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(54) **A HINGE MECHANISM**

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Description

Field of the Invention

[0001] The present invention relates to a hinge mechanism which enables opening and closing of the doors of household appliances.

Background of the Invention

[0002] In appliances that have doored structures such as refrigerators, ovens and deep freezers; hinge mechanisms which enable attaching the doors to the body of the appliance, and enable them to be opened and closed around an axis passing through the said edges. Besides having enough endurance to carry appliance bodies having doors of different weights, the hinge systems comprise counterweight spring systems in order to provide convenience to the user while lifting the door. Additionally, hinge systems to which a damper is added in order to prevent the door from hitting against the body while closing the door, are present.

[0003] The United States patent document numbered US8533914 in the background of the invention discloses a hinge for the doors of the electrical appliances. Hinge, spring that controls and softens the movement of the door, and damper system is present. The damper steps in when the door is about to be closed, and provides a soft closing.

[0004] The United States patent document numbered US3187374A relates to improvements in counterbalance and self-braking type hinge mechanisms for pivotally supporting and balancing and otherwise positionally controlling the lid or cover of an open top type cabinet or the like. Thus the invention relates more specifically to motion control hinge mechanisms such as are useful for example in connection with top covers of record player cabinets, 'freezer cabinets', filing cabinets, or other receptacles having hinged covers or lids swingable from horizontal closed positions to vertically standing open positions.

[0005] The German utility model document numbered DE20306043 in the background of the invention discloses a hinge for the doors of the appliances such as refrigerators and freezers. Hinge, spring that controls and softens the movement of the door, and damper system is present. The damper steps in when the door is about to be closed, and provides a soft closing.

[0006] The United States patent document numbered US8806718 in the background of the invention discloses a hinge that is used for the doors of the household appliances. The hinge comprises a damper in order to improve the movement of the door.

[0007] The damper systems that are present in the state of the art could not provide different absorptions of force at different positions of the door with respect to the appliance. These situations cause insufficiencies in providing the desired comfort while closing the door.

[0008] In the damper systems that are present in the

state of the art, important parts such as spring and damper, are placed outside the body of the hinge, and for this reason, they are exposed to external effects. The system that is exposed to impacts, dirt and dust loses its function over time.

[0009] In the state of the art, the forces that are transmitted to the damper do not arrive perpendicularly at every position of the door. This situation causes the damper to get deformed over time because of the lateral forces arising on the damper.

[0010] The hinge systems could not stay at the mounting position before being mounted, because of the spring they comprise. For an appropriate assembling, the hinge has to be held at the mounting position and it has to be fixed to its place thus and so. In the United States patent document numbered US6438799 that is present in the state of the art, a plastic part for fixing the hinge to the mounting position that is broken at the first use after the assembly is developed. As a result of this part being broken, it becomes functionless in the event of the hinge being demounted and mounted again. At the same time, the broken pieces constitute risk for the mechanism and the breaking process requires high forces to be exerted. A locking system that enables the hinge to be demounted and mounted multiple times, that does not cause breaking event, thereby that does not pose a risk for the mechanism, that does not require high forces to be exerted like the ones required in the breaking process has to be developed.

Short Description of the Invention

[0011] The object of the invention is to provide a hinge mechanism which comprises a damper inside the hinge in order to prevent accelerations during closing.

[0012] Another object of the invention is to provide a hinge mechanism which provides the motion to be transmitted to the damper with the help of a cam form, and that provides different closing comforts by the cam that is produced in the desired forms.

[0013] Another object of the invention is to provide a hinge mechanism which comprises a locking mechanism that holds the mechanism fixed at the mounting position in order to enable mounting multiple times.

Detailed Description of the Invention

[0014] The "Hinge mechanism" in order to fulfill the objects of the present invention is illustrated in the attached figures, where:

- Figure1 - Exploded view of the inventive hinge mechanism.
- Figure2 - Perspective view of the inventive hinge mechanism where the appliance door is in the opened state
- Figure3 - Side transparent view of the inventive hinge mechanism where the appliance door is in

- the opened state
- Figure4 - Perspective view of the inventive hinge mechanism where the appliance door is in the closed state
- Figure5 - Side transparent view of the inventive hinge mechanism where the appliance door is in the closed state
- Figure6 - View of the inventive hinge mechanism at the mounting position.
- Figure7 - View of the alternative embodiment of the lock protrusion of the inventive hinge mechanism.
- Figure8 - View of the alternative embodiment of the lock protrusion of the inventive hinge mechanism.
- Figure9 - View of an alternative embodiment of the inventive hinge mechanism in order to be fixed at the mounting position.

[0015] Elements shown in the figures are numbered as follows:

1. Hinge mechanism
2. Fixed piece
 - 2.1. Lower wall of the fixed piece
 - 2.2. Lateral wall of the fixed piece
 - 2.3. Connection hole of the fixed piece
 - 2.4. Shrink fit pin hole of the fixed piece
 - 2.5. Triangular hole of the fixed piece
 - 2.6. Flap
 - 2.7. Slot
 - 2.8. Lock protrusion
 - 2.9. Lock groove
 - 2.10. Lock hole of the fixed piece
3. Moving piece
 - 3.1. Lower wall of the moving piece
 - 3.2. Lateral wall of the moving piece
 - 3.3. Connection hole of the moving piece
 - 3.4. Fixed pin hole of the moving piece
 - 3.5. Moving pin hole of the moving piece
 - 3.6. Lock hole of the moving piece
4. Fixed pin
 - 4.1. Knurled end
 - 4.2. Triangular end
5. Moving pin
 - 5.1. Knurled region
 - 5.2. Protruded end
6. Cam pin
 - 6.1. Knurled surface
7. Spring
8. Linear transmission piece
 - 8.1. Damper hub
 - 8.2. Flat end
 - 8.3. Protrusion
 - 8.4. Pulley slot
 - 8.5. Unloader
9. Damper
10. Cam body

- 10.1. Moving pin unloader
- 10.2. Cam pin hole
- 10.3. Cam surface
11. Pulley assembly
 - 11.1. Pulley body
 - 11.2. Pulley hole
 - 11.3. Pin
 - 11.4. Slot pulley
 - 11.5. Cam pulley
12. Male conical piece
 - 12.1. Slit
 - 12.2. Conical protrusion
13. Female conical piece
 - 13.1. Flap protrusion
 - 13.2. Conical unloader
14. Lock pin

[0016] The inventive hinge mechanism (1) which balances the door of the doored household appliances during the opening and closing of the door, which prevents accelerations during closing, which keeps the mechanism fixed at the mounting position in order to provide healthy mounting, 2. is defined by claim 1 and among other features comprises;

- 25 - at least one fixed piece (2) which is fixed to the appliance body,
- at least one moving piece (3) which is fixed to the appliance door,
- 30 - at least one fixed pin (4) that connects the fixed piece (2) and moving piece (3) to each other and around the axis of which the moving piece (3) revolves,
- at least one moving pin (5) that is fixed on the moving piece (3) and that revolves with the moving piece (3),
- 35 - at least one cam pin (6) that is engaged over the fixed pin (4), that has the shape of a hollow pipe, and that performs a revolving motion around the fixed pin (4),
- at least one spring (7) which balances the weight of the door of the appliance,
- 40 - at least one linear transmission piece (8) which transmits the weight of the door of the appliance from the moving piece (3) to the spring (7),
- at least one damper (9) which prevents the door of the appliance to hit against the appliance body during fast closings by reducing its speed,
- 45 - at least one cam body (10) which enables the speed of the door of the appliance to be transferred to the desired amount of dampers (9) at the desired hinge positions during fast closings,
- 50 - at least one pulley assembly (11) which enables the perpendicular transmission of the incident forces from cam body (10) to the damper (9),
- at least one male conical piece (12) on which the end of the spring (7) that does not rest on the linear transmission piece (8) rests,
- 55 - at least one female conical piece (13) inside of which the male conical piece (12) is engaged, and that is

fixed on the fixed piece (2).

[0017] The fixed piece (2) comprises;

- at least one lower wall of the fixed piece (2.1) which rests on the appliance body,
- at least two lateral walls of the fixed piece (2.2) at the opposing sides of the lower wall of the fixed piece (2.1), which are perpendicular to the lower wall of the fixed piece (2.1),
- at least one connection hole of the fixed piece (2.3) which enable fixing to the appliance body and which are present on the lower wall of the fixed piece (2.1),
- at least one shrink fit pin hole of the fixed piece (2.4) inside of which the fixed pin (4) is shrink fitted, and that is present on one of the lateral walls of the fixed piece (2.2),
- at least one triangular hole of the fixed piece (2.5) inside of which the fixed pin (4) passes, that is present on one of the lateral walls of the fixed piece (2.2) and which prevents turning as a result of it being triangular,
- at least two flaps (2.6) that are present at each of the lateral walls of the fixed piece (2.2), and to which the female conical piece (13) is attached,
- at least two slots (2.7) that are present at each of the lateral walls of the fixed piece (2.2), and inside of which the moving pin (5) moves,
- at least one lock protrusion (2.8) which fixes the moving pin (5) to its place at the mounting position, and that is present on one surface of the slots (2.7),
- at least one lock groove (2.9) on which the moving pin (5) gets placed during mounting, and that is present on one surface of the slots (2.7).

