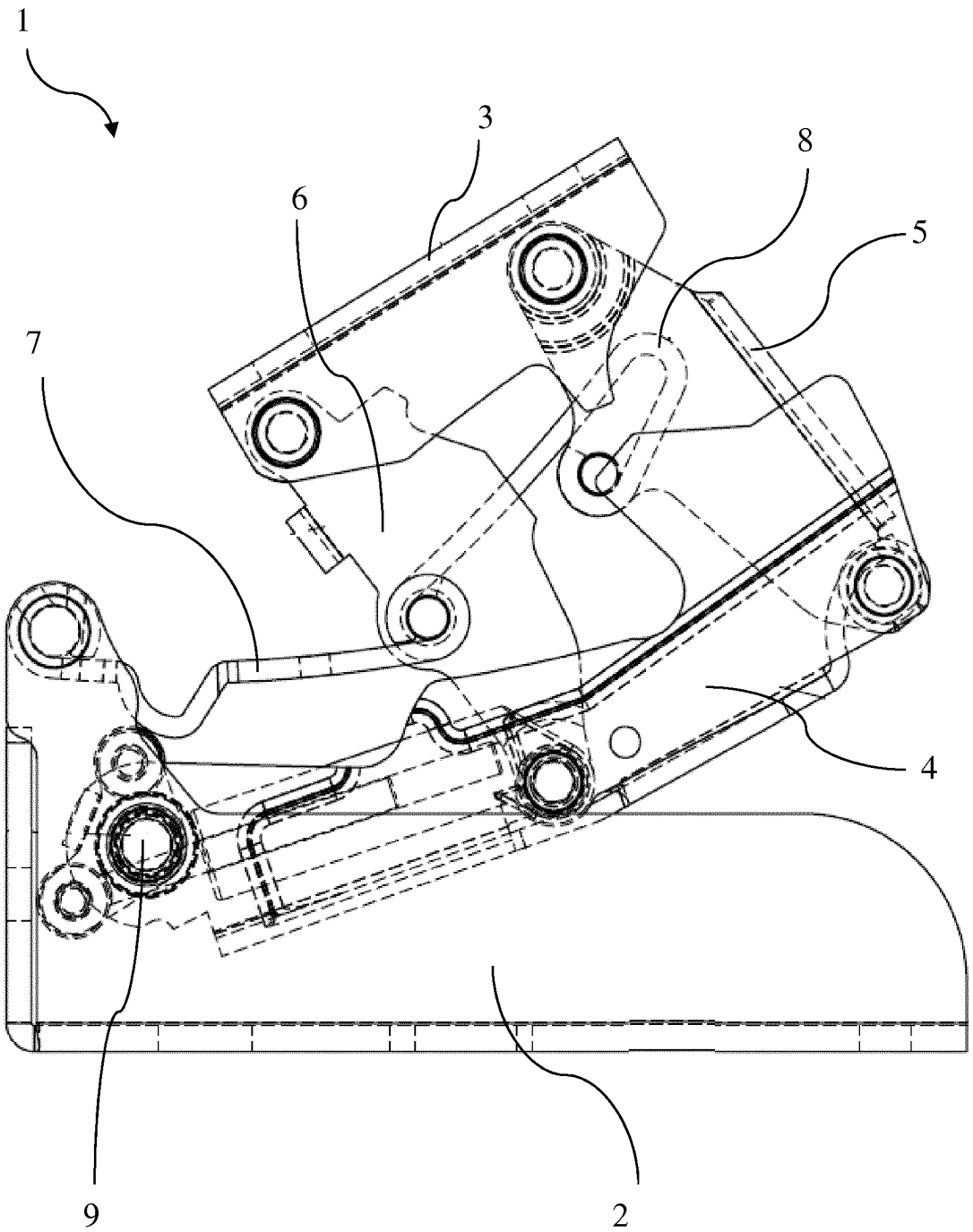


FIGURE 5

