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(71) Applicant: **Atasan Metal Sanayi Ticaret Limited Sirketi**
Sakarya (TR)

(72) Inventor: **CIFTCI, Mehmet Faik**
SAKARYA (TR)

(74) Representative: **Dericioglu Kurt, Ekin**
Ankara Patent Bureau Limited
Bestekar Sokak No: 10
Kavaklidere
06680 Ankara (TR)

(54) A HINGE MECHANISM

(57) The present invention relates to a hinge mechanism (1) which enables to open and close the household appliance doors. The objective of the present invention is to provide a hinge mechanism (1) which enables the door to be closed and opened in a balanced way, and which prevents hard hitting by slowing down the door in case the door is closed fast and opened fast.

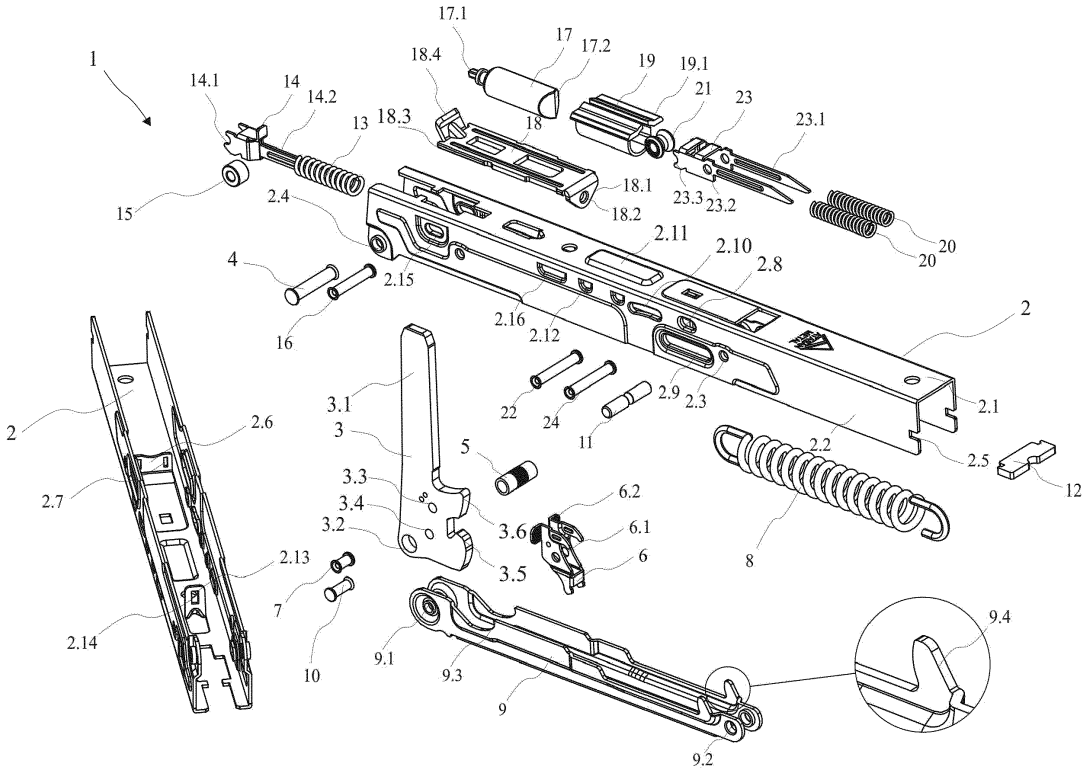

Figure 1

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Description

Field of the Invention

[0001] The present invention relates to a hinge mechanism which enables to open and close the household appliance doors.

Background of the Invention

[0002] In appliances having doors such as oven, dishwasher, fridge, deep freezer; hinge mechanisms are used which enable the doors to be attached to the appliance body and to be opened and closed around an axis passing through these edges. The hinge systems comprise counterweight, spring systems in order to provide ease to the user while lifting doors, as well as they have the strength to carry appliance bodies having different door weights. Furthermore, there are hinge systems comprising damper in order to prevent the door from hitting the appliance body while closing or to prevent it from opening too fast with the weight of the door.

[0003] The United States patent document no. US20110017191, an application in the state of the art, discloses a hinge mounted to household appliances. The hinge comprises a damper in order to provide slow closing and opening. In the invention, it is stated that the hinge can comprise dampers, one for opening and one for closing.

[0004] The United States patent document no. US20120067333, an application in the state of the art, discloses a hinge mechanism for ovens. The hinge creates a closing force in order to keep the door in closed position. It comprises a damper resisting against this closing movement and slows it.

[0005] European Patent Document no EP2562341, an application known in the state of the art, discloses a damper system for hinges used in household appliances. The hinge slows down the door in order to prevent the door from hitting the body during closing.

[0006] The damper systems in the current technique cannot provide different force absorption in different positions of the door with the appliance. This situation causes insufficiencies in providing the desired comfort while closing or opening the door.

[0007] The mechanism used in transferring forces to the damper in the state of the art wear off in time due to their structure, and they cause the damper to be deformed in time.

Summary of the Invention

[0008] The objective of the present invention is to provide a hinge mechanism which connects the appliance and the door to each other and allows the door opening and closing freely by rotating around its axis.

[0009] Another objective of the present invention is to provide a hinge mechanism which enables the opening movement of the door in a controlled way by means of the weight of the door without requiring the user to apply force.

[0010] A further objective of the present invention is to provide a hinge mechanism which prevents the door or the appliance from getting damaged by preventing the excessively fast opening and closing movement of the door during closing and opening.

[0011] Yet another objective of the present invention is to provide a hinge mechanism which prevents the wearing of the hinge and elongates the life of the hinge by preventing the unwanted forces to occur during the transmission of the forces.

Detailed Description of the Invention

[0012] A hinge mechanism developed to fulfill the objectives of the present invention is illustrated in the accompanying figures, in which:

Figure 1 is the exploded view of the inventive hinge mechanism

Figure 2 is the exploded view of an alternative embodiment of the inventive hinge mechanism.

Figure 3 is the view of the inventive hinge mechanism wherein the appliance door is in open position.

Figure 4 is the view of the inventive hinge mechanism wherein the appliance door is in half open position.

Figure 5 is the perspective view of the inventive hinge mechanism wherein the appliance door is in closed position.

Figure 6 is the view of an alternative embodiment of the inventive hinge mechanism wherein the appliance door is in open position.

Figure 7 is the view of an alternative embodiment of the inventive hinge mechanism wherein the appliance door is in half open position.

Figure 8 is the perspective view of an alternative embodiment of the inventive hinge mechanism wherein the appliance door is in closed position.

