

(19)



(11)

EP 1 953 320 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
22.09.2010 Bulletin 2010/38

(51) Int Cl.:
E05F 11/04^(2006.01)

(21) Application number: **08101146.2**

(22) Date of filing: **31.01.2008**

(54) **Device used to open and close Vasistas windows.**

Vorrichtung zum Öffnen und Schließen von Oberlichtfenstern

Dispositif utilisé pour ouvrir et fermer des fenêtres Vasistas

(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 MT NL NO PL PT
RO SE SI SK TR**
Designated Extension States:
AL BA MK RS

(30) Priority: **01.02.2007 IT MC20070016**

(43) Date of publication of application:
06.08.2008 Bulletin 2008/32

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FR-A- 327 781 FR-A- 2 668 532

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Description

[0001] The present patent application relates to a device used to open and close Vasistas windows, which is actuated by means of a single rope (see e.g. FR 2668532A).

[0002] Although different types of locks for Vasistas windows are currently available on the market, the present description refers to the locks for windows that are exclusively provided with Vasistas opening and are situated at such a height that they cannot be reached by the operator manually.

[0003] Different locks are used in this group of Vasistas windows, the most typical comprising a latch with relevant housing. The latch is fixed to the upper side of the frame of the fall-front window and the housing is fixed to the crosspiece of the fixed frame of the window.

[0004] The lock is opened when the latch is removed from its housing, overcoming the antagonist force of a return spring associated with the latch.

[0005] When the window is situated at such a height that the operator cannot reach the latch manually, the lock is provided with suitable remote control means, the most common ones being a rod ending with a hook used to hook the latch by means of an eyelet.

[0006] After having inserted the hook into the eyelet, the operator simply needs to pull the rod downwards to open the window, which will stop after a predefined opening angle by an ordinary end-of-travel stop mechanism.

[0007] Instead of using the rod to push the window against the fixed frame, the operator can close the window by means of a rope provided in some models of Vasistas windows.

[0008] More precisely, by means of a suitable pulley system, the rope is tensioned to pull the fall-front window against the fixed frame of the window, favouring the elastic snap coupling between the latch and the relevant housing.

[0009] In order to avoid using the rod to open the window, a type of locks in which the latch is retracted by means of a second rope has been devised.

[0010] Moreover, some of the devices used to open and close Vasistas windows use a single rope; however, these devices have not been very successful on the market, due to the mounting system and large dimensions, which are characterised by large volume, intrusiveness and anti-aesthetical characteristics.

[0011] In fact, in addition to the single rope, this type of devices comprises a pin fitted with the fixed frame of the window and a large lock fitted to the upper crosspiece of the window, in such a way that the lock is even more visible and bulky when the window is in the maximum opening position.

[0012] The purpose of the present invention is to obtain a device used to open Vasistas windows provided with only one rope, which comprises a small lock that incorporates all the mechanisms that are necessary to hook and release the pin of the lock.

[0013] A further purpose of the present invention is to obtain a device used to open and close Vasistas windows provided with only one rope, which comprises a small lock designed in such a way that it can be fitted to the fixed frame of the window, while the pin is designed to be fitted to the upper crosspiece of the frame of the fall-front window.

[0014] These and other advantages, which will become evident in the description below, have been achieved by the device of the invention, whose main characteristics are illustrated in the first claim.

[0015] The said device comprises a lock-assembly designed to be fitted to the wall or the upper crosspiece of the window fixed frame, which contains all the mechanisms that are necessary to lock and release the pin with vertical axis fitted to the upper crosspiece of the window frame in opposite position to the box-shaped lock-assembly.

[0016] The components include an oscillating plate that cooperates with a catch and is provided with a hook, which is designed to hook and hold the pin when the lock is closed, preventing the window from opening.

[0017] To release the oscillating plate from the catch, the operator simply needs to pull the rope that actuates the opening lever contained in the lock-assembly, which in turns makes the catch oscillate, releasing the oscillating plate.

[0018] When the window is open and the rope is released, a flexible blade actuated by a suitable cam temporarily releases the opening lever from the catch, in such a way that the catch is not retracted when the rope is pulled again to close the window. In fact, to close the window the operator simply needs to pull the rope again; by means of a pulley system, the rope pulls the window against the wall until the pin penetrates deeply into the lock-assembly and is hooked to it.

[0019] Once the window is closed, when the rope is no longer tensioned, the interference of the flexible blade with the cam ends and the opening lever is engaged with the catch in such a way that, when the operator pulls the rope again, the catch is retracted and the oscillating plate is released, opening the window.

[0020] For major clarity the description of the lock of the invention continues with reference to the enclosed drawings, which only have an illustrative, not limiting purposes, whereby:

Fig. 1 is a diagrammatic view of the components of the device of the invention.

Fig. 2 is a diagrammatic view of the device of the invention installed in a Vasistas window, shown in open position.

Fig. 3 is an axonometric exploded view of all the components contained in the lock-assembly.

Figs. 4 to 9 are plan views of the different positions of the various elements contained in the lock-assembly during the opening and closing of the fall-front window.

Fig. 4A is an axonometric enlarged view of the oscillating plate and relevant catch shown in the same position as the components in fig. 4.

Fig. 6A is an axonometric enlarged view of the oscillating plate and relevant catch shown in the same position as the components in fig. 6.

[0021] With reference to fig. 1, the device of the invention is composed of a box-shaped body (C) that houses the lock (S) used to lock and release the pin (1) with vertical axis, which is part of a block (B) designed to be fitted above the upper crosspiece (TA) of the frame of the panel (A) of the window (F).

[0022] The box-shaped body (C) is fitted to the upper crosspiece (TF) of the fixed frame of the window (F), as shown in fig. 2.

[0023] The lock (S) contained in the box-shaped body (C) is actuated by means of a rope (2) used to open the lock (S) and close the panel (A), while automatically locking the pin (1) inside the lock (S).

[0024] The box-shaped body (C) is composed of an upper half-shell (CS) and a lower half-shell (CI) provided with housings for the various components and relevant return springs.

[0025] It must be noted that the rope (2) moves along the following travel:

- a first perfectly vertical section (T1) before the upright (M) of the fixed frame of the window (F);
- a second horizontal section (T2) before the upper crosspiece (TF) of the fixed frame of the window (F);
- a third section (T3) between the box-shaped body (C) and the block (B);
- a fourth, last section (T4) between the block (B) and the box-shaped body (C) with the fixing points of the end of the rope (2) that enters the box-shaped body (C) with the section (T2) and comes out with the section (T3).

[0026] The lower half-shell (CI) is provided with a first pin (3) with vertical axis used to pivot an oscillating plate (4), a second pin (5) with vertical axis used to pivot a catch (6) and an opening lever (7), above which a flexible blade (8) is mounted.

