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(71) Applicant: **Atasan Metal Sanayi Ticaret Limited Sirketi**
54060 Sakarya (TR)

(72) Inventor: **Ciftci, Mehmet Faik**
54060 Sakarya (TR)

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

(54) Damper hinge counter support system for a home appliance

(57) The invention is related to a damper counter support system (1) for home appliances (C) basically used in kitchens, said system being adapted to the counter support hinge of the door in order to prevent the slamming shut of the door during the closing motion. The system (1) ensures that the motion of the door (K) is absorbed in stages so that the door is slowed down when it is closing and it does not slam shut. Moreover the system (1) also eliminates the abrasion, wear and noise problems that might occur on the door (K) and/or the body of the home appliances (C) due to the opening and closing actions. The system is characterized in that the system enables angular movement according to the position of the door (K) as a difference to other systems. By means of this angular movement the pin (7) is placed on the bearing (21) located on the body of the hinge (2). Thus the damages that might occur on the door (K) are also prevented. Another characterization of the invention is that it comprises an second absorbing mechanism which absorbs the excessive loads applied on the damper (9) and prevents the damper from getting (9) damaged.

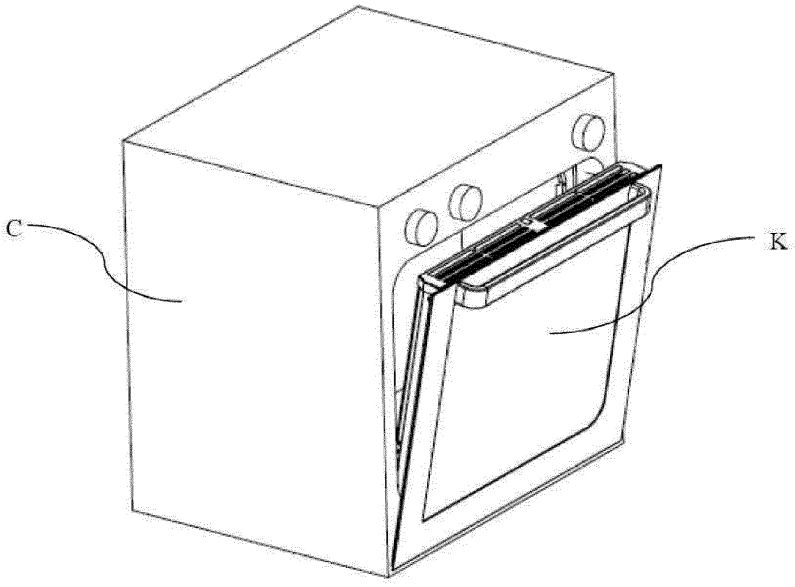


Figure 1

EP 2 562 341 A2

Description

Field of the Invention

[0001] This invention is related to a damper hinge counter support system, adapted to the counter support hinge, designed in order to ensure that the doors of home appliances used in kitchens do not slam shut when they are being closed.

Prior Art

[0002] In the home appliances used in kitchens, especially one of the most important problems in ovens, when a person lets go of the door of the oven, it slams shut and hits the body of the home appliance. With the effect of this impact both the appliance body gets damaged and these bring problems such as noise and wear along with it. Various studies have been conducted regarding this issue by home appliance manufacturers but a sufficient solution has not been reached. In embodiments known in the state of the art, there are different absorbing mechanisms adapted to the body of the home appliance and its doors. However when such mechanisms are applied to the home appliances, different problems are faced due to the structure of said mechanisms. At the moment a study that can cover the requirements of the user in every aspect and at the same time lengthen the lifespan of the home appliance is not known.

[0003] In the international patent application numbered W02009033960 in the known state of the art, a door hinge for home appliances such as oven and dishwashers is described. The described door hinge, comprises a door handle that can be mounted on a door, a body that can be mounted on the frame of the appliance, and a main shaft on which the door handle is attached longitudinally, a counter weight spring and a closing spring. When the door opens the counter weight spring keeps the door in balance. The closing spring, applies a closing force automatically just before the door reaches the closed position. In the international patent application numbered W02010091770 in known state of the art, an oven door opening and closing mechanism is described. This mechanism, is made of at least one hinge, that enables the foreseen opening and closing movements dependent on the oven body, at least a closing force manufacturer that produces the foreseen closing force, a mobile element that is connected with the hinge, and a kinematic tool that converts the foreseen rotating opening and closing motion of the hinge, into the foreseen reciprocating opening and closing motion of the mobile element. Moreover in the foreseen area, an absorbing system that produces an absorbing force which eliminates the closing effect of the mobile element is present. In the German patent document numbered DE102005045365 in the known state of the art, a hardware which has a closing unit in order to give the door mobility is described. The damper unit absorbs the impact of the door and an energy absorbing unit is installed on the door. The damper unit, parts off, near the end of the circuit located at the absorbing area from the non absorbing motion of the door. The closing unit comprises a spring and it has been placed completely on the door.

