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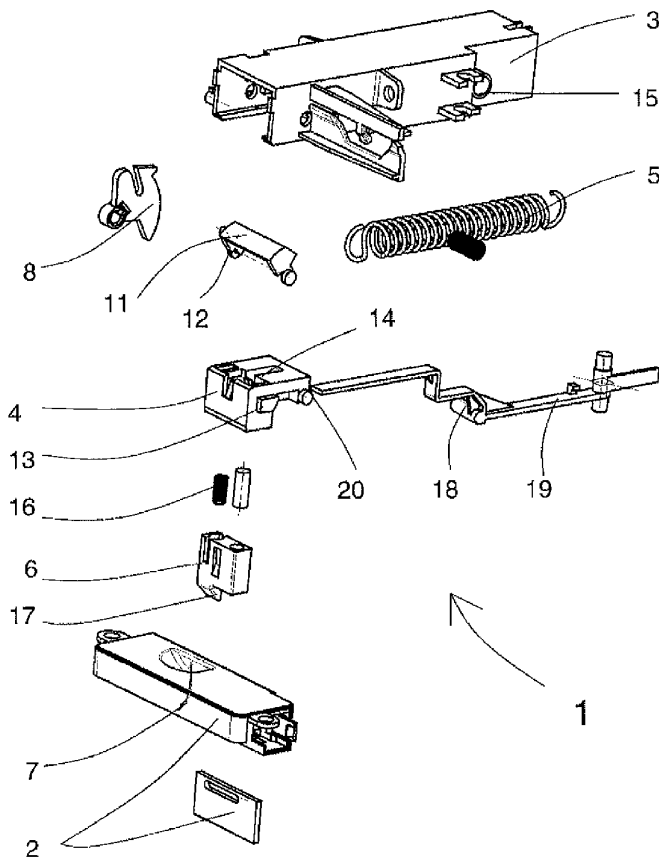
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[Fortsetzung auf der nächsten Seite]

(54) Title: LOCK FOR A DOMESTIC APPLIANCE

(54) Bezeichnung: VERSCHLUSS FÜR EIN HAUSGERÄT



(57) **Abstract:** The invention relates to a lock (1) for a movable closing element (2), especially a door, a cover, a flap, or similar on a domestic appliance such as a dishwasher, a washing machine, a refrigerator, or similar. Said lock comprises a closing hook (6) which can be made to engage with the closing element when being closed and/or be made to disengage therefrom when being opened. The closing hook (6) can be made to engage with a cavity (7) in the closing element (2).

(57) **Zusammenfassung:** Die Erfindung betrifft einen Verschluss (1) für ein bewegbares Schließelement (2), insbesondere für eine Tür, einen Deckel, eine Klappe o. dgl. an einem Hausgerät, wie einer Geschirrspülmaschine, einer Waschmaschine, einem Kühlschrank o. dgl., mit einem Schließhaken (6), der beim Schließen in und/oder beim öffnen außer Eingriff mit dem Schließelement (2) bringbar ist. Der Schließhaken (6) ist in Eingriff mit einer Mulde (7) im Schließelement (2) bringbar.

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Veröffentlicht:

- mit internationalem Recherchenbericht
- vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

Lock for a Domestic Appliance

Technical Field

5 The invention relates to a dishwashing machine comprising an improved lock.

Background

Domestic appliances such as a dishwasher, or similar domestic appliances such as a washing machine or a refrigerator, have a door, a cover, a flap, or similar, to allow loading or unloading to take place. For locking purposes, the door, the cover, the flap or similar operates in combination with a lock.

Document EP 0 728 438 B1 shows a locking device for a dishwasher, a cutout with a bridging piece arranged within it being provided in the upper edge of the dishwasher door. In the locking position, a downward pointing cantilever element arranged in the dishwasher casing engages in the cutout. The cantilever element has an opening underneath from which a peg element projects. In the locking position, the forward end of said peg element rests on the bridging piece in the cutout. When the door is moved into the locking position the peg is raised, thereby activating a microswitch.

A lock of this kind for the movable closing element on the domestic appliance, such as for the door, the cover, the flap or similar, can be attached to the body of the domestic appliance. The lock has a closing hook which in turn can be made to engage with the closing element when being closed and/or be made to disengage there from when being opened. A disadvantage of such a lock is the strong closing pressure needed to lock the closing element.

Summary

25 It is an object of the present invention to overcome or at least ameliorate one or more of the disadvantages of the prior art, or at least provide a useful alternative. Aspects of the present invention provide a lock for a domestic appliance having a reduced closing pressure.

