



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.09.2008 Bulletin 2008/39

(51) Int Cl.:
E05C 17/32 (2006.01) E05F 1/10 (2006.01)

(21) Application number: **08102268.3**

(22) Date of filing: **04.03.2008**

(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

(72) Inventor: **Cirilli, Alessandro**
60035 Jesi (AN) (IT)

(74) Representative: **Baldi, Claudio**
Ing. Claudio Baldi s.r.l.
Viale Cavallotti 13
P.O. Box 187
60035 Jesi (Ancona) (IT)

(30) Priority: **20.03.2007 IT MC20070056**

(71) Applicant: **Cirilli, Alessandro**
60035 Jesi (AN) (IT)

(54) **Mechanism for starting and absorbing the opening travel of bottom-hung windows**

(57) The present invention relates to a mechanism designed to start and absorb the opening travel of vasis-tas windows, which comprises a first lever (1) and a second lever (2), hinged compass-like and subjected to the action of a return spring (6,60) that tends to close the said levers one against the other, being respectively provided at the free ends (1 band 2b) with fixing means (3) for the upright (MT) of the window frame (T) and sliding fixing means (4) inside the channel (C) obtained on the upright (MA) of the window (A).

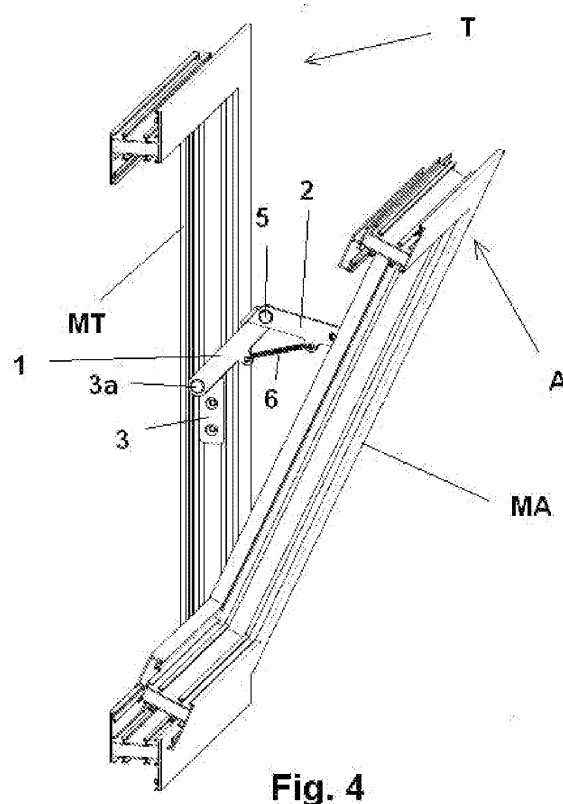


Fig. 4

Description

[0001] The present patent application for industrial invention relates to a mechanism designed to start and absorb the opening travel of vasistas windows.

[0002] Although different typologies of vasistas windows are currently known, the present description refers to windows that can only be opened according to the vasistas system.

[0003] This special category of windows includes different types of opening and closing devices, which are in most cases installed together with a stop mechanism of the window at the end of the opening travel.

[0004] The said stop mechanism allows to adjust the maximum opening angle of the window.

[0005] The most common stop means consists in a connecting rod that is pivoted at the lower end to one of the lateral uprights of the window, while the other end is fixed in an articulated way to a sliding plate hooked to the upright of the window frame.

[0006] The sections used for the frames are externally provided with at least one longitudinal channel that is used as guide track for the cursor applied at the upper end of the connecting rod.

[0007] The connecting rod is composed of a strip with suitable thickness to be housed - when the window is closed - inside the window frame, and more exactly between the window upright and the upright of the window frame.

[0008] When the window is closed, the strip is in vertical position and the cursor is positioned at the upper dead point; on the contrary, when the window is opened, the cursor tends to move down spontaneously until it reaches its natural lower dead point, where the connecting rod is in perfectly horizontal position.

[0009] Once this position is reached, the closing of the window is not possible. In fact, in spite of the force exerted to push the window, the cursor is prevented from starting an ascending travel, because of the perfectly horizontal force discharged by the connecting rod, which is unable to start the ascending travel of the cursor.

[0010] In order to eliminate the said inconvenience, a plate is usually fixed along the guide track to act as stop for the descending travel of the cursor; evidently, the fixing height of the stop plate is such that, when the window has reached the maximum opening angle, the connecting rod is not yet in horizontal or almost horizontal position.

[0011] Moreover, by adjusting the fixing height of the stop plate along the upright of the frame, the maximum overturning angle of the window can be fixed as desired.

[0012] The purpose of the present invention is to find a solution to the two aforementioned inconveniences of devices of known type used to open and close vasistas windows and devise a mechanism associated with them used to adjust the maximum opening angle of the window.

