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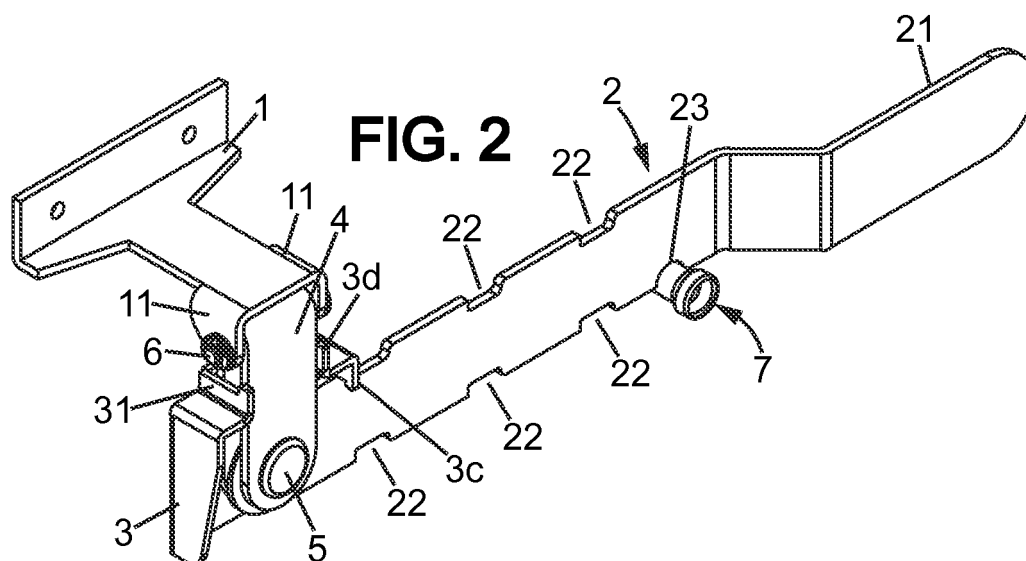
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(54) **Locking stay device for windows**

(57) Locking stay device for connecting inside and outside window sashes (101, 100) of a window, comprising:
- a base (1) having one end connected with the outside window sash and another end arranged with a connector

which can pivot in relation to said base;
- a bar shaped locking element (2) whose sides have notches along its length, and whose head is pivotally connected with said connector;
- a support (4) connected with said inside window sash, having stops for said notches of the locking element.



Description

Field of invention

[0001] The present invention relates to a locking stay device used between an inside window frame and an outside window sash, in particular, a window locking stay device adapted for adjusting the opening of a vent.

Background of invention

[0002] In the prior art, a window contains an inside window frame and an outside window sash, wherein the inside window frame is mounted on the wall or the roof, while one end of the outside window sash is pivotally connected with the inside window frame, the other end can be opened or closed by a locking stay device. Usually, the locking stay device contains a bar-shaped locking element which is a cylindrical pin and a locking device, wherein the bar-shaped locking element is pivotally connected with the outside window sash, on which there are a plurality of position pylomes, and the cylindrical pin is arranged on the inside window frame, which cooperates with the position pylomes to adjust the opening of a vent, when closed, the inside window frame and the outside window sash is tightly connected by turning the locking stay device with a handle.

[0003] There are some disadvantages existing in the structure mentioned above, firstly, the vent opening adjustment device is detached from the locking stay device which results in more parts, difficulty in assembling, higher manufacturing cost, and annoying operation; Secondly, bar-sharp locking element has pylomes which affects the mechanical strength of the locking element; Moreover, the locking element is easy to slip from the cylindrical pin which affects the position and the use.

Summary of the invention

[0004] In light of prior art mentioned above, the technical problem that the present invention intends to solve is to provide a locking stay device for window, which combines the vent opening adjustment mechanism and the locking mechanism.

[0005] The technical scheme used by the present invention for solving the above-mentioned problem is: a locking stay device for windows, used on the inside window frame and outside window sash, **characterized in that** it comprises:

- a base, of which one end is connected with the outside window sash and another end is arranged with a connector which can pivot in relation to said base;
- a bar shaped locking element, whose sides have notches along its length, and whose head is pivotally connected with said connector;
- a support, connected with said inside window frame, having stops for said notches on the locking element.