[0004] In the German patent document numbered DE102007032758 in the known state of the art a damper system for home appliances, regarding the closing of especially oven doors is described. This system, has at least one arm that extends out of the body of the door. The power of the inner arm which is moved by the motion of the external arm makes the damper work. This arm is located on the body of the hinge. In the European patent documents in the known state of the art numbered EP1995524 (A2) and EP 2284344 (A2), a hinge system for the wings or doors of especially electrical home appliances is mentioned. This system comprises a first box which has a body that has been shaped, a second box which has a shaped body, a connection element located between the first and the second bodies, and an absorbing cylinder which absorbs the counter movement against the first body and which is attached to onto the second body.

[0005] In the German patent document numbered DE102008018867 (A1) in the known applications of the state of the art, a mechanism which is mounted on home appliances and which has an absorbing unit is described. This absorbing unit, ensures that the door of the home appliance comes to the closed position at a slow motion so that it does not slam shut. A white goods home appliance mechanism which comprises a starting point of an absorbing area foreseen for decreasing speed changes in at least one main operating process is described.

Brief description of the invention

[0006] The purpose of the invention is to provide a home appliance damper hinge counter support system that prevents the slamming shut of the door of the home appliance by slowing down of the closing motion of the door.

[0007] Another purpose of the invention is to provide a home appliance damper hinge counter support system that eliminates the abrasion, wear and noise problems that are formed on the door and/or body of the home appliance due to opening and closing actions.

[0008] Yet another purpose of the invention is to provide a home appliance damper hinge counter support system that can make an angular movement according to the position of the appliance door as a difference when compared with other systems.

[0009] Another aim of the invention is to provide a home appliance damper hinge counter support system that comprises as a difference from other systems, an additional absorbing mechanism that prevents the damage to the damper in excessive loads that might occur during the fast closing motion of the door.

Detailed description of the invention

[0010] "A home appliance damper hinge counter support system" provided in order to reach the aims of this invention has been shown in the attached figures, wherein said figures illustrate the following:

Figure 1 is the perspective view of the home appliance
Figure 2 is the perspective view of the home appliance damper hinge counter support system when the appliance is in the semi-open position
Figure 3 is the view of the home appliance damper hinge counter support system when the appliance is in the semi-open position
Figure 4 is the perspective view of the home appliance damper hinge counter support system when the appliance is in the closed position
Figure 5 is the view of the home appliance damper hinge counter support system when the appliance is in the closed position
Figure 6 is the view of the home appliance damper hinge counter support system when the appliance is in the open position
Figure 7 is the perspective view of the home appliance damper hinge counter support system when the appliance is in the open position
Figure 8 is the perspective view of another embodiment of the home appliance damper hinge counter support system.

[0011] The parts in the figures have each been numbered and their references have been given below.

1. A home appliance damper hinge counter support system
2. Hinge body

    21. Bearing

3. Hinge arm
4. Counter Support
5. Counter support body

    51. Rear wall

6. Connection shaft
7. Pin
8. Damper shaft

    81. Elastic piece

9. Damper
10. Roller
11. Shaft
12. Slit
13. Transmitter
14. Elastic element

C. Home appliance
K. Door

[0012] A home appliance damper hinge counter support system (1) subject to the invention comprises;

- At least a hinge body (2)located at the inner surface of the door (K) of the home appliance (C),
- At least one bearing (21),
- At least a hinge arm (3) that connects the home appliance (C) to the hinge body (2) such that the door (K) is enabled to be opened and closed,
- At least a counter support (4) which has one end connected to the hinge body (2) and the other end to the hinge arm (3), wherein the hinge arm comprises a vertical surface and extensions that vertically extend towards this surface,
- At least a counter support body (5) which is connected to the counter support (4) by its extensions,
- At least a connection shaft (6) which connects the counter support (4) and the hinge arm (3) and which also connects the counter support (4) and the counter support body (5) and which enables the movement of the counter support body (5) at a certain axis,
- At least a pin (7) which is located on the hinge body (2) when the door (K) of the home appliance (C) comes to a closed position and which enters the bearing (21) located on the hinge body (2) and which is present in the counter support body (5),
- At least a damper shaft (8) which is connected to the pin (7) and which moves together with the pin (7) and extends towards the inside of the counter support body (5),
- At least a damper (9) which is located inside the counter support body (5) to which the damper shaft (8) is connected to; said damper absorbing loads that are loaded on it,
- At least an elastic piece (81) located on the damper shaft (8), which applies counter force in the reverse direction to the motion of the damper shaft (8) towards the damper (9) and in this way helps to return the damper shaft (8) after the door (K) is closed and opened, and the connected pin (7) to return back to their initial positions,
- At least a roller (10) that moves with the excessive load that comes onto the damper (9),
- At least a shaft (11) that passes through the roller (10), that comes out of the surfaces that are located towards the counter support body (5) and that moves with the load it receives from the roller (10),
- At least a slit (12) that comes out of the surfaces of the shaft (11) that is located towards the counter support body (5) and into which the shaft (11) is inserted and mounted,
- At least a transmitter (13) that transfers the load applied to the roller (10) located inside the counter support body (5) and which has arms,
- At least an elastic element (14) that is fitted to the

arms of the transmitter (13) and that absorbs the impact,

- At least a rear wall (51) that is located at the tip of the counter support body (5) and which is fitted to the arms of the transmitter (13).