[0013] The components shown in the figures are each given reference numbers as follows:

1. Hinge mechanism
2. Appliance part
    - 2.1. Lower wall
    - 2.2. Side wall
    - 2.3. Connection hole
    - 2.4. Rotation pin hole
    - 2.5. Fixing piece recess
    - 2.6. Damper spring surface
    - 2.7. Damper spring hole
    - 2.8. Damper spring piece pin slot
    - 2.9. Counterweight spring pin slot
    - 2.10. Damper pin cam slot
    - 2.11. Damper holding piece slot

2.12. Damper holding piece recess
2.13. Closing spring surface
2.14. Closing spring hole
2.15. Closing spring pin slot
2.16. Damper piece recess
2.17. Alternative damper pin cam slot

3. Door part

3.1. Door protrusion
3.2. Rotation pin hole
3.3. Door fixing piece hole
3.4. Counterweight spring piece hole
3.5. Closing spring cam surface
3.6. Slow closing cam surface

4. Appliance part rotation pin
5. Door part rotation pin
6. Door fixing piece

6.1. Door fixing hole
6.2. Door fixing protrusion

7. Door fixing pin
8. Counterweight spring
9. Counterweight spring piece

9.1. Counterweight spring piece connection hole
9.2. Counterweight spring pin hole
9.3. Closing spring pin contact surface
9.4. Damper pin cam surface
9.5. Alternative damper pin cam surface

10. Counterweight spring piece pin
11. Counterweight spring pin
12. Counterweight spring fixing piece
13. Closing spring
14. Closing spring piece

14.1. Closing spring pin recess
14.2. Closing spring protrusion

15. Closing spring roller
16. Closing spring pin
17. Damper

17.1. Damper tip
17.2. V-surface
17.3. Alternative damper tip

18. Damper part

18.1. Damper surface
18.2. Damper hole
18.3. Tab
18.4. Cam contact surface

19. Damper holding piece

19.1. Protrusion

20. Damper spring
21. Damper roller
22. Damper pin
23. Damper spring piece

23.1. Damper spring protrusion
23.2. Damper spring piece pin hole
23.3. Damper pin recess

24. Damper spring piece pin
25. Alternative damper roller
26. Alternative damper roller pin

[0014] The inventive hinge mechanism (1), which balances the door during the opening and opening of the door in household appliances with a door and prevents the accelerations during opening and closing, comprises

- at least one appliance part (2) which is preferably fixed to the appliance body,
- at least one door piece (3) which is preferably fixed to the appliance door,
- at least one appliance part rotation pin (4) which connects the appliance part (2) and the door part (3) together and about the axis of which the door part (3) rotates,
- at least one door part rotation pin (5) which is fixed on the door part (3) and rotates together with the door part (3),
- at least one door fixing piece (6) which enables the appliance door to be fixed to the door part (3),
- at least one door fixing pin (7) which fixes the door part (3) and the door fixing piece (6) to each other,
- at least one counterweight spring (8) which balances the weight of the appliance door,
- at least one counterweight spring piece (9) which transfers the movement and weight of the appliance door to the counterweight spring (8)
- at least one counterweight spring piece pin (10) which connects the door part (3) to the counterweight spring piece (9),
- at least one counterweight spring pin (11) which connects one end of the counterweight spring (8) and the counterweight spring piece (9) to each other,
- at least one counterweight spring fixing piece (12) which connects the other end of the counterweight spring (8) and the appliance part (2) to each other,
- at least one female closing spring (13) which generates the forces at the moment when the appliance door closes, and which applies force such that it will keep the appliance door in closed position,
- at least one closing spring piece (14) which holds the closing spring (13) and transfers the movements of the door part (3),
- at least one closing spring roller (15) which receives the movements of the door part (3) to transfer them

to the closing spring piece (14),

- at least one closing spring pin (16) which passes through the closing spring roller (15), and which transfers the movements of the door part (3) to the closing spring piece (14) by allowing its rotation,
- at least one damper (17) which absorbs the excess forces generated during opening and closing of the appliance door and enables the door to slow down,
- at least one damper piece part (18) which transfers the movement of the door part (3) to the damper (17) during closing,
- at least one damper holding piece (19) which keeps the damper (17) in its place and allows its linear movement,
- at least one damper spring (20) which absorbs the excess forces loaded on the damper (17),
- at least one damper roller (21) to which the excess loads on the damper (17) are transferred, and wherein the opening movement of the counterweight spring piece (9) is transferred to the damper (17) during the opening of the appliance door,
- damper pin (22) which passes through the damper roller (21), and which enables the movement of the damper (17) to be transferred to the damper spring (20) and the counterweight spring piece (9) by allowing the rotation of the damper roller (21),
- at least one damper spring piece (23) which holds the damper spring (20) and transfers the movement of the damper pin (22) to the damper spring (20),
- at least one damper spring piece pin (24) which regulates the movement of the damper spring piece (23) in the appliance part (2),
- at least one alternative damper roller (25) which transfers the movement of the counterweight spring piece (9) moving depending on the movement of the door part (3) to the damper (17) during closing in the alternative embodiment,
- alternative damper roller pin (26) which passes through the alternative damper roller (25) and which enables the movement of the door part (3) to be transferred to the damper (17) by allowing the rotation of the alternative damper roller (25) in the alternative embodiment.

[0015] The appliance part (2) comprises

- at least one lower wall (2.1) which is preferably abutted on the appliance body,
- at least two side walls (2.2) which are vertical to the lower wall (2.1) of the appliance part on both corresponding sides of the lower wall (2.1) of the appliance part,
- at least one appliance part connection hole (2.3) which enables fixing to the appliance body,
- at least one rotation pin hole (2.4) through which the appliance part rotation pin (4) preferably close fits,
- at least one fixing piece recess (2.5) in which the counterweight spring fixing piece (12) fits,
- at least one damper spring surface (2.6) against which the damper spring (20) abuts,
- at least one damper spring hole (2.7) through which the damper spring protrusion (23.1) passes,
- at least one damper spring piece pin slot (2.8) through which the damper spring piece pin (24) passes and along which it can move,
- at least one counterweight spring pin slot (2.9) through which the counterweight spring pin (11) passes and along which it can move,
- at least one damper pin cam slot (2.10) through which the damper pin (22) passes and along which it can move,
- at least one damper holding piece slot (2.11) in which the damper holding piece (19) fits,
- at least one damper holding piece recess (2.12) in which the protrusion (19.1) provided on the damper holding piece (19) fits,
- at least one closing spring surface (2.13) against which the closing spring (13) abuts,
- at least one closing spring hole (2.14) through which the closing spring protrusion (14.2) passes,
- at least one closing spring pin slot (2.15) through which the closing spring pin (16) passes and along which it can move,
- at least one damper part recess (2.16) in which the tab (18.3) on the damper part (18) enters and along which it moves,
- at least one alternative damper pin cam slot (2.17) shaped in the desired cam form through which the alternative damper roller pin (26) passes and along which it can move in the alternative embodiment.

[0016] The door part (3) comprises

- at least one door protrusion (3.1) which fits into the space inside the appliance door,
- at least one rotation pin hole (3.2) through which the door part rotation pin (5) close fits,
- at least one door fixing piece hole (3.3) through which the door fixing pin (7) passes,
- at least one counterweight spring piece hole (3.4) through which the counterweight spring piece pin (10) passes,
- at least one closing spring cam surface (3.5) which is formed in order to transfer the movement of the door to the closing spring roller (15) in a desired ratio, and which is in contact with the closing spring roller (15),
- at least one slow closing cam surface (3.6) which is formed in order to transfer the movement of the door to the cam contact surface (18.4) provided on the damper part (18) in a desired ratio, and which is contact with the cam contact surface (18.4).