[0013] The first inconvenience consists in the sudden impact and counterblow suffered by the window at the

end of the opening travel, because the said travel is in free descent due to gravity and is interrupted suddenly when the cursor applied at the upper end of the connecting rod interferes with the stop plate.

[0014] The second inconvenience is represented by the fact that the window gets sometimes stuck in closing position in spite of the fact that the lock is actuated in opening direction.

[0015] Evidently, the overturning of the window for opening purposes requires a small initial push so that the barycentre of the window is moved away from the vertical plane passing through the horizontal rotational axis of the window, in such a way to originate a natural progressive overturning momentum given by the weight of the window when eccentric with respect to the rotational axis.

[0016] When the window is opened, the said initial push is traditionally given by a return spring installed in the lock and designed to cause the forward movement of the oscillating hook that seizes the window as soon as the retention catch that interferes with the oscillating hook is released.

[0017] Evidently, the return spring could be strengthened to increase the initial push. However, such a solution would make the closing movement more difficult, because a stronger force would be necessary to rearm the oscillating hook subjected to the return action of the spring.

[0018] The observation of these two types of inconveniences has resulted in the present invention, which is aimed at designing a new stop mechanism for the opening movement of vasistas windows, which is able to absorb and start the overturning travel of the opening window.

[0019] More precisely, the purpose of the present invention is to devise a mechanism completely separate and independent from the lock able to provide the initial push of the closed window in the opening direction, in such a way that the window is moved away from the window frame as soon as the lock of the window is actuated for opening.

[0020] A further purpose of the invention is to devise a mechanism able to absorb the stop movement of the window at the end of the opening travel, in order to avoid the deleterious counterblow and stress generated by the current stop mechanisms.

[0021] Not least, another purpose of the present invention is to devise a mechanism designed to start and absorb the opening of vasistas windows that, in addition to have the aforementioned characteristics, is suitable to be installed between the window and the window frame, thus being completely hidden when the window is closed.

[0022] These and other purposes have been achieved by the mechanism of the invention, whose main characteristics are illustrated in the first claim.

[0023] The mechanism of the invention is made of a pair of levers hinged compass-like, with the first lever being provided at the free end with fixing means for the upright of the window frame, and the second lever being

provided at the free end with means able to be hooked and slide inside a channel obtained on the upright of the window frame.

[0024] The levers are connected by means of a pivoting pin and are constantly subjected to the return force exerted by a spring that tends to close them one against the other.

[0025] The said mechanism is installed in the window by stopping the fixing means of the first lever at one of the lateral uprights of the window frame and inserting the sliding means of the second lever inside the channel of the lateral upright of the window.

[0026] When the window is closed, the mechanism of the invention is completely contained between the upright of the window frame and the upright of the window, with the two levers in maximum divaricated position, being practically aligned in vertical direction, one on the extension of the other, with the return spring in maximum load position.

[0027] As soon as the lock of the window frame is opened, the two levers start rotating one against the other with respect to the pivoting pin under the action of the return spring that tends to close them, one on top of the other.

[0028] Because of the return spring, the mechanism of the invention provides the window with the starting energy necessary for initial opening.

[0029] In order to obstacle the mutual rotation of the levers beyond a certain limit, one of the levers is provided with a tooth able to interfere with the other lever.

[0030] More precisely, the first lever is provided near the pivoting pin with a transversal wing designed to interfere with the shaped border of the end of the second lever, in such a way to prevent the second lever from rotating with respect to the first beyond a predefined semi-closing angle.

[0031] When the said angle is reached, the return spring is discharged and the window is in maximum opening position.

[0032] The mechanism of the invention is designed to cooperate with the traditional stop plate fixed along the upright where the cursor slides that guarantees the desired maximum opening angle of the window, in which the return spring is discharged or basically discharged.

[0033] Because of the spring, the window is no longer stopped in maximum opening position with an abrupt movement, since the two levers are free to divaricate beyond the angle that they should assume when the window has reached the predefined maximum opening angle.

[0034] In practical terms, when the cursor of the second lever touches the stop plate at the end of the descending travel - thus stopping the second lever joined to - the window continues the opening overturning travel because of the extra-divarication of the first lever compared to the second one, which is momentarily stopped, thus rearming the return spring.

[0035] In other words, the window can suffer an extra

overturning travel beyond the predefined maximum opening angle; however, the extra travel occurs under the braking absorbing action of the spring that forces the window to go back and stop in an inclined position that exactly corresponds to the predefined maximum opening angle.