[0013] The home appliance damper hinge counter support system (1) subject to the invention, can absorb the loads arising due to the closing of the doors (K) of home appliances and as a difference from other systems in the state of the art, it can move angularly according to the position of the door (K).

[0014] The hinge body (2), is located inside the inner surface of the home appliance (C) door (K). This spring body (2) that is necessary for the door (K) to open and close, has a bearing (21) on it. Moreover the hinge arm (3) that is connected to the hinge body (2) ensures that the hinge body (2) is attached to the home appliance (C) body.

[0015] The counter support (4), is an element that connects the counter support body (5) to the hinge arm (3). The connection shafts (6) attached to the counter support (4) ensures that both the counter support body (5) and the hinge arm (3) is placed on the same counter support (4). By means of this connection shaft (6) the counter support body (5), moves angularly according to the position of the door (K). During this angular motion the pin (7) is placed on the bearing (21) that is preferably spherically shaped located on the hinge body (2). By this means the damages that might occur on the door (K) are eliminated.

[0016] The counter support body (5) houses the elements of a home appliance damper counter support system (1). The side surface of the counter support body (5) has slits (12) on it. When the home appliance (C) door (K) reaches a closed position inside the counter support body, (5) a pin (7) is present which enters into the bearing (21) of the hinge body (2). This pin (7) which has an end that is free, is connected with its other end to the damper shaft (8). The damper shaft (8), transfers the force due to the closing of the door (K) to the damper (9). When the home appliance (C) door (K) is brought to the closed position, the pin (7) that enters into the bearing (21) on the hinge body (2) transfers the forces occurring due to the closing of the door (K) via the damper shaft (8) to the damper (9) and as the damper (9) absorbs these forces the appliance (C) door (K) is enables to close slowly.

[0017] The damper (9) is the element that absorbs the loads applied on it. In the preferred embodiment of the invention in order for the excessive loads that are applied onto the damper to be absorbed an additional elastic element (14) has been added into the system (1). With the absorption of the excessive loads by the elastic element (14) the damages that might have been caused on the damper (9) is prevented.

[0018] Within the scope of these basic concepts, it is possible to develop many other various embodiments of "A Home Appliance Damper hinge Counter support System"; therefore the invention cannot be limited to the examples provided herein and the invention is actually as stated in the following claims.

Claims

1. A home appliance damper hinge counter support system (1) which basically comprises;

- At least a hinge body (2) located at the inner surface of the door (K) of the home appliance (C),
- At least one bearing (21),
- At least a hinge arm (3) that connects the home appliance (C) to the hinge body (2) such that the door (K) is enabled to be opened and closed;

characterized in that it also comprises

- At least a counter support (4) which has one end connected to the hinge body (2) and the other end to the hinge arm (3), wherein the hinge arm comprises a vertical surface and extensions that vertically extend towards this surface,
- At least a counter support body (5) which is connected to the counter support (4) by its extensions,
- At least a connection shaft (6) which connects the counter support (4) and the hinge arm (3) and which also connects the counter support (4) and the counter support body (5) and which enables the movement of the counter support body (5) at a certain axis,
- At least a pin (7) which is located on the hinge body (2) when the door (K) of the home appliance (C) comes to a closed position and which enters the bearing (21) located on the hinge body (2) and which is present in the counter support body (5),
- At least a damper shaft (8) which is connected to the pin (7) and which moves together with the pin (7) and extends towards the inside of the counter support body (5),
- At least a damper (9) which is located inside the counter support body (5) to which the damper shaft (8) is connected to; said damper absorbing loads that are loaded on it,
- At least an elastic piece (81) located on the damper shaft (8), which applies counter force in the reverse direction to the motion of the damper shaft (8) towards the damper (9) and in this way helps to return the damper shaft (8) after the door (K) is closed and opened, and the connected pin (7) to return back to their initial positions,
- At least a roller (10) that moves with the excessive load that comes onto the damper (9),
- At least a shaft (11) that passes through the roller (10), that comes out of the surfaces that are located towards the counter support body

(5) and that moves with the load it receives from the roller (10),
- At least a slit (12) that comes out of the surfaces of the shaft (11) that is located towards the counter support body (5) and into which the shaft (11) is inserted and mounted,
- At least a transmitter (13) that transfers the load applied to the roller (10) located inside the counter support body (5) and which has arms,
- At least an elastic element (14) that is fitted to the arms of the transmitter (13) and that absorbs the impact,
- At least a rear wall (51) that is located at the tip of the counter support body (5) and which is fitted to the arms of the transmitter (13).