According to an aspect of the invention, there is provided a dishwashing machine comprising:

- 30 a door comprising a movable closing element;
- a closure for the movable closing element, the closure comprising a closing hook releasably engagable with the closing element,
- wherein the closing hook respectively engages or disengages with a cavity in the closing element when the door is respectively closed or opened, and

wherein the closing hook is arranged on a sliding carriage, the sliding carriage being movable between a locking position and an unlocking position.

Appropriately the closing element is locked by the closing hook engaging with a cavity in the closing element. If the rotary door latch has been manually released by mistake without the closing element having been closed, the following embodiment still enables the closing element to be closed. For this purpose the closing hook is positioned in the sliding carriage by means of a spring. Moreover the contact surface of the closing hook is oblique to the closing element. When the closing element is closed, the closing hook is pressed into the sliding carriage due to the oblique contact surface and then slides back into the cavity in the closing element.

Lastly, the lock can also be designed having regard to an improvement in child safety. For this purpose, in the locking position a stopper dowel engages with the guide in such a way that movement of the dowel in the sliding carriage is blocked. As a measure of child safety, on the closing element being opened said stopper dowel can be unlatched so that it no longer engages with the guide. A lever which can be accessed from outside of the casing is arranged on the lock in order to actuate the stopper dowel manually.

The advantages obtained with the invention are in particular that the lock is sure to function and that it is easier to assemble. Moreover despite its greater functionality the lock is cost-effective and therefore particularly suitable for cost-sensitive domestic appliances.

An exemplary embodiment of the invention, having various developments and designs, is shown in the drawings and described in greater detail below. The drawings show the following:

- 25 Fig. 1 An exploded view of a lock,
- Fig. 2 The lock from Fig. 1 in locking engagement with the closing element
- Fig. 3 A perspective view of the lock seen from one side,
- Fig. 4 A view of the lock as in Fig. 3 seen from the other side,
- Fig. 5 A cutaway view through the lock with the sliding carriage in the locking position,
- 30 Fig. 6 A cutaway view as in Fig. 5, but seen from the opposite side,
- Fig. 7 A cutaway view through the lock with the sliding carriage in the unlocking position, and
- Fig. 8 A cutaway view as in Fig. 7, but seen from the opposite side.

Detailed Description

Fig 1 shows the individual components of a lock 1 for a moveable closing element 2. The closing element 2, indicated in the form of a diagram only, is intended for a door, a cover, a flap, or similar on a domestic appliance such as a dishwasher, a washing
5 machine, a refrigerator, or similar, said closing element 2 being attached in a known way by means of a movable hinge to the body of the domestic appliance.

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The lock 1 has a casing 3 in which is arranged a sliding carriage 4 which can be moved between a locking position and an unlocking position. The locking position can be seen in greater detail in Fig. 5 and Fig. 6, and the unlocking position in Fig. 7 and Fig. 8. The sliding carriage 4 is loaded by means of a spring 5 in the direction of the locking position. A closing hook 6 is arranged on the sliding carriage 4. As Fig. 2 shows, when the closing element 2 is closed, said closing hook 6 can be made to engage with the closing element 2. For this purpose the closing hook 6 can be made to engage and lock with a cavity 7 in the closing element 2. When the closing element 2 is opened, the closing hook 6 disengages from the closing element 2 by leaving the cavity 7, though this is not shown in greater detail in the drawings.

As can be further deduced from Fig. 1, a rotary door latch 8 is positioned in and/or on the casing 3 and can be rotated. When the closing element 2 is closed, the rotary door latch 8 can be made to operate in combination with the closing element 2. By operating together in this way, the rotary door latch 2 then actuates the sliding carriage 4 in such a way that when the closing element 2 is closed, the sliding carriage 4 is moved by the pressure of the spring 5 into the locking position shown in Fig. 5. For the purpose of operating in combination with the closing element 2, the rotary door latch 8 arranged on the side of the casing 3 juts out of the casing 3, for example at a type of aperture 9, or projects above the casing 3, as can be seen in Fig. 3 and Fig. 4.

It can be seen from Fig. 5 or Fig. 7 that a guide 10 for the sliding carriage 4 is arranged in the casing 3 for the purpose of moving said sliding carriage 4 into the locking position.

The rotary door latch 8 acts via a lever 11 on the sliding carriage 4, for which purpose a connecting member 12 is located on the lever 11. The connecting member 12 on the lever 11 then acts on the sliding carriage 4, in conjunction with a lug 13, in such a way that on the closing element 2 being closed, the lever 11 moves the sliding carriage 4 by means of dowel 20 in the guide 10.