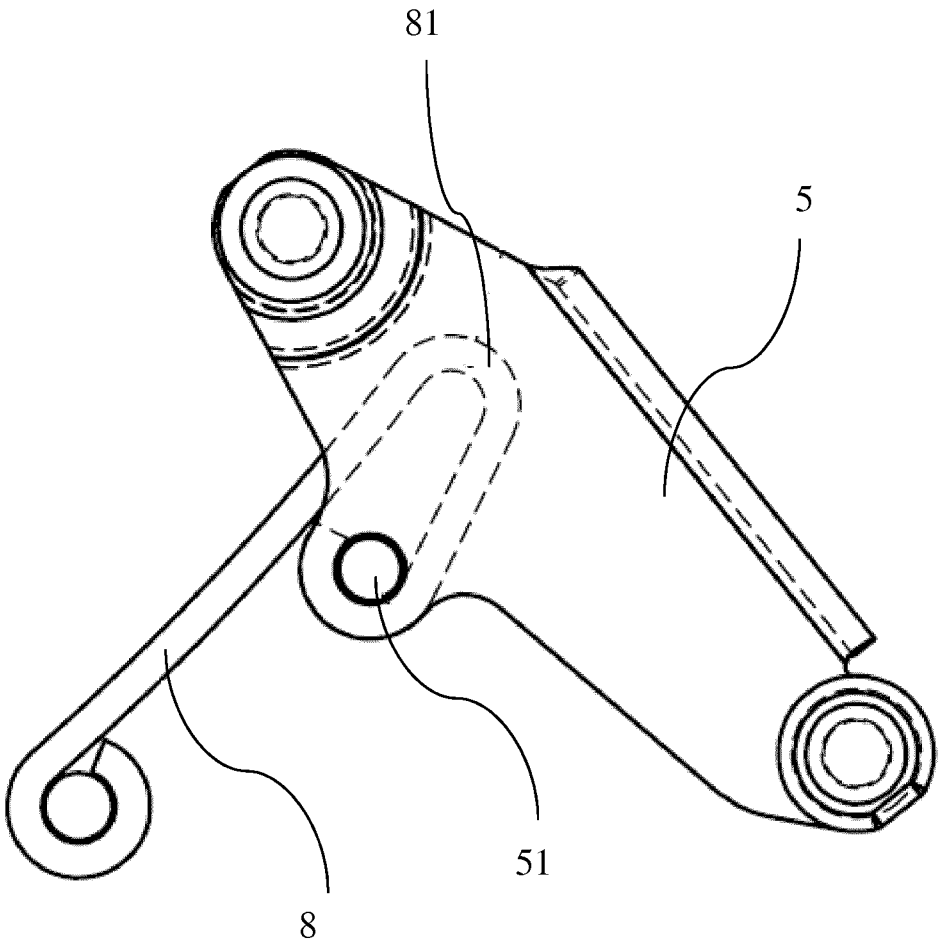


FIGURE 6

