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

Unterstützungssystem für einen Dämpferscharnier für ein Haushaltsgerät

Système de support de charnière d'amortisseur pour appareil domestique

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EP 2 562 341 B1

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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 WO2009033960 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 WO2010091770 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 is connected to hinge arm (3) and comprises a surface vertical to the hinge arm (3) and extensions that vertically extend from 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 at least another connection shaft (6) 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 hinge 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) are 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.

[0018] According to 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.

[0019] 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 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 is connected to hinge arm (3) and comprises a surface vertical to the hinge arm (3) and extensions that vertically extend from this surface,
- At least a counter support body (5) which is connected to the counter support (4) by its extensions,
- 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 a bearing (21) located on the hinge body (2), said pin (7) being 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,

characterized in that it also comprises

- at least a connection shaft (6) which connects the counter support (4) and the hinge arm (3) and another connection shaft (6) which connects the counter support (4) and the counter support body (5) and enables the movement of the counter support body (5) at a certain axis,
- 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.

Patentansprüche

1. Ein Unterstützungssystem für einen Dämpferscharnier für ein Haushaltsgerät, welches grundsätzlich umfasst,

- mindestens ein Scharniergehäuse (2), das auf der inneren Oberfläche der Tür (K) des Haushaltgeräts (C) angeordnet ist,
- mindestens einen Scharnierarm (3), der das Haushaltsgerät (C) mit dem Scharniergehäuse (2) verbindet, so dass die Tür (K) geöffnet unf geschlossen werden kann,
- mindestens einen Gegenhalter (4), welcher mit dem Scharnierarm (3) verbunden ist und eine dem Scharnierarm (3) vertikale Oberfläche und Verlängerungen aufweist, die sich von dieser Oberfläche vertikal erstrecken,
- mindestens ein Gegenhalter-Gehäuse (5), welches mit dem Gegenhalter (4) mittels seiner Verlängerungen verbunden ist,
- mindestens einen Stift (7), welcher am Scharniergehäuse (2) angeordnet ist, wobei die Tür (K) des Haushaltgeräts (C) in eine geschlossene Lage gebracht wird und in eine am Scharniergehäuse (2) angebrachte Lagerung (21) eingreift, wobei der genannte Stift (7) am Gegenhalter-Gehäuse (5) vorhanden ist,
- mindestens eine Dämpfer-Welle (8), welche mit dem Stift (7) verbunden ist und welche sich mit dem Stift (7) zusammen bewegt und sich gegen das Innere des Gegenhalter-Gehäuses (5) erstreckt,
- mindestens einen Dämpfer (9), welcher mit dem Inneren des Gegenhalter-Gehäuses (5) verbunden ist, zu welchem die Dämpfer-Welle (8) angeschlossen ist, wobei der Dämpfer die Ladungen, die darauf beladen sind, absorbiert,
- mindestens ein elastisches Teil (81), das auf der Dämpfer-Welle (8) angeordnet ist und welches in der umgekehrten Richtung eine Gegenkraft gegen den Dämpfer (9), auf die Bewegung der Dämpfer-Welle (8) ausübt und somit der Rückkehr der Dämpfer-Welle (8), nachdem die Tür (K) geschlossen und geöffnet ist und der Rückkehr des angesclossenen Stifts (7) zu seinen anfänglichen Positionen hilft,

dadurch gekennzeichnet, dass es weiter umfasst,

- mindestens eine Verbindunswelle (6), welche den Gegenhalter (4) und den Scharnierarm (3) sowie die andere Verbindungswelle (6), welche den Gegenhalter (4) und das Gegenhalter-Gehäuse (5) verbindet und die Bewegung des Gegenhalter-Gehäuses (5) auf einer bestimmten Achse ermgölicht,
- mindestens eine Rolle (10), die sich mit der auf den Dämpfer (9) angebrachten Überlast bewegt,
- mindestens eine Welle (11), die durch die Rolle (10) hindurch geht, die aus den Oberflächen, die gegen das Gegenhalter-Gehäuse (5) angeordnet sind, hervorgeht und sich mit der Last be-

wegt, die sie von der Rolle (10) erhält,
- mindestens einen Schlitz (12), der aus der Oberfläche der Welle (11), die gegen das Gegenhalter-Gehäuse (5) angeordnet ist, hervorgeht und in welchen die Welle (11) eingesetzt und befestigt ist,
- mindestens einen Übermittler (13), der die Last, die auf die in der Innenseite des Gegenhalter-Gehäuses (5) angeordnete Rolle (10) angewendet wird, überträgt und welcher Arme aufweist,
- mindestens ein Federelement (14), das an den Armen des Übermittlers (13) befestigt sind und den Aufschlag absorbiert,
- mindestens eine Rückwand (51), die auf dem oberen Teil des Gegenhalter-Gehäuses (5) angeordnet ist und welche an den Armen des Übermittlers (13) befestigt ist.