[0006] The sides of said sides of said locking element may also have a groove and said locking stay device may further include a stop pin cooperating with said groove, and being arranged on said inside window sash.

[0007] Preferably, said notches are formed symmetrically on the sides of said locking element along its length, and correspondingly, said support has a pair of stops which are arranged separately, which can be supported smoothly and with same pressure.

[0008] The upper part of said stops may have a projecting part which prevents said notches of said locking element from being detached from an end of said inside window, which can ensure that the locking element cannot easily escape from the notches.

[0009] The lower part of said stops may have an insert part, and correspondingly, said locking element may have a slot near its head, when said inside and outside windows are closed, said slot of locking element is able to cooperate with said insert part in order to limit movements of said locking element, which further improves the stability of the position.

[0010] Said upper part of said stops may have a projecting part which prevents said notches of said locking element from being detached from an end of said inside window, and said stops have stepped appearance and comprise a horizontal part, a vertical part which is at the level of the upper part of said horizontal part and said insert part which is at the level of the lower part of said horizontal part, while said projecting part is at the level of the top of the said vertical part. Such design is simple with better results.

[0011] Preferably, said connector may be pivotally connected with said base around a pivotal axis, and said connector is pivotally connected with said locking element by a riveting axis, and the rotation direction of said connector in relation to said base is perpendicular to the rotation direction of said locking element in relation to said connector.

[0012] In order to facilitate the operation, the tail of said locking element may be curved and may form a handle.

[0013] Furthermore, the head of said stop pin may have a retaining bump.

[0014] Compared with the prior art, the advantages of this invention are as follows: the vent opening adjustment device is integrated with the locking stay device which requires less part numbers, reduces manufacturing materials and costs, besides, the installing space is also reduced.

Brief description of the drawings

[0015]

Figure 1 shows a perspective view of a roof window according to one embodiment of the invention, in closed position.

Figure 2 shows an enlarged view of a locking stay device of the window of Figure 1.

Figure 3 shows a front view of the device of Figure 2. Figure 4 shows an enlarged perspective view of a support belonging to the locking stay device of Figures 2 and 3.

Figure 5-7 show perspective views of the window of Figure 1 in other positions, Figure 5a showing a detail of Figure 5.

Detailed description of the invention

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

[0017] As shown in figure 1 and 2, a window according to one embodiment of the invention contains an inside window frame 101, an outside window sash 100, and a locking stay device 10 arranged between the inside window frame 101 and the outside window sash 100, and the locking stay device 10 contains a base 1, a locking element 2, a support 3 and a stop pin 7.

[0018] One end of the base is connected with the outside window sash 100, and the other end has a connector 4 which can pivot relative to the base 1. The locking element 2 has the shape of a bar, and comprises notches 22 formed symmetrically along the length of two side edges of the locking element 2. A side edge has a groove 23 (see figure 6), the other side edge has a slot near its head, and the head part of the locking element is pivotally arranged relative to the connector 4, and the end part of said locking element 2 is curved and forms a handle 21.

[0019] As shown in figure 4, the support 3 is connected with the inside window frame 101 through connecting part 32, and the support 3 has 2 stops 31 adapted to limit the displacement of the notches 22 of the locking element, and the stops distant from each other have an upper part with a protruding part 3d which prevents the notches 22 from being disengaged from the end of the inside window frame. As shown in figure 3 and 4, and the stops has a stepped appearance and has a horizontal part 3b, a vertical part 3a which is at the level of the upper side of the horizontal part 3b and an insert part 3c which is at the level of the lower side of the horizontal part 3b, while a protruding part 3d is at the level of the top of the vertical part 3a, the stop pin 7 is arranged to protrude on the inside window frame 101.

[0020] Furthermore, the connector 4 is pivotally connected with a tongue part 11 of the base through a pivotal axis 6, and the connector 4 is also pivotally connected with the locking element 2 through a riveting axis 5, and the rotation direction of the connector 4 in relation to the base 1 is perpendicular to the rotation direction of the locking element 2 in relation to the connector 4, so that a universal joint is formed between the locking element 2 and the base 1.