2. A home appliance damper hinge counter support system (1) according to claim 1, **characterized in that**, it comprises an elastic element (14) which is a pressure spring that is fitted into the arms of the transmitter (13) so that the excessive load applied to the damper (9) is absorbed and the damper does not get damaged.

3. A home appliance damper hinge counter support system (1) according to claim 1, **characterized in that**, it comprises, an elastic element (14) which is a leaf spring that is placed between the transmitter (13) and the rear wall (51) which expands to absorb the force applied, in order to absorb excessive loads, and to prevent the damper (9) from getting damaged.

4. A home appliance damper hinge counter support system (1) according to any of the preceding claims, **characterized in that**, it comprises a connection shaft (6) which enables the axial movement of the counter support (4) and with the aid of this movement enables the compatible operation of the counter support (4) and the rotating motion of the door (K).

5. A home appliance damper hinge counter support system (1) according to any of the preceding claims, **characterized in that**, it comprises a connection shaft (6) that enables the axial movement of the counter support (4) and enables that the pin (7) stays inside the bearing (21) during the whole of the closing motion of the door.

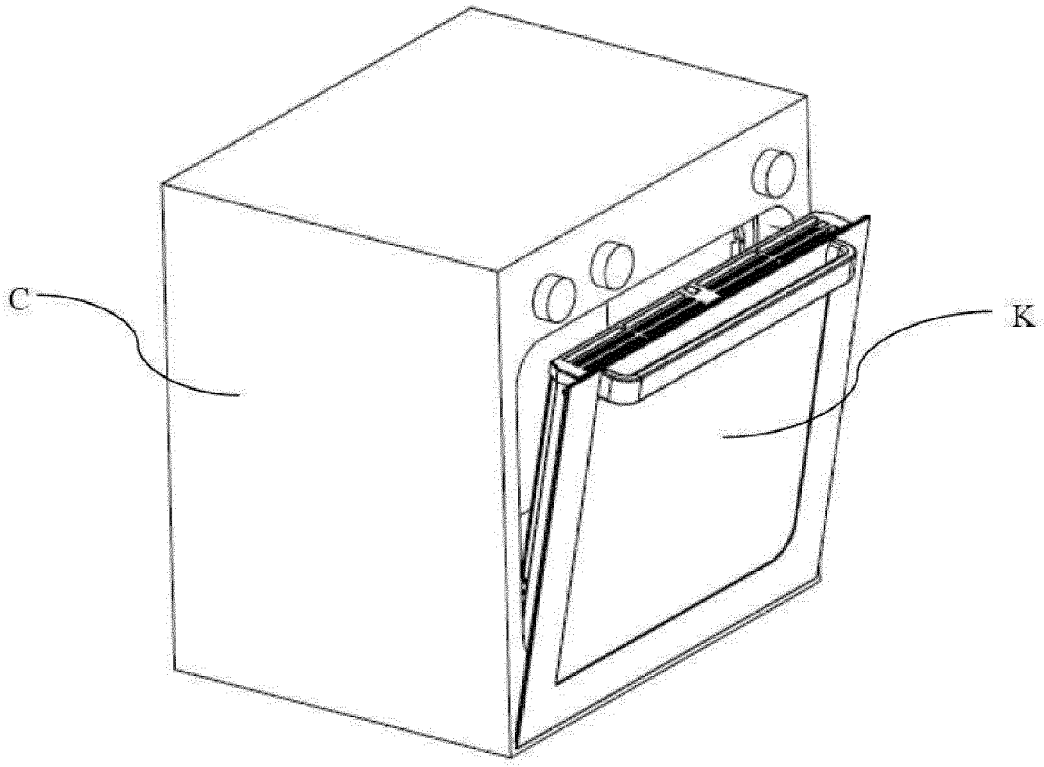


Figure 1

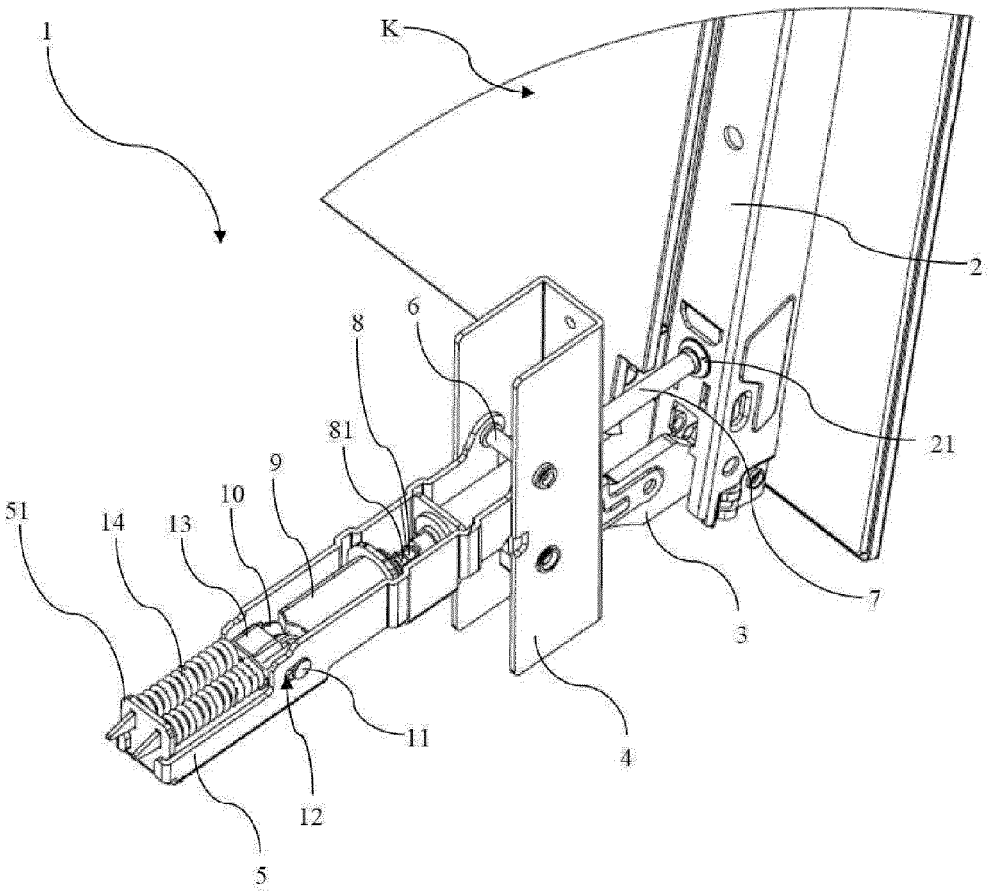


Figure 2

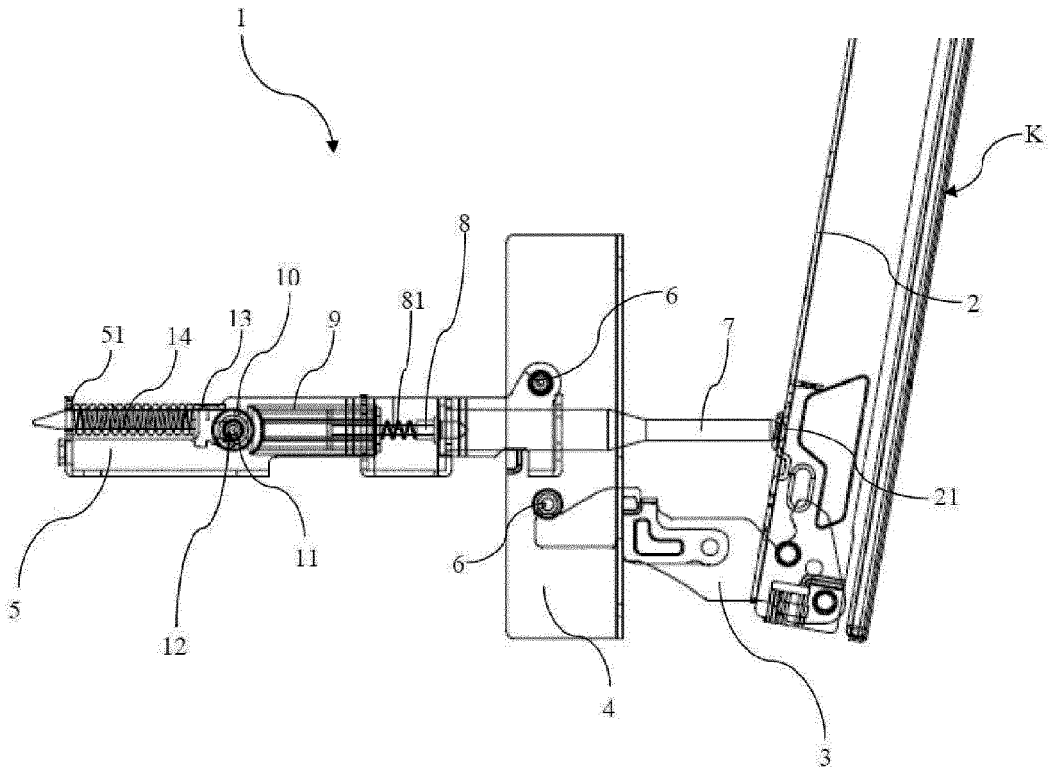


Figure 3

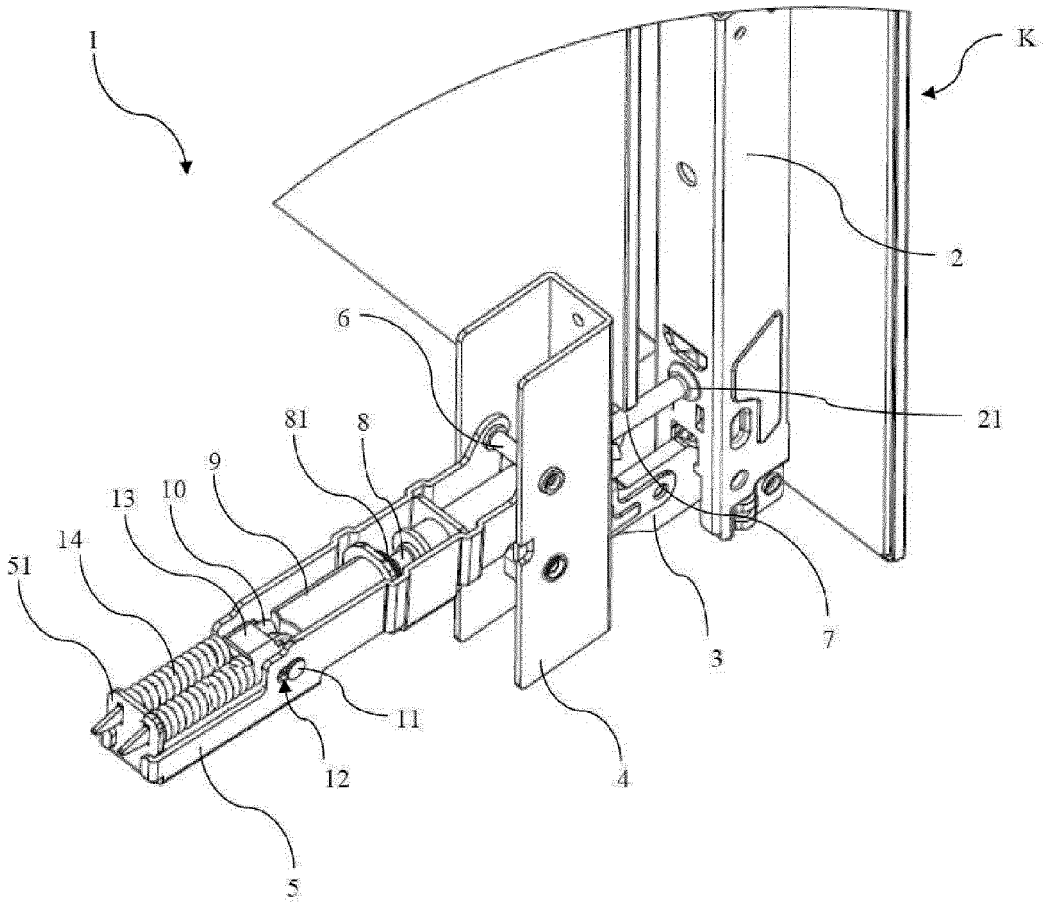
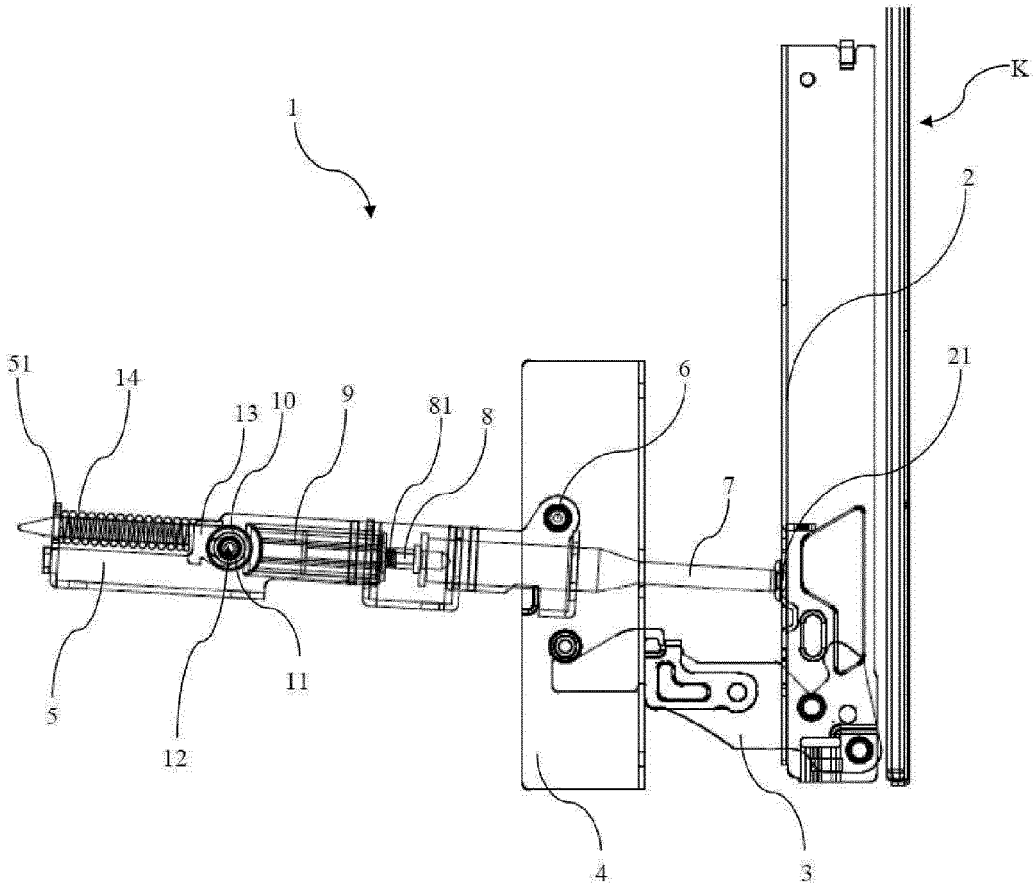