[0036] For major clarity, the description of the mechanism according to the invention continues with reference to the enclosed drawings, which only have an illustrative, not limitative value, whereby:

- figure 1 is an exploded axonometric view of the device of the invention;
- figure 2 is an axonometric view of the device of the invention;
- figure 3 is a plan view of the invention seen from the opposite side of figure 2;
- figure 4 is a view of the device of the invention installed in a vasistas window with the window in maximum opening position, seen from an angle that shows the internal side of the window frame;
- figure 5 is a view of the device of the invention installed in a vasistas window with the window in maximum opening position, seen from an angle that shows the external side of one of the window uprights;
- figure 6 shows the configuration of the mechanism of the invention when the window is closed; in this figure the mechanism is seen from a perpendicular direction to the internal side of one of the two uprights of the window frame;
- figure 7 shows the configuration of the mechanism of the invention when the window is closed; in this figure the mechanism is seen from a perpendicular direction to the external side of one of the two uprights of the window;
- figure 8 is an axonometric view of the device of the invention according to a second constructive embodiment;
- figure 9 shows the device of fig. 8 installed in a vasistas window in maximum opening position;
- figure 10 is a sectional view of one of the sections used to obtain both the window frame and the window frame.

[0037] With reference to figure 1, the device of the invention is composed of a first lever (1) and a second lever (2), hinged compass-like at one end (1a and 2a), while the other end (1 b and 2b) is provided with fixing means (3) for the upright (MT) of the window frame (T) and fixing means (4) that slide in the channel (C) obtained on the upright (MA) of the window (A).

[0038] The levers (1 and 2) are connected by means of a pivoting pin (5) and are subjected to the action of a return spring (6) that tends to close them one on top of the other.

[0039] According to a preferred embodiment of the mechanism of the invention, the levers (1 and 2) are pro-

vided with central holes (1 c and 2c) to fix the two hooked ends (6a) of the return spring (6), with cylindrical helical configuration.

[0040] The first lever (1) is provided at the end (1 a) with a transversal wing (1 d) designed to interfere with the shaped border (2d) of the end (2a) of the second lever (2), in such a way to prevent the second lever (2) from rotating with respect to the first lever (1) beyond a predefined semi-closing angle (α), as shown in figures 2 and 3.

[0041] The fixing means (3) for the upright (MT) of the window frame (T) consist in a stop plate (3) pivoted by means of a pin (3a) to the first lever (1).

[0042] The plate (3) is provided with holes (3b) for the screws used to fix it to the upright (MT) of the window frame (T), as shown in fig. 4.

[0043] The sliding fixing means (4) consist in a pin (4) with enlarged head (4a), with the stem (4b) inserted with possibility of rotation inside a hole (2e) obtained at the end (2b) of the second lever (2).

[0044] As shown in fig. 10, the channel (C) has a T-shaped section that comprises a mouth (C1) and a sliding track (C2), it being provided that the pin (4) is suitably dimensioned for the stem (4b) to slide exactly inside the said mouth (C1), while the enlarged head (4a) exactly slides inside the track (C2).

[0045] In order to be inserted in the track (C2), the enlarged head (4a) is provided with a pair of lateral facets with parallel direction (4c) at a distance slightly lower than the width of the mouth (C1).

[0046] The pin (4) is driven into rotation with respect to the second lever (2) by means of a plate-like crank (7) provided at the free end (7a) with a tooth (7b) facing the lever (2) that is contained in a housing (2f) suitably obtained in the lever (2).

[0047] The installation of the mechanism of the invention requires to fix the plate (3) to the upright (MT) of the frame (T) and insert the head (4a) of the pin (4) inside the sliding channel (C) of the upright (MA) of the window (A).

[0048] To complete the latter operation, the plate-like crank (7) is lifted to make the tooth (7b) come out of the housing (2f), thus allowing to rotate the crank (7) until the enlarged head (4a) is positioned with the two facets (4c) in parallel position to the borders of the mouth (C1) of the channel (C), in such a way to insert the head (4a).

[0049] Once this position is reached, the plate-like crank (7) is rotated to fit the head (4a) into the track (C2) because of the fact that the lateral facets (4c) are given an inclined position with respect to the longitudinal borders of the mouth (C1), as shown in figure 10.

[0050] Now the crank (7) is engaged again and blocked against the lever (2).

[0051] Figures 8 and 9 illustrate an alternative constructive version of the mechanism of the invention, which differs from the previous one only in that it is provided with a torsional return spring (60), whose central "curl" is inserted into the pivoting pin (5), while the two

divaricable "claws" (61) are respectively hooked to the first (1) and the second (2) lever.

[0052] In the foregoing description the installation of the mechanism of the invention is such that the fixing means (3) are stopped on the upright (MT) of the window frame (T), while the sliding fixing means (4) are engaged inside a channel (C) of the upright (MA) of the window (A). Nevertheless, the same fixing means (3) can be installed in the upright (MA) of the window (A) and the sliding fixing means (4) can be installed inside a channel (C) obtained on the upright (MT) of the window frame (T), without altering or impairing the efficiency of the mechanism.