[0018] Moving piece (3) comprises;

- at least one lower wall of the moving piece (3.1) which rests on the appliance door,
- at least two lateral walls of the moving piece (3.2) at the opposing sides of the lower wall of the moving piece (3.1), which are perpendicular to the lower wall of the moving piece (3.1),
- at least one connection hole of the moving piece (3.3) which enables fixing to the appliance door and is present on the lower wall of the moving piece (3.1),
- at least two fixed pin holes of the moving piece (3.4) that are present at each of the lateral walls of the moving piece (3.2), and inside of which the fixed pin (4) passes,
- at least two moving pin holes of the moving piece (3.5) that are present at each of the lateral walls of the moving piece (3.2), and inside of which the fixed pin (4) passes.

[0019] Fixed pin (4) comprises;

- one knurled end (4.1) that shrink fits to the shrink fit

pin hole of the fixed piece (2.4) and that has a knurled surface in order to prevent it from slipping and turning,

- at least one triangular end (4.2) that fits into the triangular hole of the fixed piece (2.5) and which prevents turning as a result of it being triangular.

[0020] Moving pin (5) comprises;

- one knurled region (5.1) that shrink fits to the moving pin hole of the moving piece (3.5) and that has a knurled surface in order to prevent it from slipping and turning,
- at least two protruded ends (5.2) which fit inside the slot (2.7), which enable movement along the slot, which are present on both two ends and which prevents the lock protrusion (2.8) from moving to inside or outside of the fixed piece (2).

[0021] Cam pin (6) comprises;

- one knurled surface (6.1) that shrink fits to the cam body (10) and that has a knurled surface in order to prevent it from slipping and turning on the cam body (10).

[0022] Linear transmission piece (8) comprises;

- at least one damper hub (8.1) inside of which the damper (9) is placed, fixed and which prevents the damper (9) from external effects,
- at least one flat end (8.2) that passes from inside the spring (7),
- at least one groove (8.3) in which the spring (7) is fitted,
- at least one pulley slot (8.4) inside of which the pulley body (11) moves, which enables the forces received by the pulley body (11) from the cam body (10) to be transferred to the damper (9) perpendicularly and in the desired amount,
- at least one unloader (8.5) on which the moving pin (5) rests and to which the moving piece (3) transmits its motion.

[0023] Cam body (10) comprises;

- at least one moving pin unloader (10.1) on which the moving pin (5) rests and which enables it to be fixed via the moving piece (3),
- at least one cam pin hole (10.2) through which the cam pin (6) shrink fits, and which enables it to be fixed via the moving piece (3),
- at least one cam surface (10.3) which has a sloped surface that enables the movement of the moving piece (3) to be transmitted to the pulley assembly (11) at a desired position and in a desired amount.

[0024] Pulley assembly (11) comprises;

- at least one pulley body (11.1) that has two reciprocal parallel walls and one wall which connects the said two walls to each other and which is perpendicular to the parallel walls,
- at least four pulley holes (11.2) on the parallel walls, two of them are placed in one wall and the other two of them are placed on the other wall reciprocally,
- at least two pins (11.3) passing through the pulley holes (11.2),
- at least four slot pulleys (11.4) that are fitted into the ends of the pins (11.3) which stays out of the pulley body (11.1), that are placed inside the pulley slots (8.4), that reduce the friction between the pulley slot (8.4) by freely rotating around their axes during their movement inside the pulley slot (8.4),
- at least two cam pulleys (11.5) which are present in the middle region of the pins (11.3) that remain inside the pulley body (11.1), one of which is in contact with the cam surface (10.3) and one of which is in contact with the damper (9); which reduce friction, depreciation, and noise production on the surfaces to which they contact.

[0025] Male conical piece (12) comprises;

- at least one slit (12.1) inside of which the flat end (8.2) can pass,
- at least one conical protrusion (12.2) which passes into the female conical piece (13).

[0026] Female conical piece (13) comprises;

- at least two flap protrusions (13.1) which are attached to the flaps (2.6) and which are present in opposite positions from each other,
- at least one conical unloader (13.2) which passes into the conical protrusion (12.2) and which prevents the lateral movement.

[0027] The fixed piece (2) and the moving piece (3), the lower wall of the fixed piece (2.1) and the lower wall of the moving piece (3.1) have to be held in a position in which they are parallel to each other for the hinge mechanism (1) to be able to be mounted to the appliance body. This position is called mounting position. The protruded ends (5.2), that preferably have an inverse conical shape, that are present on the moving pin (5) that moves inside the slot (2.7), are positioned on the lock groove (2.9) at the mounting position, and their movement is prevented by the lock groove (2.8). After the mounting, in order to get the hinge mechanism in a useable state, the movement of opening the appliance door is realized, thus enabling the protruded ends (5.2) get out of the lock groove (2.9) and passing over the lock protrusion (2.8). During the passing of the protruded ends (5.2) over the lock protrusion (2.8), the lock protrusion (2.8) bends so that it moves away from the way of the protruded ends (5.2). When a remounting is necessary, the lock protrusion

(2.8) is restored to its previous position, and the protruded ends (5.2) are positioned on the lock groove (2.9) again. As no breaking occurs during the deactivating and reactivating processes of the lock protrusion (2.8), no distribution of the particles that may pose a risk for the mechanism occurs.

[0028] In an alternative embodiment not forming part of the invention, the lock protrusion (2.8) is in a shape of a rod that is positioned perpendicularly to the slot (2.6) surface. (Figure 7)

[0029] In an alternative embodiment not forming part of the invention, the lock protrusion (2.8) is in a closed, hollow form. (Figure 8)

[0030] In an alternative embodiment of the invention, the hinge mechanism (1) that is fixed to the mounting position comprises;

- at least one fixed piece (2) having at least one lock hole of the fixed piece (2.10) that is present on at least one of the lateral walls of the fixed piece (2.2),
- at least one moving piece (3) having at least one lock hole of the moving piece (3.6) that is present on at least one of the lateral walls of the moving piece (3.2) and that is aligned with the lock hole of the fixed piece (2.10) at the mounting position,
- at least one lock pin (14) that prevents the movement of the moving piece (3) with respect to the fixed piece (2) by passing through the lock hole of the fixed piece (2.10) and the lock hole of the moving piece (3.6) at the mounting position. (Figure 9)

Claims

1. A hinge mechanism (1) which balances the door of the doored household appliances during the opening and closing of the door, which prevents accelerations during closing, which keeps the mechanism fixed at the mounting position in order to provide healthy mounting, the hinge comprising:

- at least one fixed piece (2) which is fixed to the appliance body,
- at least one moving piece (3) which is fixed to the appliance door,
- at least one fixed pin (4) that connects the fixed piece (2) and moving piece (3) to each other and around the axis of which the moving piece (3) revolves,
- at least one moving pin (5) that is fixed on the moving piece (3) and that revolves with the moving piece (3),
- at least one cam pin (6) that is engaged over the fixed pin (4), that has the shape of a hollow pipe, and that performs a revolving motion around the fixed pin (4),
- at least one spring (7) which balances the weight of the door of the appliance,

- at least one linear transmission piece (8) which transmits the weight of the door of the appliance from the moving piece (3) to the spring (7),
 - at least one damper (9) which prevents the door of the appliance to hit against the appliance body during fast closings by reducing its speed,
 - at least one cam body (10) which enables the speed of the door of the appliance to be transferred to the desired amount of dampers (9) at the desired hinge positions during fast closings,
 - at least one pulley assembly (11) which enables the perpendicular transmission of the incident forces from cam body (10) to the damper (9),
 - at least one male conical piece (12) on which the end of the spring (7) that does not rest on the linear transmission piece (8) rests,
 - at least one female conical piece (13) inside of which the male conical piece (12) is engaged, and that is fixed on the fixed piece (2),
 - wherein said fixed piece (2) that is fixed on the appliance body, comprises;

- at least one lower wall of the fixed piece (2.1) which rests on the appliance body,
- at least two lateral walls of the fixed piece (2.2) at the opposing sides of the lower wall of the fixed piece (2.1), which are perpendicular to the lower wall of the fixed piece (2.1),
- at least one connection hole of the fixed piece (2.3) which enable fixing to the appliance body and which are present on the lower wall of the fixed piece (2.1),

the hinge being **characterized in that**,
 said fixed piece (2) further comprises :

- at least one shrink fit pin hole of the fixed piece (2.4) inside of which the fixed pin (4) is shrink fitted, and that is present on one of the lateral walls of the fixed piece (2.2),
- at least one triangular hole of the fixed piece (2.5) inside of which the fixed pin (4) passes, that is present on one of the lateral walls of the fixed piece (2.2) and which prevents turning as a result of it being triangular,
- at least two flaps (2.6) that are present at each of the lateral walls of the fixed piece (2.2), and to which the female conical piece (13) is attached,
- at least two slots (2.7) that are present at each of the lateral walls of the fixed piece (2.2), and inside of which the moving pin (5) moves,
- at least one lock protrusion (2.8) which fixes the moving pin (5) to its place at the

mounting position, and that is present on one surface of the slots (2.7),

- at least one lock groove (2.9) on which the moving pin (5) gets placed during mounting, and that is present on one surface of the slots (2.7),

- said at least one cam body (10) which enables the speed of the door of the appliance to be transferred to the desired amount of dampers (9) at the desired hinge positions during fast closings, comprising;

- at least one moving pin unloader (10.1) on which the moving pin (5) rests and which enables it to be fixed via the moving piece (3),
- at least one cam pin hole (10.2) through which the cam pin (6) shrink fits, and which enables it to be fixed via the moving piece (3),
- at least one cam surface (10.3) which has a sloped surface that enables the movement of the moving piece (3) to be transmitted to the pulley assembly (11) at a desired position and in a desired amount.