2. Ein Unterstützungssystem (1) für einen Dämpferscharnier für ein Haushaltsgerät gemäß Anspruch 1, **dadurch gekennzeichnet, dass** es ein Federelement (14) aufweist, welches eine Druckfeder ist, die in den Armen des Übermittlers (13) befestigt ist, so daß die auf den Dämpfer (9) angewendete Überlast absorbiert ist und der Dämpfer nicht beschädigt wird.

3. Ein Unterstützungssystem (1) für einen Dämpferscharnier für ein Haushaltsgerät gemäß Anspruch 1, **dadurch gekennzeichnet, dass** es ein Federelement (14) aufweist, welches eine Blattfeder ist, die zwischen dem Übermittler (13) und der Rückwand (51) angeordnet ist, welche sich ausdehnt um die ausgeübte Kraft zur Aufnahme der Überlast zu absorbieren und zu verhindern dass der Dämpfer (9) beschädigt wird.

4. Ein Unterstützungssystem (1) für einen Dämpferscharnier für ein Haushaltsgerät gemäß einem der vorhergehenden Ansprüchen, **dadurch gekennzeichnet, dass** es eine Verbindungswelle (6) aufweist, welche die axiale Bewegung des Gegenhalters (4) gewährleistet und mit Hilfe dieser Bewegung einen zusammenpassenden Betrieb des Gegenhalters (4) sowie die Drehbewegung der Tür (K) ermöglicht.

5. Ein Unterstützungssystem (1) für einen Dämpferscharnier für ein Haushaltsgerät gemäß einem der vorhergehenden Ansprüchen, **dadurch gekennzeichnet, dass** es eine Verbindungswelle (6) aufweist, welche die axiale Bewegung des Gegenhalters (4) gewährleistet und ermöglicht, dass der Stift (7) während der ganzen Schließbewegung innerhalb der Lagerung (21) bleibt.

Revendications

1. Un système de support de comptoir de charnière à amortissement pour appareil électroménager (1) consiste principalement en:

- Au moins un corps de charnière (2) placé sur la surface intérieure de la porte (K) de l'appareil électroménager (C),
- Au moins une tige de charnière (3) reliant l'appareil électroménager (C) au corps de charnière (2) dans une manière qu'on permet à la porte de s'ouvrier et se fermer;
- Au moins un support de comptoir (4) relié à la tige de charnière (3) et comportant une surface verticale à la tige de charnière (3) et les extensions s'étendant verticalement de cette surface,

caractérisé en ce qu'il comprend aussi

- au moins un arbre de raccordement (6) reliant le support de comptoir (4) et la tige de charnière (3) et un autre arbre de raccordement (6) reliant le support de comptoir (4) et le corps de support de comptoir (5) et permettant le mouvement du corps de support de comptoir (5) dans un axe certain;
- Au moins un corps de support de comptoir (5) relié au support de comptoir (4) par ses extensions,
- Au moins une épingle (7) qui est placée sur le corps de charnière (2) lors que la porte de l'appareil électroménager (C) atteint à la position fermée et qui entre dans le palier (21) placé sur le corps de charnière (2), ladite épingle (7) étant présente dans le corps de support de comptoir (5),
- Au moins un arbre d'amortisseur (8) relié à l'épingle et se déplaçant ensemble avec l'épingle (7) et s'étendant vers l'intérieur du corps de support de comptoir (5),
- Au moins un amortisseur (9) placé à l'intérieur du corps de support de comptoir (5) auquel est relié l'arbre d'amortisseur (8), ledit amortisseur absorbant les charges y chargées,
- Au moins une pièce élastique (81) placée sur l'arbre d'amortisseur (8) exerçant une contreforce dans la direction inverse au mouvement de l'arbre d'amortisseur (8) vers l'amortisseur (9) et ainsi aide à retourner l'arbre d'amortisseur (8) après la fermeture et l'ouverture de la porte (K), et revenir l'épingle (7) reliée à leurs positions initiales, - Au moins un cylindre (10) se déplaçant avec la charge excessive arrivant sur l'amortisseur (9),
- Au moins un arbre (11) passant par le cylindre (10) sortant des surfaces placées vers le corps de support de comptoir (5) et se déplaçant avec

la charge qu'il reçoit du cylindre (1Q),
- Au moins une encoche (12) sortant des surfaces de l'arbre (11) placé vers le corps de support de comptoir (5) et dans lequel est inséré et monté l'arbre (11),
- Au moins un transmetteur (13) transférant la charge exercée au cylindre (10) placé à l'intérieur du corps de support de comptoir (5) et possédant des tiges,
- Au moins un élément élastique (14) fixé aux tiges du transmetteur (13) et absorbant l'impact,
- Au moins une paroi arrière (51) placée à l'extrémité du corps de support de comptoir (5) et fixée aux bras du transmetteur (13).