[0027] The lower half-shell (CI) is also provided with two housings (9 and 10) for two return torsional springs (11 and 12), respectively for the oscillating plate (4) and the catch (6), and a third housing (13) for a compression spring (14) to return the lever (7).

[0028] With reference to fig. 6A, the oscillating plate (4) is provided with a hole (4a) that houses the pivoting pin (3) and a hook (4b) with suitable configuration to hook and release the pin (1).

[0029] The plate (4) is also provided with a wing (4c) in opposite position to the hook (4b), which is shaped in such a way that it cooperates with the catch (6) that is suitably provided with a tooth (6a) that touches the wing (4c), when the lock is closed, as shown in fig. 4A.

[0030] The catch (6) is provided with a hole (6b) for the insertion of the pivoting pin (5) and a hole (6c) for the insertion of a connection peg (8a) situated below the flexible blade (8).

5 **[0031]** The blade (8) is composed of a rectilinear section (8b) that surmounts the lever (7) and a curved shelf (8c) that surmounts the oscillating plate (4).

[0032] The rectilinear section (8b) is provided at the end with a hole for the rivet (15) for fixing to the lever (7), which oscillates together with the blade (8).

10 **[0033]** The lever (7) is shaped as a square with a longer wing (7a) and a shorter wing (7b), provided with a hole (7c) in coaxial position to the hole (6b) in order to be coupled with the pivoting pin (5).

15 **[0034]** The wing (7a) is provided with an ear (7d) with fixing holes for the end of the rope (2), and a tooth (7e) used to centre the return spring (14) that is compressed when the rope (2) is tensioned with a force (T).

20 **[0035]** The vertex of the L-shaped lever (7) is provided with a slot (7f) that houses (when the lock is closed) the peg (8a) with suitable length to pass over the slot (7f) and through the hole (6c) of the catch (6).

25 **[0036]** Both the catch (6) and the oscillating plate (4) are respectively provided with a hole (6d and 4d) for insertion of the hooked end (11 a and 12a) of the spring (11 and 12).

[0037] The spring (11) exerts a thrust on the oscillating plate (4) that tends to rotate it at the end of the opening travel, while the spring (12) tends to push the catch (6) against the plate (4) in such a way that the tooth (6a) interferes with the wing (4c) of the oscillating plate (4).

30 **[0038]** Finally, it must be noted that the lower half-shell (CI) has a central transversal notch (I) to let the pin (1) come in and out with respect to the box-shaped body.

35 **[0039]** For a better understanding of the lock (S) of the invention, the description continues with reference to the operative steps in which the components cooperate to open or close the window (F) where it is mounted.

40 **[0040]** With reference to fig. 4, when the lock is closed, the oscillating plate (4) is oriented in such a way that the hook (4b) prevents the pin (1) from coming out of the box-shaped body (C).

[0041] As shown in fig. 4A, the tooth (6a) of the catch (6) obstructs the rotation of the oscillating plate (4) that tends to eject the pin (1) from the box-shaped body (C) under the thrust of the spring (11).

[0042] Fig. 4A shows that the peg (8a) is inserted into the hole (6c) and into the slot (7f), thus coupling the lever (7) with the catch (6).

50 **[0043]** In such a position, in order to open the lock (S) the operator simply needs to pull the rope (2) to rotate the lever (7) around the pin (5), as shown in fig. 5; because of the connection peg (8a), the rotation determines the rotation of the catch (6), thus releasing the wing (4c) from the tooth (6a).

55 **[0044]** When the interference between the catch (6) and the oscillating plate (4) ends, the oscillating plate (4) rotates until the end of the opening travel, under the thrust

of the spring (12), in such a way that the pin (1) comes out of the box-shaped body (C) and the panel (A) opens, as shown in fig. 6.

[0045] Fig. 6A shows the behaviour of the flexible blade (8) as soon as the plate (4) rotates at the end of the opening travel.

[0046] The plate (4) incorporates a protruding cam (4e) that interferes with the shelf (8c) at the end of the opening travel of the plate (4), determining the upward flexion of the shelf (8c) that makes the peg (8a) come out of the hole (6c) of the catch (6), eliminating the connection between the lever (7) and the catch (6), which moves forward towards the plate (4) under the thrust of the return spring (12), as shown in fig. 6A.

[0047] When the window is open, as soon as the tension on the rope (2) ends, the lever (7) resumes the initial idle position under the thrust of the return spring (14), as shown in fig. 7.

[0048] In this position the peg (8a) is aligned with the hole (6c), but is not able to penetrate it since the blade (8) remains bent upwards due to the interference of the ending section (8c) with the cam (4e), in such a way that the lever (8) is no longer able to drive the catch (6) into rotation, when it is driven into rotation together with the lever (7) following to the new tensioning of the rope (2).

[0049] In order to close the window, the operator must pull the rope (2) to generate - due to the travel imposed on the rope (2) by the pulleys (N) - a force (FO) that pushes the panel (A) against the fixed frame of the window (F), with consequent forced reinsertion of the pin (1) in the box-shaped body (C) where the pin (1) drives the plate (4) into rotation, thus being automatically hooked by the hook (4b).

[0050] Fig. 8 shows the closing phase, when the lever (7) is rotated and the spring (14) is compressed because the rope (2) is tensioned.

[0051] Fig. 8 also shows that during the backward rotation of the plate (4), under the thrust of the pin (1), the interference between the blade (8) and the cam (4e) ends when the hook (4b) of the plate (4) passes over the tooth (6a) of the catch (6), which is pushed by the return spring (12) and is engaged again with the appendix (4c) of the plate (4), which is therefore stopped with the pin (1) in hooked position, as shown in fig. 9.

[0052] In this position, the operator simply needs to release the rope (2) in such a way that the spring (14) brings the lever (7) back to idle position and the blade (8) with it, thus reinserting the peg (8a) inside the hole (6c) obtained on the catch (6), as soon as the peg (8a) and the hole (6c) are realigned one above the other, thus restoring the connection of the catch (6) with the lever (7), as shown in fig. 4A.

