

(19)



(11)

EP 2 280 140 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
15.06.2016 Bulletin 2016/24

(51) Int Cl.:
E05C 1/12 (2006.01)

(21) Application number: **09180703.2**

(22) Date of filing: **23.12.2009**

(54) Lock for inclined roof window

Verriegelung für ein Schrägdachfenster

Verrou pour fenêtre de toit incliné

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **22.06.2009 CN 200910099974**

(43) Date of publication of application:
02.02.2011 Bulletin 2011/05

(73) Proprietor: **Dong, Zhijun**
Yinzhou District
Ningbo City
Zhejiang Province (CN)

(72) Inventor: **Dong, Zhijun**
Yinzhou District
Ningbo City
Zhejiang Province (CN)

(74) Representative: **Cabinet Plasseraud**
66, rue de la Chaussée d'Antin
75440 Paris Cedex 09 (FR)

(56) References cited:
CN-Y- 201 221 253 GB-A- 605 704
US-A- 1 817 939 US-A- 1 831 067
US-A- 2 211 290 US-A- 2 368 840

EP 2 280 140 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Field of invention

[0001] The present invention relates to a lock, in particular, a lock for inclined roof window.

Background of invention

[0002] Inclined roof windows are adapted for inclined roof, which can provide abundance of sunshine for buildings. In order to allow ventilation between inside and outside of the house, most of the inclined roof windows are designed to be opened and closed. And for the opening and closing process, a lock is provided. The use of the lock has a direct impact on the efficiency of the inclined roof window.

[0003] In the prior art, it is known that there are lots of locks for windows, e.g. Chinese patent application for invention No. 200610050768.5, described "a new window lock" (publication No. CN1847594A), which includes a housing, a base member and bolt, a fixed base being arranged on the base member, and a first spring being arranged between the fixed base and the bolt, and a sliding closure which is connected with the bolt being arranged outside of the housing. It is characterized in that a buckle mechanism is arranged between the bolt and fixed base. Similarly, Chinese patent application No. 200810060108.4, described "a window lock" (publication No. CN101245680A), wherein the bolt is directly connected with a sliding closure which is adapted for pulling so that the sliding closure moves when the bolt is retreated, therefore, noise generated in the movement has two sources, one is from the bolt, and the other is from the sliding closure.

[0004] Furthermore, Chinese utility model No. ZL200820106956.X, "lock for inclined roof window" (grant publication No. CN201221253Y) discloses a lock which includes a base member, a bolt, a bolt ball, a semicircular connecting rod, a controlling actuation arm, a housing and a return spring, wherein said half covering housing is arranged on the first half of said base member, and two slides are arranged respectively on left and right sides of inner wall of the half covering housing, and the bolt is arranged inside the housing. One end of said bolt which extends over the housing is hinged with the bolt ball, and the other end is hinged with said semicircular connecting rod, and said connecting rod which has a short notch is connected with half covering housing of the base member through a hinge. Said semicircular connecting rod is fixed on the controlling actuation arm which is hinged with the base member, and said return spring is arranged inside the notch which is at the level inside of base member, one end of the return spring is fixed on the base member, and the other end is fixed on the controlling actuation arm. Due to the fact that the bolt slides inside the slide, compared with the lock known from CN1847594A and CN101245680A, the noise is reduced,

however, when the bolt retreats back inside, it also drives the actuation arm, therefore, the actuation arm is bound to make some noise, besides, the actuation arm of the lock is an unconventional member, thus it is not easy to manufacture this member.

Summary of the invention

[0005] In order to solve the technical problem mentioned above this invention provides a lock for inclined roof windows, wherein when its bolt retreats; it will not drive the actuation arm, so that the noise is reduced greatly.

[0006] The technical scheme to solve said technical problem used by this invention is to provide a lock for inclined roof window according to claim 1.

[0007] Said holding cavity of said base member may have an axial guide groove, and correspondingly, the outer-wall of said bolt has a guide rib along its length direction. Thus, the bolt movement is limited and the bolt cannot spin.

[0008] Preferably, the cooperative structure of the actuation arm and handle can be designed as follows: the head of said actuation arm has a handle whose lower end has a groove and whose upper end has an elastic filler, and there is a partition between said groove and said elastic filler, while said head of said actuation arm is inserted inside said groove and squeezed by said elastic filler.

[0009] Said reset member may be a reset elastic means which is arranged at the tail of said actuation arm.

[0010] The inlet of said locking notch may have a flange part which is connected smoothly with the inside of said locking notch.

[0011] Said middle part of said actuation arm may be in the form of a bend.

[0012] The connection between the connecting rod and actuation arm can be designed as follows: the tail part of said connecting rod has an oblong hole or sliding groove in its length direction, and correspondingly, the middle part of said actuation arm has a sliding pin within said oblong hole or sliding groove, when said bolt is completely retreated into said holding cavity of said base member, said connecting rod moves inwardly while not driving said sliding pin, which allows the connecting rod doesn't drive the actuation arm within a certain travel stroke.