[0021] With reference to figure 3, when the inside window frame 101 and the outside window sash 100 are closed, the groove 23 of the locking element 2 cooperates with the stop pin 7, and the slot cooperates with the insert part 3c. These two locking mechanism can lock simulta-

neously and respectively from the up and down side. And the head of the stop has a retaining bump 71, see figure 5.

[0022] As shown in figures 5 and 5a, the vent opening is in the first level position where the wind rate is low, and when being adjusted to the position shown in figure 6 or 7, one only need to hold the handle 21 and move the locking element 2 upward a little bit so that the locking element 2 can be disengaged with the protruding part 3d, and then pull the locking element 2 so that the locking element 2 can pivot in relation with the pivotal axis 6, and when further moving the locking element 2 upward to the place where the stops engage with the second or third section of notches 22 of the locking element 2, push the locking element 2 into the stops 31 of the support and release, the locking element 2 descends a little so as to be limited by the protruding part 3d, thus the locking element 2 is fixed and will not be detached easily.

[0023] As shown in figure 6, the vent opening is in the second level position where the wind rate is larger than the first level, and in this level position, the second section of notches 22 cooperates with the stops 31.

[0024] As shown in figure 7, the vent opening is in the second level position where the wind rate is the largest, and in this level position, the third section of notches 22 cooperates with the stops 31.

[0025] If necessary, similarly the number of the wind rate sections can be arranged over 3 (i.e. the window may have more than 3 opening positions similar to those of figures 5-7).

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

a. A locking stay device (10) adapted to hold an outside window sash (100) which is pivotally arranged relative to an inside window frame (101), comprising:

- a base (1) having a first end part mounted on the outside window sash (100) ;
- a connector (4) pivotally connected to a second end part of said base (1) ;
- a locking element (2) having the shape of a bar with side edges, comprising a first end part pivotally connected to said connector (4) and further comprising notches (22) formed along the length of said side edges ;
- a support (3) mounted on said inside window frame (101) and having stops (31) adapted to engage said notches (22) ; **characterized in that** each of said stops (31) has an upper part (3a) with a protruding part (3d) which prevents said engagement notches (22) from being disengaged from said stops ;

b. Said engagement notches (22) are formed symmetrically on said side edges of said locking element (2), and correspondingly said support (3) has two stops (31) distant from each other, so that each por-

tion of said locking element between two symmetrical engagement notches can be positioned between said stops.

c. A side edge of said locking element (2) has a groove (23), and wherein a stop pin (7) adapted to be engaged by said groove (23) is arranged to protrude on said inside window frame (101);

d. The lower part of said stops has an insert part, and correspondingly, said locking element has a slot near its head, and when said inside and outside windows are closed, said slot of locking element is able to cooperate with said insert part in order to limit movements of said locking element;

e. Each of said stops (31) has a stepped appearance and comprises a horizontal part (3b) with a top surface from which said upper part (3a) protrudes vertically;

f. One of said stops (31) further comprises an insert part (3c) which protrudes from a bottom surface of said horizontal part (3b), said insert part being arranged so that when said outside window sash (100) is closed with said inside window frame (101), said locking element (2) cooperates with said insert part to limit a displacement of said locking element;

g. A second end part of said locking element (2) is curved and forms a handle (21);

h. Said stop pin (7) has a head provided with a retaining bump (71).

Claims

1. Locking stay device for connecting inside and outside window sashes (101, 100) of a window, comprising:

- a base (1) having one end connected with the outside window sash (100) and another end arranged with a connector (4) which can pivot in relation to said base;
- a bar shaped locking element (2) whose sides have notches (22) along its length, and whose head is pivotally connected with said connector (4);
- a support (3), connected with said inside window sash (101), having stops (31) for said notches of the locking element.

2. Locking stay device according to claim 1, **characterized in that** the sides of said sides of said locking element (2) also has a groove (23) and said locking stay device further includes a stop pin (7), cooper-

ating with said groove, and being arranged on the said inside window sash (7).