[0017] The door fixing piece (6) comprises

- at least one door fixing hole (6.1) through which the

door fixing pin (7) passes,
- at least one door fixing protrusion (6.2) which enters into the recess in the door.

[0018] The counterweight spring piece (9) comprises

- at least one counterweight spring piece connection hole (9.1) through which the counterweight spring piece pin (10) passes,
- at least one counterweight spring hole (9.2) through which the counterweight spring pin (10) passes,
- at least one damper pin cam surface (9.4) which transfers the movement of the door to the damper pin (22) in a desired ratio while the door is opening,
- at least one closing spring pin contact surface (9.3) which limits the movement by contacting the closing spring pin (16) while the door is opening,
- at least one alternative damper pin cam surface (9.5) which transfers the movement of the door while the door is closing to the alternative damper roller pin (26) in a desired ratio in the alternative embodiment.

[0019] The closing spring piece (14) comprises

- at least one closing spring pin recess (14.1) against which the closing spring pin (16) abuts,
- at least one closing spring protrusion (14.2) which holds the closing spring (13).

[0020] The damper (17) comprises

- at least one damper tip (17.1) in which the damper part (18) is placed and fixed,
- at least one v-surface (17.2) which contacts the damper roller (21), at least one alternative damper tip (17.3) on which the alternative damper roller (25) makes rotary movement in the alternative embodiment.

[0021] The damper part (18) comprises

- at least one damper surface (18.1) against which the damper (17) abuts,
- at least one damper hole (18.2) in which the damper tip (17.1) is placed and fixed,
- at least one tab (18.3) which engages into the damper part recess (2.16) and which moves along it,
- at least one cam contact surface (18.4) which is in contact with the slow closing cam surface (3.6).

[0022] The damper spring piece (23) comprises

- at least one damper spring protrusion (23.1) which holds the damper spring (20),
- at least one damper spring piece pin hole (23.2) through which the damper spring piece pin (24) passes,
- at least one damper pin recess (23.3) against which the damper pin (22) abuts.

Claims

1. A hinge mechanism (1), which balances the door during the opening and closing of the door in household appliances with a door and prevents the accelerations during opening and closing, **characterized by**

- at least one appliance part (2) which is fixed to the appliance body,
- at least one door piece (3) which is fixed to the appliance door,
- at least one appliance part rotation pin (4) which connects the appliance part (2) and the door part (3) together and about the axis of which the door part (3) rotates,
- at least one door part rotation pin (5) which is fixed on the door part (3) and rotates together with the door part (3),
- at least one door fixing piece (6) which enables the appliance door to be fixed to the door part (3),
- at least one door fixing pin (7) which fixes the door part (3) and the door fixing piece (6) to each other,
- at least one counterweight spring (8) which balances the weight of the appliance door,
- at least one counterweight spring piece (9) which transfers the movement and weight of the appliance door to the counterweight spring (8)
- at least one counterweight spring piece pin (10) which connects the door part (3) to the counterweight spring piece (9),
- at least one counterweight spring pin (11) which connects one end of the counterweight spring (8) and the counterweight spring piece (9) to each other,
- at least one counterweight spring fixing piece (12) which connects the other end of the counterweight spring (8) and the appliance part (2) to each other,
- at least one female closing spring (13) which generates the forces at the moment when the appliance door closes, and which applies force such that it will keep the appliance door in closed position,
- at least one closing spring piece (14) which holds the closing spring (13) and transfers the movements of the door part (3),
- at least one closing spring roller (15) which receives the movements of the door part (3) to transfer them to the closing spring piece (14),
- at least one closing spring pin (16) which passes through the closing spring roller (15), and which transfers the movements of the door part (3) to the closing spring piece (14) by allowing

its rotation,
- at least one damper (17) which absorbs the excess forces generated during opening and closing of the appliance door and enables the door to slow down,
- at least one damper piece part (18) which transfers the movement of the door part (3) to the damper (17) during closing depending on the cam form structure,
- at least one damper holding piece (19) which keeps the damper (17) in its place and allows its linear movement,
- at least one damper spring (20) which absorbs the excess forces loaded on the damper (17),
- at least one V shaped damper roller (21) to which the excess loads on the damper (17) are transferred, and wherein the opening movement of the counterweight spring piece (9) is transferred to the damper (17) during the opening of the appliance door,
- damper pin (22) which passes through the damper roller (21), and which enables the movement of the damper (17) to be transferred to the damper spring (20) and the cam form (2.10 being connected to the cam formed slot) provided on the counterweight spring piece (9) by allowing the rotation of the damper roller (21),
- at least one damper spring piece (23) which holds the damper spring (20) and transfers the movement of the damper pin (22) to the damper spring (20),
- at least one damper spring piece pin (24) which regulates the movement of the damper spring piece (23) in the appliance part (2).

2. A hinge mechanism (1) according to claim 1, **characterized by** an appliance part (2) fixed to the appliance body and comprising

- at least one lower wall (2.1) which is abutted against the appliance body,
- at least two side walls (2.2) which are perpendicular to the lower wall (2.1) of the appliance part on both corresponding sides of the lower wall (2.1) of the appliance part,
- at least one appliance part connection hole (2.3) which enables fixing to the appliance body,
- at least one rotation pin hole (2.4) through which the appliance part rotation pin (4) close fits,
- at least one fixing piece recess (2.5) in which the counterweight spring fixing piece (12) fits,
- at least one damper spring surface (2.6) against which the damper spring (20) abuts,
- at least one damper spring hole (2.7) through which the damper spring protrusion (23.1) passes,
- at least one damper spring piece pin slot (2.8) through which the damper spring piece pin (24) passes and along which it can move,
- at least one counterweight spring pin slot (2.9) through which the counterweight spring pin (11) passes and along which it can move,
- at least one damper pin cam slot (2.10) through which the damper pin (22) passes and along which it can move, and which is shaped in the desired cam form,
- at least one damper holding piece slot (2.11) in which the damper holding piece (19) fits,
- at least one damper holding piece recess (2.12) in which the protrusion (19.1) provided on the damper holding piece (19) fits,
- at least one closing spring surface (2.13) against which the closing spring (13) abuts,
- at least one closing spring hole (2.14) through which the closing spring protrusion (14.2) passes,
- at least one closing spring pin slot (2.15) through which the closing spring pin (16) passes and along which it can move,
- at least one damper part recess (2.16) in which the tab (18.3) on the damper part (18) enters and along which it moves.