Claims

1. Mechanism designed to start and absorb the opening travel of vasistas windows, of the type comprising a first lever (1) and a second lever (2), hinged compass-like at one end (1 a and 2a), while the other end (1 b and 2b) is provided with fixing means (3) for the upright (MA) of the window (A) or the upright (MT) of the window frame (T) and sliding fixing means (4) inside the channel (C) obtained in the upright (MT) of the window frame (T) or in a channel obtained on the upright (MA) of the window frame (A), mechanism being **characterised in that** the levers (1 and 2) are subjected to the action of a return spring (6, 60) that tends to close them one on top of the other.
2. Mechanism as claimed in the above claim, **characterised in that** the levers (1 and 2) are provided with central holes (1 c and 2c) to fix the two hooked ends (6a) of the return spring (6) with cylindrical helical configuration.
3. Mechanism as claimed in claim 1, **characterised in that** the return spring (60) is a torsional spring and has the central "curl" inserted into the pivoting pin (5), while the two divaricable "claws" (61) are respectively hooked to the first (1) and the second (2) lever.
4. Mechanism as claimed in one of the above claims, **characterised in that** the first lever (1) is provided at the end (1a) with a transversal wing (1d) designed to interfere with the shaped border (2d) of the end (2a) of the second lever (2), in such a way to prevent the second lever (2) from rotating with respect to the first lever (1) beyond a predefined semi-closing angle (α).
5. Mechanism as claimed in any of the above claims, **characterised in that** the fixing means (3) consist in a stop plate (3) pivoted to the first lever (1) by means of a pin (3a) and provided with holes (3b) for the fixing screws.

6. Mechanism as claimed in any of the above claims, **characterised in that** the sliding fixing means (4) consist in a pin (4) with enlarged head (4a) and stem (4b) inserted with possibility of rotation inside a hole (2e) obtained at the end (2b) of the second lever (2); it being also provided that the enlarged head (4a) has a pair of lateral facets with parallel direction (4c) at a distance slightly lower than the width of the mouth (C1).
7. Mechanism as claimed in the above claim, **characterised in that** the pin (4) is fitted to a plate-like crank (7) provided at the free end (7a) with a tooth (7b) facing the lever (2) that is contained in a housing (2f) suitably obtained in the lever (2).