Claims

1. Device used to open and close Vasistas windows, of the type comprising a box-shaped body (C) that

houses a lock (S), a pin (1) interfaced with the lock (S) and a single rope (2) used to open the lock (S) and close the panel (A) of the window (F), in which the lock (S) comprises:

- a first pin (3) used to pivot an oscillating plate (4) provided with a hook (4b) and associated with a return spring (11);
 - a second pin (5) used to pivot a lever (7) associated with a return spring (14) and a catch (6) associated with a return spring (12) provided with a tooth (6a) designed to engage with a wing (4c) of the plate (4);
- device being **characterised in that**
- the lever (7) is coupled with a flexible blade (8) that ends with a shelf (8c) and provided with a lower connection peg (8a) inserted through a slot (7f) of the lever (7) and through a hole (6c) obtained on the catch (6);
 - the rope (2) moves through the support of the pin (1) and actuates the lever (7) directly;
 - the oscillating plate (4) is provided with a protruding cam (4e) that interferes with the shelf (8c) only at the end of the opening travel of the oscillating plate (4), determining the upward flexion of the shelf (8c) that makes the peg (8a) come out of the hole (6c) of the catch (6), eliminating the connection between the lever (7) and the catch (6);

2. Device used to open and close Vasistas windows as claimed in the above claim, **characterised in that** the blade (8) is composed of a rectilinear section (8b) that surmounts a lever (7) and a curved shelf (8c) that surmounts the oscillating plate (4), in which the rectilinear section (8b) is provided at the end with a hole for the rivet (15) used for fixing to the lever (7).
3. Device used to open and close Vasistas windows as claimed in one of the above claims, in which the interference between the blade (8) and the cam (4e) - during the backward rotation of the plate (4) under the thrust of the pin (1) - ends when the hook (4b) of the plate (4) passes over the tooth (6a) of the catch (6), which is pushed by the return spring (12) and is engaged again with the appendix (4c) of the plate (4), which is therefore stopped with the pin (1) hooked to the hook (4b).
4. Device used to open and close Vasistas windows as claimed in one of the above claims, in which the rope (2) makes the following travel:

- a first perfectly vertical section (T1) before the upright of the fixed frame of the window (F);
- a second horizontal section (T2) before the upper crosspiece (TF) of the fixed frame of the window (F);

- a third section (T3) between the box-shaped body (C) and the block (B) that supports the pin (1);
- a fourth, last section (T4) between the block (B) and the box-shaped body (C) with the fixing points of the end of the rope (2) that enters the box-shaped body (C) with the section (T2) and comes out with the section (T3).

5. Device used to open and close Vasistas windows as claimed in one of the above claims, **characterised in that** the box-shaped body (C) is composed of an upper half-shell (CS) and a lower half-shell (CI) with a central transversal notch (I) to let to let the pin (1), as well as all the housings for the various components that form the lock (S), including the pulleys (N) of the rope (2).

Patentansprüche

1. Vorrichtung zum Öffnen und Schließen von Klappfenstern, des Typs, der ein kastenförmiges Gehäuse (C), in dem ein Schloss (S) untergebracht ist, ein an das Schloss (S) gekoppelter Anschlagbolzen (1) und ein einzelnes Bedienungsseil (2) zum Öffnen des Schlosses (S) und Schließen des klappbaren Flügels (A) des Fensters (F) umfasst, wobei das Schloss Folgendes umfasst:

- einen ersten Stift (3) zur Drehung einer Schwingplatte (4), die einen Haken zum Einhängen (4b) aufweist und mit einer Rückholfeder (11) verbunden ist;
 - einen zweiten Stift (5) zur Drehung eines Hebels (7), der mit einer Rückholfeder (14) verbunden ist, und eine darunter liegende Haltenase (6), die mit einer Rückholfeder (12) verbunden ist und einen Haltezahn (6a) aufweist, der zum Eingreifen in einen Flügel (4c) der Platte (4) dient;
- wobei diese Vorrichtung **dadurch gekennzeichnet ist, dass**
- der Hebel (7) fest mit einer darüber befindlichen, flexiblen Klinge (8) verbunden ist, die in einer Konsole (8c) endet und an der Unterseite einen Verbindungsstift (8a) aufweist, der durch einen Schlitz (7f) des darunter befindlichen Hebels (7) und durch ein Loch (6c) gesteckt ist, das aus der Haltenase (6) herausgearbeitet ist;
 - das Bedienungsseil (2) über die Halterung des Stiftes (1) läuft und den Hebel (7) direkt betätigt;
 - die Schwingplatte (4) eine überstehende Nocke (4e) aufweist, die sich erst am Ende des Hubs zur Öffnung der Schwingplatte (4) mit der Konsole (8c) überschneidet und dadurch eine ausreichende Biegung der Konsole (8c) nach oben bewirkt, so dass der Stift (8a) aus seinem Loch

(6c) in der Nase (6) hervortritt und auf diese Weise die Verbindung zwischen dem Hebel (7) und der Nase (6) unterbrochen wird.

2. Vorrichtung zum Öffnen und Schließen von Klappfenstern gemäß dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** die Klinge (8) aus einem den Hebel (7) übersteigenden, geraden Abschnitt (8b) sowie aus einer gebogenen Konsole (8c) besteht, die die Schwingplatte (4) übersteigt, wobei der gerade Abschnitt (8b) an seinem Ende ein Loch für die Niete (15) zur Befestigung am darunter liegenden Hebel (7) aufweist.

3. Vorrichtung zum Öffnen und Schließen von Klappfenstern gemäß einem der vorstehenden Ansprüche, wobei die Überschneidung zwischen der Klinge (8) und der Nocke (4e) während der durch den Druck des Rückhaltebolzens (1) bewirkten Rückwärtsdrehung der Platte (4) in dem Moment unterbrochen wird, in dem der Haken zum Einhängen (4b) der Platte (4) den Zahn (6a) der Nase (6) überschreitet, die unter der Wirkung ihrer eigenen Rückholfeder (12) wieder in den Fortsatz (4c) der Platte (4) eingreift, die auf diese Weise mit dem Stift (1) arretiert wird, der in den Haken (4b) eingehängt ist.

4. Vorrichtung zum Öffnen und Schließen von Klappfenstern gemäß einem der vorstehenden Ansprüche, wobei das Bedienungsseil (2) folgende Strecke zurückgelegt:

- einen ersten Abschnitt (T1), der vollkommen vertikal ist und sich gegenüber einem Pfosten des festen Rahmens des Fensters (F) erstreckt;
- einen zweiten, horizontalen Abschnitt (T2), der sich gegenüber dem oberen Querbalken (TF) des festen Rahmens des Fensters (F) erstreckt;
- einen dritten Abschnitt (T3), der sich zwischen dem kastenförmigen Gehäuse (C) und dem Block (B) zur Halterung des Anschlagbolzens (1) erstreckt;
- einen vierten und letzten Abschnitt (T4), der sich zwischen dem Block (B) und dem kastenförmigen Gehäuse (C) erstreckt, wo die Stellen zur Befestigung des Anfangs des Seiles (2) vorgesehen sind, das mit seinem Abschnitt (T2) in das kastenförmige Gehäuse (C) eintritt und mit dem Abschnitt (T3) austritt.