3. A hinge mechanism (1) according to claim 1, **characterized by** a door part (3) fixed to the appliance door and comprising

- at least one door protrusion (3.1) which fits into the space inside the appliance door,
- at least one rotation pin hole (3.2) through which the door part rotation pin (5) close fits,
- at least one door fixing piece hole (3.3) through which the door fixing pin (7) passes,
- at least one counterweight spring piece hole (3.4) through which the counterweight spring piece pin (10) passes,
- at least one closing spring cam surface (3.5) which is formed in order to transfer the movement of the door to the closing spring roller (15) in a desired ratio, and which is in contact with the closing spring roller (15),
- at least one slow closing cam surface (3.6) which is formed in order to transfer the movement of the door to the cam contact surface (18.4) provided on the damper part (18) in a desired ratio, and which is contact with the cam contact surface (18.4).

4. A hinge mechanism (1) according to claim 1, **characterized by** a door fixing piece (6) enabling the appliance door to be fixed to the door part (3) and comprising

- at least one door fixing hole (6.1) through which the door fixing pin (7) passes,

- at least one door fixing protrusion (6.2) which enters into the recess in the door.

5. A hinge mechanism (1) according to claim 1, **characterized by** a counterweight spring piece (9) transferring the movement and the weight of the appliance door to the counterweight spring (8) and comprising

- at least one counterweight spring piece connection hole (9.1) through which the counterweight spring piece pin (10) passes,
- at least one counterweight spring pin hole (9.2) through which the counterweight spring pin (10) passes,
- at least one damper pin cam surface (9.4) which transfers the movement of the door to the damper pin (22) in a desired ratio while the door is opening,
- at least one closing spring pin contact surface (9.3) which limits the movement by contacting the closing spring pin (16) while the door is opening.

6. A hinge mechanism (1) according to claim 1, **characterized by** a closing spring piece (14) holding the closing spring (13) and transferring the movements of the door part (3), and comprising

- at least one closing spring pin recess (14.1) against which the closing spring pin (16) abuts,
- at least one closing spring protrusion (14.2) which holds the closing spring (13).

7. A hinge mechanism (1) according to claim 1, **characterized by** a damper (17), which absorbs the excess forces generated during opening and closing of the appliance door and enables the door to slow down, comprising

- at least one damper tip (17.1) in which the damper part (18) is placed and fixed,
- at least one v-surface (17.2) which contacts the damper roller (21).

8. A hinge mechanism (1) according to claim 1, **characterized by** a damper part (18) transferring the movement of the door part (3) to the damper (17) and comprising

- at least one damper surface (18.1) against which the damper (17) abuts,
- at least one damper hole (18.2) in which the damper tip (17.1) is placed and fixed,
- at least one tab (18.3) which engages into the damper part recess (2.16) and which moves along it,
- at least one cam contact surface (18.4) which is in contact with the slow closing cam surface (3.6) (allowing movement transfer in a desired ratio).

9. A hinge mechanism (1) according to claim 1, **characterized by** a damper spring piece (23) holding the damper spring (20) and transferring the movement of the damper pin (22), and comprising

- at least one damper spring protrusion (23.1) which holds the damper spring (20),
- at least one damper spring piece pin hole (23.2) through which the damper spring piece pin (24) passes,
- at least one damper pin recess (23.3) against which the damper pin (22) abuts.

10. A hinge mechanism (1), which balances the door during the opening and opening of the door in household appliances with a door and prevents the accelerations during opening and closing, **characterized by**

- at least one appliance piece (2) which is fixed to the appliance body,
- at least one door piece (3) which is fixed to the appliance door,
- at least one appliance part rotation pin (4) which connects the appliance part (2) and the door part (3) together and about the axis of which the door part (3) rotates,
- at least one door part rotation pin (5) which is fixed on the door part (3) and rotates together with the door part (3),
- at least one door fixing piece (6) which enables the appliance door to be fixed to the door part (3),
- at least one door fixing pin (7) which fixes the door part (3) and the door fixing piece (6) to each other,
- at least one counterweight spring (8) which balances the weight of the appliance door,
- at least one counterweight spring piece (9) which transfers the movement and weight of the appliance door to the counterweight spring (8)
- at least one counterweight spring piece pin (10) which connects the door part (3) to the counterweight spring piece (9),
- at least one counterweight spring pin (11) which connects one end of the counterweight spring (8) and the counterweight spring piece (9) to each other,
- at least one counterweight spring fixing piece (12) which connects the other end of the counterweight spring (8) and the appliance part (2) to each other,
- at least one female closing spring (13) which generates the forces at the moment when the appliance door closes, and which applies force such that it will keep the appliance door in closed

position,
- at least one closing spring piece (14) which holds the closing spring (13) and transfers the movements of the door part (3),
- at least one closing spring roller (15) which receives the movements of the door part (3) to transfer them to the closing spring piece (14),
- at least one closing spring pin (16) which passes through the closing spring roller (15), and which transfers the movements of the door part (3) to the closing spring piece (14) by allowing its rotation,
- at least one damper (17) which absorbs the excess forces generated during opening and closing of the appliance door and enables the door to slow down,
- at least one damper holding piece (19) which keeps the damper (17) in its place and allows its linear movement,
- at least one damper spring (20) which absorbs the excess forces loaded on the damper (17),
- at least one V shaped damper roller (21) to which the excess loads on the damper (17) are transferred, and wherein the opening movement of the counterweight spring piece (9) is transferred to the damper (17) during the opening of the appliance door,
- damper pin (22) which passes through the damper roller (21), and which enables the movement of the damper (17) to be transferred to the damper spring (20) and the cam form (2.10 being connected to the cam formed slot) provided on the counterweight spring piece (9) by allowing the rotation of the damper roller (21),
- at least one damper spring piece (23) which holds the damper spring (20) and transfers the movement of the damper pin (22) to the damper spring (20),
- at least one damper spring piece pin (24) which regulates the movement of the damper spring piece (23) in the appliance part (2),
- at least one alternative damper roller (25) which transfers the movement of the counterweight spring piece (9) moving depending on the movement of the door part (3) to the damper (17) during closing,
- alternative damper roller pin (26) which passes through the alternative damper roller (25) and which enables the movement of the door part (3) to be transferred to the damper (17) by allowing the rotation of the alternative damper roller (25).

11. A hinge mechanism (1) according to claim 10, **characterized by** an appliance part (2) fixed to the appliance body and comprising

- at least one lower wall (2.1) which is abutted against the appliance body,
- at least two side walls (2.2) which are perpendicular to the lower wall (2.1) of the appliance part on both corresponding sides of the lower wall (2.1) of the appliance part,
- at least one appliance part connection hole (2.3) which enables fixing to the appliance body,
- at least one rotation pin hole (2.4) through which the appliance part rotation pin (4) close fits,
- at least one fixing piece recess (2.5) in which the counterweight spring fixing piece (12) fits,
- at least one damper spring surface (2.6) against which the damper spring (20) abuts,
- at least one damper spring hole (2.7) through which the damper spring protrusion (23.1) passes,
- at least one damper spring piece pin slot (2.8) through which the damper spring piece pin (24) passes and along which it can move,
- at least one counterweight spring pin slot (2.9) through which the counterweight spring pin (11) passes and along which it can move,
- at least one damper pin cam slot (2.10) through which the damper pin (22) passes and along which it can move, and which is shaped in the desired cam form,
- at least one damper holding piece slot (2.11) in which the damper holding piece (19) fits,
- at least one damper holding piece recess (2.12) in which the protrusion (19.1) provided on the damper holding piece (19) fits,
- at least one closing spring surface (2.13) against which the closing spring (13) abuts,
- at least one closing spring hole (2.14) through which the closing spring protrusion (14.2) passes,
- at least one closing spring pin slot (2.15) through which the closing spring pin (16) passes and along which it can move,
- at least one alternative damper pin cam slot (2.17) shaped in the desired cam form through which the alternative damper roller pin (26) passes and along which it can move.