[0013] Compared with the prior art, the advantages of this invention are the following: when the bolt retreats, it drives the connecting rod moving inward, while the connecting rod doesn't drive the sliding pin, therefore, the actuation arm stays still, which limits the noise source.

[0014] Besides, the bolt moves within a certain travel stroke and inside the holding cavity of the base member, which reduces the noise during the use. The whole structure is coordinated and can be operated smoothly. Moreover, parts can be found easily which reduces the cost.

Brief description of the drawings

[0015]

Figure 1 shows a perspective view of a lock according to one embodiment of the invention, when it is in its locking position.

Figure 2 shows the lock of Figure 1 in perspective view, without its the housing.

Figure 3 shows a front view of the lock of Figure 2.

Figure 4 shows a base member belonging to the lock of Figure 1.

Figure 5 shows a bolt belonging to the lock of Figure 1.

Figure 6 shows an actuation arm belonging to the lock of Figure 1.

Figure 7 shows a connecting rod belonging to the lock of Figure 1.

Figure 8 shows the schematic diagram of the lock when the embodiment is in its unlocking position.

Detailed description of the invention

[0016] One embodiment of the invention will be further described with reference the figures.

[0017] As shown in figure 1 and 2, the lock according to the invention is adapted for a centre-pivoted window on and inclined roof window, and it includes a strike plate 10, a base member 2, a housing 1, a bolt 3, an elastic means 4, an actuation arm 7, an connecting rod 5 and reset elastic means 8.

[0018] The strike plate 10 is arranged on the exterior window frame, which has a locking notch 10b, and the inside of the said notch 10b is in the form of a bevel, and at the level of the inlet of said locking notch 10b, there is a flange part 10a whose lower end is also in the form of a bevel, so that the bolt 3 can enter into the locking notch 10b, and which is connected smoothly with the inside of said locking notch 10b.

[0019] The base member 2 is arranged on the inner window frame, and the front end of the base member 2 has a holding cavity 22 (see figure 4), housing 1 is arranged on the outside of the base member 2, the upper end has a guide groove 11, the bolt 3 is retractable in the holding cavity 22 of the base member, and the front end of the bolt is in the form of bevel.

[0020] Elastic means 4 is arranged inside of the holding cavity 22, whose front end is against with the bolt 3, and whose back end is against with the inner wall of the base member 2, and it acts on the bolt 3, biasing the bolt 3 outwardly from the holding cavity 22.

[0021] With reference to figure 6, the middle part of the actuation arm 7 forms a bend, between a tail part and a head part ; the tail part is pivotally arranged on the base member 2, and the head part extents over the guide

groove 11 and can move inside said guide groove 11. The head part of the actuation arm 7 has a handle 6 whose lower end has a groove 63 and whose upper end has a elastic filler 61, and there is a partition 62 between said groove 63 and said elastic filler 61, while said head of said actuation arm 7 is inserted inside said groove 63 and squeezed by said elastic filler 61. The reset elastic means 8 is used as the reset member of the actuation arm 7, which is arranged at the trail end of the actuation arm 7, and which can generate a force making the actuation arm 7 to move towards the strike plate 10.

[0022] With reference to figure 7, the front end of the connecting rod 5 is hinged with the back end of the bolt 3, and the back end of the connecting rod 5 is connected with the middle part of the actuation arm 7, which doesn't drive the actuation arm 7 within a certain travel stroke. The tail of said connecting rod 5 has an oblong hole 51 in its length direction, and correspondingly, the middle part of said actuation arm 7 has a sliding pin 71 within said oblong hole 51, when said bolt 3 is completely retreated into said holding cavity 22, said connecting rod moves inwardly while not driving said sliding pin 71.

[0023] As shown in figure 4 and 5, in order to prevent the rolling of the bolt 3, the inner wall of said holding cavity 22 has an axial guide groove 21, and correspondingly, the outer wall of said bolt 3 has a guide rib along its length direction. Thus, the movement of the bolt 3 is limited and it cannot spin.

[0024] When a user wants to open the window, he pulls the handle 6. As shown in figure 8, when pulling the handle 6 in direction OD, the actuation arm 7 turns, overcoming the elastic force of the elastic means 4 and reset elastic means 8, and the connecting rod 5 makes the bolt 3 retreat back into the base member by transferring the circular movement of the actuation arm 7 to the straight movement of the bolt 3, so that the bolt 3 leaves the locking notch 10b of the strike plate 10 and ends the unlocking movement. The inner window frame of the centre-pivoted window can then be pivoted.