- said at least one pulley assembly (11) which enables the perpendicular transmission of the incident forces from cam body (10) to the damper (9), comprising:

- at least one pulley body (11.1) that has two reciprocal parallel walls and one wall which connects the said two walls to each other and which is perpendicular to the parallel walls,
- at least four pulley holes (11.2) on the parallel walls, two of them are placed in one wall and the other two of them are placed on the other wall reciprocally ,
- at least two pins (11.3) passing through the pulley holes (11.2),
- at least four slot pulleys (11.4) that are fitted into the ends of the pins (11.3) which stays out of the pulley body (11.1), that are placed inside the pulley slots (8.4), that reduce the friction between the pulley slot (8.4) by freely rotating around their axes during their movement inside the pulley slot (8.4),
- at least two cam pulleys (11.5) which are present in the middle region of the pins (11.3) that remain inside the pulley body (11.1), one of which is in contact with the cam surface (10.3) and one of which is in contact with the damper (9); which reduce friction, depreciation, and noise production

- on the surfaces to which they contact,
- said linear transmission piece (8) which transmits the weight of the door of the appliance from the moving piece (3) to the spring (7), comprising;
 - at least one damper hub (8.1) inside of which the damper (9) is placed, fixed and which prevents the damper (9) from external effects,
 - at least one flat end (8.2) that passes from inside the spring (7),
 - at least one groove (8.3) in which the spring (7) is fitted,
 - at least one pulley slot (8.4) inside of which the pulley body (11) moves, which enables the forces it receives from the pulley body (11) and the cam body (10) to be transferred to the damper (9) perpendicularly and in the desired amount,
 - at least one unloader (8.5) on which the moving pin (5) rests and to which the moving piece (3) transmits its motion.
2. A hinge mechanism (1) as in Claim 1 **characterized by** at least one moving piece (3) that is fixed on the appliance door, that comprises;
- at least one lower wall of the moving piece (3.1) which rests on the appliance door,
 - at least two lateral walls of the moving piece (3.2) at the opposing sides of the lower wall of the moving piece (3.1), which are perpendicular to the lower wall of the moving piece (3.1),
 - at least one connection hole of the moving piece (3.3) which enables fixing to the appliance door and is present on the lower wall of the moving piece (3.1),
 - at least two fixed pin holes of the moving piece (3.4) that are present at each of the lateral walls of the moving piece (3.2), and inside of which the fixed pin (4) passes,
 - at least two moving pin holes of the moving piece (3.5) that are present at each of the lateral walls of the moving piece (3.2), and inside of which the fixed pin (4) passes.
3. A hinge mechanism (1) as in Claim 1 or 2 **characterized by** at least one fixed pin (4) that connects the fixed piece (2) and moving piece (3) to each other and around the axis of which the moving piece (3) revolves,
- that comprises one knurled end (4.1) that shrink fits to the shrink fit pin hole of the fixed piece (2.4) and that has a knurled surface in order to prevent it from slipping and turning,
 - at least one triangular end (4.2) that fits into the triangular hole of the fixed piece (2.5) and which prevents turning as a result of it being triangular.
4. A hinge mechanism (1) as in Claim 1 or 2 **characterized by** at least one moving pin (5) that is fixed on the moving piece (3) and that revolves with the moving piece (3), comprising
- one knurled region (5.1) that shrink fits to the moving pin hole of the moving piece (3.5) and that has a knurled surface in order to prevent it from slipping and turning,
 - at least two protruded ends (5.2) which fit inside the slot (2.7), which enable movement along the slot, which are present on both two ends and which prevents the lock protrusion (2.8) from moving to inside or outside of the fixed piece (2).
5. A hinge mechanism (1) as in Claim 1, **characterized by** at least one cam pin (6) that is engaged over the fixed pin (4), that has the shape of a hollow pipe, comprising
- at least one knurled surface (6.1) that shrink fits to the cam body (10) and that has a knurled surface in order to prevent it from slipping and turning on the cam body (10).
6. A hinge mechanism (1) as in Claim 1, **characterized by** at least one male conical piece (12) on which the end of the spring (7) that does not rest on the linear transmission piece (8) rests, comprising;
- at least one slit (12.1) inside of which the flat end (8.2) can pass,
 - at least one conical protrusion (12.2) which passes into the female conical piece (13).
7. A hinge mechanism (1) as in Claim 6, **characterized by** at least one female conical piece (13) inside of which the male conical piece (12) is engaged, and that is fixed on the fixed piece (2), comprising;
- at least two flap protrusions (13.1) which are attached to the flaps (2.6) and which are present in opposite positions from each other,
 - at least one conical unloader (13.2) which passes into the conical protrusion (12.2) and which prevents the lateral movement.
8. A hinge mechanism (1) as in Claim 1, **characterized by** at least one lock pin (14) that prevents the movement of the moving piece (3) with respect to the fixed piece (2) by passing through the lock hole of the fixed piece (2.10) and the lock hole of the moving piece (3.6) at the mounting position, inside of which the

male conical piece (12) is engaged, and that is fixed on the fixed piece (2) comprising;

- at least one fixed piece (2) having at least one lock hole of the fixed piece (2.10) that is present on at least one of the lateral walls of the fixed piece (2.2), 5
- at least one moving piece (3) having at least one lock hole of the moving piece (3.6) that is present on at least one of the lateral walls of the moving piece (3.2) and that is aligned with the lock hole of the fixed piece (2.10) at the mounting position. 10

Patentansprüche

1. Ein Scharniermechanismus (1), der die Tür des Haushalts mit Türen während des Öffnens und Schließens der Tür ausbalanciert, der Beschleunigungen während des Schließens verhindert, der den Mechanismus an der Montageposition festhält, um eine gesunde Montage zu gewährleisten, das Scharnier umfasst: 20

- mindestens ein festes Teil (2), das am Gerätekörper befestigt ist, 25
- mindestens ein bewegliches Teil (3), das an der Gerätetür befestigt ist,
- mindestens einen festen Stift (4), der das feste Teil (2) und das bewegliche Teil (3) miteinander verbindet und um dessen Achse sich das bewegliche Teil (3) dreht, 30
- mindestens einen beweglichen Stift (5), der auf dem beweglichen Teil (3) befestigt ist und sich mit dem beweglichen Teil (3) dreht, 35
- mindestens einen Nockenstift (6), der über den festen Stift (4) greift, die Form eines hohlen Rohrs hat und eine Drehbewegung um den festen Stift (4) ausführt, 40
- mindestens eine Feder (7), die das Gewicht der Tür des Geräts ausgleicht,
- mindestens ein lineares Übertragungsteil (8), das das Gewicht der Tür des Geräts von dem beweglichen Teil (3) auf die Feder (7) überträgt, 45
- mindestens einen Dämpfer (9), der durch Verringerung der Geschwindigkeit verhindert, dass die Tür des Geräts während schneller Schließen gegen den Gerätekörper schlägt,
- mindestens einen Nockenkörper (10), der es ermöglicht, die Geschwindigkeit der Tür des Geräts auf die gewünschte Anzahl von Dämpfern (9) an den gewünschten Scharnierpositionen während schneller Schließen zu übermitteln, 50
- mindestens eine Riemenscheibenanordnung (11), die die senkrechte Übertragung der einwirkenden Kräfte vom Nockenkörper (10) auf den Dämpfer (9) ermöglicht, 55

- mindestens ein männliches konisches Teil (12), auf dem das Ende der Feder (7) aufliegt, das nicht auf dem linearen Übertragungsteil (8) aufliegt,
- mindestens ein weibliches konisches Teil (13), in dessen Inneres das männliche konische Teil (12) eingreift, und das auf dem festen Teil (2) befestigt ist,
- wobei das genannte feste Teil (2), das am Gerätekörper befestigt ist, umfasst;