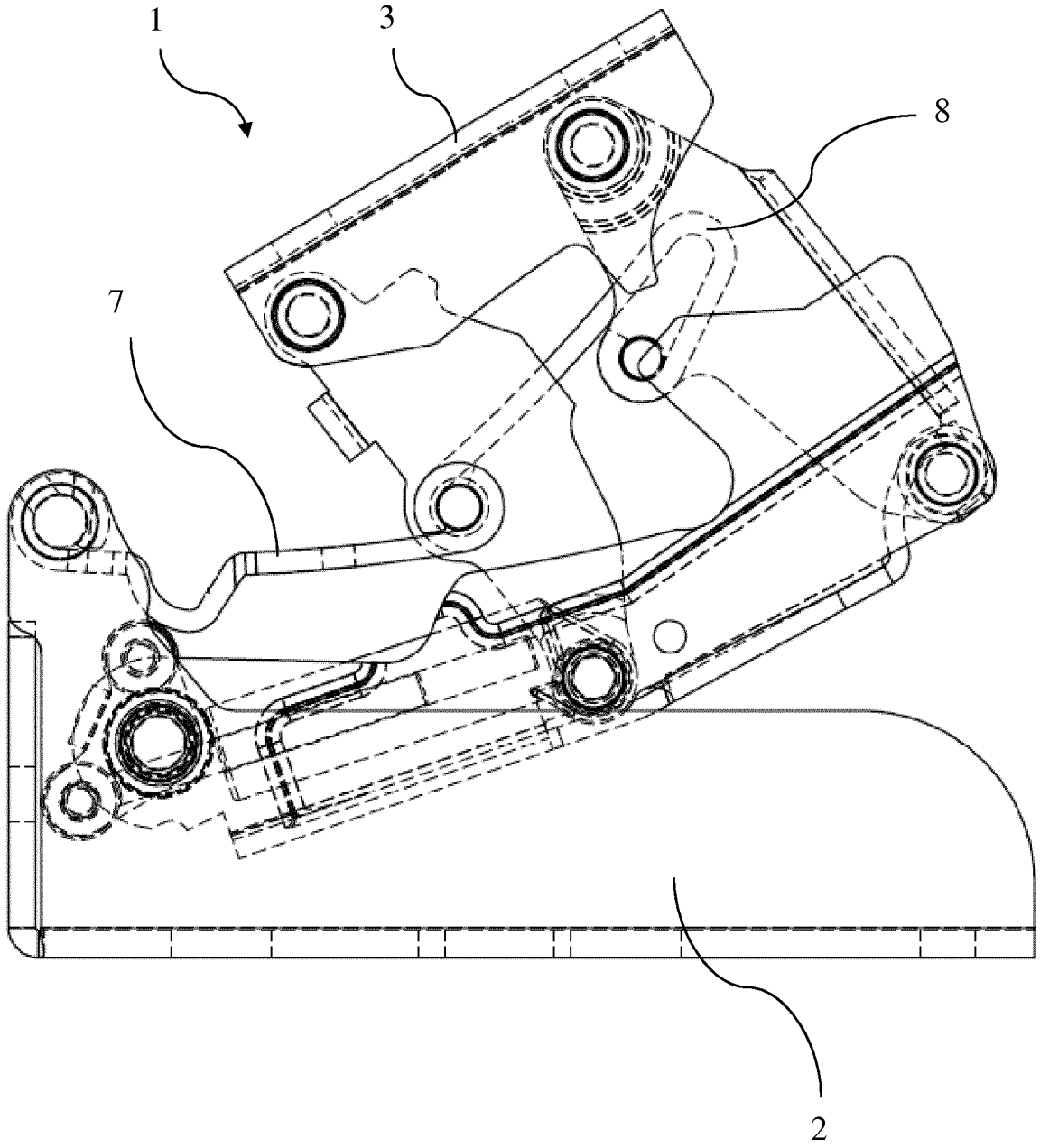


FIGURE 7