2. Un système de support de comptoir de charnière à amortissement pour appareil électroménager (1) selon la revendication 1, **caractérisé en ce qu'il** comprend un élément élastique (14) qui est un ressort de pression fixé à l'intérieure des bras du transmetteur (13) afin que la charge excessive exercée à l'amortisseur (9) soit absorbée et l'amortisseur ne soit pas endommagé.

3. Un système de support de comptoir de charnière à amortissement pour appareil électroménager (1) selon la revendication 1, **caractérisé en ce qu'il** comprend un élément élastique (14) qui est un ressort à lames placé entre le transmetteur (13) et la paroi arrière (51) s'étendant pour absorber la force exercée afin d'absorber les charges excessives et empêcher l'amortisseur (9) d'être endommagé.

4. Un système de support de comptoir de charnière à amortissement pour appareil électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un arbre de raccordement (6) permettant au mouvement axial de support de comptoir (4) et grâce à ce mouvement, permettant au fonctionnement compatible du support de comptoir (4) et au mouvement de rotation de la porte (K).

5. Un système de support de comptoir de charnière à amortissement pour appareil électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un arbre de raccordement (6) permettant au mouvement axial de support de comptoir (4) et permettant au fait que l'épingle (7) reste à l'intérieur du palier (21) pendant tout le mouvement de fermeture de la porte.