The spring 5 is designed as a helical tension spring, and is suspended on an internal linkage 14 on the sliding carriage 4 and on an external linkage 15 in the casing 3. Moreover the external linkage 15 is offset relative to the internal linkage 14 in the locking position, as can be seen from Fig. 5, so that the spring 5 engages with the sliding carriage 4 in such a way that on the closing element 2 being opened a force acts on the sliding carriage 4 in the direction of the unlocking position.

The closing hook 6 is positioned in the sliding carriage 4 by means of a helical compression spring 16, as shown in Fig. 1. Furthermore the closing hook 6 has an oblique contact surface 17 (shown in Fig. 5) for the closing element 2, in order to provide so to speak a self-recovery effect which will be explained in greater detail below. Lastly in the locking position a stopper dowel 18 engages with the guide 10, blocking the movement of the dowel 20 in the sliding carriage 4. As a measure of child safety, on the closing element 2 being opened the stopper dowel 18 can be unlatched so that it no longer engages with the guide 10. A lever 19 which can be accessed from outside of the casing 3 is arranged on the casing 3 in order to actuate the stopper dowel 18 manually.

The operation of the inventive lock 1 and the path for pulling

tight will now be explained in greater detail in the following sections, wherein for the sake of simplicity the closing element 2 will be called a door and the domestic appliance will be called a dishwasher.

By design the lock 1 holds the door 2 of the dishwasher closed with the aid of a closing pressure. The door 2 can be opened at any time by overcoming the said pressure.

When the door 2 is closed it actuates the rotary door latch 8. Together with the rotary door latch 8, the sliding carriage 4 with the closing hook 6 is moved downward over the lever 11 with the connecting member 12 until the sliding carriage 4, pulled by the tension spring 5, can slide backward into its guide 10. During the downward movement the closing hook 6 drops into a cavity 7 in the door 2 and pulls the door with it. The tension spring force pulls the door 2 against the rubber seal until the forces are in balance. This closing procedure is also explained in detail with the aid of Fig. 7.

On the door being opened, the closing hook 6 takes the sliding carriage 4 with it until the sliding carriage 4 can snap upward over the connecting member 12 of the lever 11. The door 2 is released. The rotary door latch 8 is returned to its original position by the lever 11. This opening procedure is also explained in detail with the aid of Fig. 5.

There is an additional function in the form of so to speak a self-recovery effect. There is a possibility that the rotary door latch 8 might be manually released by mistake without engaging the door 2. The lock 1 is in the closed position and the door 2 is still open. Against this possibility the closing hook 6 is positioned in the sliding carriage 4 by a spring and

has an oblique contact surface 17 on its outside. The door 2 can be closed by this means when the lock 1 is in the closed position. The spring-loaded closing hook 6 is pressed into the sliding carriage 4 and then slides back into the cavity 7 in the door 2 as soon as said door is fully closed. When the door 2 is opened the lock 1 is in the correct position again.

A further, optional supplementary function is provided as a child safety feature against inadvertent opening of the door by children. To open the door 2, the lever 19, which is accessible from outside, must be used to unlatch the stopper dowel 18 which prevents the sliding carriage 4 from moving upward. The path for opening the door 3 to vent air in the event of excessive steam pressure is unobstructed. The child safety mechanism can be turned on and off. Even with the child safety mechanism locked, the door 2 can still be opened by using additional force, for example by pushing on the door 2 from inside.

The optimized solution according to the invention gives the following advantages. The closing pressure is reduced by relocating the tension spring suspension point in the sliding carriage 4. The lever 11 with the connecting member 12 is inventively built into the casing 3. A separate lever and the associated assembly procedure are not required. The rotary door latch 8 now moves the sliding carriage 4 directly downward with the aid of a lug 13. A spring is needed for standalone repositioning of the rotary door latch 8. The leg spring is replaced by a compression spring for improved assembly of the child safety mechanism. The relocation of the center of rotation is needed in order to increase the holding force.

The invention is not confined to the exemplary embodiment described and illustrated. On the contrary, it also includes all further technically competent developments in the context of the invention defined by the claims. For example the lock 1 can also be arranged in reverse order on the movable closing element 2, whereby the closing hook 6 then engages in the body of the domestic appliance. Moreover such a lock 1 can be used not only in domestic appliances, but also in motor vehicles, real estate or similar.