- mindestens eine untere Wand des festen Teils (2.1), die auf dem Gerätekörper aufliegt,
- mindestens zwei seitliche Wände des festen Teils (2.2) an den gegenüberliegenden Seiten der unteren Wand des festen Teils (2.1), die senkrecht zur unteren Wand des festen Teils (2.1) sind,
- mindestens ein Anschlussloch des festen Teils (2.3), das die Befestigung am Gerätekörper ermöglicht und das sich an der unteren Wand des festen Teils (2.1) vorhanden sind,

das Scharnier **ist dadurch gekennzeichnet, dass**

das genannte feste Teil (2) ferner umfasst:

- mindestens ein Schrumpfsitzstiftloch des festen Teils (2.4), in dessen Innerem der feste Stift (4) eingeschrumpft wird, und das an einer der seitlichen Wände des festen Teils (2.2) vorhanden ist,
- mindestens ein dreieckiges Loch des festen Teils (2.5), in dessen Innerem der feste Stift (4) verläuft, das an einer der seitlichen Wände des festen Teils (2.2) vorhanden ist und das aufgrund seiner Dreieckigkeit ein Drehen verhindert,
- mindestens zwei Klappen (2.6), die an jeder der seitlichen Wände des festen Teils (2.2) vorhanden sind und an denen das weibliche konische Teil (13) angebracht ist,
- mindestens zwei Schlitze (2.7), die an jeder der seitlichen Wände des festen Teils (2.2) vorhanden sind und in deren Inneren sich der bewegliche Stift (5) bewegt,
- mindestens einen Verriegelungsvorsprung (2.8), der den beweglichen Stift (5) an seinem Platz in der Montageposition befestigt und der auf einer Oberfläche der Schlitze (2.7) vorhanden ist,
- mindestens eine Verriegelungsnut (2.9), in die der bewegliche Stift (5) während der Montage gelegt wird, und die auf einer Oberfläche der Schlitze (2.7) vorhanden ist,

- der genannte mindestens eine Nockenkörper (10), der es ermöglicht, die Geschwindigkeit der Tür des Geräts auf die gewünschte Anzahl von Dämpfern (9) an den gewünschten Scharnierpositionen während schneller Schließen zu übermitteln, umfassend;

- mindestens einen beweglichen Stiften-
teller (10.1), auf dem der bewegliche Stift (5)
aufliegt und der es ermöglicht, ihn über das
bewegliche Teil (3) zu befestigen,
- mindestens ein Nockenstiftloch (10.2),
durch das der Nockenstift (6) schrumpft und
das seine Befestigung über das bewegliche
Teil (3) ermöglicht,
- mindestens eine Nockenfläche (10.3), die
eine schräge Oberfläche aufweist, die es er-
möglicht, die Bewegung des beweglichen
Teils (3) in einer gewünschten Position und
in einem gewünschten Ausmaß auf die Rie-
menscheibenanordnung (11) zu übertra-
gen,

- die genannte mindestens eine Riemenschei-
benanordnung (11), die die senkrechte Übertra-
gung der einwirkenden Kräfte vom Nockenkör-
per (10) auf den Dämpfer (9) ermöglicht, umfas-
send:

- mindestens einen Riemenscheibenkörper (11.1), der zwei zueinander parallelen Wän-
de und eine Wand aufweist, die die genann-
ten beiden Wände miteinander verbindet
und die senkrecht zu den parallelen Wän-
den steht,
- mindestens vier Riemenscheibenlöcher (11.2) an den parallelen Wänden, von de-
nen zwei in einer Wand platziert sind und
die anderen zwei an der anderen Wand
wechselseitig platziert sind,
- mindestens zwei Stifte (11.3), die durch
die Riemenscheibenlöcher (11.2) geführt
werden,
- mindestens vier Schlitzriemenscheiben (11.4), die in die Enden der Stifte (11.3) ein-
gepasst sind, die aus dem Riemenschei-
benkörper (11.1) herausragen, die in den
Riemenscheibenschlitzen (8.4) platziert
sind und die die Reibung zwischen den Rie-
menscheibenschlitzen (8.4) verringern, in-
dem sie sich während ihrer Bewegung in-
nerhalb des Riemenscheibenschlitzes (8.4)
frei um ihre Achsen drehen,
- mindestens zwei Nockenriemenscheiben (11.5), die sich im mittleren Bereich der Stif-
te (11.3) befinden, die im Inneren des Rie-
menscheibenkörpers (11.1) verbleiben,
von denen eine mit der Nockenfläche (10.3)

und eine mit dem Dämpfer (9) in Kontakt
steht; sie verringern die Reibung, die Ab-
schreibung und die Geräuschentwicklung
an den Flächen, mit denen sie in Kontakt
stehen,

- das genannte lineare Übertragungsteil (8), das
das Gewicht der Tür des Geräts von dem be-
weglichen Teil (3) auf die Feder (7) überträgt,
umfassend;

- mindestens eine Dämpfernabe (8.1), in
deren Inneren der Dämpfer (9) platziert, be-
festigt ist und die den Dämpfer (9) vor äu-
ßeren Einflüssen schützt,
- mindestens ein flaches Ende (8.2), das
aus dem Inneren der Feder (7) herausragt,
- mindestens eine Nut (8.3), in die die Feder
(7) eingepasst wird,
- mindestens einen Riemenscheibenschlitz (8.4), in dessen Innerem sich der Riemenscheibenkörper (11) bewegt, der die Übertragung der Kräfte, die er vom Riemenscheibenkörper (11) und vom Nockenkörper (10) erhält, senkrecht und in der gewünschten Stärke auf den Dämpfer (9) ermöglicht,
- mindestens einen Entlader (8.5), auf dem
der bewegliche Stift (5) aufliegt und auf den
das bewegliche Teil (3) seine Bewegung
übermittelt.

2. Ein Scharniermechanismus (1) nach Anspruch 1,
gekennzeichnet durch mindestens ein bewegli-
ches Teil (3), das an der Gerätetür befestigt ist, das
umfasst;

- mindestens eine untere Wand des bewegli-
chen Teils (3.1), die auf der Gerätetür aufliegt,
- mindestens zwei seitliche Wände des beweg-
lichen Teils (3.2) an den gegenüberliegenden
Seiten der unteren Wand des beweglichen Teils
(3.1), die senkrecht zur unteren Wand des be-
weglichen Teils (3.1) verlaufen,
- mindestens ein Anschlussloch des bewegli-
chen Teils (3.3), das die Befestigung an der Ge-
rätetür ermöglicht und an der unteren Wand des
beweglichen Teils (3.1) vorhanden ist,
- mindestens zwei feste Stiftlöcher des beweg-
lichen Teils (3.4), die an jeder der seitlichen
Wände des beweglichen Teils (3.2) vorhanden
sind und in deren Innerem der feste Stift (4) ver-
läuft,
- mindestens zwei bewegliche Stiftlöcher des
beweglichen Teils (3.5), die an jeder der seitli-
chen Wände des beweglichen Teils (3.2) vor-
handen sind und in deren Innerem der feste Stift
(4) verläuft,

3. Ein Scharniermechanismus (1) nach Anspruch 1 oder 2, **gekennzeichnet durch** mindestens einen festen Stift (4), der das feste Teil (2) und das bewegliche Teil (3) miteinander verbindet und um dessen Achse sich das bewegliche Teil (3) dreht, 5
- dass er ein gerändeltes Ende (4.1) umfasst, das in das Schrumpfsitzstiftloch des festen Teils (2.4) schrumpft und eine gerändelte Oberfläche aufweist, um ein Verrutschen und Drehen zu verhindern, 10
 - mindestens ein dreieckiges Ende (4.2), das in das dreieckige Loch des festen Teils (2.5) passt und das aufgrund seiner Dreieckigkeit eine Drehung verhindert. 15
4. Ein Scharniermechanismus (1) nach Anspruch 1 oder 2, **gekennzeichnet durch** mindestens einen beweglichen Stift (5), der an dem beweglichen Teil (3) befestigt ist und der sich mit dem beweglichen Teil (3) dreht, umfassend 20
- einen gerändelten Bereich (5.1), der in das bewegliche Stiftloch des beweglichen Teils (3.5) eingeschrumpft wird und eine gerändelte Oberfläche aufweist, um ein Abrutschen und Drehen zu verhindern, 25
 - mindestens zwei vorspringende Enden (5.2), die in den Schlitz (2.7) passen, die eine Bewegung entlang des Schlitzes ermöglichen, die an beiden Enden vorhanden sind und die verhindern, dass sich der Verriegelungsvorsprung (2.8) nach innen oder außen des festen Teils (2) bewegt. 30
5. Ein Scharniermechanismus (1) nach Anspruch 1, **gekennzeichnet durch** mindestens einen Nockenstift (6), der über den festen Stift (4) greift, der die Form eines hohlen Rohrs hat, umfassend 35
- mindestens eine gerändelte Fläche (6.1), die auf den Nockenkörper (10) eingeschrumpft ist und eine gerändelte Oberfläche aufweist, um ein Verrutschen und Drehen auf dem Nockenkörper (10) zu verhindern. 40
6. Ein Scharniermechanismus (1) nach Anspruch 1, **gekennzeichnet durch** mindestens einen männlichen konischen Teil (12), auf dem das Ende der Feder (7) aufliegt, das nicht auf dem linearen Übertragungsteil (8) aufliegt, umfassend; 50
- mindestens einen Schlitz (12.1), in dessen Inneres das flache Ende (8.2) verlaufen kann, 55
 - mindestens einen konischen Vorsprung (12.2), der in das weibliche konische Teil (13) übergeht.
7. Ein Scharniermechanismus (1) nach Anspruch 6,

gekennzeichnet durch mindestens ein weibliches konisches Teil (13), in dessen Inneres das männliche konische Teil (12) eingreift, und das an dem festen Teil (2) befestigt ist, umfassend;

- mindestens zwei Klappenvorsprünge (13.1), die an den Klappen (2.6) angebracht sind und die in entgegengesetzten Positionen zueinander vorhanden sind,
- mindestens einen konischen Entlader (13.2), der in den konischen Vorsprung (12.2) übergeht und die seitliche Bewegung verhindert.