12. A hinge mechanism (1) according to claim 10, **characterized by** a door part (3) fixed to the appliance door and comprising

- at least one door protrusion (3.1) which fits into the space inside the appliance door,
- at least one rotation pin hole (3.2) through which the door part rotation pin (5) close fits,
- at least one door fixing piece hole (3.3) through which the door fixing pin (7) passes,
- at least one counterweight spring piece hole (3.4) through which the counterweight spring piece pin (10) passes,

- at least one closing spring cam surface (3.5) which is formed in order to transfer the movement of the door to the closing spring roller (15) in a desired ratio, and which is in contact with the closing spring roller (15).

13. A hinge mechanism (10) according to claim 10, **characterized by** a door fixing piece (6) enabling the appliance door to be fixed to the door part (3) and comprising

- at least one door fixing hole (6.1) through which the door fixing pin (7) passes,
- at least one door fixing protrusion (6.2) which enters into the recess in the door.

14. A hinge mechanism (1) according to claim 10, **characterized by** a counterweight spring piece (9) transferring the movement and the weight of the appliance door to the counterweight spring (8) and comprising

- at least one counterweight spring piece connection hole (9.1) through which the counterweight spring piece pin (10) passes,
- at least one counterweight spring hole (9.2) through which the counterweight spring pin (10) passes,
- at least one damper pin cam surface (9.4) which transfers the movement of the door to the damper pin (22) in a desired ratio while the door is opening,
- at least one closing spring pin contact surface (9.3) which limits the movement by contacting the closing spring pin (16) while the door is opening,
- at least one alternative damper pin cam surface (9.5) which transfers the movement of the door while the door is closing to the alternative damper roller pin (26) in a desired ratio.

15. A hinge mechanism (1) according to claim 10, **characterized by** a closing spring piece (14) holding the closing spring (13) and transferring the movements of the door part (3), and comprising

- at least one closing spring pin recess (14.1) against which the closing spring pin (16) abuts,
- at least one closing spring protrusion (14.2) which holds the closing spring (13).

16. A hinge mechanism (1) according to claim 10, **characterized by** a damper (17), which absorbs the excess forces generated during opening and closing of the appliance door and enables the door to slow down, comprising

- at least one alternative damper tip (17.3) on which the alternative damper roller (25) makes rotary movement,
- at least one v-surface (17.2) which contacts the damper roller (21).

17. A hinge mechanism (1) according to claim 10, **characterized by** a damper spring piece (23) holding the damper spring (20) and transferring the movement of the damper pin (22), and comprising

- at least one damper spring protrusion (23.1) which holds the damper spring (20),
- at least one damper spring piece pin hole (23.2) through which the damper spring piece pin (24) passes,
- at least one damper pin recess (23.3) against which the damper pin (22) abuts.

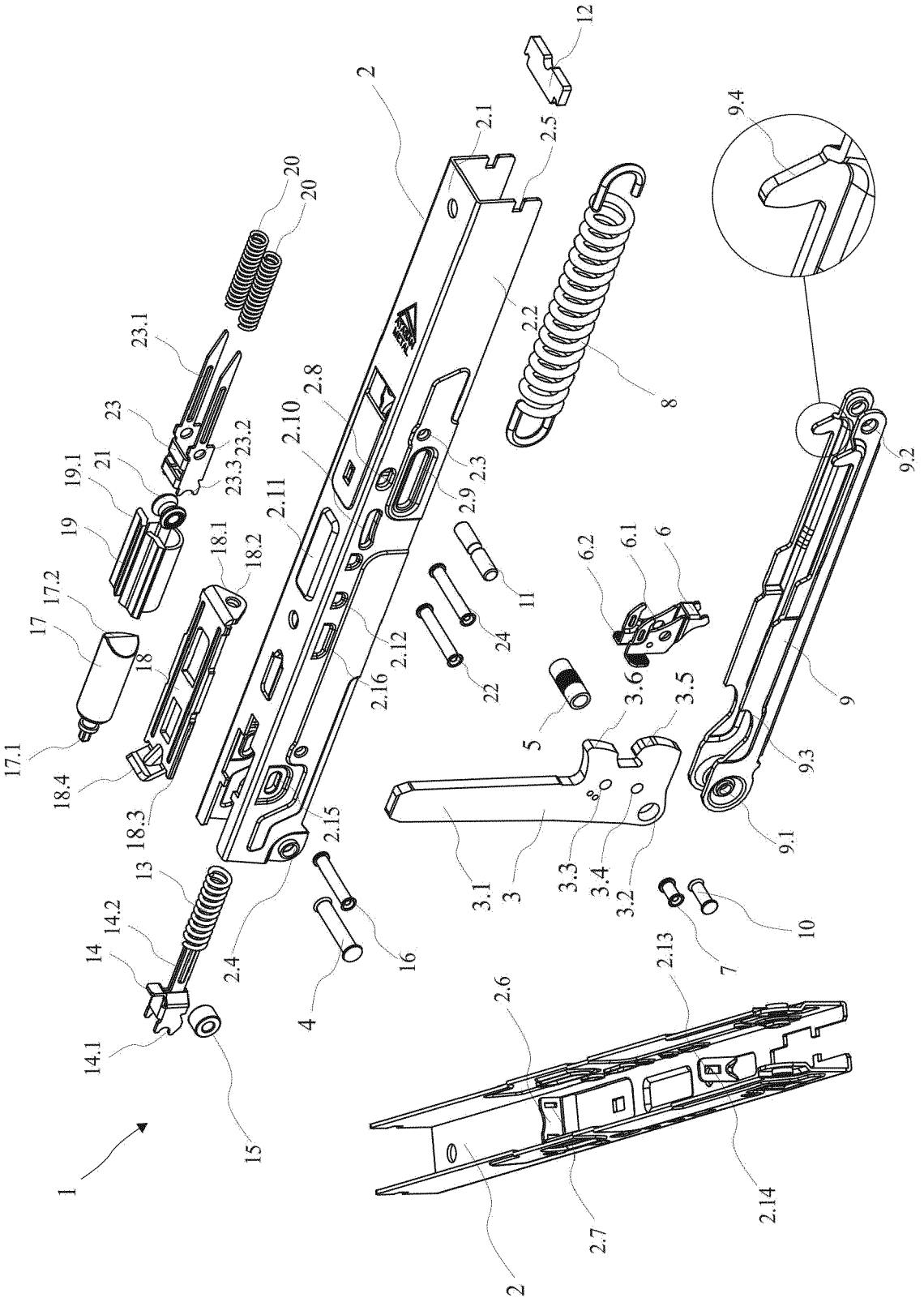
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Figure 1