List of reference characters:

- 1: Lock
- 2: Closing element / door
- 3: Casing
- 4: Sliding carriage
- 5: Spring / helical tension spring
- 6: Closing hook
- 7: Cavity
- 8: Rotary door latch
- 9: Aperture
- 10: Guide
- 11: Lever
- 12: Connecting member (on the lever)
- 13: Lug (on the sliding carriage)
- 14: Internal linkage (on the sliding carriage, for the spring)
- 15: External linkage (on the casing, for the spring)
- 16: Helical compression spring (for the closing hook)
- 17: Oblique contact surface
- 18: Stopper dowel
- 19: Lever (for actuating the stopper dowel)
- 20: Dowel (on the sliding carriage)

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The claims defining the invention are as follows:

1. A dishwashing machine including:
a door including a movable closing element; and
a closure for the movable closing element, the closure including a closing hook releasably engagable with the closing element, the closing hook adapted to engage or disengage with a cavity in the closing element when the door is closed or opened respectively;

wherein the closing hook is arranged on a sliding carriage, the sliding carriage movable between a locking position and an unlocking position.

2. Dishwashing machine according to claim 1, wherein the closing hook is positioned in the sliding carriage by a spring.

3. The dishwashing machine as claimed in either claim 1 or 2, wherein the closing hook includes an oblique contact surface engagable with the closing element.

4. The dishwashing machine as claimed in any one of claims 1 to 3, wherein the sliding carriage includes a dowel, and the closure further includes:

a guide for moving the sliding carriage into the locking position; and
a stopper dowel which, when the sliding carriage is in the locking position, engages with the guide, thereby blocking the movement of the dowel in the sliding carriage to provide a measure of child safety,
wherein, when the closing element is opened, the stopper dowel is disengaged from the guide

5. The dishwashing machine as claimed in claim 4 wherein the closure further includes:

a casing; and
a lever adapted to actuate the stopper dowel manually, wherein the lever is accessible from outside of the casing.

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6. Dishwashing machine according to one of the preceding claims, wherein the movable sliding carriage is arranged together with the closing hook on the body of a domestic appliance.
7. A dishwashing machine substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings.

Dated 6 December, 2010

BSH Bosch und Siemens Hausgeräte

Patent Attorneys for the Applicant/Nominated Person

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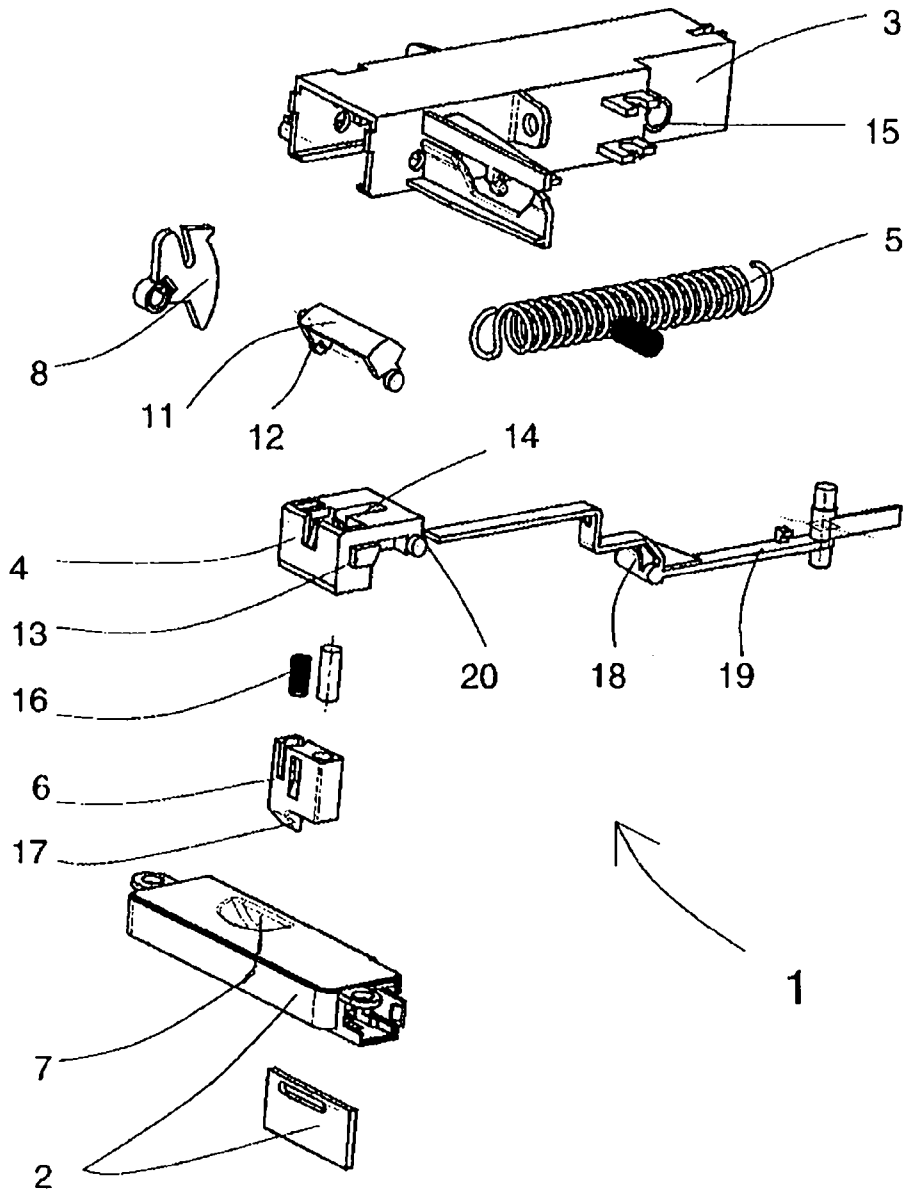