8. Ein Scharniermechanismus (1) nach Anspruch 1, **gekennzeichnet durch** mindestens einen Verriegelungsstift (14), der die Bewegung des beweglichen Teils (3) in Bezug auf das feste Teil (2) verhindert, indem er durch das Verriegelungsloch des festen Teils (2.10) und das Verriegelungsloch des beweglichen Teils (3.6) in der Montageposition hindurchgeht, in dessen Inneres das männliche konische Teil (12) eingreift, und der an dem festen Teil (2) befestigt ist, umfassend;

- mindestens ein festes Teil (2) mit mindestens einem Verriegelungsloch des festen Teils (2.10), das an mindestens einer der seitlichen Wände des festen Teils (2.2) vorhanden ist,
- mindestens ein bewegliches Teil (3), das mindestens ein Verriegelungsloch des beweglichen Teils (3.6) aufweist, das an mindestens einer der seitlichen Wände des beweglichen Teils (3.2) vorhanden ist und das mit dem Verriegelungsloch des festen Teils (2.10) in der Montageposition ausgerichtet ist.

Revendications

1. Un mécanisme de charnière (1) qui équilibre la porte des appareils ménagers à porte pendant l'ouverture et la fermeture de la porte, qui empêche les accélérations pendant la fermeture, qui maintient le mécanisme fixé à la position de montage afin d'assurer un montage sain, la charnière comprenant :
- au moins une pièce fixe (2) qui est fixée au corps de l'appareil,
 - au moins une pièce mobile (3) qui est fixée à la porte de l'appareil,
 - au moins une tige fixe (4) qui connecte la pièce fixe (2) et la pièce mobile (3) l'une à l'autre et autour de l'axe de laquelle la pièce mobile (3) pivote,
 - au moins une tige mobile (5) qui est fixée sur la pièce mobile (3) et qui pivote avec la pièce mobile (3),
 - au moins une tige de came (6) qui est engagée

sur la tige fixe (4), qui a la forme d'un tube creux, et qui effectue une motion révolutive autour de la tige fixe (4),

- au moins un ressort (7) qui équilibre le poids de la porte de l'appareil, 5
- au moins une pièce de transmission linéaire (8) qui transmet le poids de la porte de l'appareil de la pièce mobile (3) au ressort (7),
- au moins un amortisseur (9) qui empêche la porte de l'appareil de frapper contre le corps de l'appareil pendant les fermetures rapides en réduisant sa vitesse, 10
- au moins un corps de came (10) qui permet la vitesse de la porte de l'appareil d'être transférée à la quantité souhaitée d'amortisseurs (9) aux positions de charnière souhaitées pendant les fermetures rapides, 15
- au moins un ensemble de poulies (11) qui permet la transmission perpendiculaire des forces incidentes du corps de came (10) à l'amortisseur (9), 20
- au moins une pièce conique mâle (12) sur laquelle repose l'extrémité du ressort (7) qui ne repose pas sur la pièce de transmission linéaire (8), 25
- au moins une pièce conique femelle (13) à l'intérieur de laquelle est engagée la pièce conique mâle (12), et qui est fixée sur la pièce fixe (2),
- dans lequel ladite pièce fixe (2) qui est fixée sur le corps de l'appareil, comprend ; 30

- au moins une paroi inférieure de la pièce fixe (2.1) qui repose sur le corps de l'appareil,
- au moins deux parois latérales de la pièce fixe (2.2) aux côtés opposés de la paroi inférieure de la pièce fixe (2.1), qui sont perpendiculaires à la paroi inférieure de la pièce fixe (2.1), 35
- au moins un trou de connexion de la pièce fixe (2.3) qui permet la fixation au corps de l'appareil et qui est présent sur la paroi inférieure de la pièce fixe (2.1), 40

la charnière est **caractérisée en ce que**, 45
ladite pièce fixe (2) comprend en outre :

- au moins un trou de tige à ajustement fretté de la pièce fixe (2.4) à l'intérieur duquel la tige fixe (4) est ajustée par frettage, et qui est présent sur l'une des parois latérales de la pièce fixe (2.2), 50
- au moins un trou triangulaire de la pièce fixe (2.5) à l'intérieur duquel passe la tige fixe (4), qui est présent sur une des parois latérales de la pièce fixe (2.2) et qui empêche la rotation du fait qu'il est triangulaire, 55
- au moins deux volets (2.6) qui sont pré-

sents sur chacune des parois latérales de la pièce fixe (2.2), et sur lesquels la pièce conique femelle (13) est attachée,

- au moins deux fentes (2.7) qui sont présentes sur chacune des parois latérales de la pièce fixe (2.2), et à l'intérieur desquelles se déplace la tige mobile (5),
- au moins une saillie de verrouillage (2.8) qui fixe la tige mobile (5) à son emplacement dans la position de montage, et qui est présente sur une surface des fentes (2.7),
- au moins une rainure de blocage (2.9) sur laquelle la tige mobile (5) est placée pendant le montage, et qui est présente sur une surface des fentes (2.7),

- ledit au moins un corps de came (10) qui permet la vitesse de la porte de l'appareil d'être transférée à la quantité souhaitée d'amortisseurs (9) aux positions de charnière souhaitées pendant les fermetures rapides, comprenant ;

- au moins un déchargeur de tige mobile (10.1) sur lequel repose la tige mobile (5) et qui permet de la fixer par l'intermédiaire de la pièce mobile (3),
- au moins un trou de tige de came (10.2) à travers lequel la tige de came (6) est ajustée par frettage, et qui lui permet d'être fixée par l'intermédiaire de la pièce mobile (3),
- au moins une surface de came (10.3) qui a une surface inclinée qui permet au mouvement de la pièce mobile (3) d'être transmis à l'ensemble de poulie (11) à une position désirée et dans une quantité désirée,

- ledit au moins un ensemble de poulie (11) qui permet la transmission perpendiculaire des forces incidentes du corps de came (10) à l'amortisseur (9) comprenant :

- au moins un corps de poulie (11.1) qui a deux parois parallèles réciproques et une paroi qui connecte lesdites deux parois l'une à l'autre et qui est perpendiculaire aux parois parallèles,
- au moins quatre trous de poulie (11.2) sur les parois parallèles, deux d'entre eux étant placés dans une paroi et les deux autres étant placés sur l'autre paroi de manière réciproque,
- au moins deux tiges (11.3) passant par les trous de la poulie (11.2),
- au moins quatre poulies à fente (11.4) qui sont ajustées dans les extrémités des tiges (11.3) qui restent à l'extérieur du corps de la poulie (11.1), qui sont placées à l'intérieur des fentes de la poulie (8.4), qui réduisent