5. Vorrichtung zum Öffnen und Schließen von Klappfenstern gemäß einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das kastenförmige Gehäuse (C) aus einer oberen Halbschale (CS) und einer unteren Halbschale (CI) besteht, wobei ein mittlerer Querschlitz (I) für den Eintritt und den Austritt des Bolzens (1) sowie alle Sitze für die verschiedenen Bauteile vorgesehen sind, aus denen

das Schloss (S) besteht, einschließlich der Umlenkrollen (N) des Bedienungsseiles (2).

Revendications

1. Dispositif pour l'ouverture et la fermeture de fenêtres à vasistas, du type comprenant un corps-boîtier (C), dans lequel une serrure (S) est logée, un pivot de butée (1), interfacé à la serrure (S) et une seule corde de commande (2) pour l'ouverture de la serrure (S) et pour la fermeture de la partie à abattant (A) de la fenêtre (F), où dite serrure (S) comprend:

- un premier pivot (3) pour le pivotement d'une plaque oscillante (4), qui présente un crochet d'accrochage (4b) et qui est associée à un ressort de rappel (11) ;
- un deuxième pivot (5) pour le pivotement d'un levier (7) qui est associé à un ressort de rappel (14) et à un sous-jacent cliquet de retenue (6), lui aussi associé à un ressort de rappel (12) et présentant une dent de retenue (6a) apte à s'embrayer avec une aile (4c) de la plaque (4) ;
- dispositif **caractérisé en ce que**
- le dit levier (7) est solidaire avec une lame flexible qui le surmonte (8), terminée par un rebord (8c) et qui présente inférieurement un pieu de liaison (8a), enfilé à travers une fente (7f) du sous-jacent levier (7) et à travers un trou (6c) réalisé sur le cliquet de retenue (6) ;
- la dite corde de commande (2) glisse à travers le support du dit pivot (1) et actionne directement le levier (7) ;
- la dite plaque oscillante (4) présente une came débordante (4e) qui interfère avec le dit rebord (8c) seulement en fin de course d'ouverture de la plaque oscillante (4), de manière à déterminer une flexion vers le haut du rebord même (8c), flexion suffisante à faire sortir le pieu (8a) du trou (6c) du cliquet (6), en interrompant ainsi la liaison entre le levier (7) et le cliquet (6).

2. Dispositif pour l'ouverture et la fermeture de fenêtres à vasistas selon la revendication précédente, **caractérisé en ce que** la dite lame (8) résulte composée d'un segment rectiligne (8b) qui surmonte le dit levier (7) et d'un rebord arqué (8c), qui surmonte la dite plaque oscillante (4), où dit segment rectiligne (8b) présente à ses extrémités un trou pour le rivet (15) de fixation du levier sous-jacent (7).

3. Dispositif pour l'ouverture et la fermeture de fenêtres à vasistas selon l'une des revendications précédentes, où l'interférence entre la dite lame (8) et la came (4e) - pendant la rotation inverse de la plaque (4), sous la poussée du pivot de retenue (1) - ne se réalise plus lorsque le crochet d'accrochage (4b) de la

plaque (4) dépasse la dent (6a) du cliquet (6), qui est à son tour poussé par son ressort de rappel (12) et revient s'embrayer avec l'appendice (4c) de la plaque (4), qui est ainsi arrêtée avec le pivot (1) accroché dans le crochet (4b).

4. Dispositif pour l'ouverture et la fermeture de fenêtres à vasistas selon l'une des revendications précédentes, où la corde de commande (2) suit un parcours où l'on peut identifier :

- un premier segment (T1) parfaitement vertical avant le montant du cadre fixe de la fenêtre (F) ;
- un deuxième segment (T2), horizontal, avant la traverse supérieure (TF) du cadre fixe de la fenêtre (F) ;
- un troisième segment (T3) qui se déploie entre le corps-boîtier (C) et le bloc (B) de support du pivot de butée (1) ;
- un quatrième et dernier segment (T4) qui se déploie entre le dit bloc (B) et le corps-boîtier (C) sur lequel sont prévus les points de fixation de l'extrémité de la corde (2), qui entre dans le corps-boîtier (C) avec son segment (T2) et en sort avec le segment (T3).

5. Dispositif pour l'ouverture et la fermeture de fenêtres à vasistas selon l'une des revendications précédentes, **caractérisé en ce que** le dit corps-boîtier (C) est composé d'une semi-coque supérieure (CS) et d'une semi-coque inférieure (CI), prévoyant une entaille transversale médiane (I) pour l'entrée et la sortie du pivot (1), ainsi que tous les logements des divers composants qui concourent à la formation de la serrure (S), y comprises les courroies de renvoi (N) de la corde de commande (2).