3. Locking stay device according to claim 2, **characterized in that** the head of said stop pin (7) has an anticeeping boss.

4. Locking stay device according to any one of the preceding claims, **characterized in that** said notches (22) are formed symmetrically on the sides of said locking element (2) along its length, and correspondingly, said support (3) has a pair of stops (31) which are arranged separately.

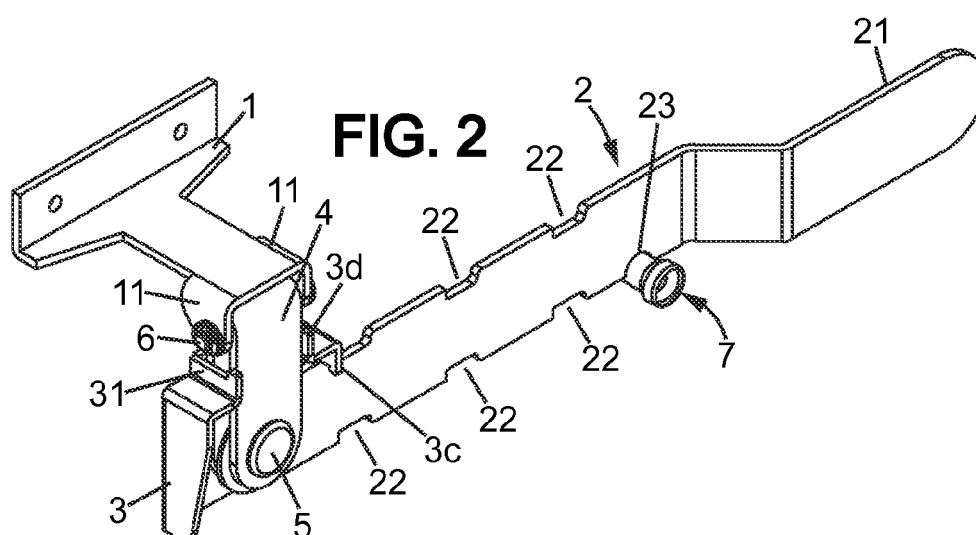
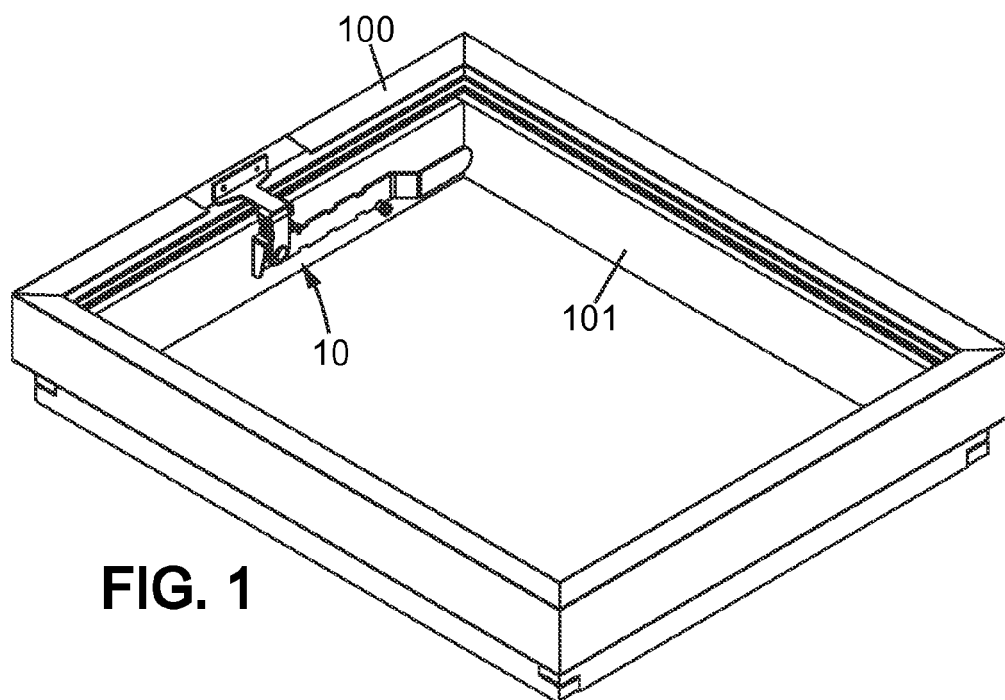
5. Locking stay device according to anyone of the preceding claims, **characterized in that** the upper part of said stops (31) has a projecting part (3d) which prevents said notches (22) of said locking element from being separated from an end of said inside window.