- la friction entre la fente de la poulie (8.4) en tournant librement autour de leurs axes pendant leur mouvement à l'intérieur de la fente de la poulie (8.4),
- au moins deux poulies de came (11.5) qui sont présentes dans la région centrale des tiges (11.3) qui restent à l'intérieur du corps de poulie (11.1), dont l'une est en contact avec la surface de la came (10.3) et dont l'autre est en contact avec l'amortisseur (9) ; qui réduisent la friction, l'amortissement et la production de bruit sur les surfaces auxquelles elles sont en contact,
- ladite pièce de transmission linéaire (8) qui transmet le poids de la porte de l'appareil de la pièce mobile (3) au ressort (7), comprenant ;
- au moins un moyeu d'amortisseur (8.1) à l'intérieur duquel l'amortisseur (9) est placé, fixé et qui protège l'amortisseur (9) des effets extérieurs,
 - au moins une extrémité plate (8.2) qui passe à l'intérieur du ressort (7),
 - au moins une rainure (8.3) dans laquelle est ajusté le ressort (7),
 - au moins une fente de poulie (8.4) à l'intérieur de laquelle le corps de poulie (11) se déplace, qui permet aux forces qu'il reçoit du corps de poulie (11) et du corps de came (10) d'être transférées à l'amortisseur (9) perpendiculairement et dans la quantité souhaitée,
 - au moins un déchargeur (8.5) sur lequel repose la tige mobile (5) et auquel la pièce mobile (3) transmet sa motion
2. Un mécanisme de charnière (1) selon la revendication 1, **caractérisé par** au moins une pièce mobile (3) qui est fixée sur la porte de l'appareil, qui comprend ;
- au moins une paroi inférieure de la pièce mobile (3.1) qui repose sur la porte de l'appareil,
 - au moins deux parois latérales de la pièce mobile (3.2) aux côtés opposés de la paroi inférieure de la pièce mobile (3.1), qui sont perpendiculaires à la paroi inférieure de la pièce mobile (3.1),
 - au moins un trou de connexion de la pièce mobile (3.3) qui permet la fixation à la porte de l'appareil et qui est présent sur la paroi inférieure de la pièce mobile (3.1),
 - au moins deux trous de tige fixe de la pièce mobile (3.4) qui sont présents sur chacune des parois latérales de la pièce mobile (3.2), et à l'intérieur desquels passe la tige fixe (4),
 - au moins deux trous de tige mobile de la pièce mobile (3.5) qui sont présents sur chacune des parois latérales de la pièce mobile (3.2), et à l'intérieur desquels passe la tige fixe (4).
3. Un mécanisme de charnière (1) selon la revendication 1 ou 2, **caractérisé par** au moins une tige fixe (4) qui connecte la pièce fixe (2) et la pièce mobile (3) l'une à l'autre et autour de l'axe de laquelle la pièce mobile (3) pivote
- qui comprend une extrémité moletée (4.1) qui est ajustée par frettage au trou de tige à ajustement fretté de la pièce fixe (2.4) et qui a une surface moletée afin de l'empêcher de glisser et de tourner,
 - au moins une extrémité triangulaire (4.2) qui est ajustée dans le trou triangulaire de la pièce fixe (2.5) et qui empêche la rotation du fait qu'elle est triangulaire.
4. Un mécanisme de charnière (1) selon la revendication 1 ou 2, **caractérisé par** au moins une tige mobile (5) qui est fixée sur la pièce mobile (3) et qui pivote avec la pièce mobile (3), comprenant
- une région moletée (5.1) qui est ajustée par frettage au trou de la tige mobile de la pièce mobile (3.5) et qui a une surface moletée afin de l'empêcher de glisser et de tourner,
 - au moins deux extrémités en saillie (5.2) qui sont ajustées à l'intérieur de la fente (2.7), qui permettent un mouvement le long de la fente, qui sont présentes sur les deux extrémités et qui empêchent la saillie de verrouillage (2.8) de se déplacer vers l'intérieur ou l'extérieur de la pièce fixe (2).
5. Un mécanisme de charnière (1) selon la revendication 1, **caractérisé par** au moins une tige de came (6) qui est engagée sur la tige fixe (4), qui a la forme d'un tube creux, comprenant
- au moins une surface moletée (6.1) qui est ajustée par frettage au corps de came (10) et qui a une surface moletée afin de l'empêcher de glisser et de tourner sur le corps de came (10).
6. Un mécanisme de charnière (1) selon la revendication 1, **caractérisé par** au moins une pièce conique mâle (12) sur laquelle repose l'extrémité du ressort (7) qui ne repose pas sur la pièce de transmission linéaire (8), comprenant ;
- au moins une entaille (12.1) à l'intérieur de laquelle l'extrémité plate (8.2) peut passer,
 - au moins une saillie conique (12.2) qui passe dans la pièce conique femelle (13).

7. Un mécanisme de charnière (1) selon la revendication 6, **caractérisé par** au moins une pièce conique femelle (13) à l'intérieur de laquelle est engagée la pièce conique mâle (12), et qui est fixée sur la pièce fixe (2), comprenant;
- 5
- au moins deux saillies de volet (13.1) qui sont attachées aux volets (2.6) et qui sont présentes dans des positions opposées l'une à l'autre,
 - au moins un déchargeur conique (13.2) qui passe dans la saillie conique (12.2) et qui empêche le mouvement latéral.
- 10
8. Un mécanisme de charnière (1) selon la revendication 1, **caractérisé par** au moins une tige de verrouillage (14) qui empêche le mouvement de la pièce mobile (3) par rapport à la pièce fixe (2) en passant à travers le trou de verrouillage de la pièce fixe (2.10) et le trou de verrouillage de la pièce mobile (3.6) à la position de montage, à l'intérieur de laquelle la pièce conique mâle (12) est engagée, et qui est fixée sur la pièce fixe (2) comprenant ;
- 15
- au moins une pièce fixe (2) ayant au moins un trou de verrouillage de la pièce fixe (2.10) qui est présent sur au moins une des parois latérales de la pièce fixe (2.2),
 - au moins une pièce mobile (3) ayant au moins un trou de verrouillage de la pièce mobile (3.6) qui est présent sur au moins une des parois latérales de la pièce mobile (3.2) et qui est aligné avec le trou de verrouillage de la pièce fixe (2.10) à la position de montage.
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- 55