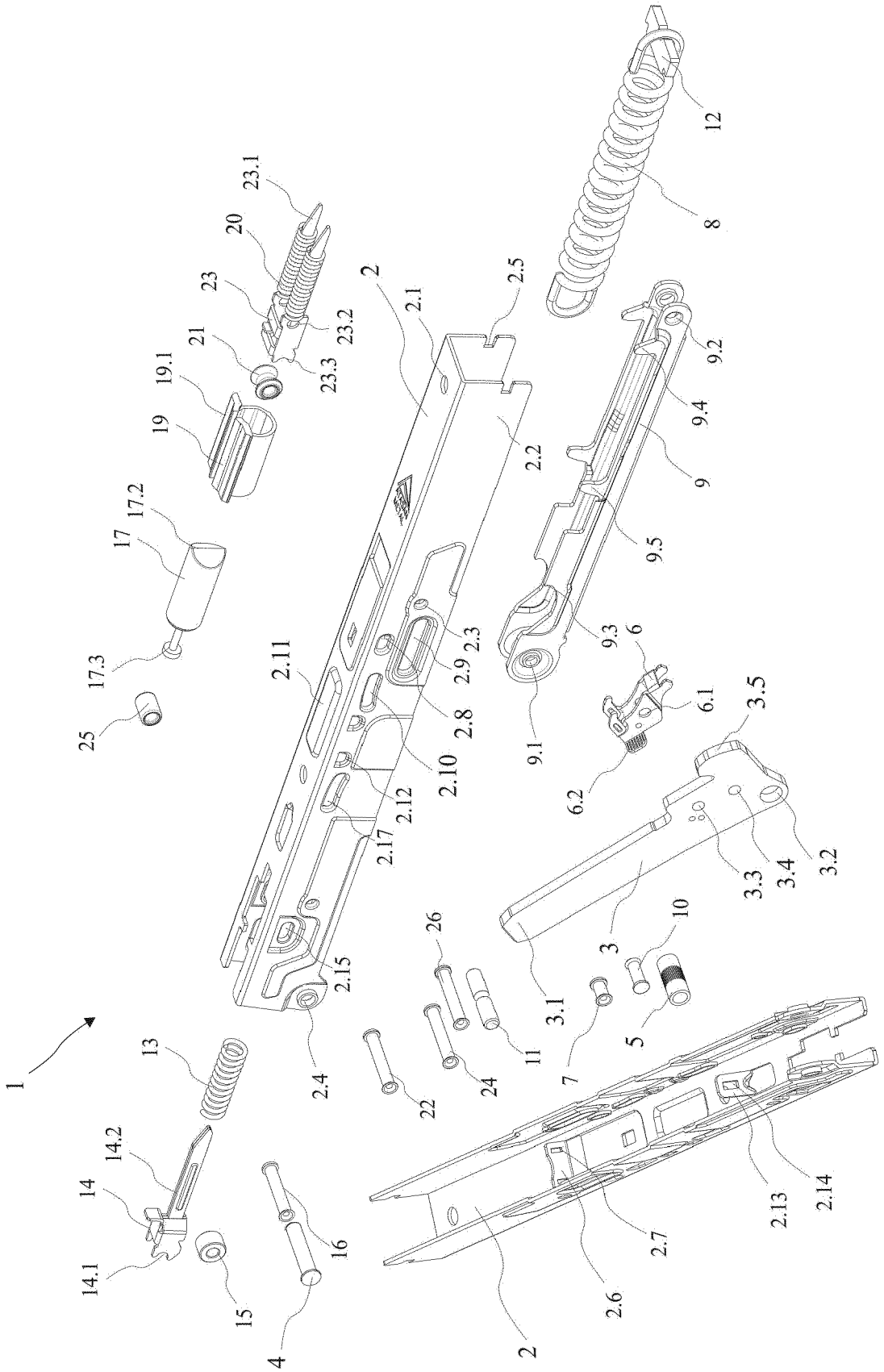
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Figure 2