[0025] On the contrary, for closing the window, the user may push the handle 6 in the direction opposite the direction OD. Pushing the handle 6 brings the upwards movement of the inner window frame of the centre-pivoted window. Due to the pivoting movement, the bolt 3 and the bevel of the lower part of the flange part 10a of the strike plate collide with each other, which generates the lateral force that overcomes the elastic force of the spring and pushes the bolt 3 towards inside of the holding cavity (by camming effect), the bolt 3 drives the connecting rod 5 to move inwards. Since the back part of the connecting rod 5 has a oblong hole 51, when the connecting rod 5 moves inwards, it doesn't drive any pivoting of actuation arm 7. After the bolt 3 passes the flange part 10a, the bolt 3 is moved outwardly to the locking position under action of the spring 4, thus, the bolt 3 and the strike plate 10 are locked with each other, so that the inner and exterior window frames of the centre-pivoted window are being locked.

[0026] From the above description, one understands that the following features of the invention are of importance:

a. A lock comprising:

- a strike plate (10) ;
- a bolt (3) mounted in a base member (2) and adapted to be displaced in translation relative to said base member (2) between a locking position in which it lockingly engages with said strike plate (10) and an unlocking position in which it retracts into said base member without locking engagement with the strike plate; and
- an actuation arm (7) adapted to swivel relative to the base member (2) and linked to the bolt (3) through a connecting rod (5), whereby swivelling said actuation arm in an opening direction (OD) drives said bolt towards its unlocking position ;

characterized in that it further comprises locking elastic means (4) adapted to push said bolt (3) towards its locking position, and that said connecting rod (5) comprises a free travel stroke portion adapted so that said actuation arm (7) is not driven by said bolt (3) when said strike plate (10) displaces the bolt (3) along a predetermined free travel stroke against the action of said elastic means (4);

b. Said free travel stroke portion comprises an oblong hole (51) which extends longitudinally through said connecting rod (5), said oblong hole (51) being traversed by a sliding pin (71) which is secured to said actuation arm (7) and is arranged to slide along the longitudinal direction of said oblong hole;

c. Said sliding pin (71) is secured to a middle part of said actuation arm (7), and a front end of said connecting rod (5) is mounted to pivot about a crank pin (35) secured to a back end of said bolt (3);

d. The lock further comprises reset elastic means (8) adapted to push said actuation arm (7) so as to swivel in a direction opposite said opening direction (OD);

e. Said bolt (3) is mounted to slide inside a holding cavity (22) which is provided in said base member (2) and extends axially in the direction of translation of the bolt.

f. The lock further comprises anti-rotation means (21, 31) provided in said bolt (3) and in said holding cavity (22) and adapted to prevent said bolt (3) from turning inside said holding cavity (22);

g. Said anti-rotation means comprise a guide groove (21) which extends axially in said holding cavity (22) and a corresponding guide rib (31) protruding on an

outer surface of said bolt (3);

h. Said locking elastic means (4) are formed by a helical spring which is arranged in the inside of said holding cavity (22) in compression between said bolt (3) and an annular shoulder (23) formed by an inner wall of said base member (2);

i. Said actuation arm (7) comprises a head (73) on which a handle (6) is secured, said handle (6) comprising a groove section (63) and a filler section (64) separated from said groove section (63) by a flexible partition wall (62), said head (73) being inserted inside said groove section (63), an elastic filler being inserted inside said filler section (64) so as to push away said partition wall (62) and to squeeze said head (73);

j. The lock further comprises a housing (1) which covers said base member (2) and has an opening (11) traversed by said actuation arm (7);

k. Said middle part of said actuation arm (7) is bent;

l. Said actuation arm (7) is substantially formed by a U-shaped arm having two parallel legs (7A, 7B), and wherein said reset elastic means are formed by a torsion spring (8) which is arranged substantially between said legs (7A, 7B) in a base section (72) of said actuation arm (7);

m. A front end of said bolt (3) is in the form of a bevel, and said strike plate (10) comprises a locking notch (10b) to receive said bolt (3);

n. A window is equipped with at least one lock according to any one of the preceding claims;

o. A window is equipped with two locks and comprises a pivoting sash on the top of which the base members (2) of said locks are secured, further comprising an exterior window frame on which the strike plates (10) of said locks are secured, and wherein a single handle (6) having the form of a bar is secured to the actuation arms (7) of said locks.