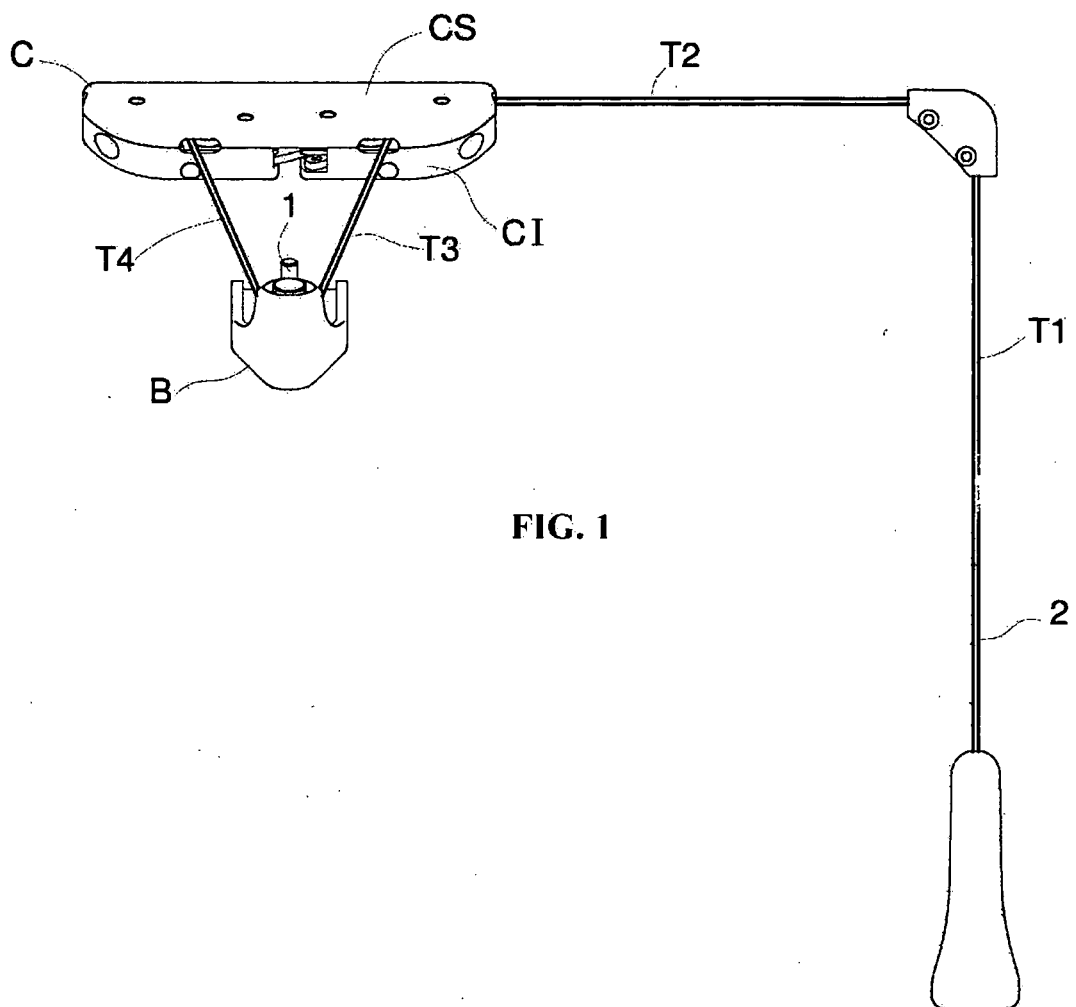


FIG. 1

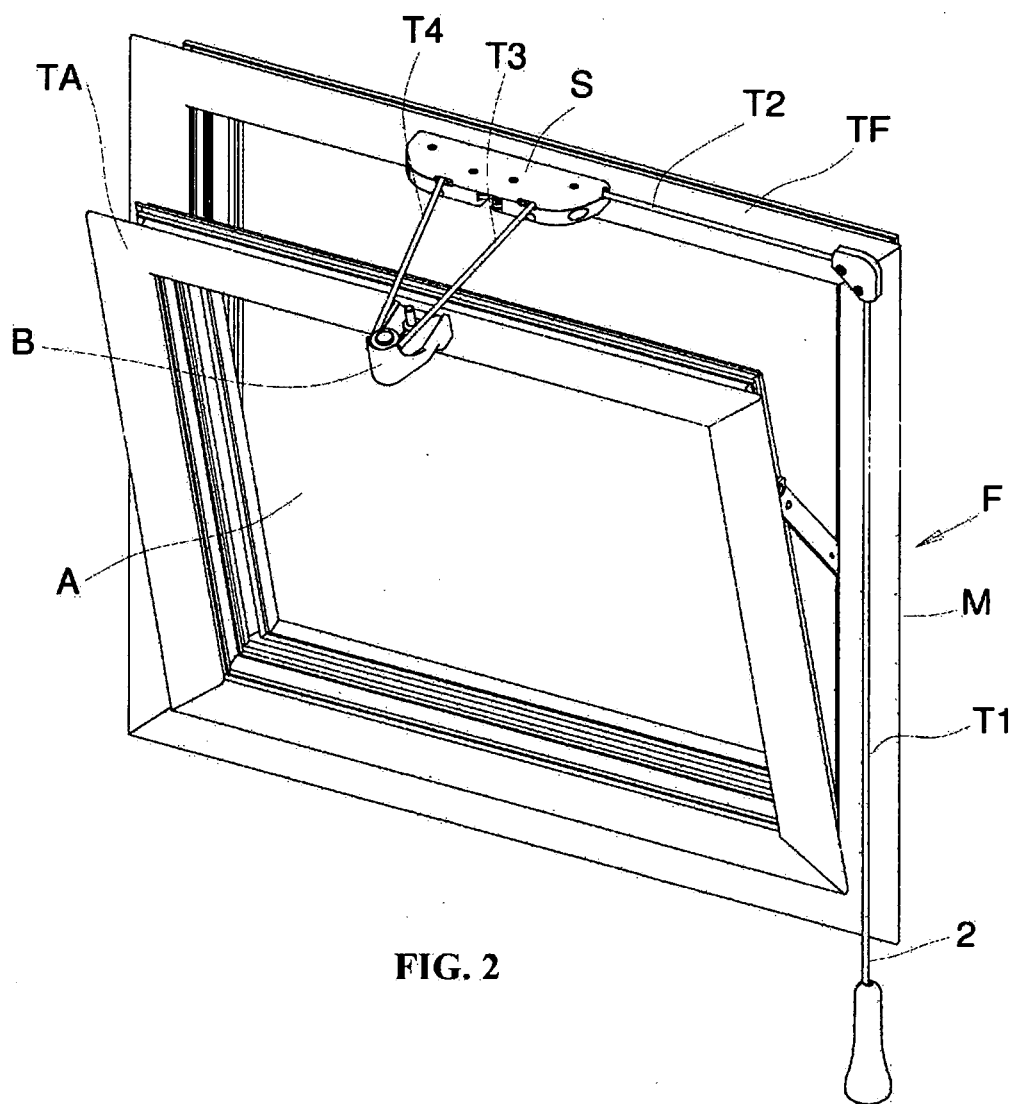
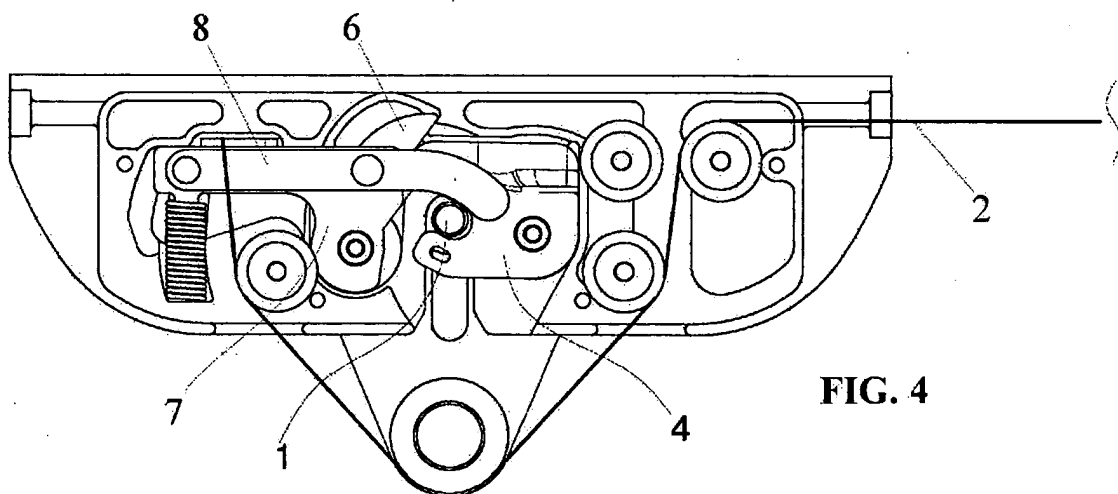