Figure 4



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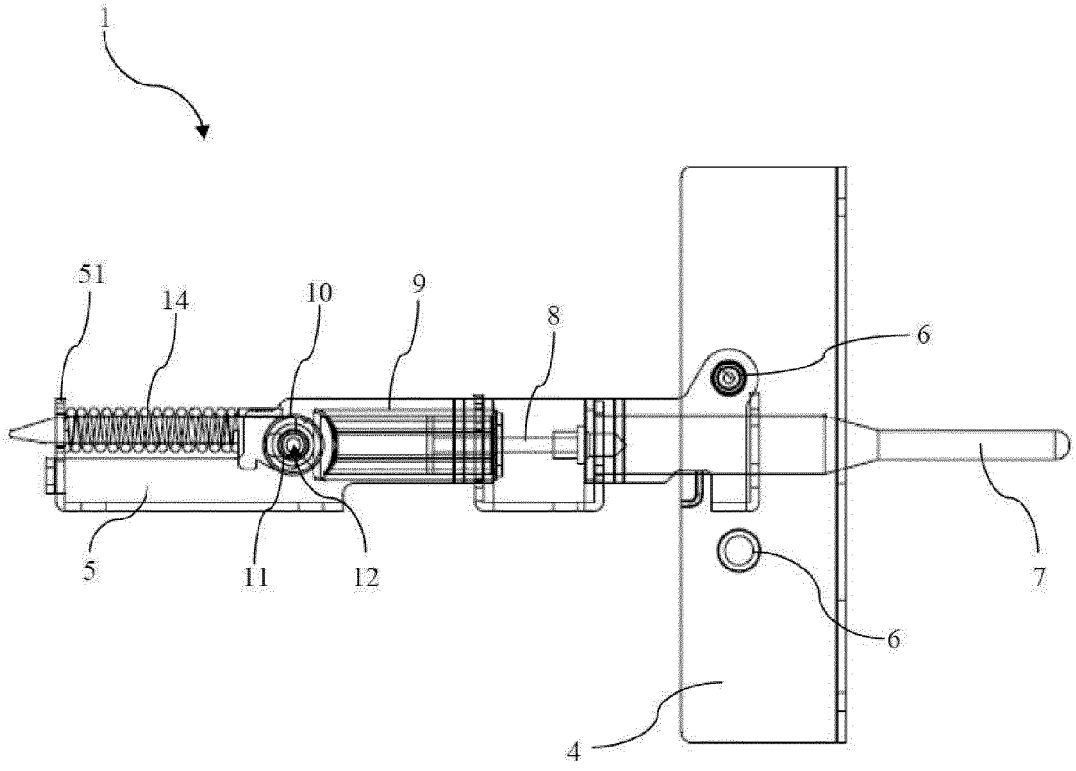