Claims

1. A lock for inclined roof window, comprising:

- a locking member (10) with a locking notch (10b),
- a base (2) with a holding cavity (22) at its front end,
- a housing (1), arranged at the outside of said base, having a guide hole (11) on its upper end,
- a retractable bolt (3), arranged inside said hold-

ing cavity of said base, said retractable bolt having a front end in the form of a bevel,

- a rocker arm (7), whose tail is pivotally arranged on said base (2), and whose head projects over said guide hole (11) of said housing and is able to move back and forth inside said guide hole,

- a connecting rod (5) having a front end and a back end, said front end being connected with the back end of said bolt (3) and being able to pivotally move in relation with said bolt, said back end being connected with the middle part of said rocker arm (7), and

- a reset member (8), which generates a force to make said rocker arm move in the direction towards said locking member, **characterized in that**

said lock further comprises a spring (4), arranged at the inside of said holding cavity, which front end is against said bolt (3), and which back end is against an inner-wall of said base, and **in that**

the back end of the connecting rod (5) is adapted to move in relation with said rocker arm in a fixed stroke while not driving said rocker arm.

2. A lock for inclined roof window according to claim 1, **characterized in that** said holding cavity (22) of said base has an axial guide groove (21), and correspondingly, the outer-wall of said bolt has a guide rib (31) in its length direction.
3. A lock for inclined roof window according to claim 1 or claim 2, **characterized in that** said head of said rocker arm has a handle (6) whose lower end has a groove and whose upper end has a elastic filler, and there is a partition between said groove and said elastic filler, while said head of said rocker arm is inserted inside said groove and squeezed by said elastic filler.
4. A lock for inclined roof window according to anyone of the preceding claims, **characterized in that** said reset member (8) is a torsion spring which is arranged at the tail of said rocker arm.
5. A lock for inclined roof window according to anyone of the preceding claims, **characterized in that** the inlet of said locking notch (10b) has a flange part (10a) which is connected smoothly with the inside of said locking notch.
6. A lock for inclined roof window according to anyone of the preceding claims, **characterized in that** said middle part of said rocker arm (7) is in the form of a bend.
7. A lock for inclined roof window according to any of claims 1 to 6, **characterized in that** the tail of said

connecting rod has a sliding opening or sliding groove (51) in its length direction, and correspondingly, the middle part of said rocker arm has a projecting pin (71) within said sliding opening or sliding groove, when said bolt is completely retreated into said holding cavity of said base, said connecting rod moves inwardly while not driving said projecting pin.

10 Patentansprüche

1. Eine Verriegelung für ein Schrägdachfenster umfassend:

- ein Verriegelungselement (10) mit einer Verriegelungskerbe (10b)

- eine Basis (2) mit einem Halterungshohlraum (22) an deren Vorderseite,

- ein Gehäuse (1), das an der Außenseite der Basis angeordnet ist und ein Führungsloch (11) an seinem oberen Ende aufweist,

- einen einziehbaren Bolzen (3), der innerhalb des Halterungshohlraums der Basis angeordnet ist, wobei der einziehbare Bolzen ein vorderes Ende in der Form einer Schräge aufweist,

- einen Kipphebel (7), dessen Schwanz schwenkbar auf der Basis (2) angeordnet ist, und dessen Kopf über das Führungsloch (11) des Gehäuses hinausragt und in der Lage ist, innerhalb des Führungslochs sich zurück und vorwärts zu bewegen,

- eine Verbindungsstange (5) mit einem vorderen Ende und einem hinteren Ende, wobei das vordere Ende mit dem hinteren Ende des Bolzens (3) verbunden ist und in der Lage ist, sich schwenkbar in Bezug auf den Bolzen zu bewegen, wobei das hintere Ende mit dem mittleren Teil des Kipphebels (7) verbunden ist, und

- ein Rückstellelement (8), welches eine Kraft erzeugt, um den Kipphebel in die Richtung zum Verriegelungselement zu bewegen,

dadurch gekennzeichnet, dass

die Verriegelung des Weiteren eine Feder (4) umfasst, die innerhalb des Halterungshohlraums angeordnet ist, dessen vorderes Ende gegen den Bolzen (3) anliegt, und dessen hinteres Ende gegen eine innere Wand der Basis anliegt, und dass das hintere Ende der Verbindungsstange (5) angepasst ist, um in Bezug auf den Kipphebel sich in einem festgelegtem Schlag zu bewegen, während der Kipphebel nicht angetrieben wird.

2. Verriegelung für Schrägdachfenster gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Halterungshohlraum (22) der Basis eine axiale Führungsrille (21) aufweist und korrespondierend die äußere Wand des Bolzens eine Führungsrippe (31)

in seiner Längsrichtung aufweist.