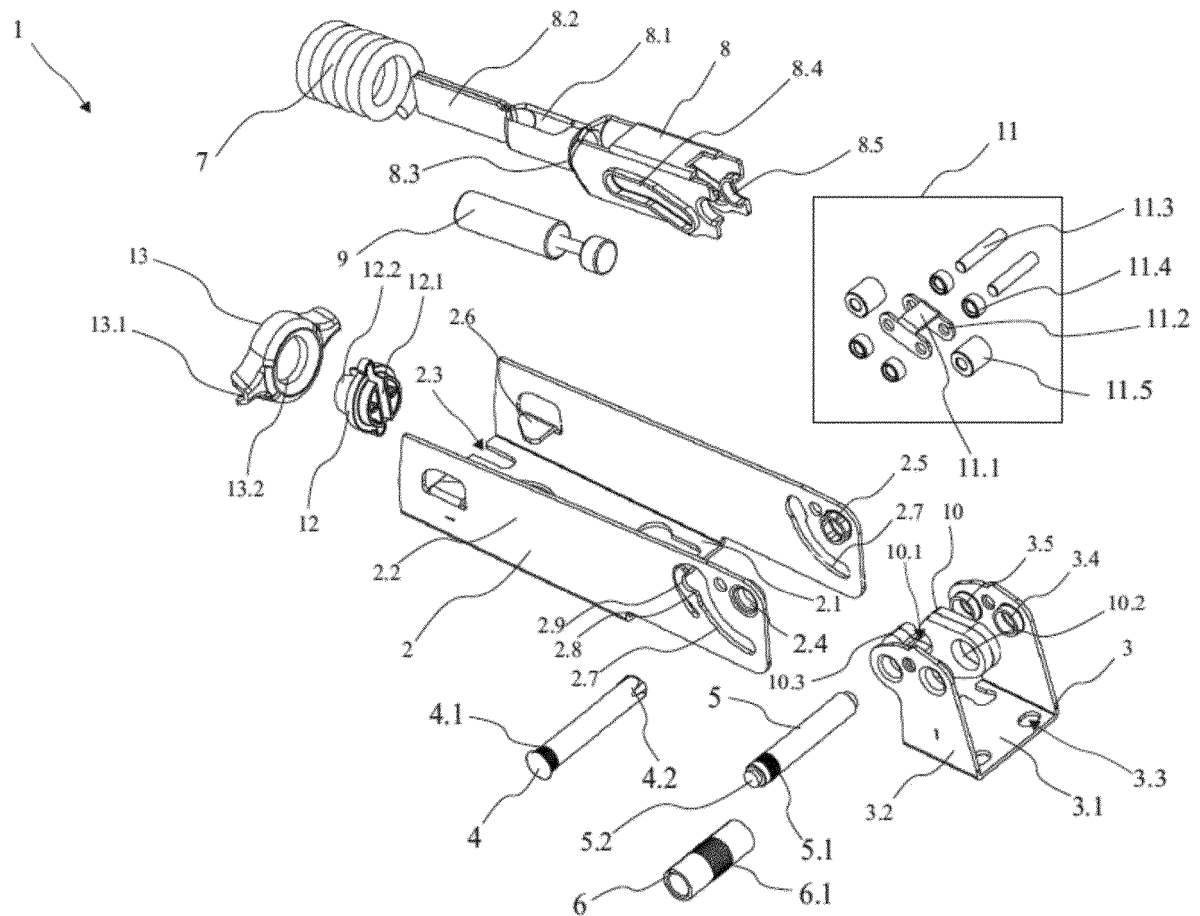


Figure 1

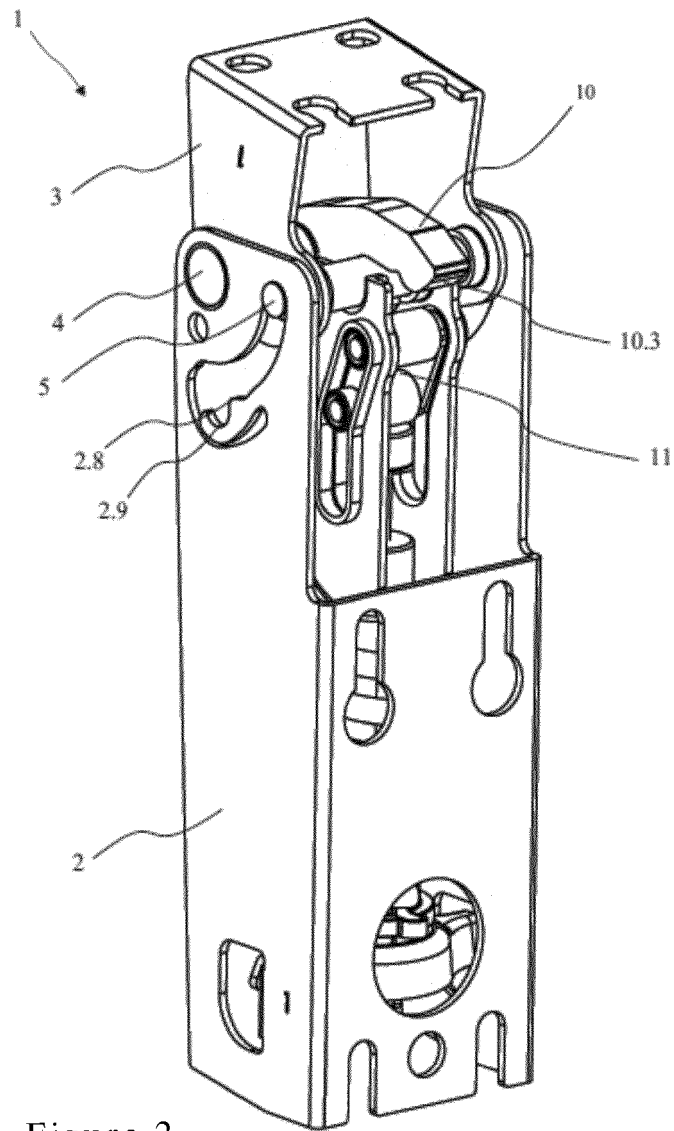


Figure 2

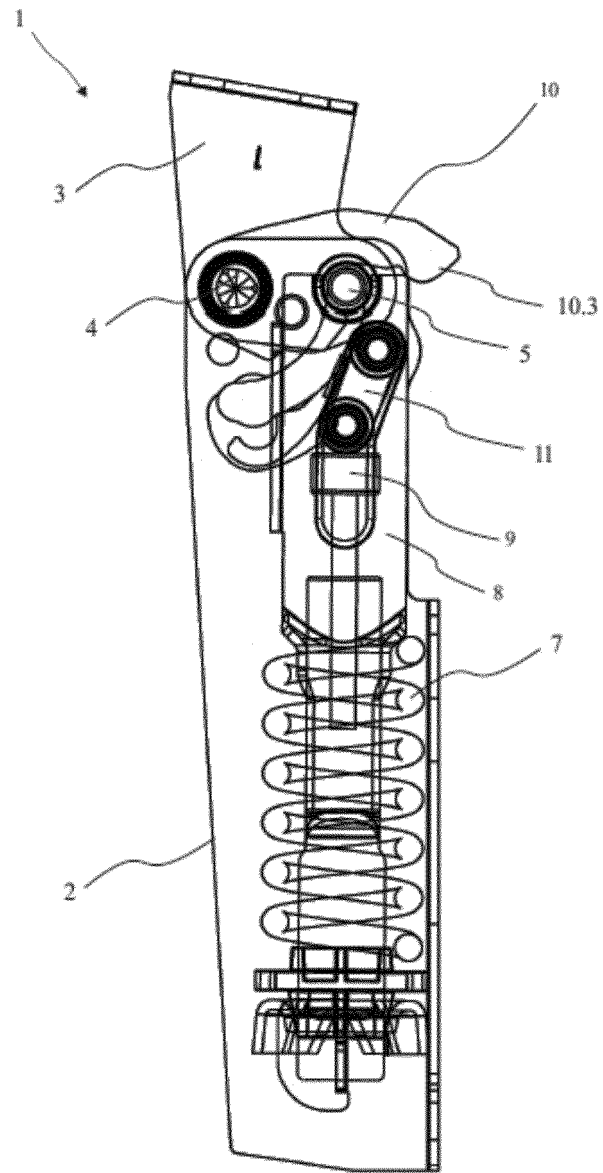


Figure 3

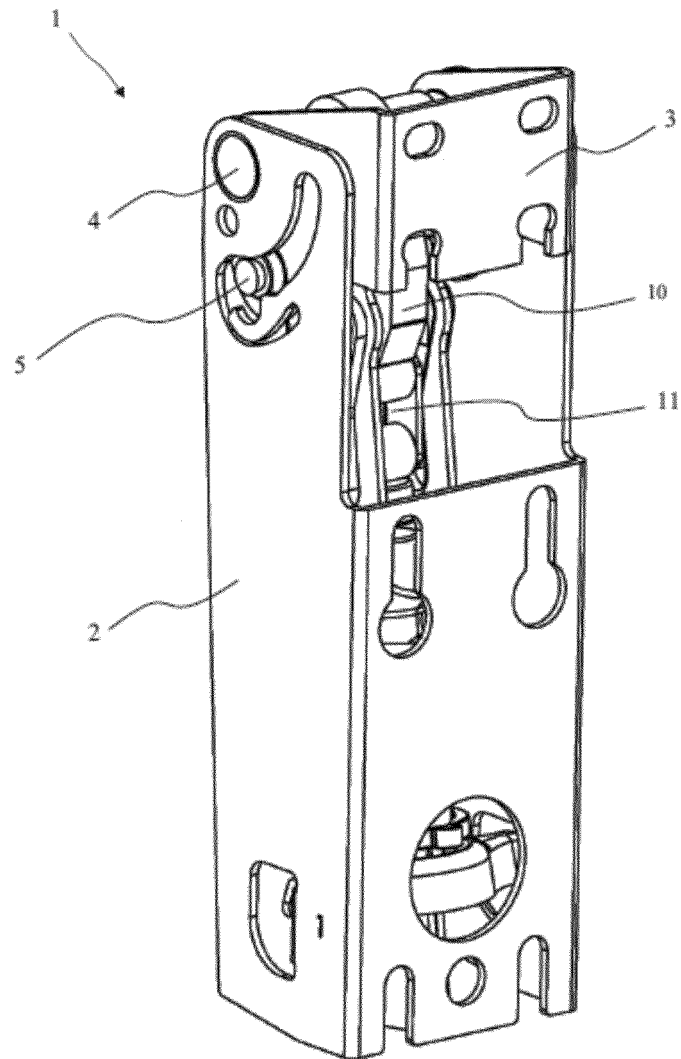


Figure 4

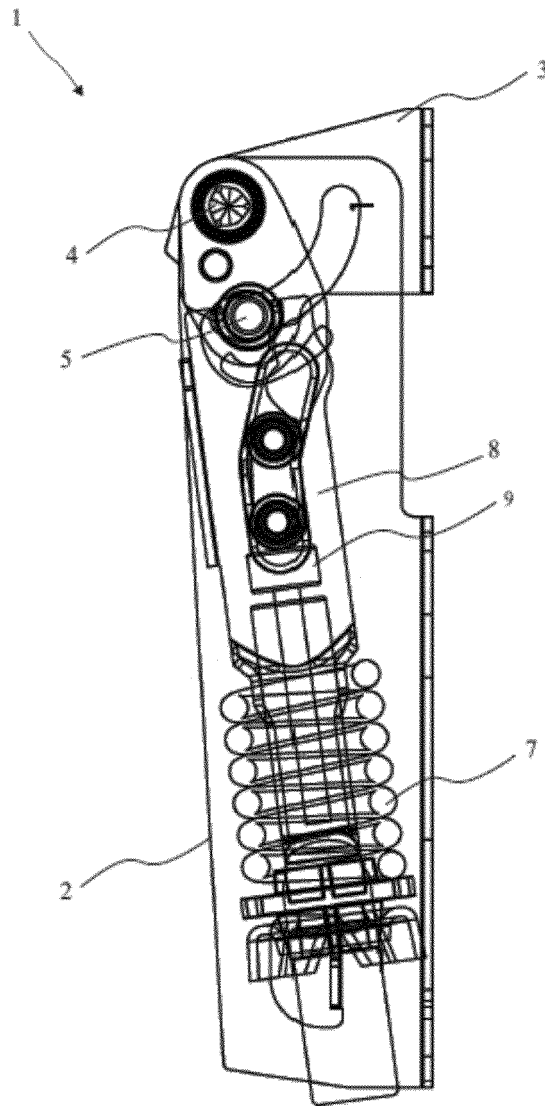


Figure 5