5

10

15

20

25

30

35

40

45

50

55

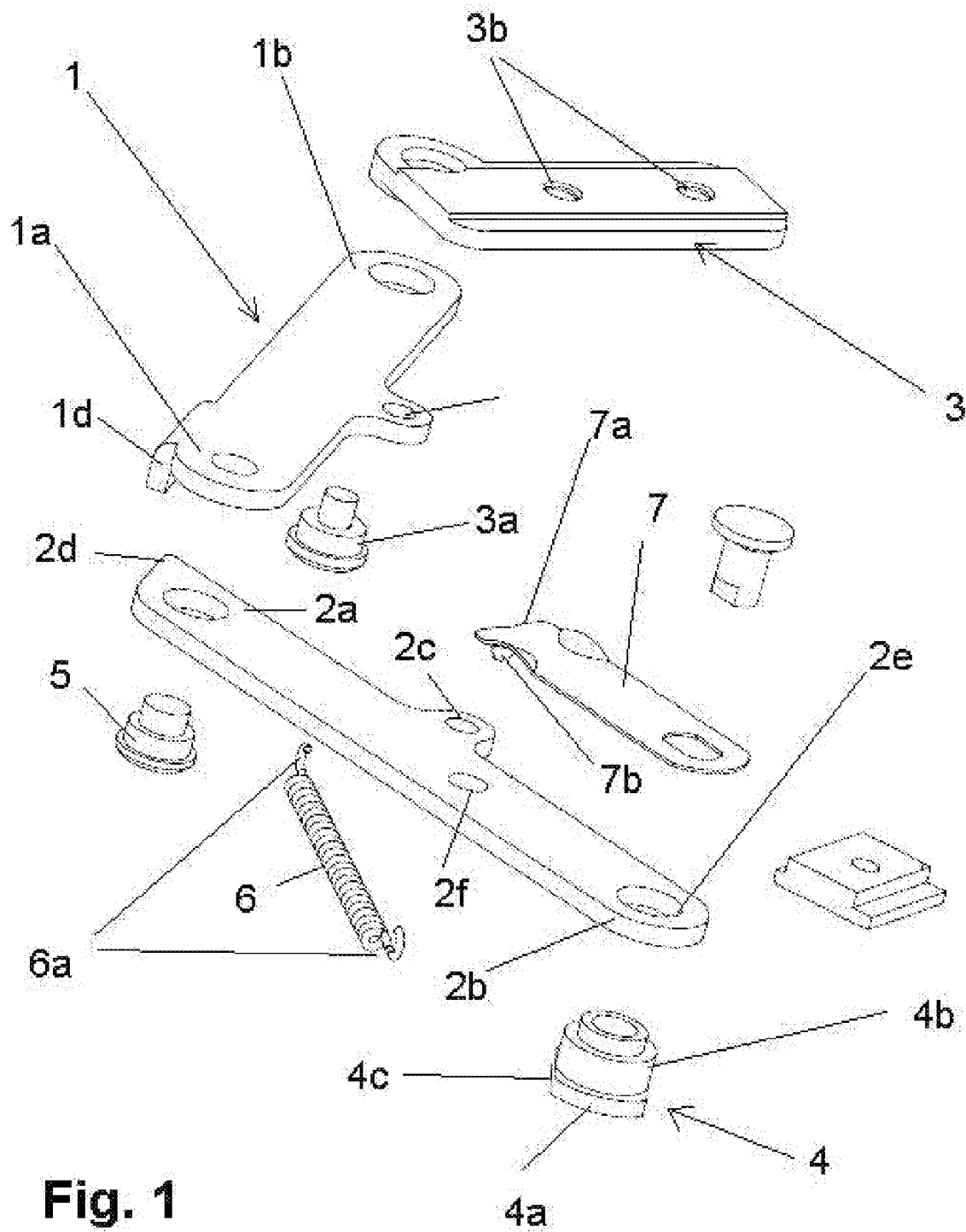