3. Verriegelung für ein Schrägdachfenster gemäß Anspruch 1 oder Anspruch 2, **dadurch gekennzeichnet, dass** der Kopf des Kipphebels einen Griff (6) aufweist, dessen unteres Ende eine Rille aufweist und dessen oberes Ende einen elastischen Füllstoff aufweist, und wobei es eine Trennung zwischen die Rille und dem elastischen Füllstoff gibt, während der Kopf des Kipphebels in die Rille eingeführt wird und durch den elastischen Füllstoff zusammengepresst wird. 5
4. Verriegelung für ein Schrägdachfenster gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Rückstellelement (8) eine Torsionsfeder ist, welche an dem Schwanz des Kipphebels angeordnet ist. 10
5. Verriegelung für ein Schrägdachfenster gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einlass der Verriegelungs-kerbe (10b) einen Flanschteil (10a) aufweist, welcher reibungslos mit der Innenseite der Verriegelungs-kerbe verbunden ist. 20
6. Verriegelung für ein Schrägdachfenster gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der mittlere Teil des Kipphebels (7) in der Form einer Krümmung ist. 25
7. Verriegelung für ein Schrägdachfenster gemäß einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** der Schwanz der Verbindungsstange eine Gleitöffnung oder Gleitrille (51) in seiner Längsrichtung aufweist und korrespondierend der mittlere Teil des Kipphebels einen hervorstehenden Stift (71) innerhalb der Gleitöffnung oder Gleitrille aufweist, wobei der Bolzen vollständig in den Halterungshohlraum der Basis eingezogen ist, wobei die Verbindungsstange sich nach innen bewegt, wobei der hervorstehende Stift nicht angetrieben wird. 30

Revendications

1. Verrou pour fenêtre de toit incliné, comprenant :

- un élément de verrouillage (10) avec une encoche de verrouillage (10b),
- une base (2) avec une cavité de retenue (22) à son extrémité avant,
- un logement (1), agencé à l'extérieur de ladite base, possédant un trou de guidage (11) sur son extrémité supérieure,
- un pêne rétractable (3), agencé à l'intérieur de ladite cavité de retenue de ladite base, ledit pêne rétractable possédant une extrémité avant sous

forme de biseau,

- un bras oscillant (7), dont la queue est agencée de façon pivotante sur ladite base (2), et dont la tête fait saillie par-dessus ledit trou de guidage (11) dudit logement et est capable de se déplacer en va-et-vient à l'intérieur dudit trou de guidage,

- une bielle (5) possédant une extrémité avant et une extrémité arrière, ladite extrémité avant étant raccordée à l'extrémité arrière dudit pêne (3) et étant capable de se déplacer de façon pivotante par rapport audit pêne, ladite extrémité arrière étant raccordée à la partie médiane dudit bras oscillant (7), et

- un organe de réarmement (8), qui génère une force pour faire en sorte que ledit bras oscillant se déplace dans la direction vers ledit élément de verrouillage, **caractérisé en ce que**

ledit verrou comprend en outre un ressort (4), agencé à l'intérieur de ladite cavité de retenue, laquelle extrémité avant est contre ledit pêne (3), et laquelle extrémité arrière est contre une paroi intérieure de ladite base, et **en ce que**

l'extrémité arrière de la bielle (5) est adaptée pour se déplacer par rapport audit bras oscillant dans une course fixe sans entraîner ledit bras oscillant.

2. Verrou pour fenêtre de toit incliné selon la revendication 1, **caractérisé en ce que** ladite cavité de retenue (22) de ladite base possède une rainure de guidage axiale (21), et, de façon correspondante, la paroi extérieure dudit pêne possède une nervure de guidage (31) dans sa direction de longueur. 30

3. Verrou pour fenêtre de toit incliné selon la revendication 1 ou la revendication 2, **caractérisé en ce que** ladite tête dudit bras oscillant possède une poignée (6) dont l'extrémité inférieure possède une rainure et dont l'extrémité supérieure possède un remplissage élastique, et il y a une séparation entre ladite rainure et ledit remplissage élastique, alors que ladite tête dudit bras oscillant est insérée à l'intérieur de ladite rainure et serrée par ledit remplissage élastique. 35

4. Verrou pour fenêtre de toit incliné selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit organe de réarmement (8) est un ressort de torsion qui est agencé sur la queue dudit bras oscillant. 40

5. Verrou pour fenêtre de toit incliné selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'entrée de ladite encoche de verrouillage (10b) possède une partie à bride (10a) qui est raccordée uniformément avec l'intérieur de ladite encoche de verrouillage. 45

6. Verrou pour fenêtre de toit incliné selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite partie médiane dudit bras oscillant (7) est sous forme de coude.

5

7. Verrou pour fenêtre de toit incliné selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la queue de ladite bielle possède une ouverture coulissante ou rainure coulissante (51) dans sa direction de longueur, et de façon correspondante, la partie médiane dudit bras oscillant possède une goupille saillante (71) à l'intérieur de ladite ouverture coulissante ou rainure coulissante, lorsque ledit pêne est complètement retiré dans ladite cavité de retenue de ladite base, ladite bielle se déplace vers l'intérieur tout en n'entraînant pas ladite goupille saillante.