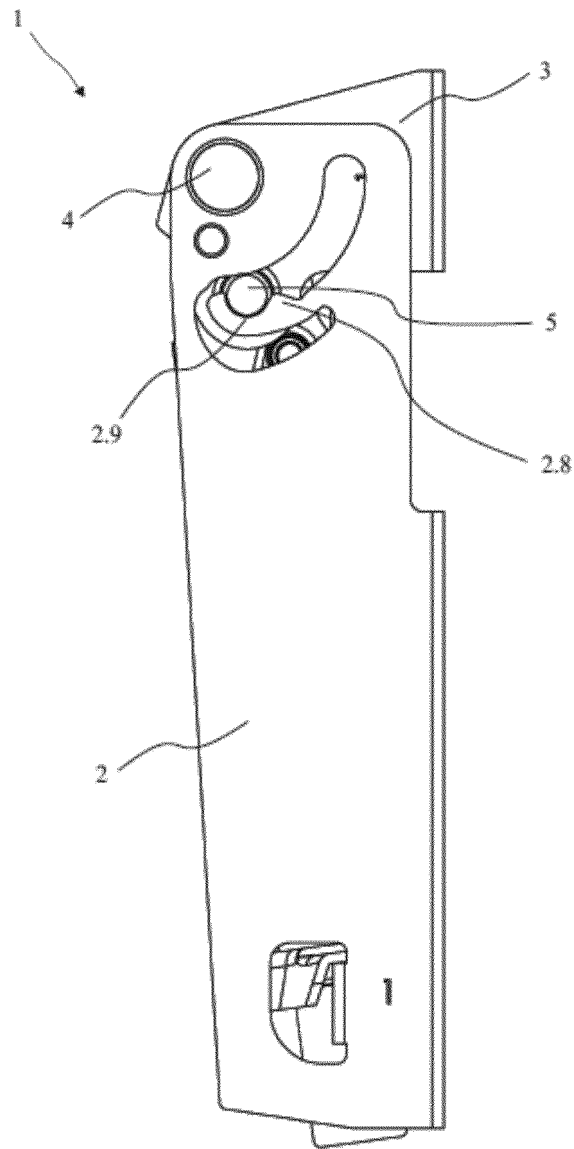


Figure 6

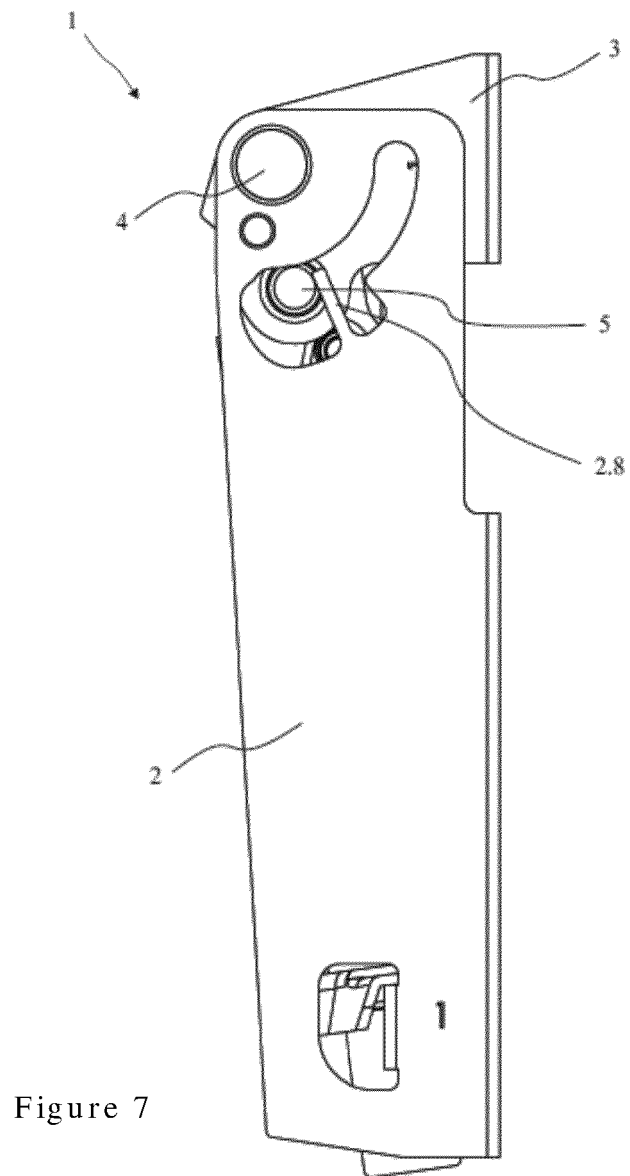


Figure 7

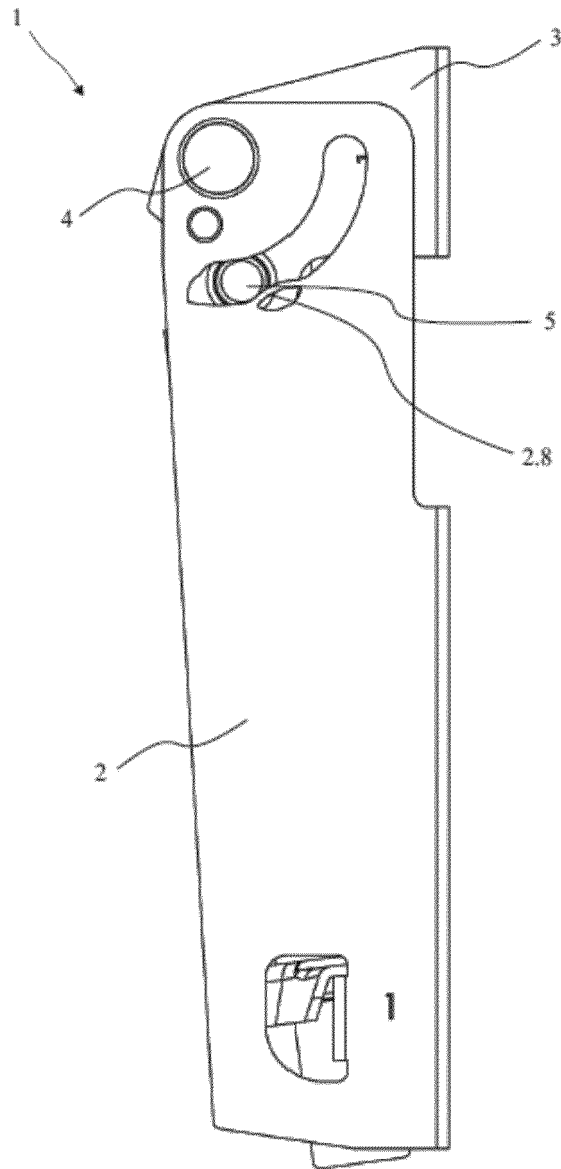


Figure 8

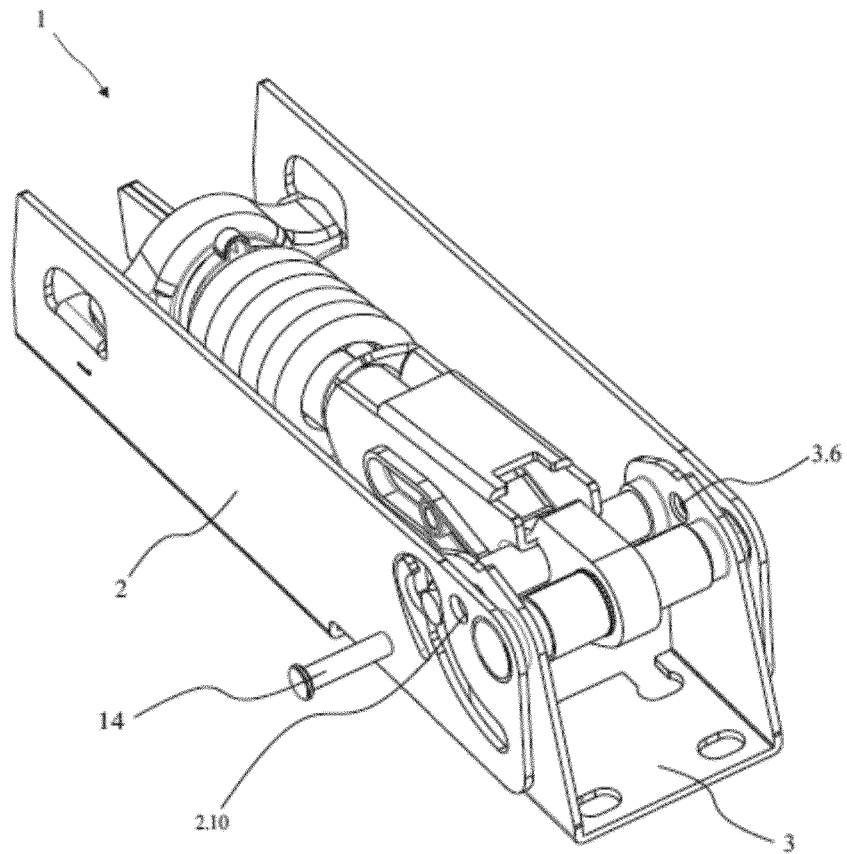


Figure 9

REFERENCES CITED IN THE DESCRIPTION

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