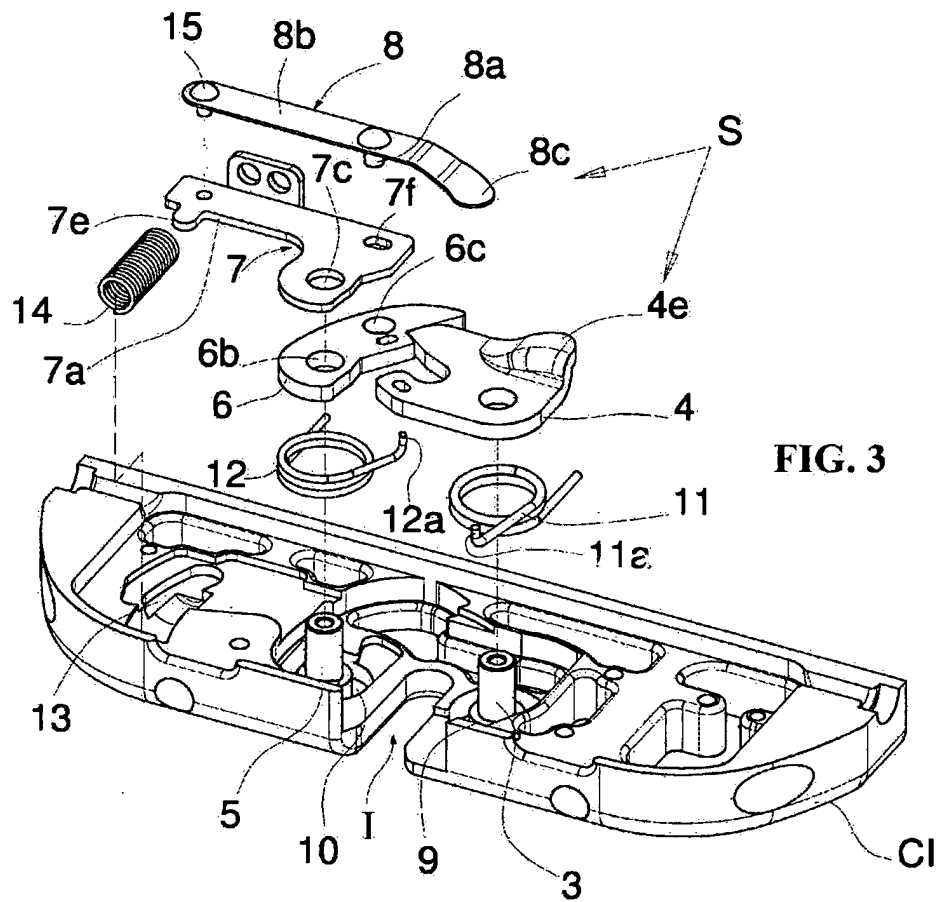
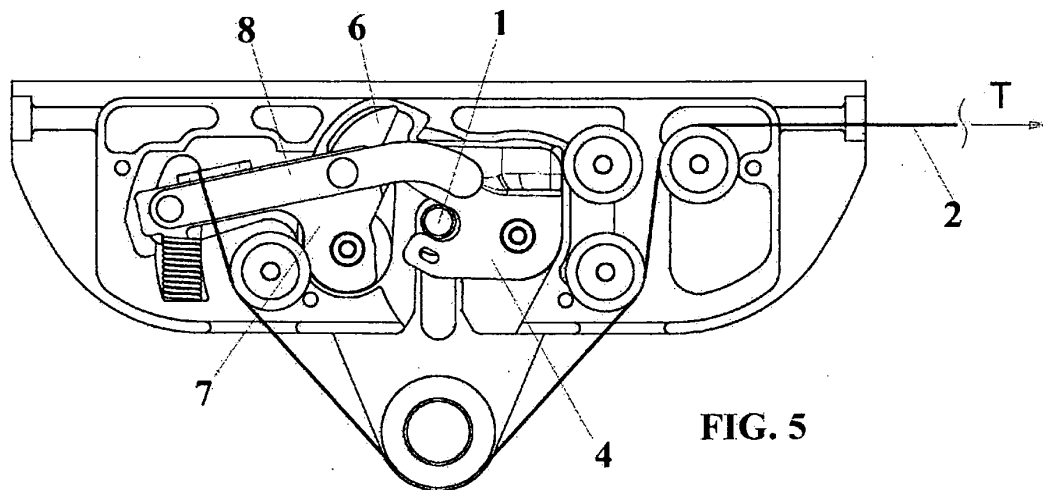
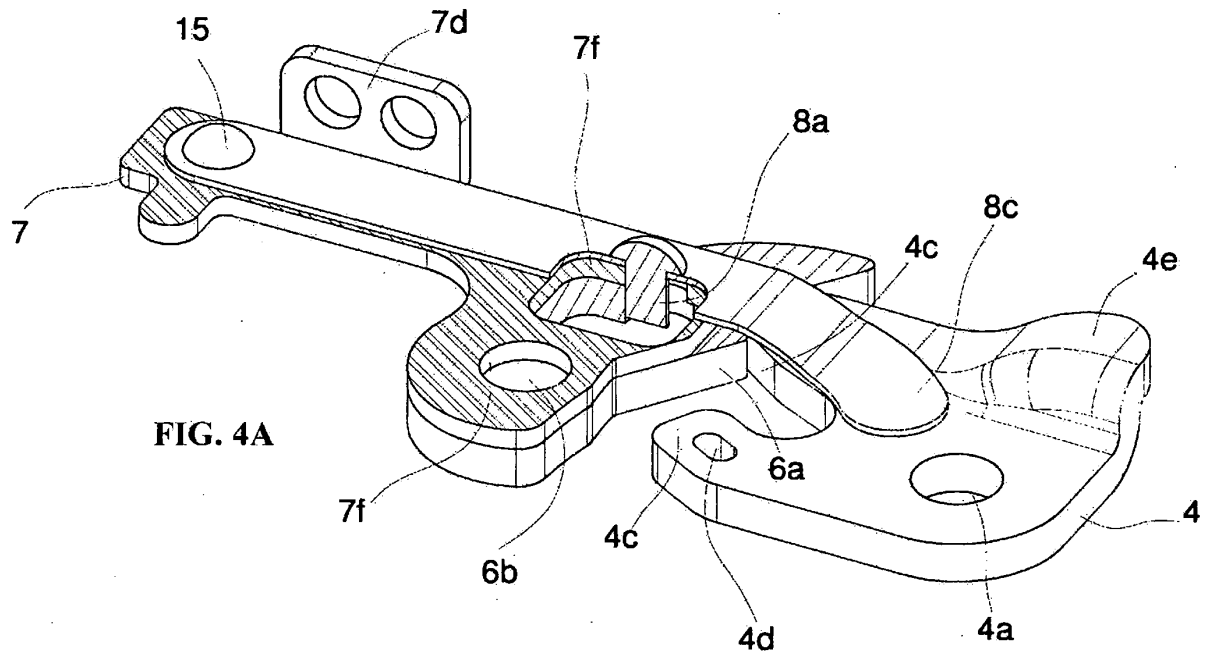
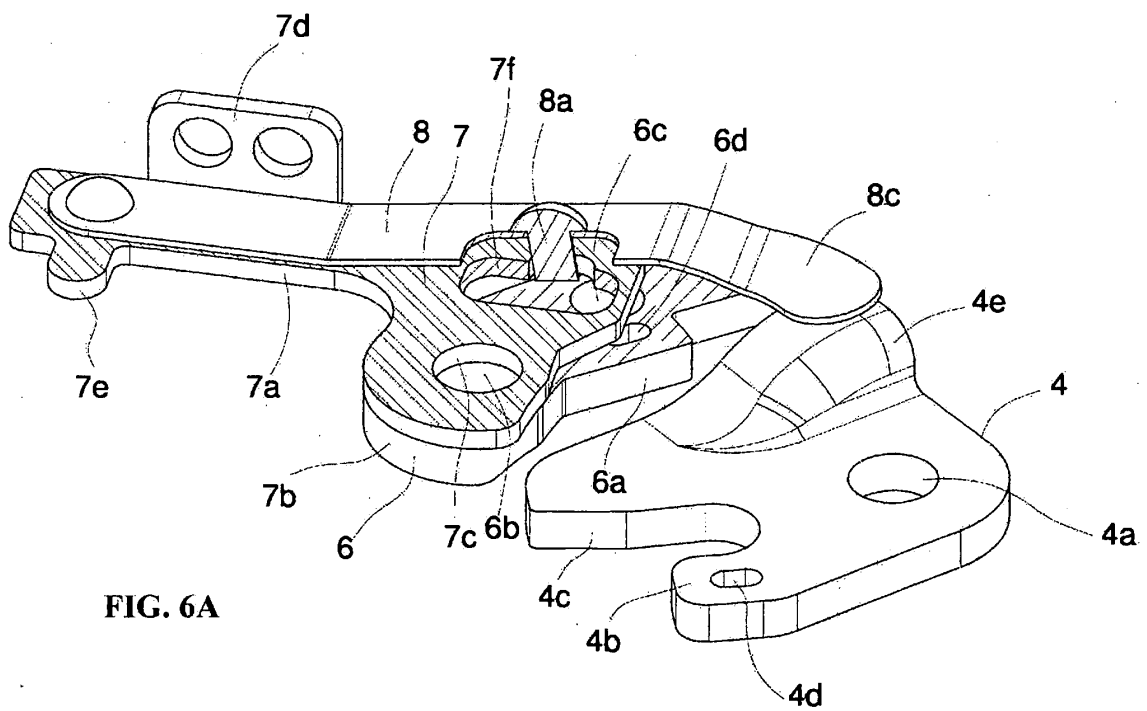