10

15

20

25

30

35

40

45

50

55

FIG. 1

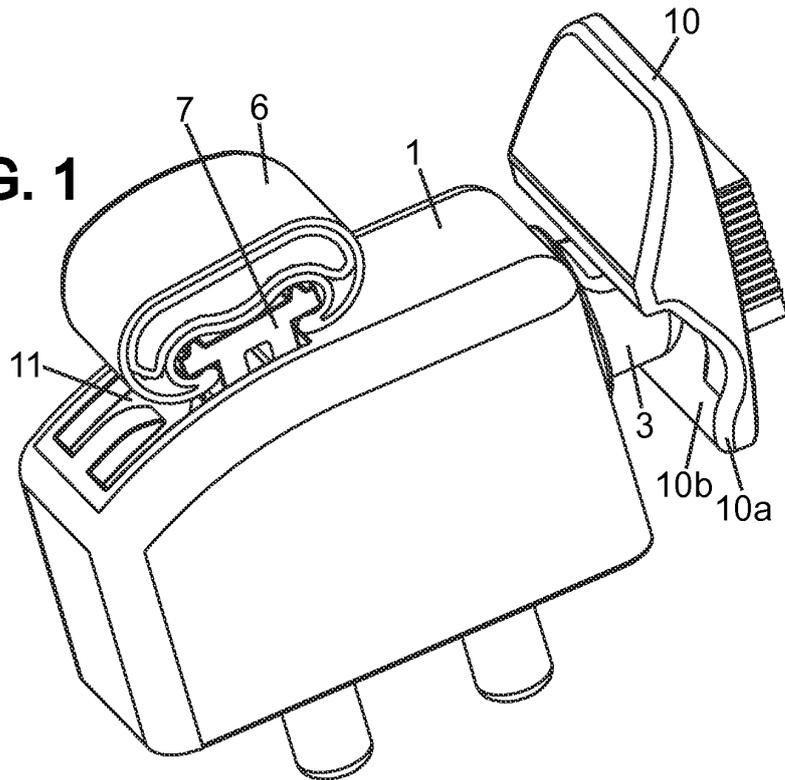