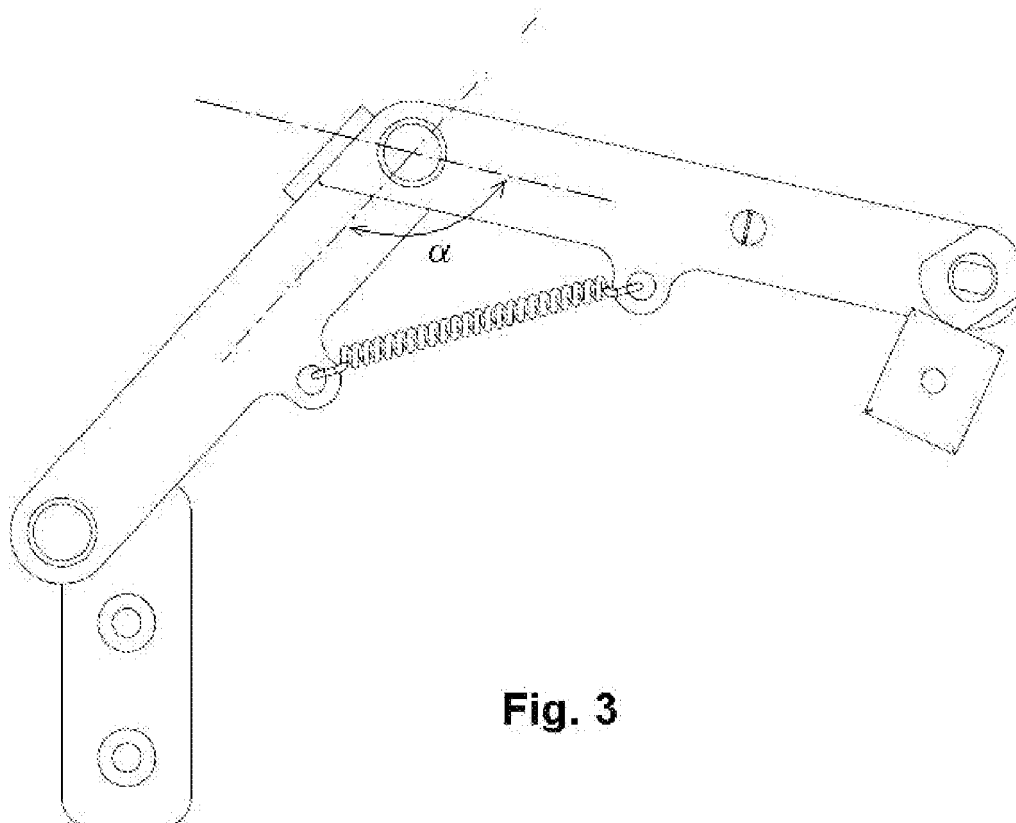
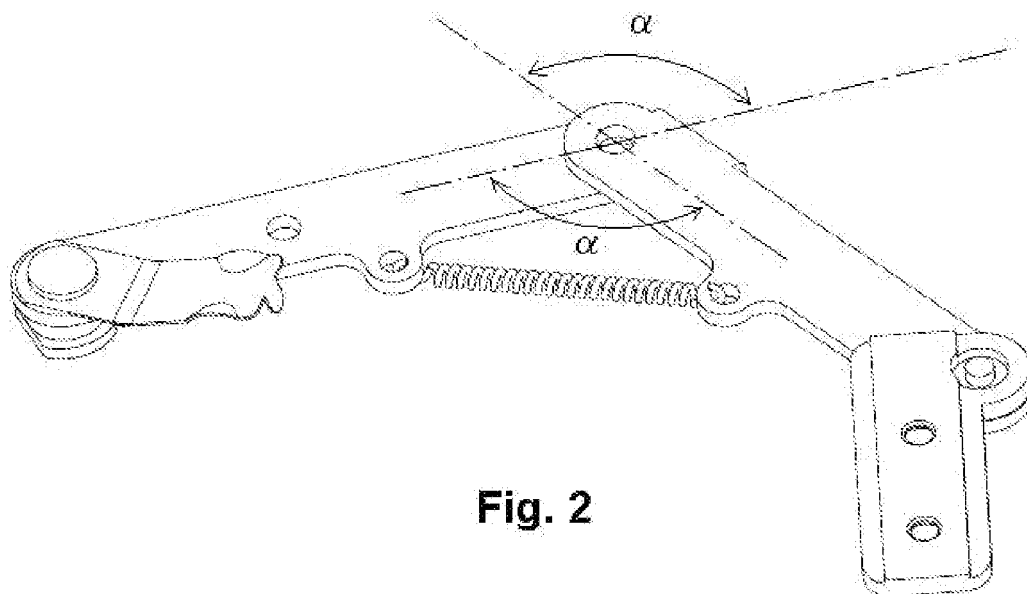
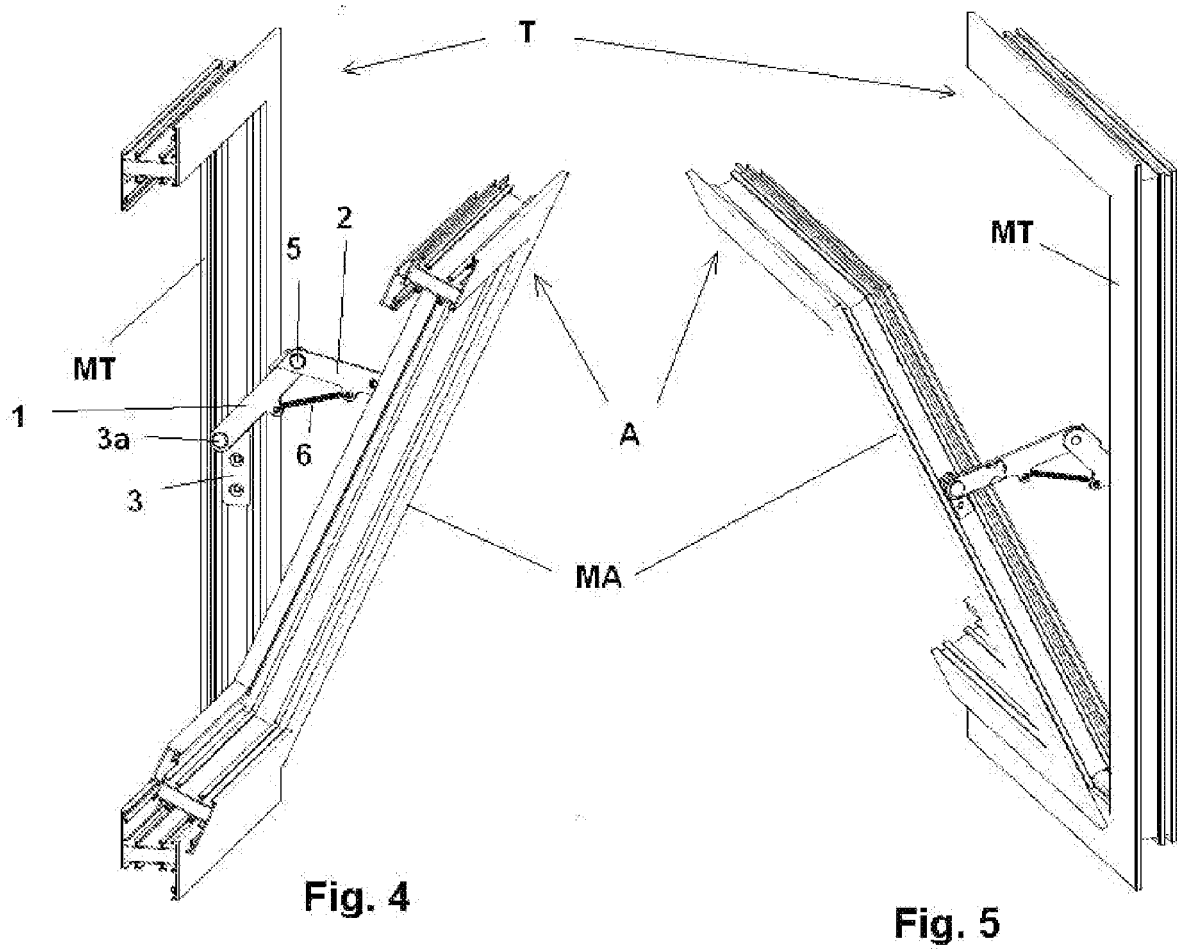