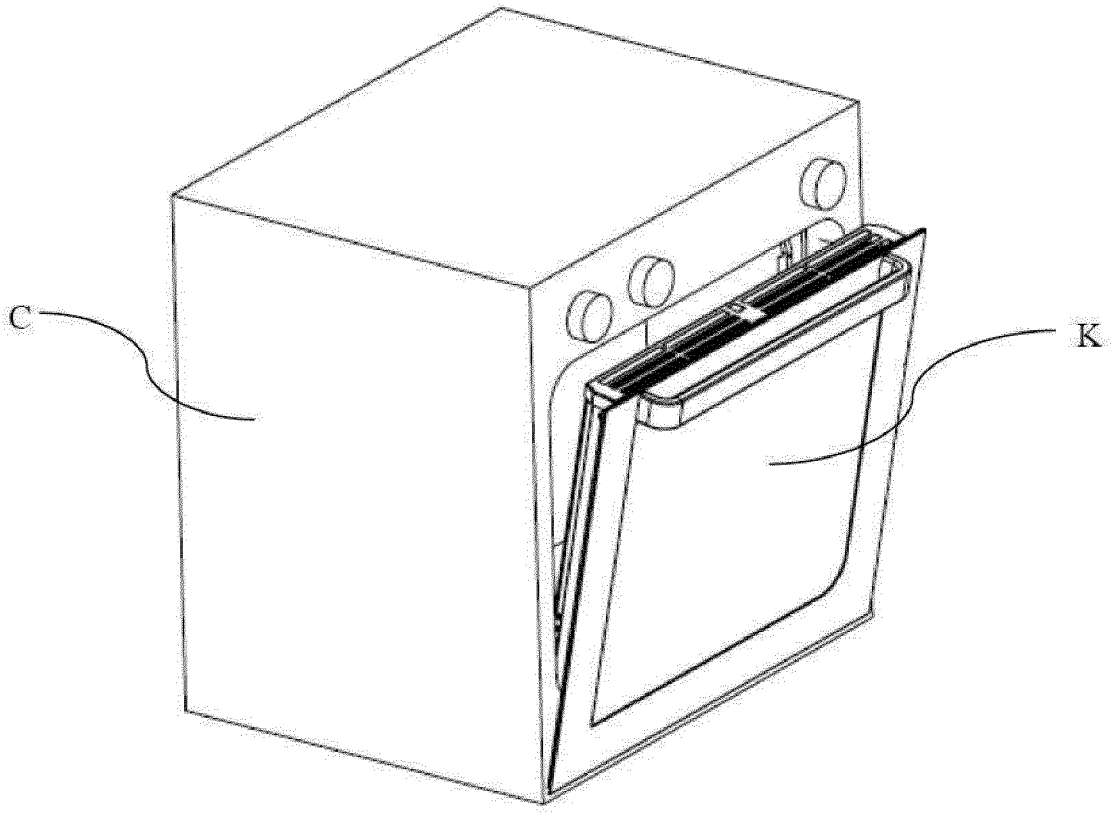


Figure 1

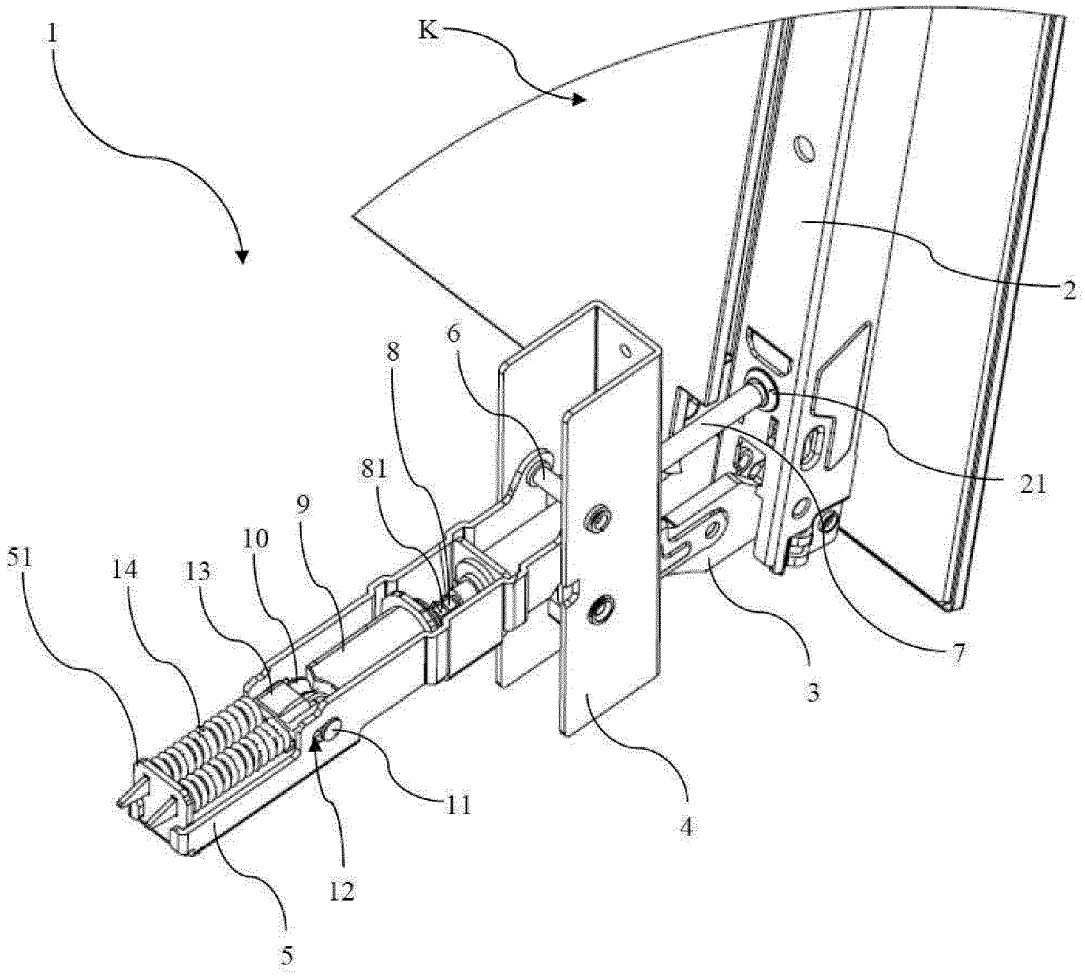


Figure 2