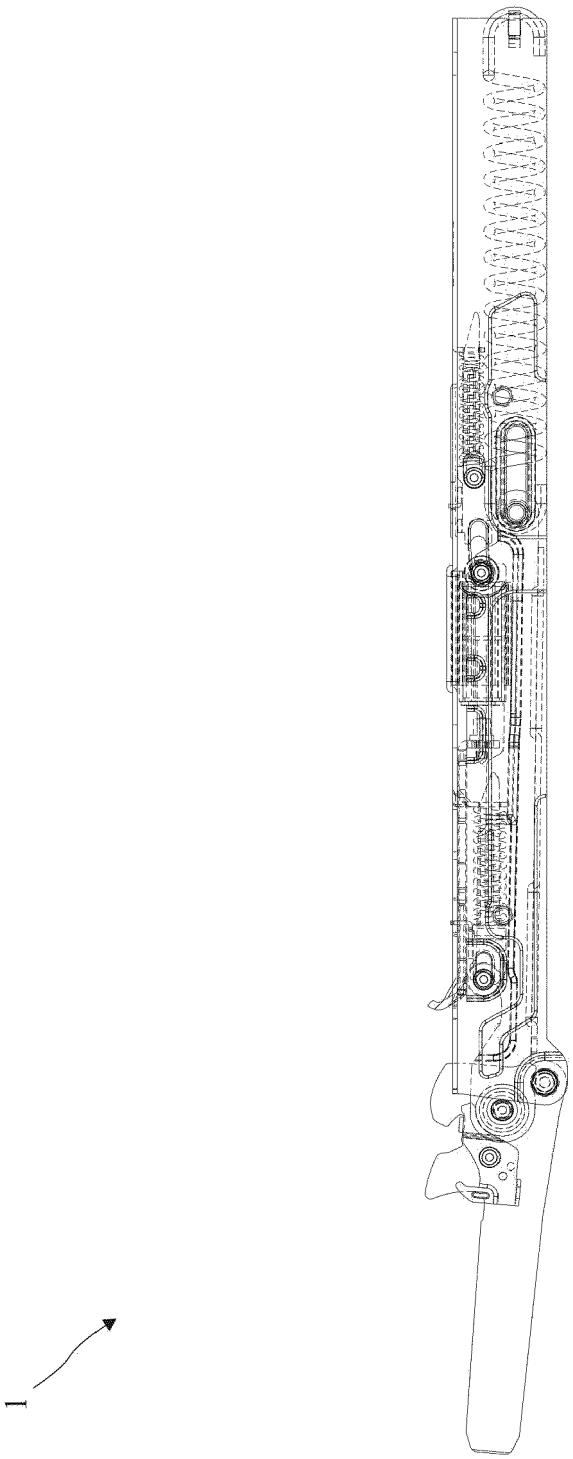


Figure 3

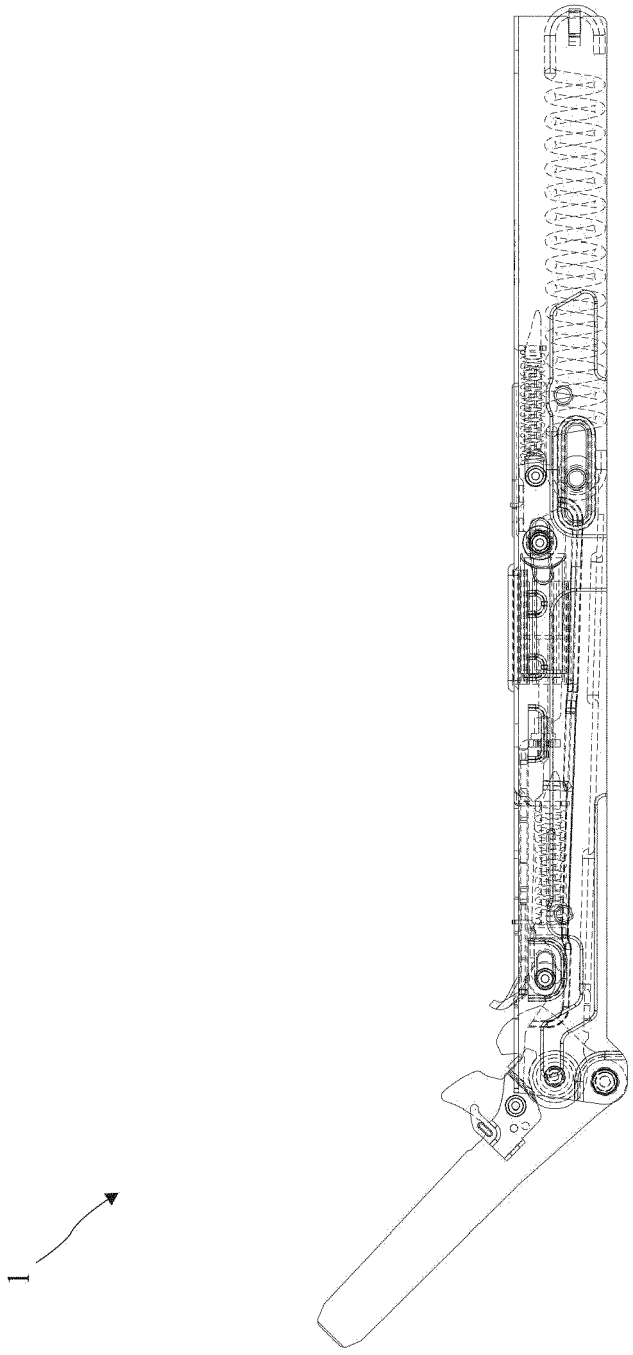


Figure 4

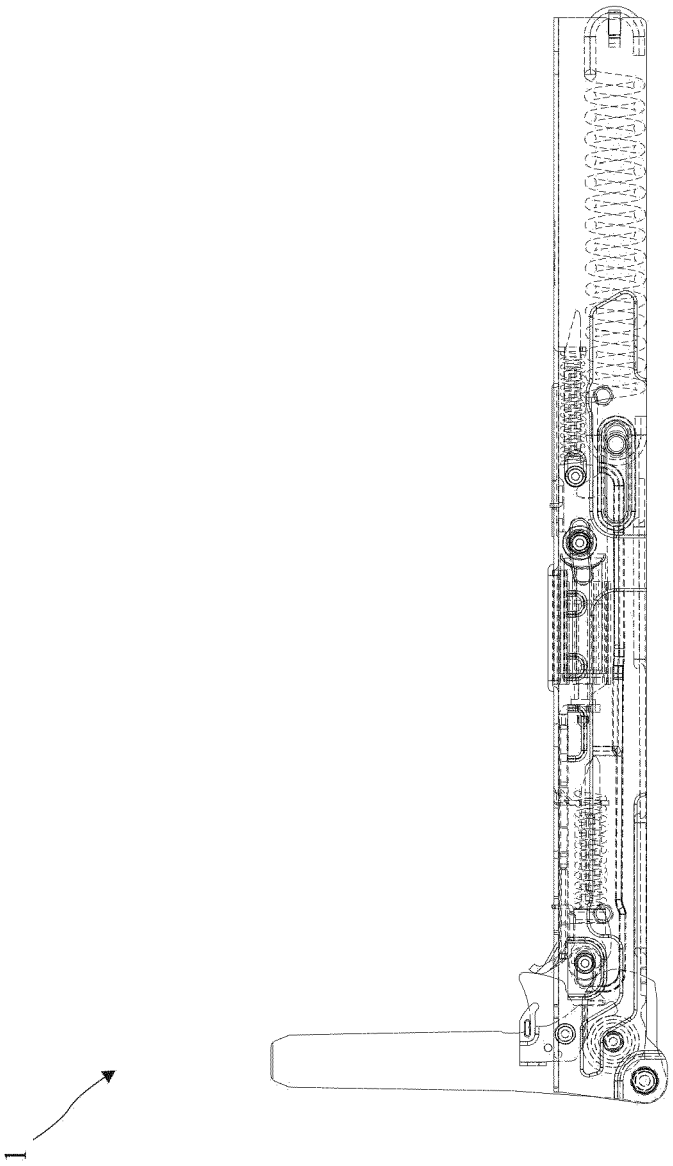
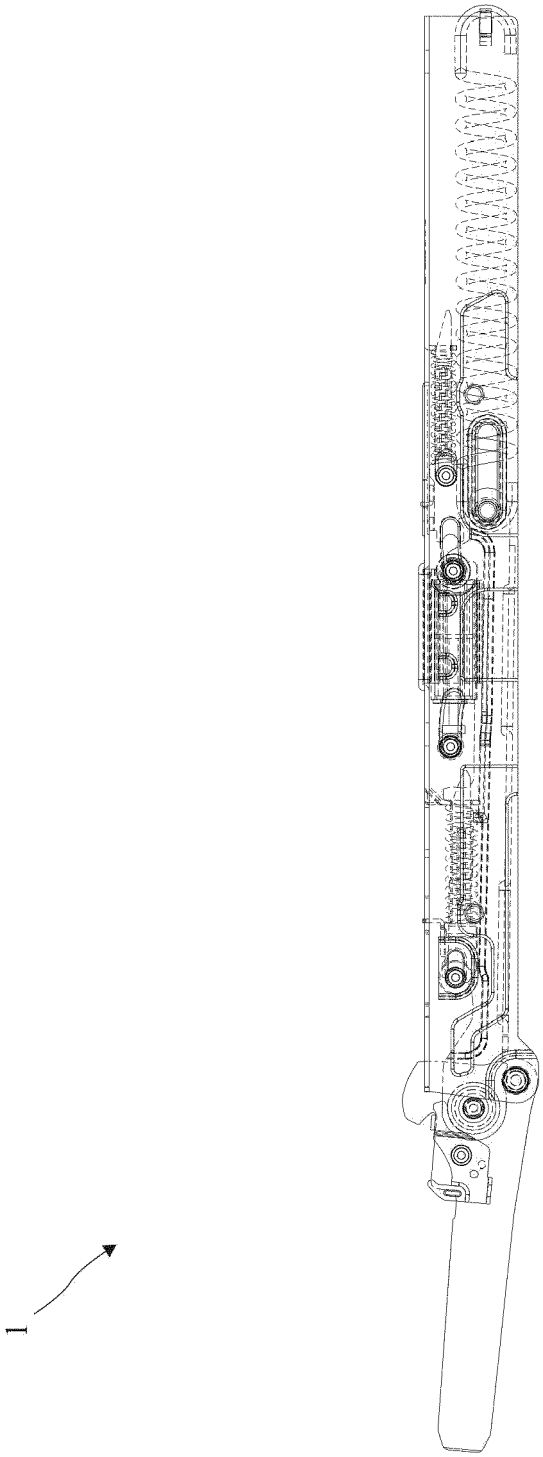