Fig. 1





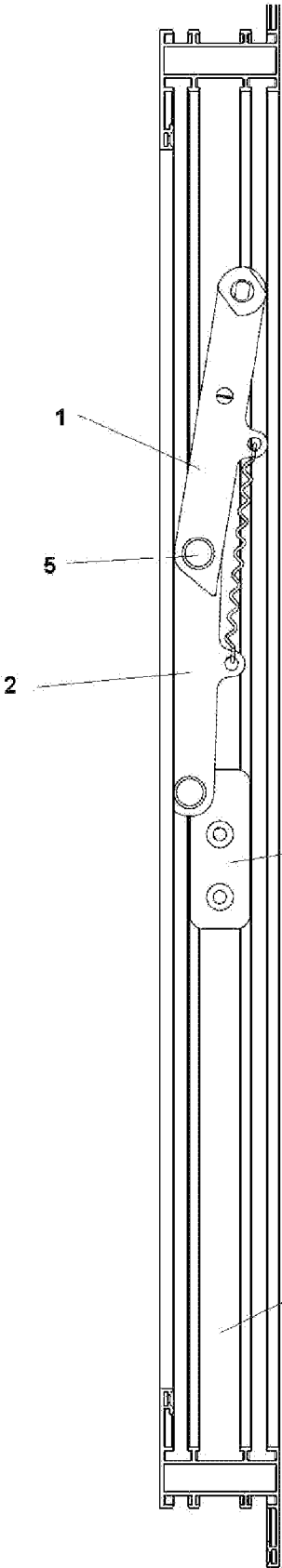


Fig. 6

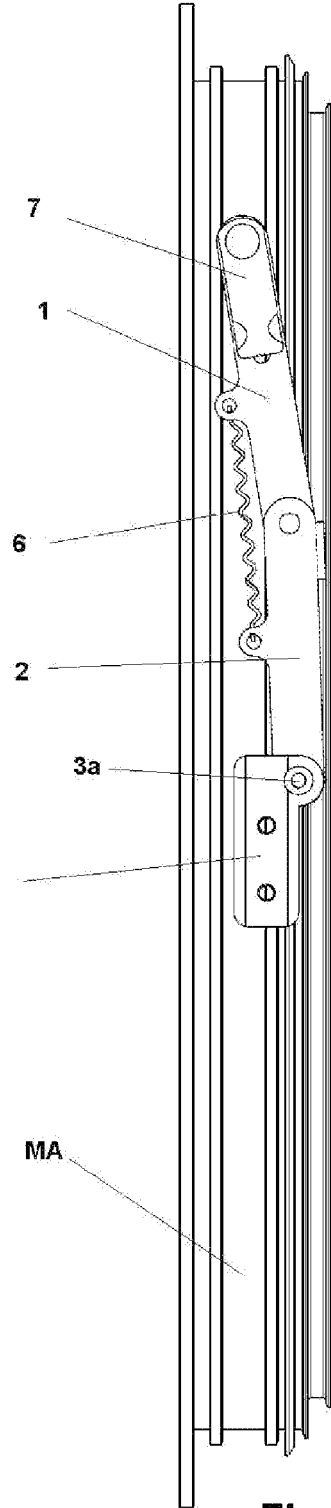


Fig. 7