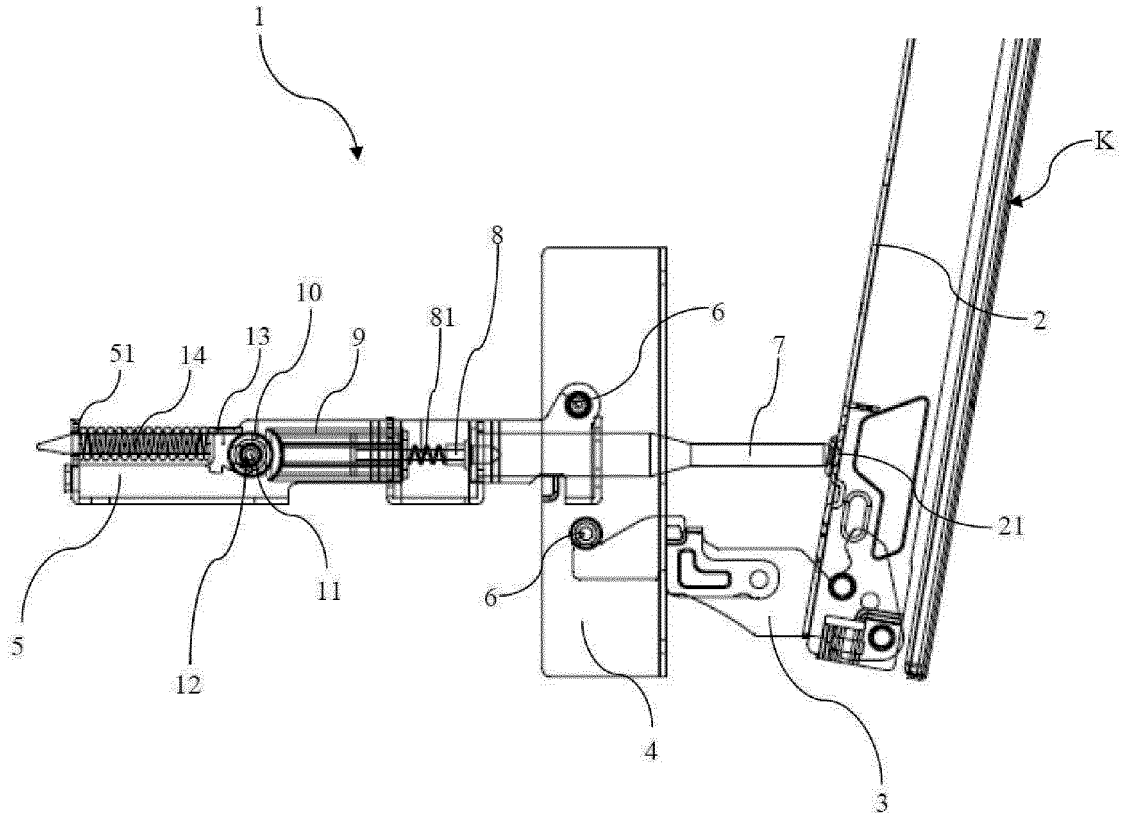


Figure 3

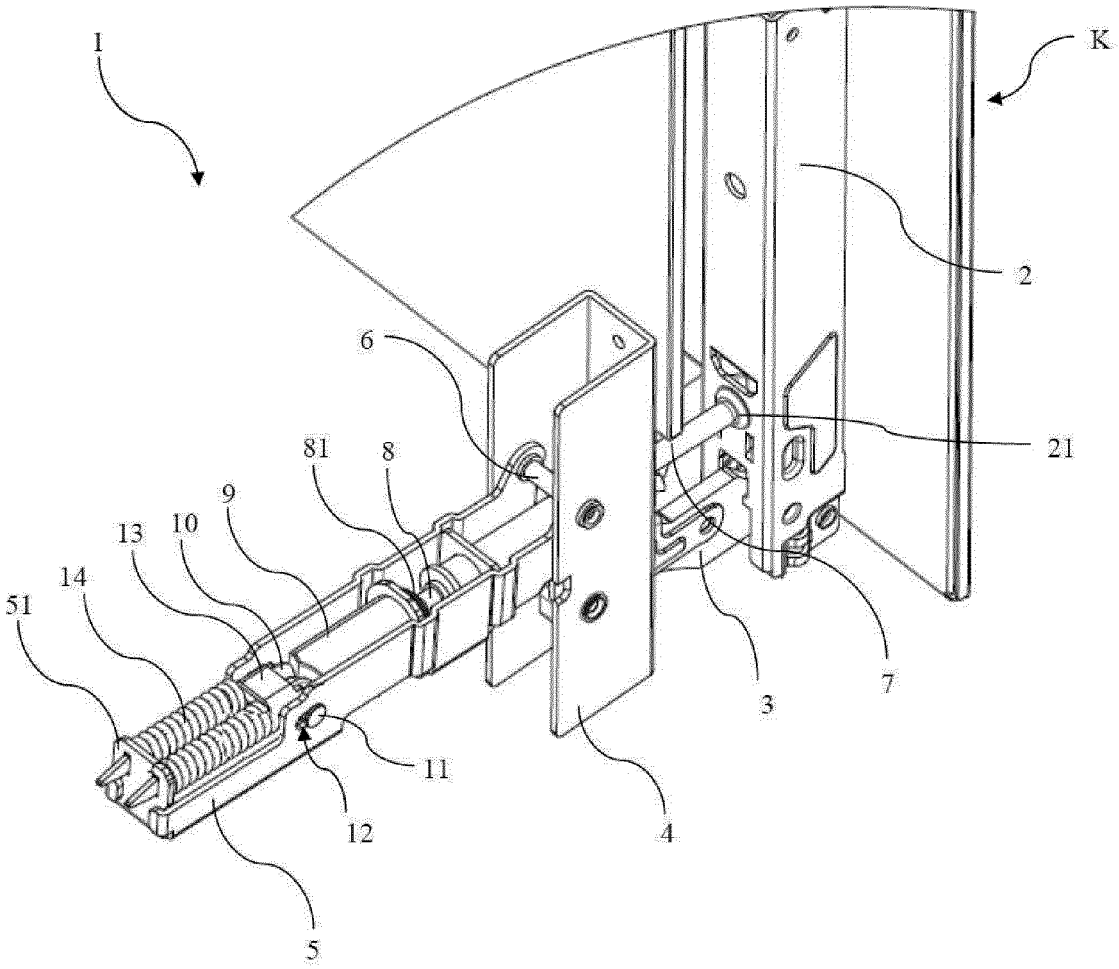