Figure 6

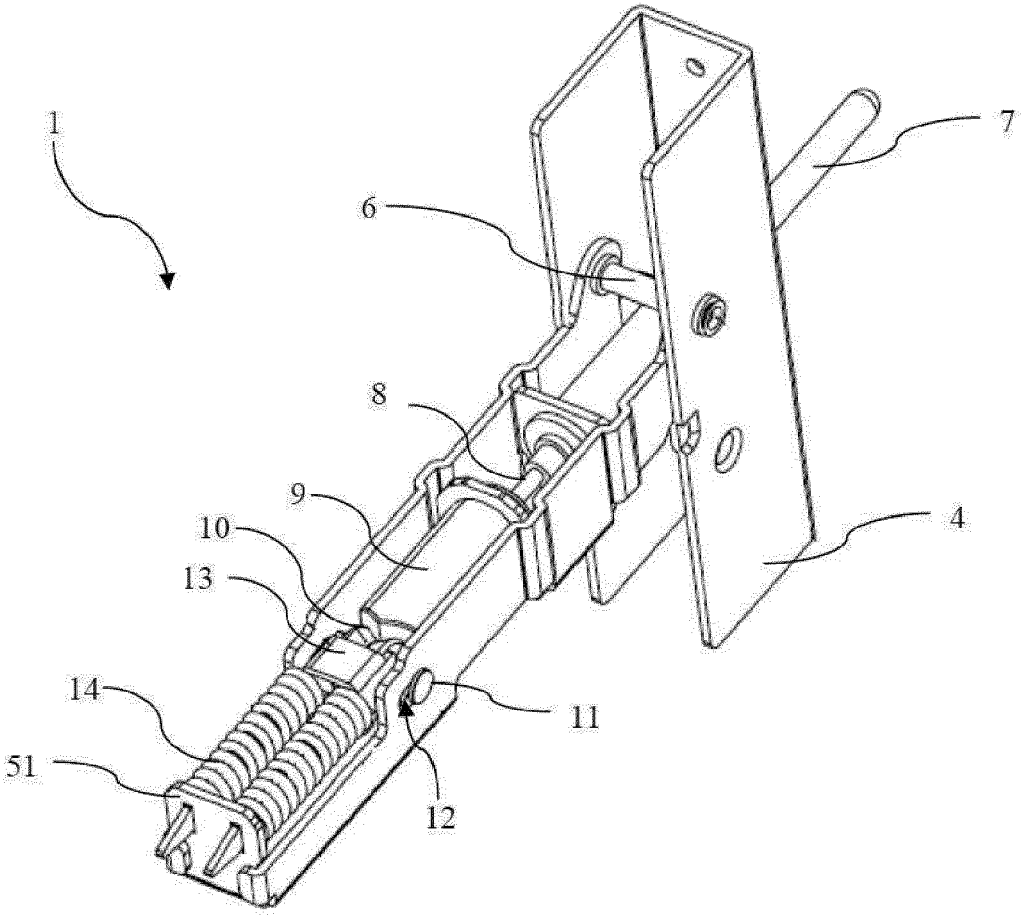

Figure 7

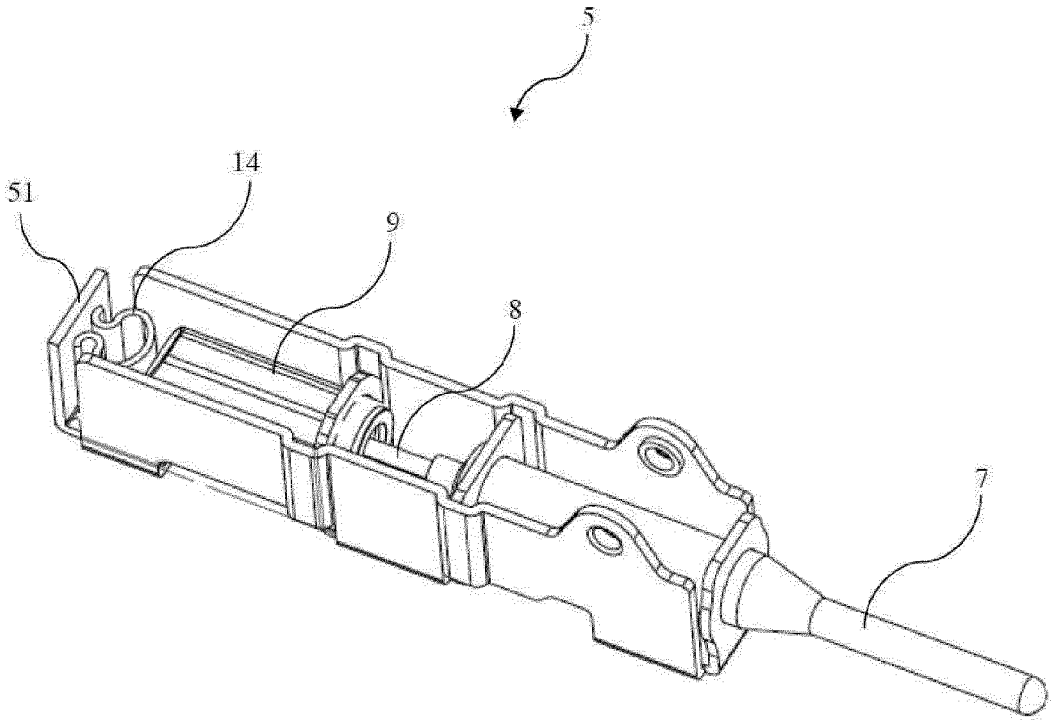

Figure 8

REFERENCES CITED IN THE DESCRIPTION

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