Fig. 1

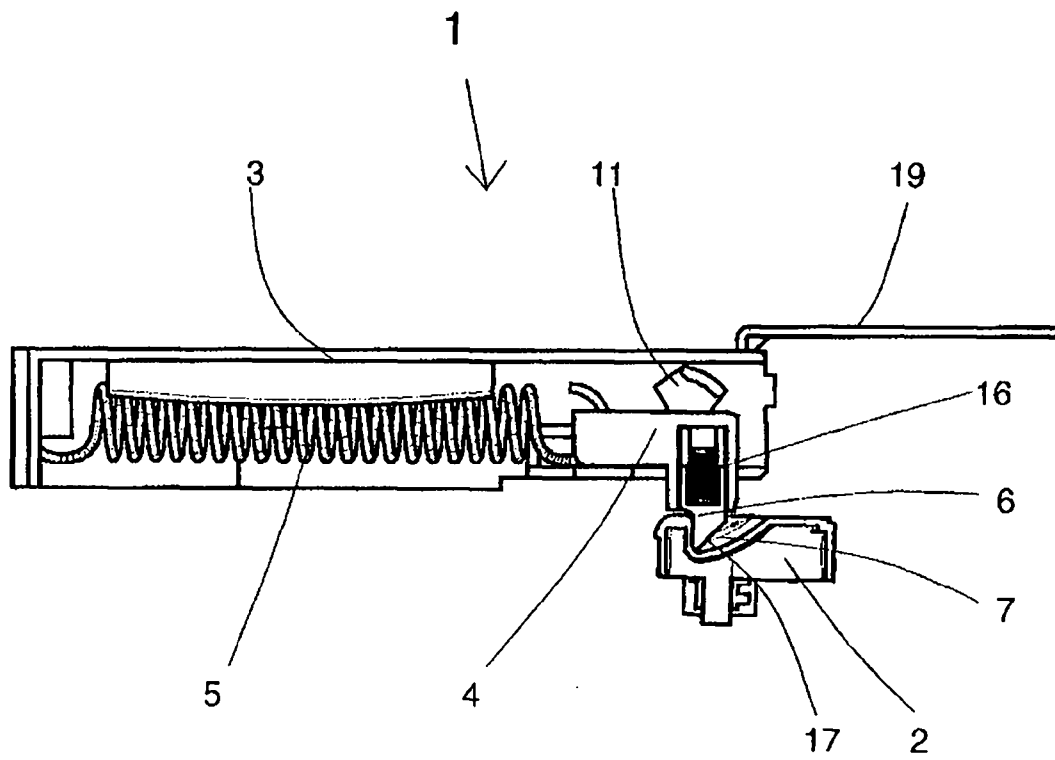


Fig. 2

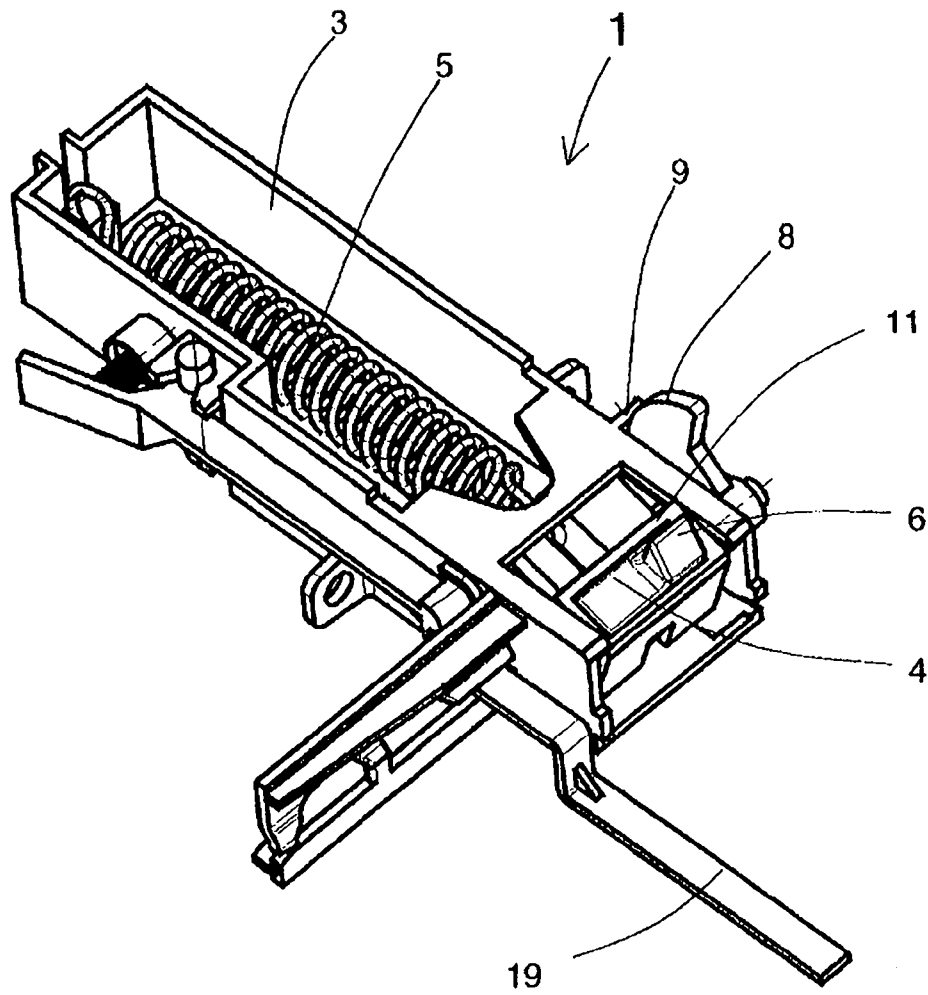