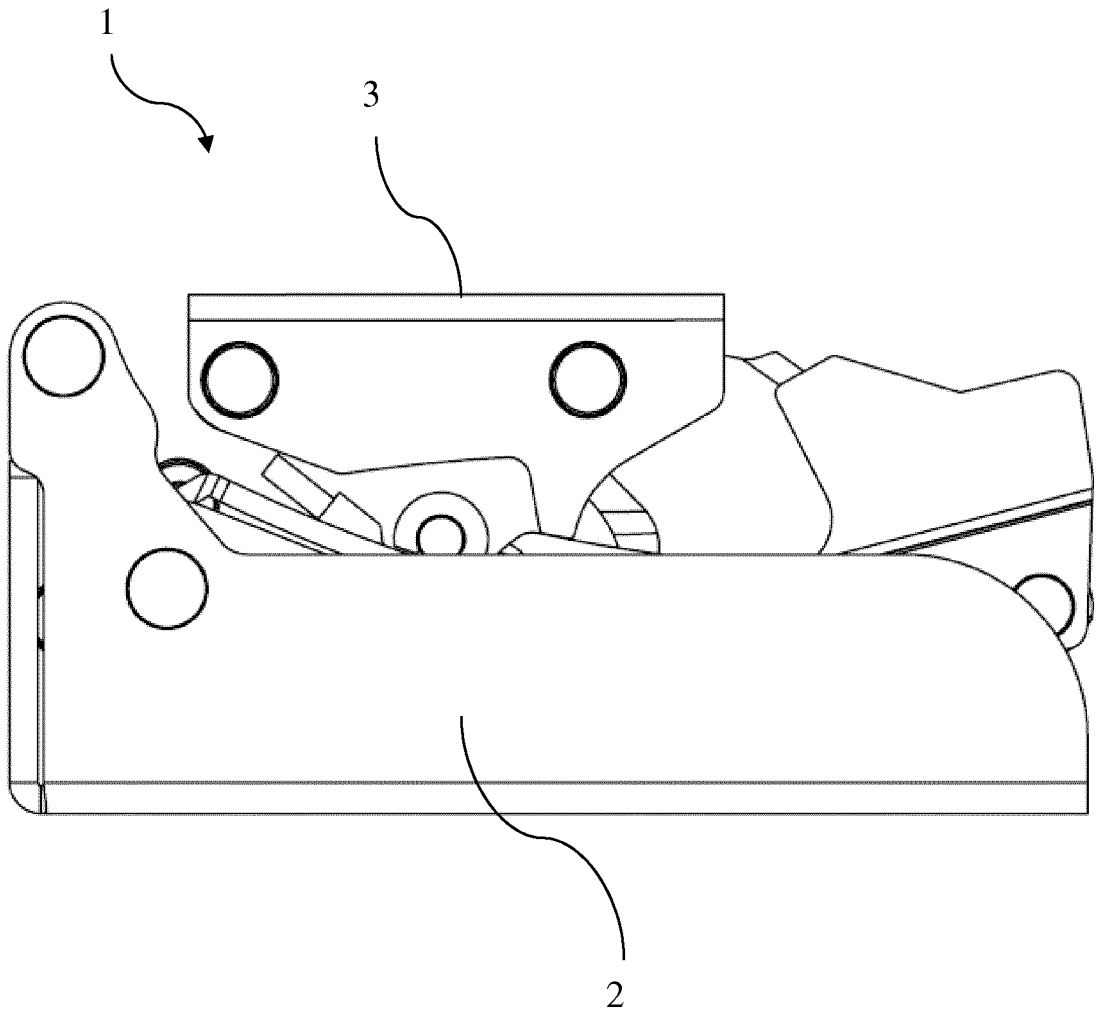


FIGURE 8

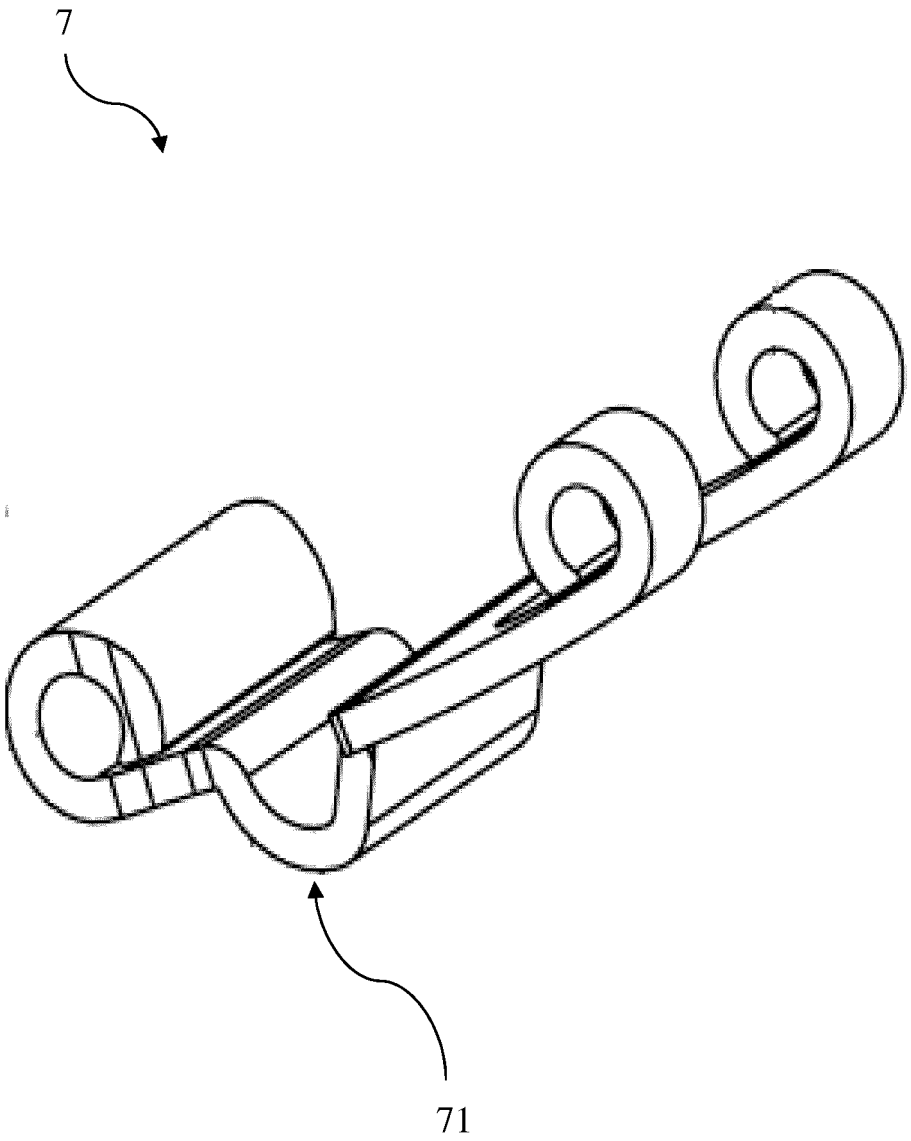