Figure 4

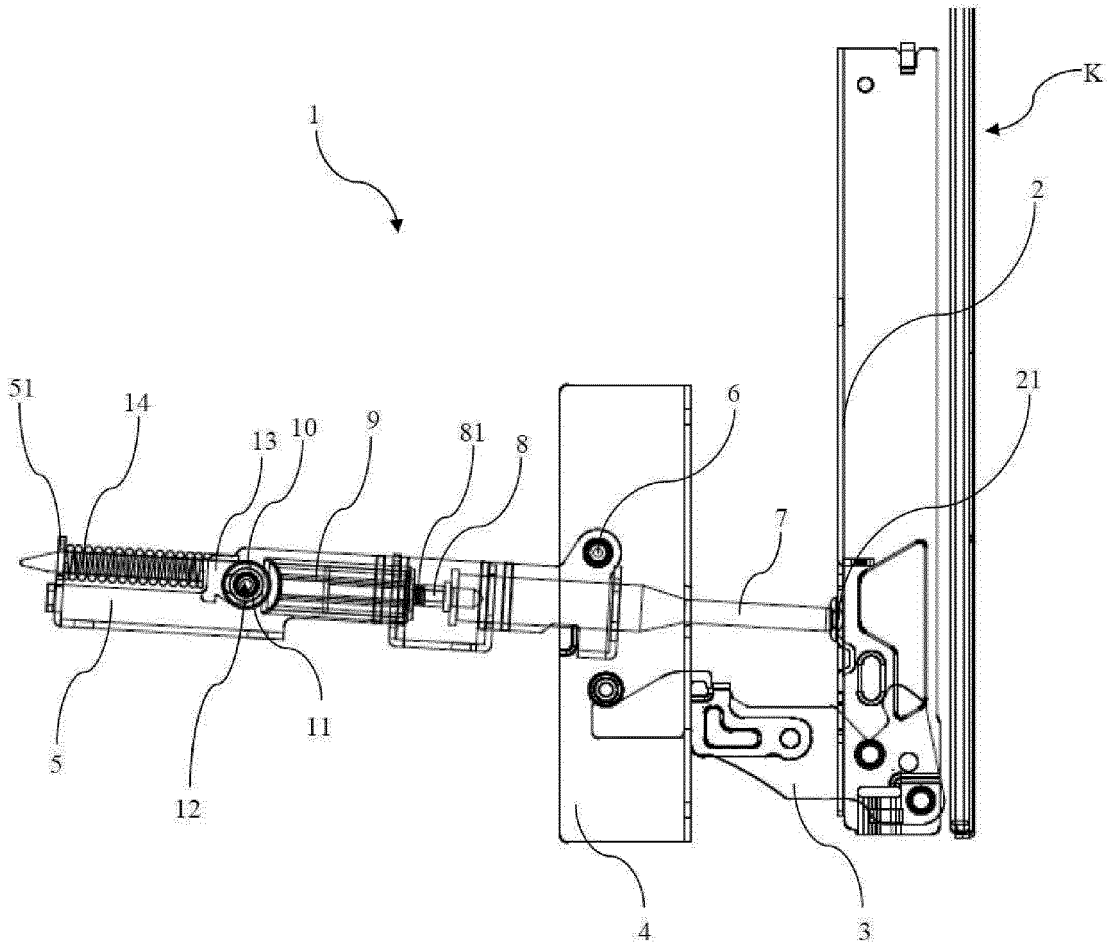


Figure 5

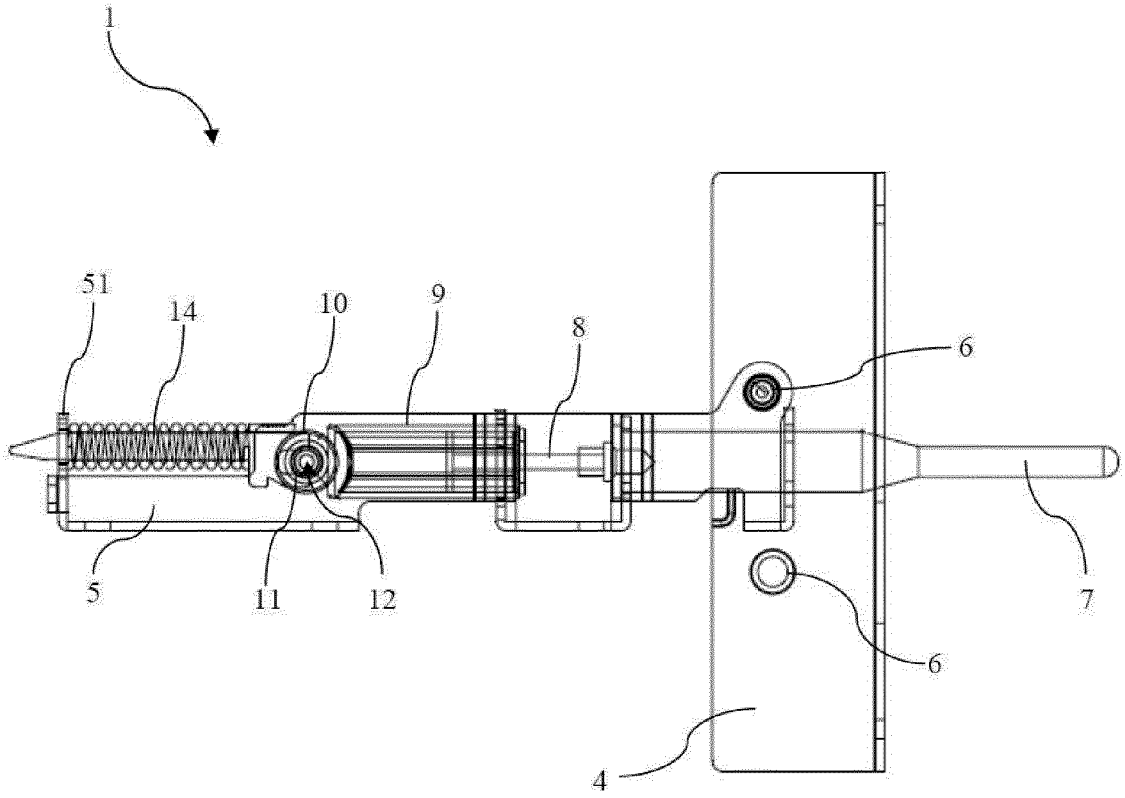