Fig. 3

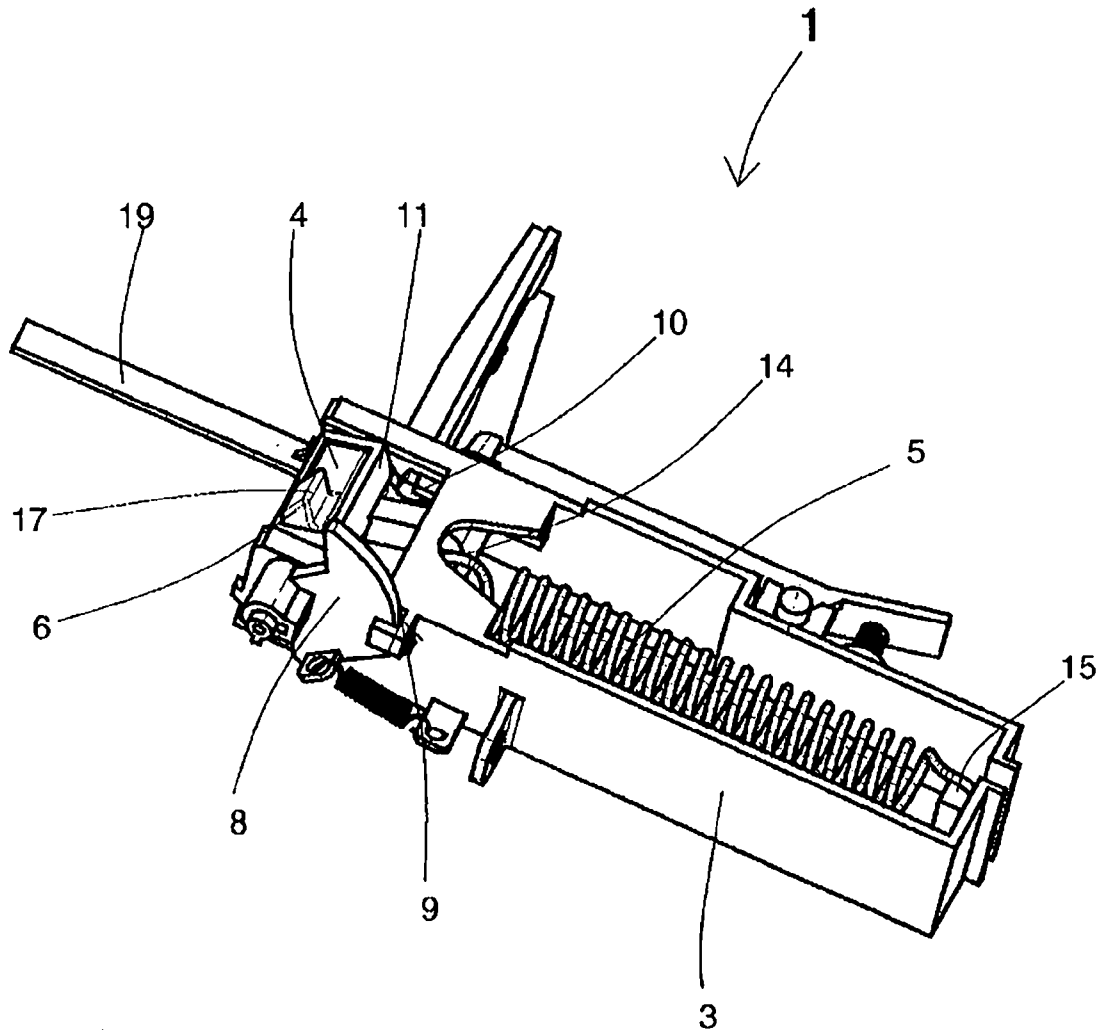


Fig. 4

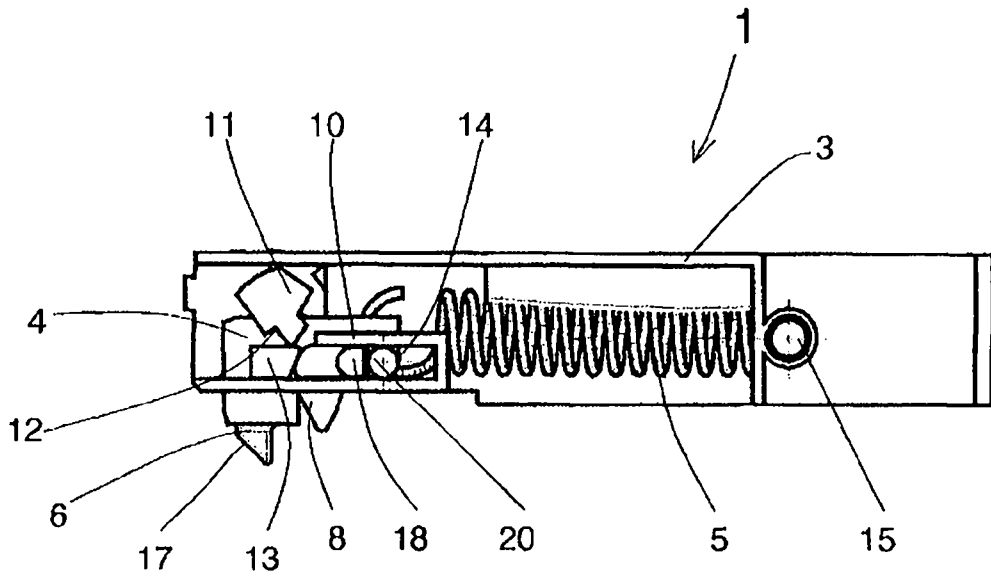