Figure 5



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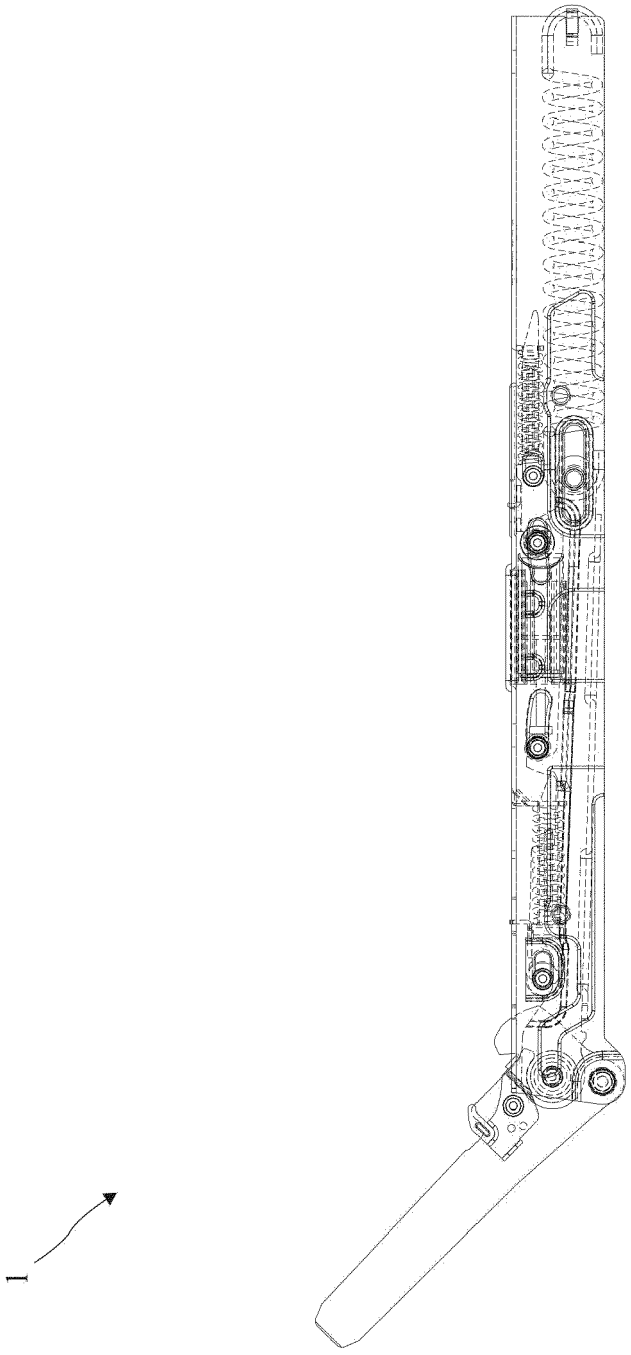

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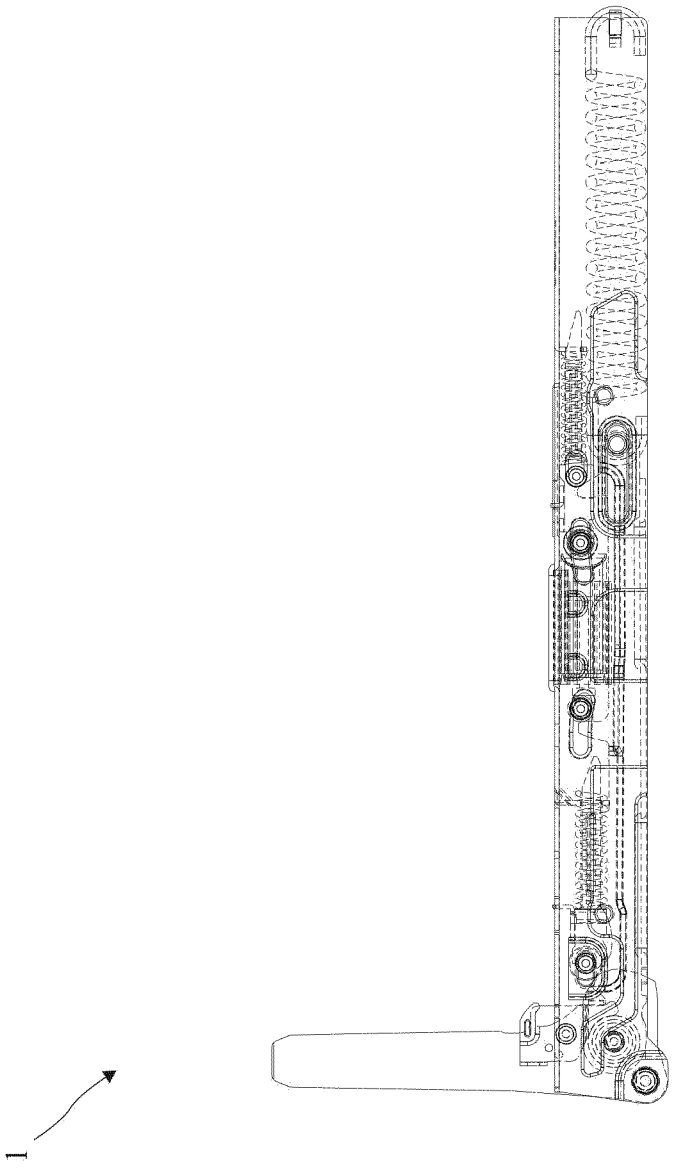

Figure 8

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EUROPEAN SEARCH REPORT

Application Number
EP 16 20 2937

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 664 737 A2 (ATASAN METAL SANAYI VE TICARET LTD SIRKETI [TR]) 20 November 2013 (2013-11-20)	1,3-7, 10-17	INV. E05F1/12 E05F5/02
A	* paragraph [0013] - paragraph [0027]; figures 1-7 *	2,8,9	

TECHNICAL FIELDS SEARCHED (IPC)

E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 April 2017	Guillaume, Geert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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13-04-2017

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EP 2664737 A2	20-11-2013	EP 2664737 A2	20-11-2013
		SI 2664737 T1	30-06-2016

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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