Figure 6

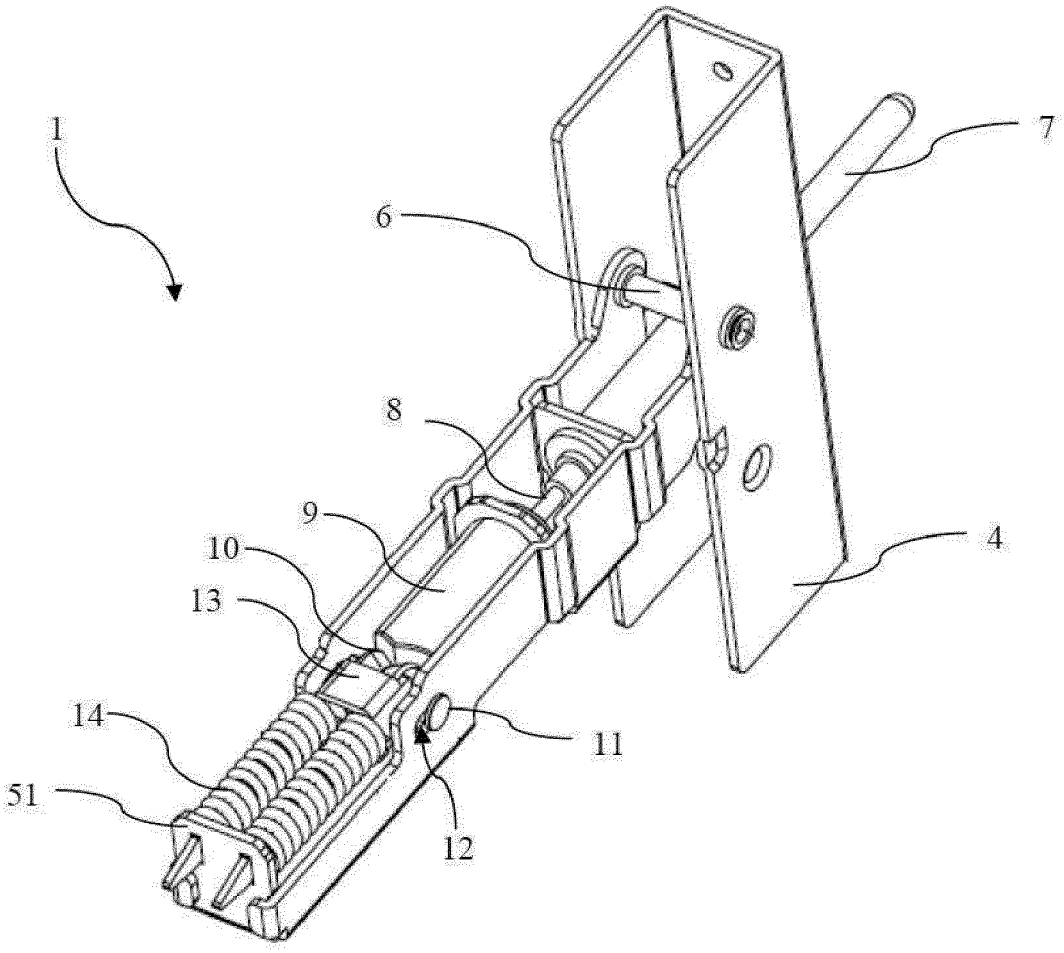


Figure 7

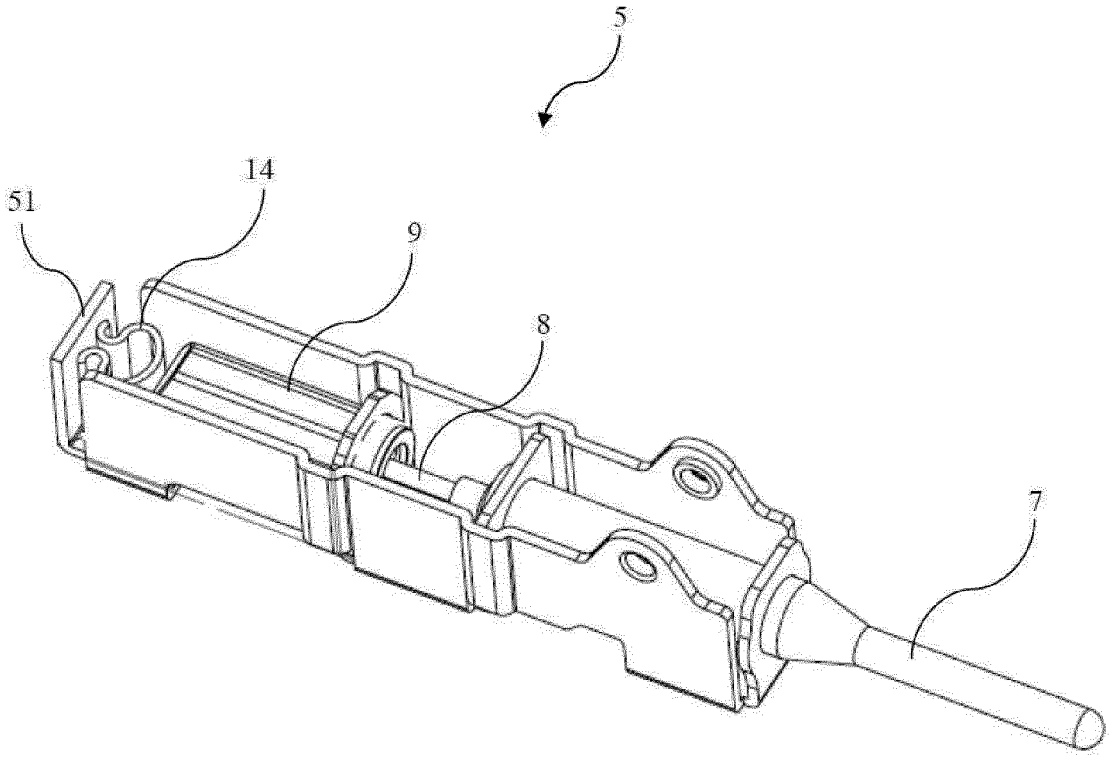


Figure 8

REFERENCES CITED IN THE DESCRIPTION

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