Fig. 5

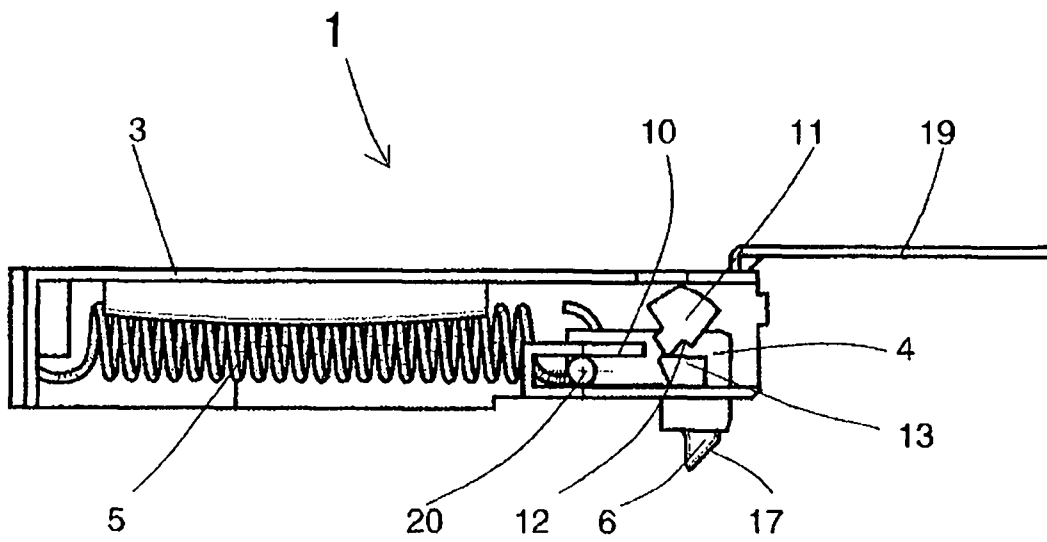


Fig. 6