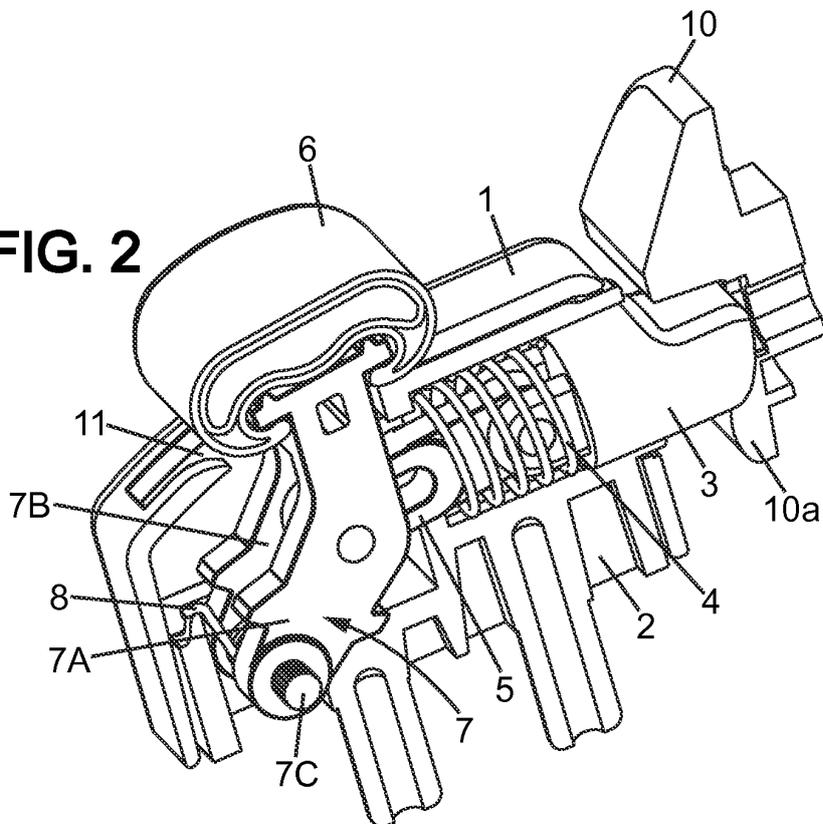
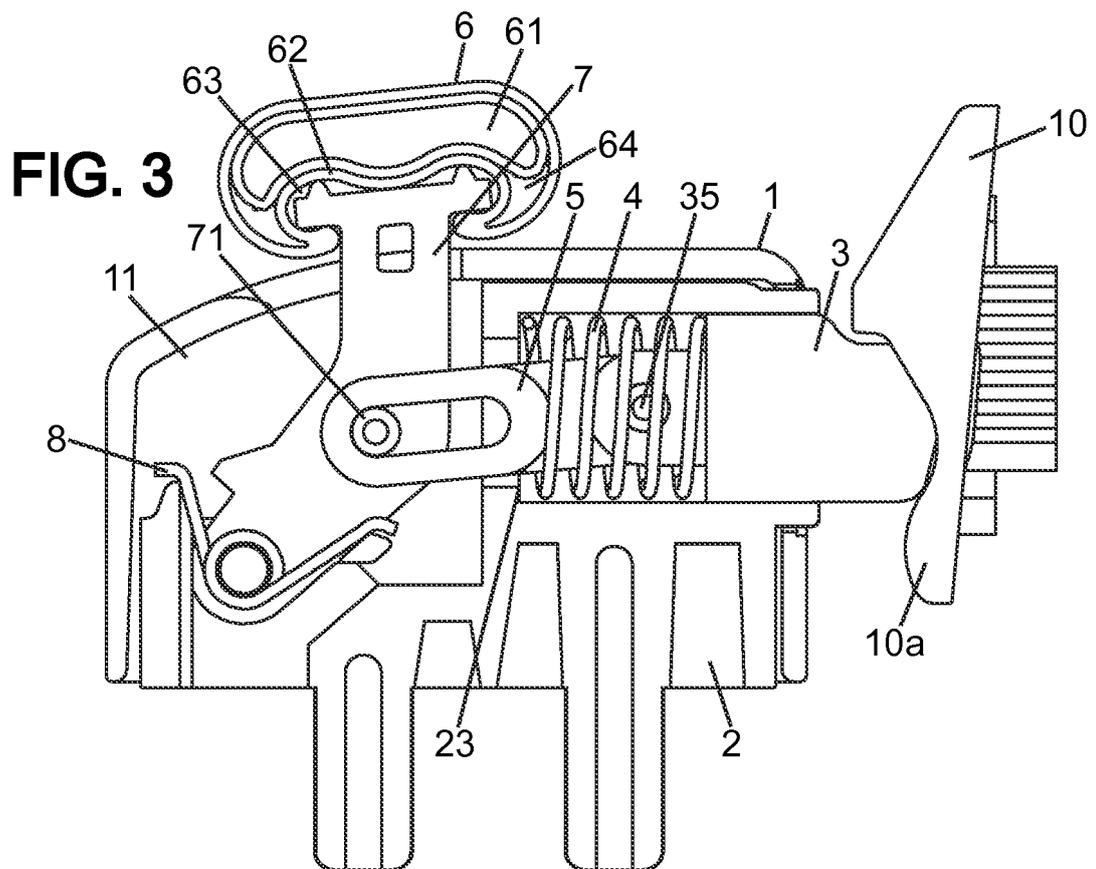