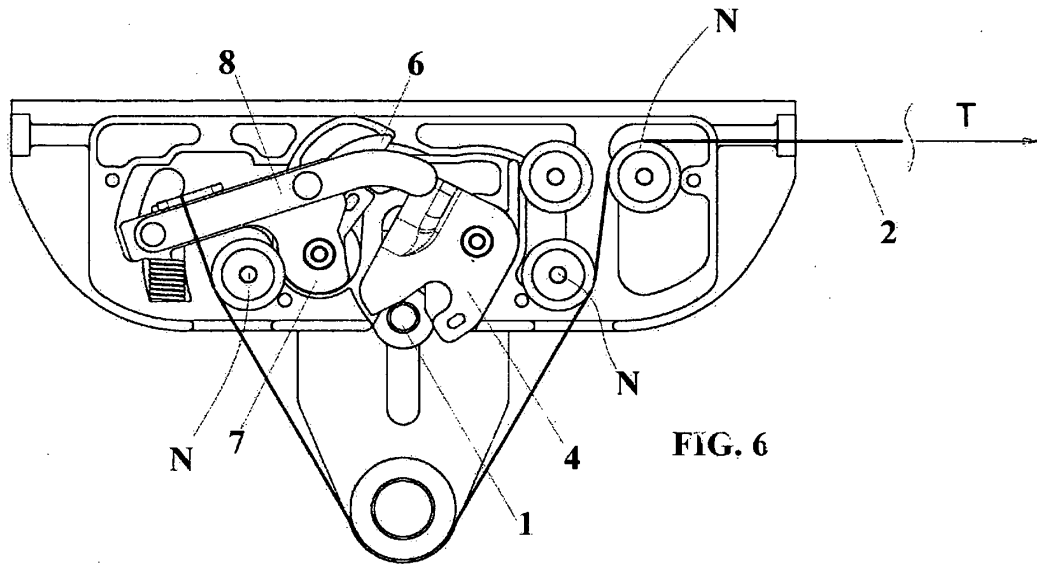
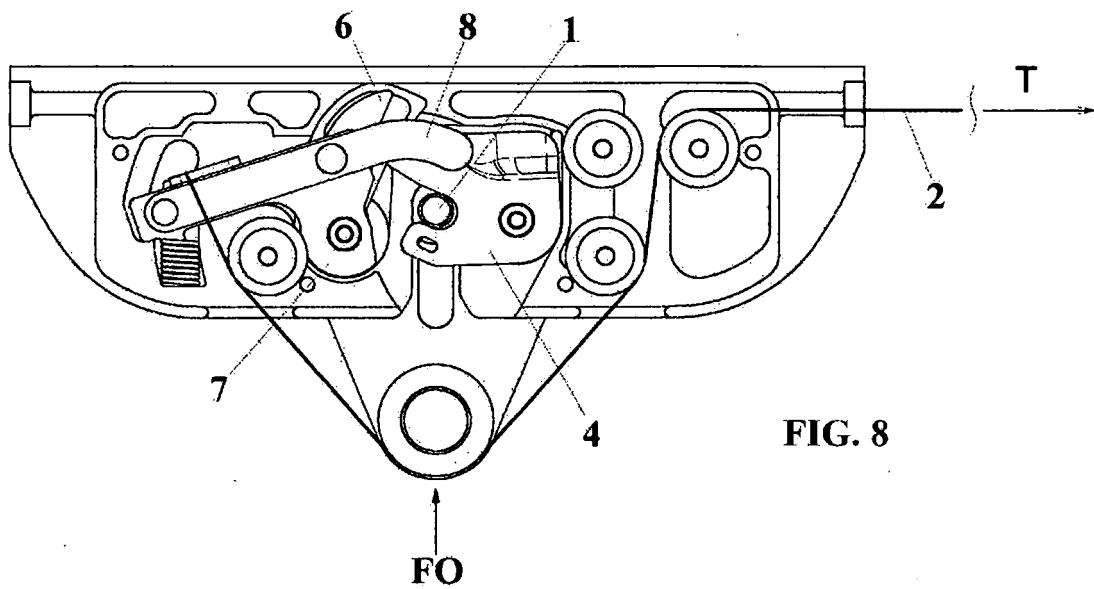
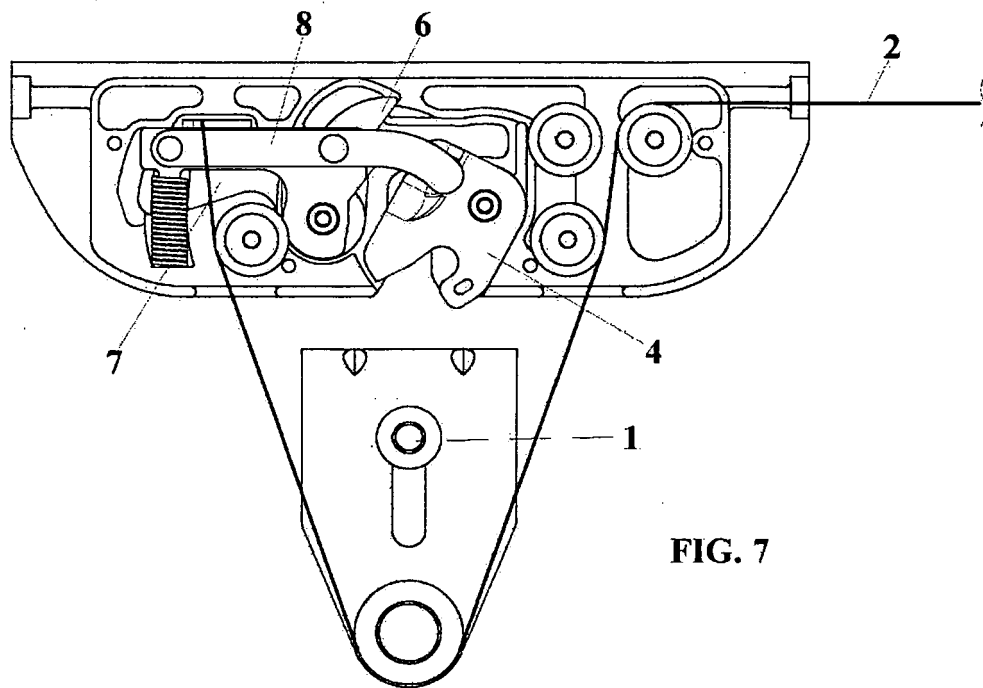