FIGURE 9

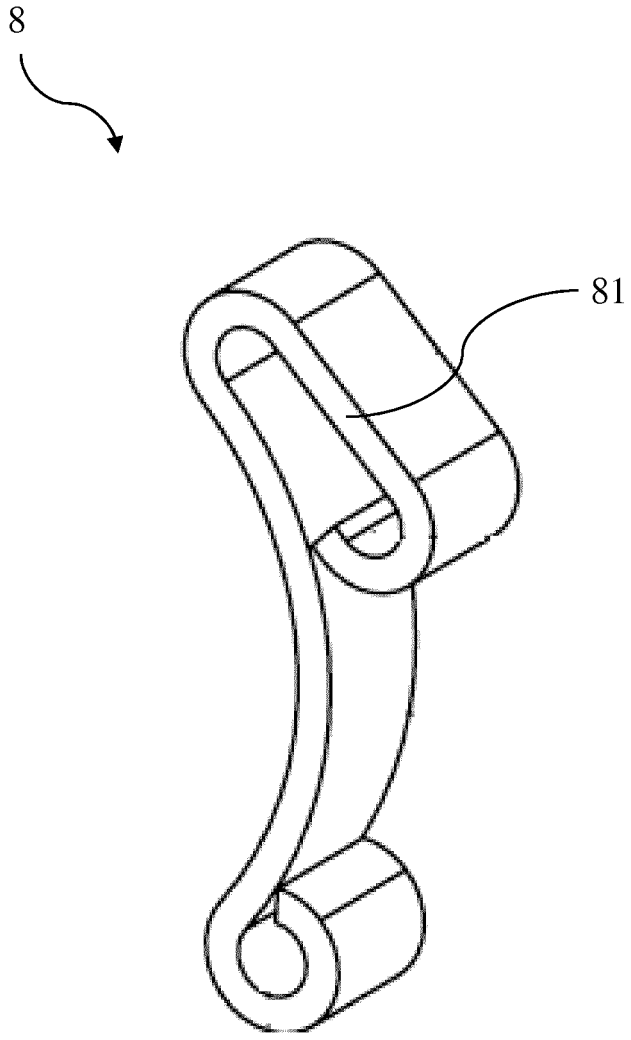