FIG. 2





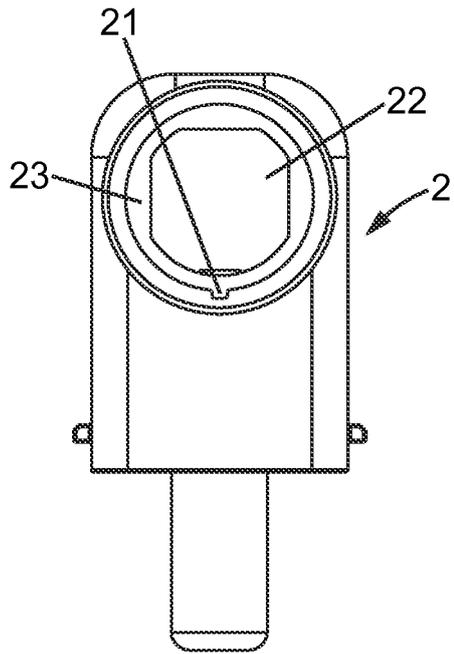


FIG. 4

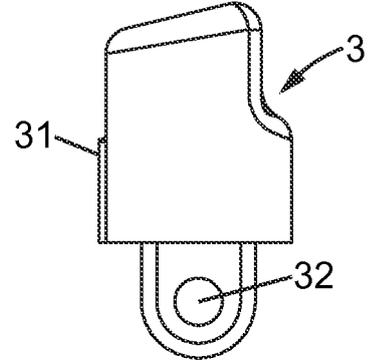


FIG. 5

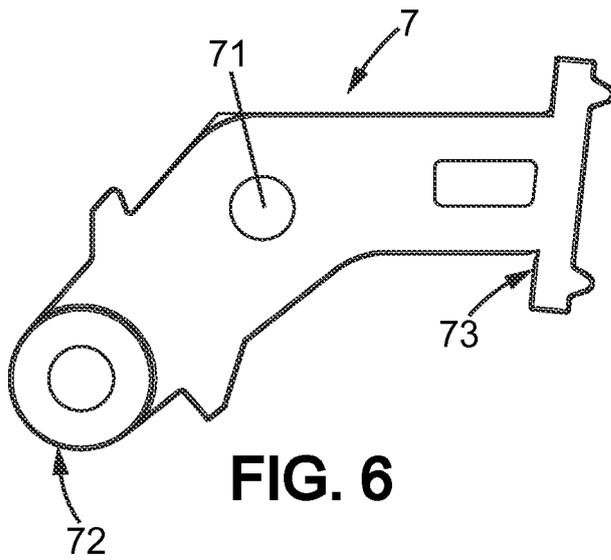


FIG. 6

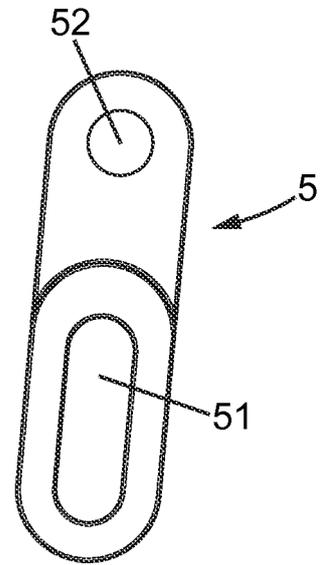
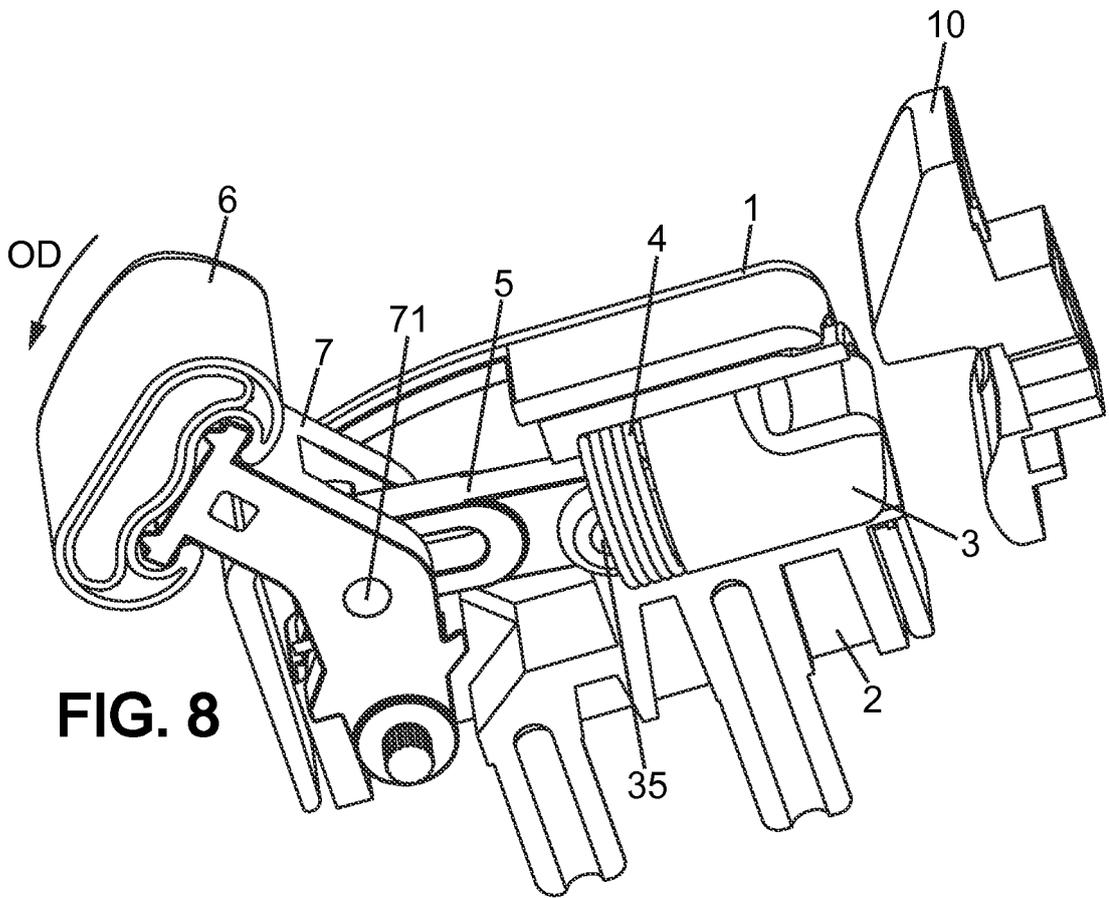


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 200610050768 [0003]
- CN 1847594 A [0003] [0004]
- CN 200810060108 [0003]
- CN 101245680 A [0003] [0004]
- CN ZL200820106956X [0004]
- CN 201221253 Y [0004]