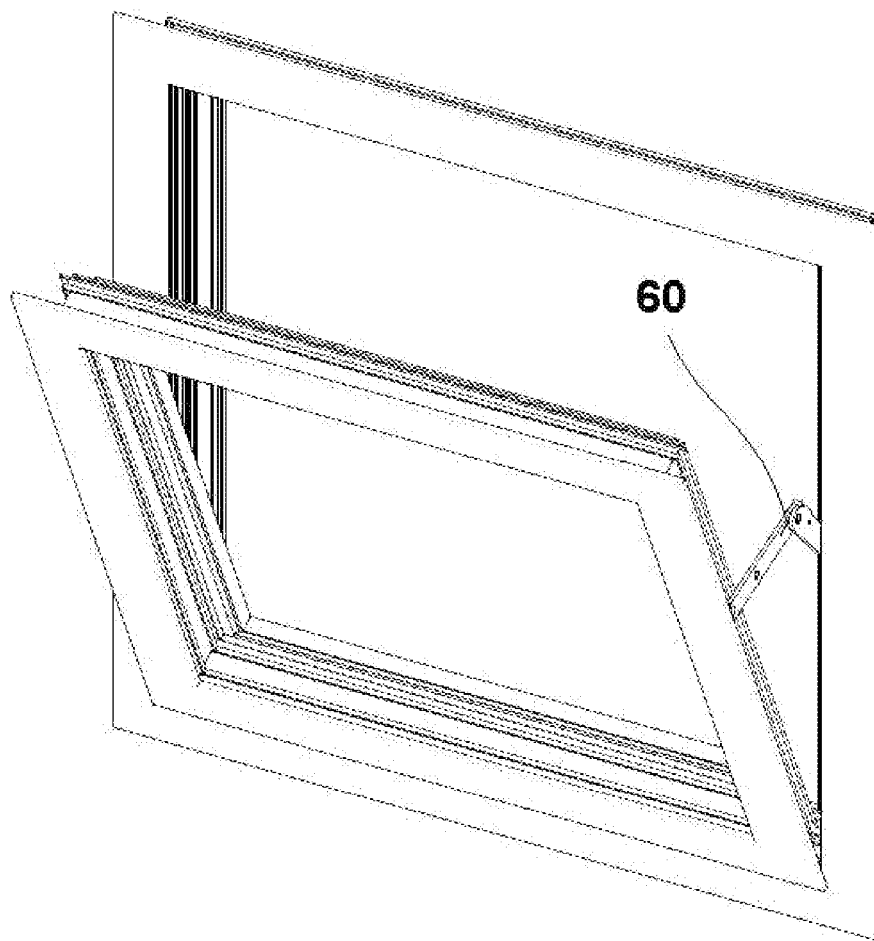
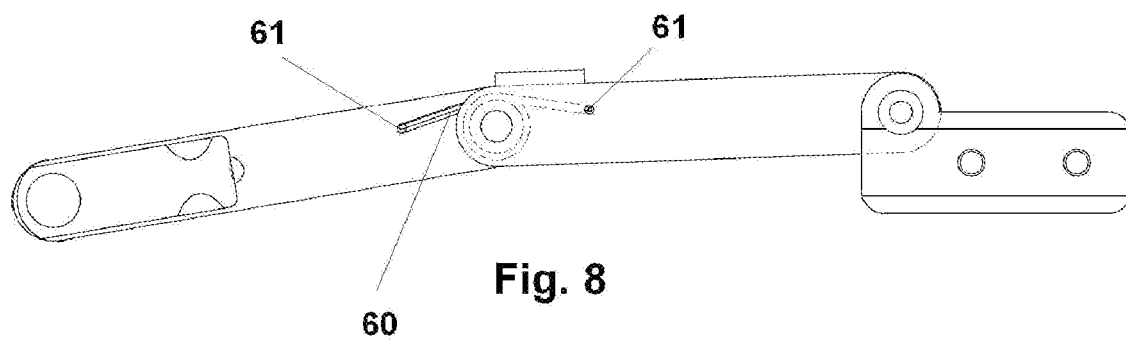


Fig. 9

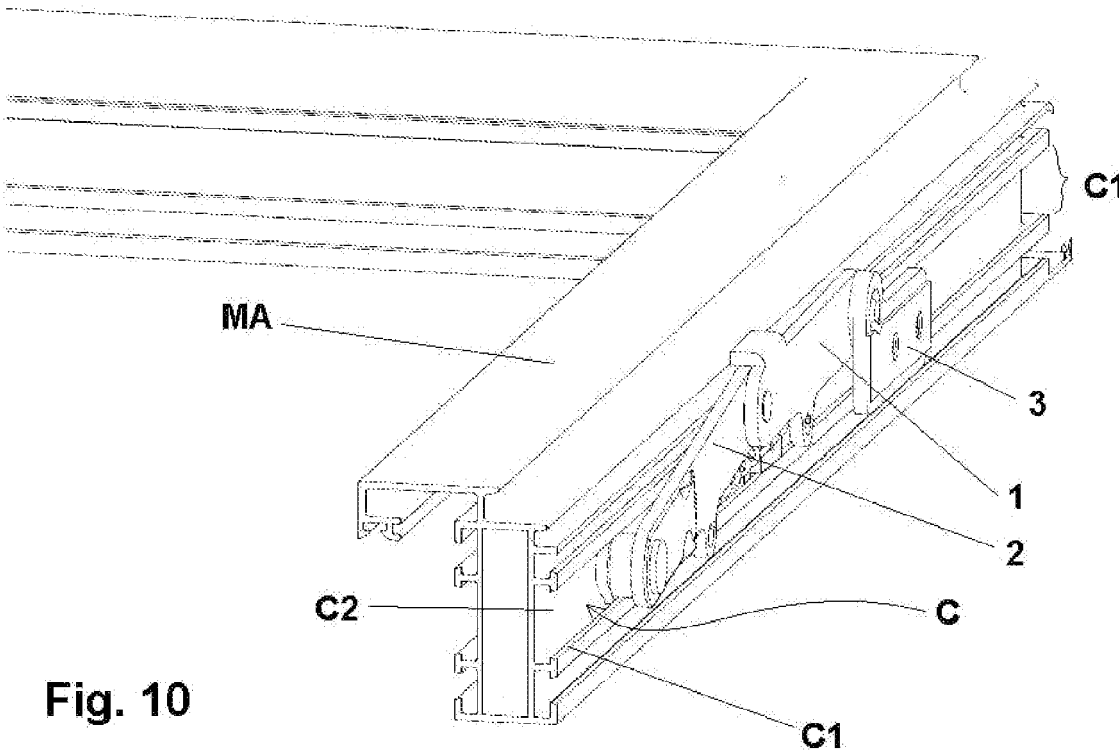


Fig. 10