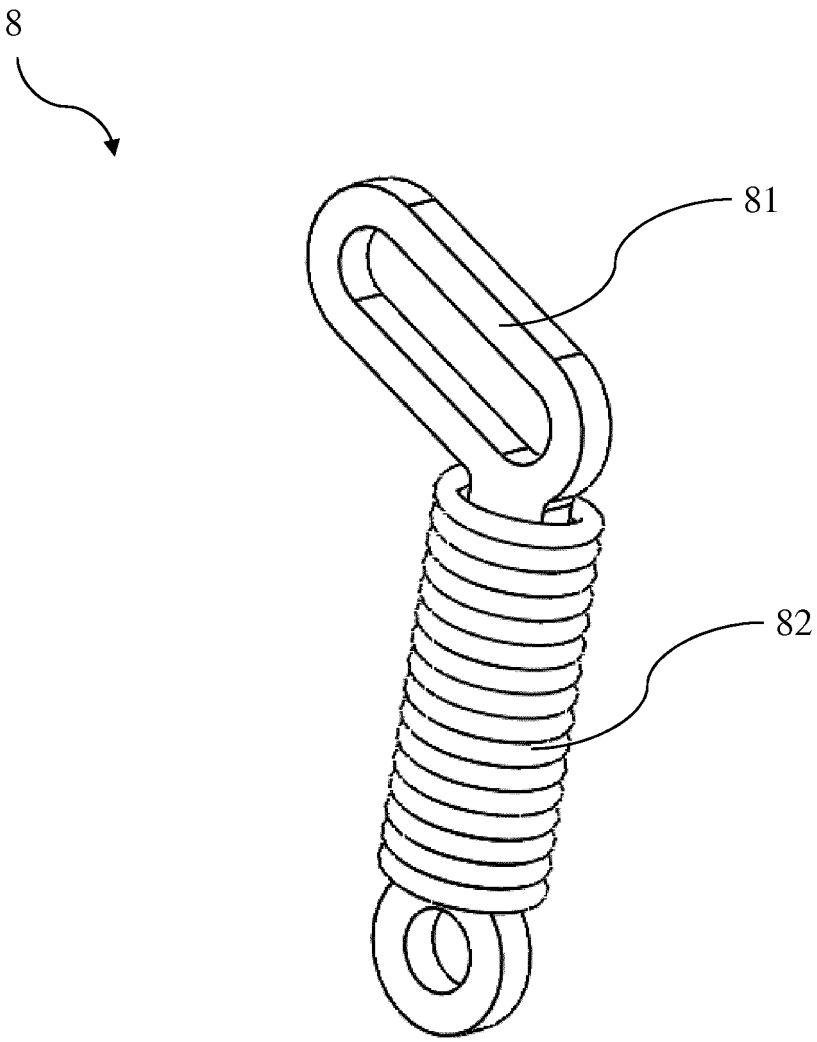