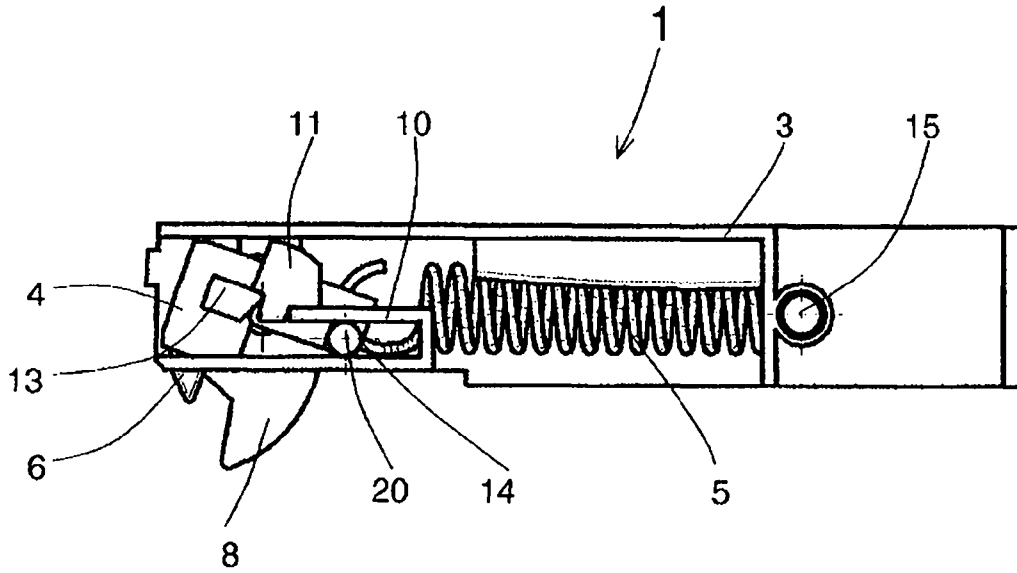


Fig. 7

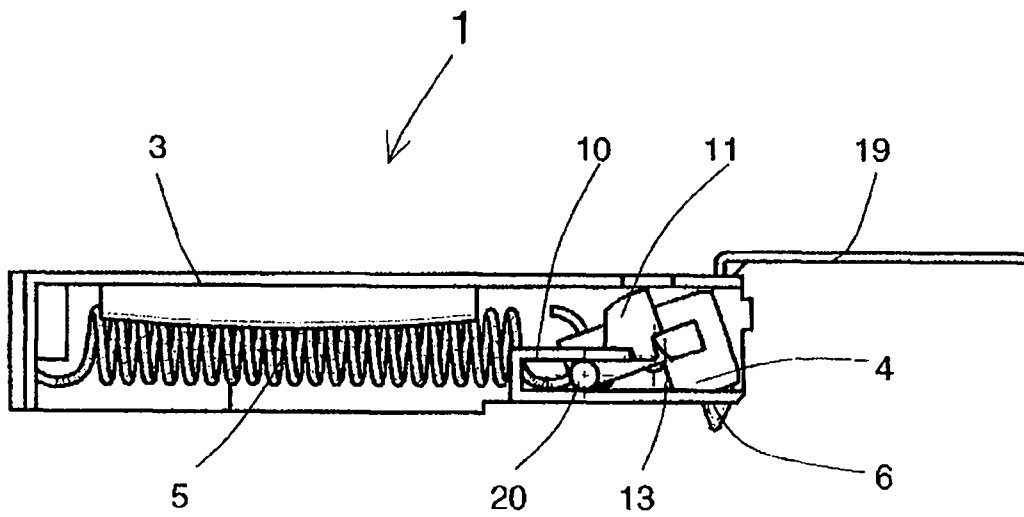


Fig. 8