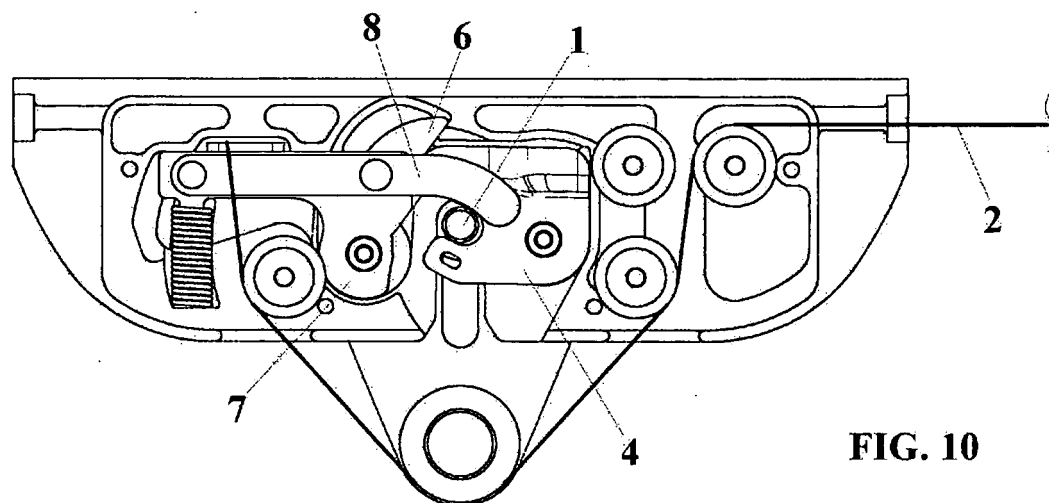
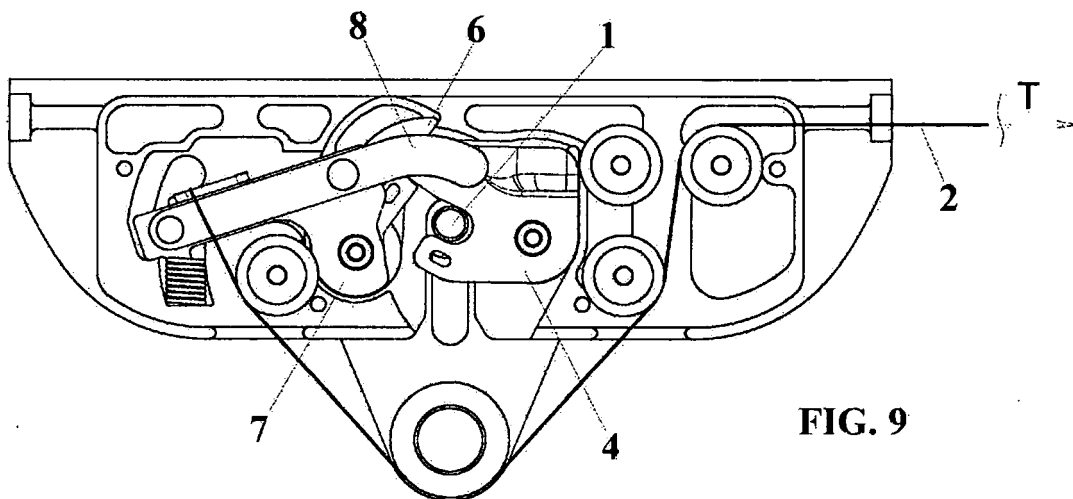
FIG. 2











REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 2668532 A [0001]