FIGURE 10



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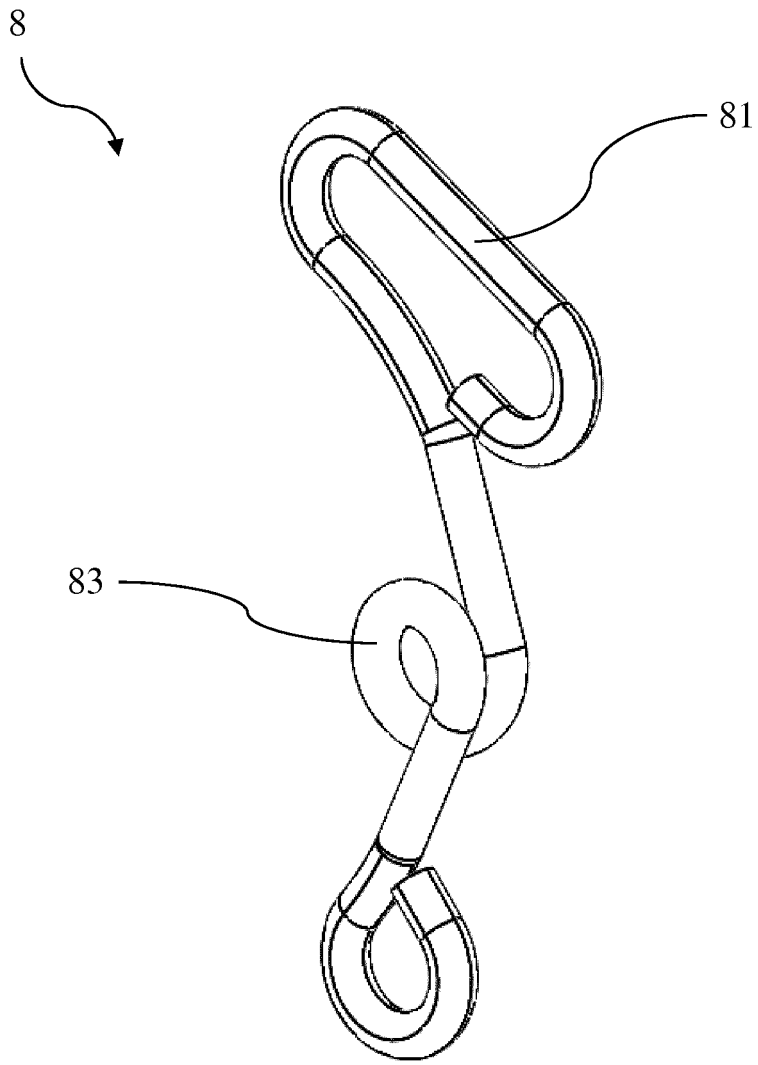

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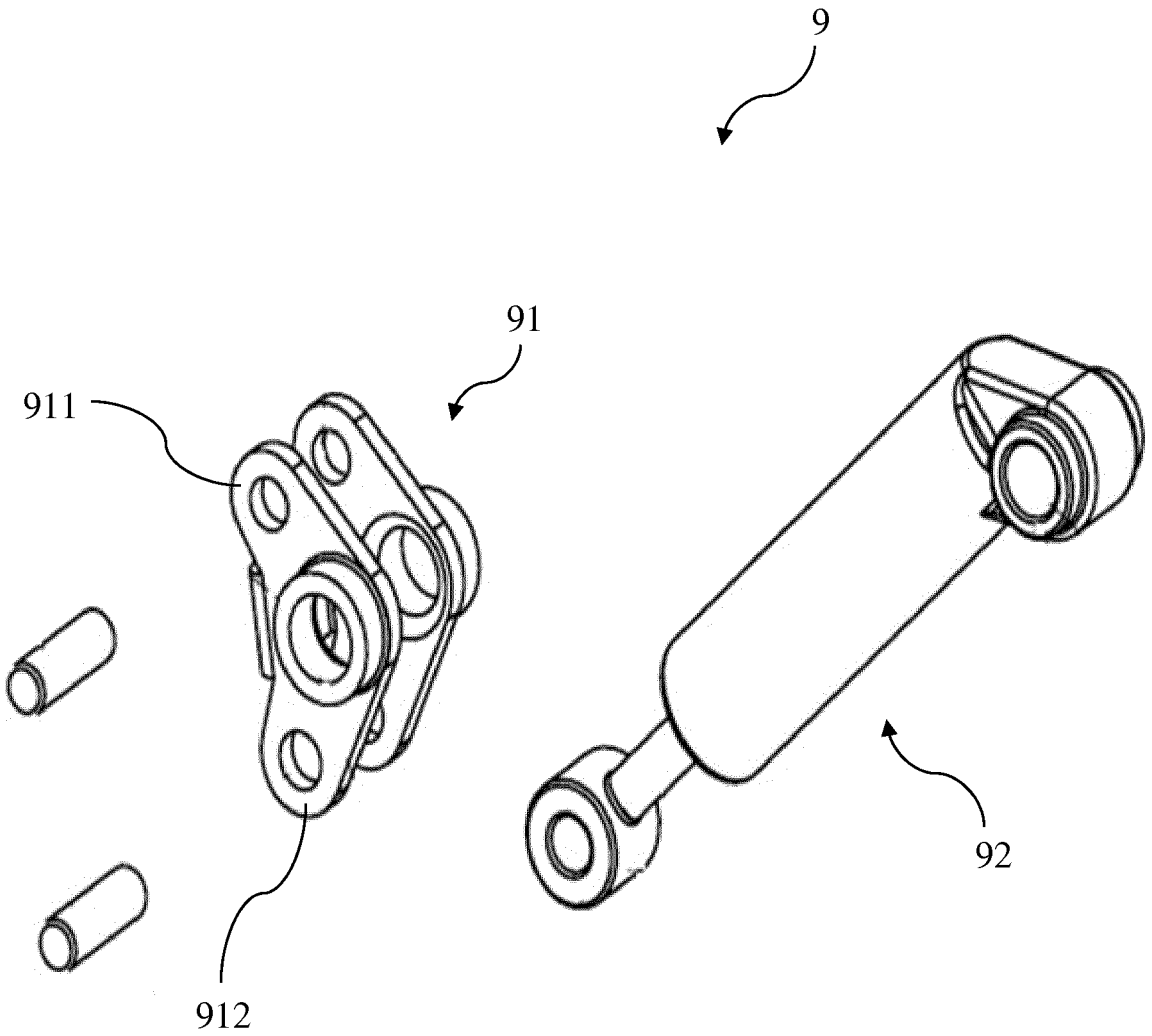
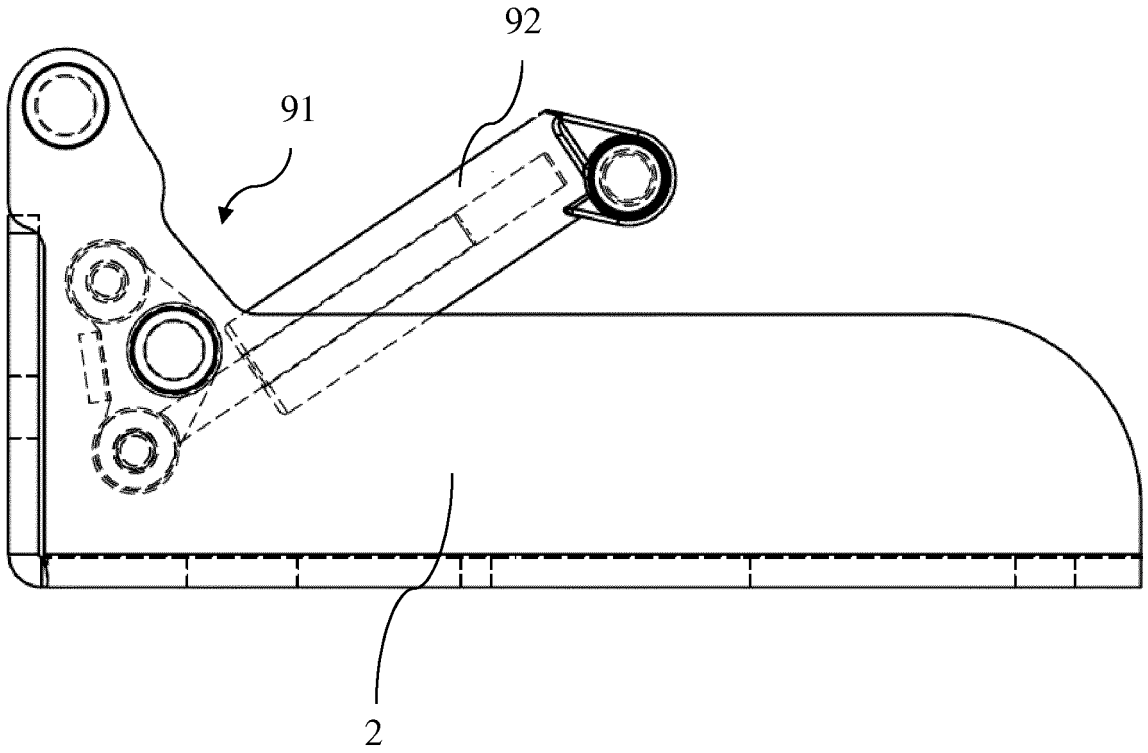


FIGURE 13



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