6. Locking stay device for windows according to any one of the preceding claims, **characterized in that** the lower part of said stops (31) has an insert part (3c), and correspondingly, said locking element (2) has a slot near its head, when said inside and outside windows are closed, said slot of locking element is able to cooperate with said insert part in order to limit movements of said locking element (2).

7. Locking stay device according to claim 6, **characterized in that** the upper part (3a) of said stops (31) has a projecting part which prevents said notches (22) of said locking element from being separated from an end of said inside window, and said stops have stepped appearance and comprise a horizontal part (3b), a vertical part which is at the level of the upper part of said horizontal part and said insert part (3c) which is at the level of the lower part of said horizontal part, while said projecting part (3d) is at the level of the top of the said vertical part.

8. Locking stay device according to any one of the preceding claims, **characterized in that** said connector (4) is pivotally connected with said base (1) around a pivotal axis, and said connector (4) is pivotally connected with said locking element by a riveting axis, and the rotation direction of said connector in relation to said base is perpendicular to the rotation direction of said locking element in relation to said connector.

9. Locking stay device according to any one of the preceding claims, **characterized in that** the tail of said locking element (2) is curved and forms a handle (21).



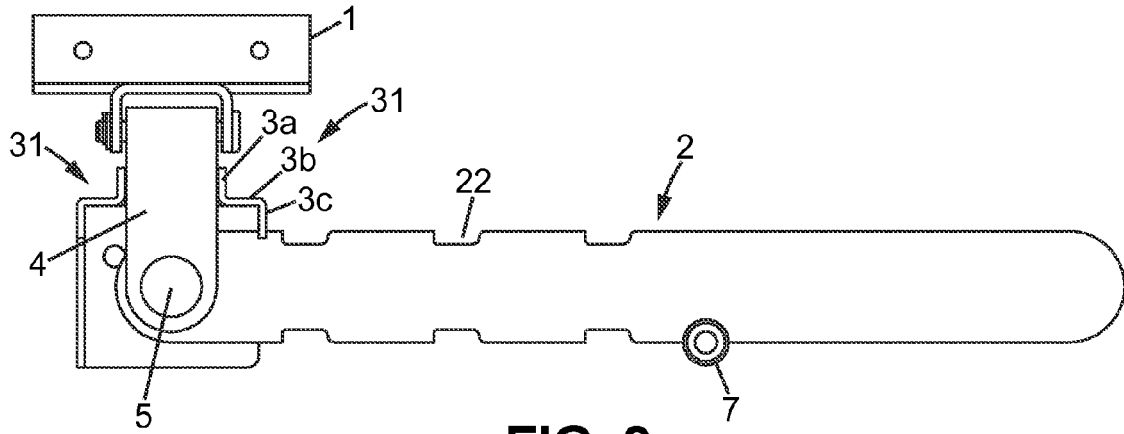


FIG. 3

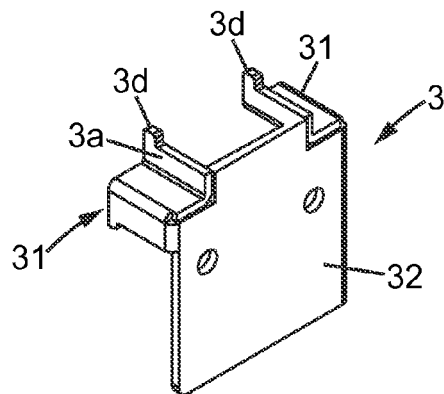


FIG. 4

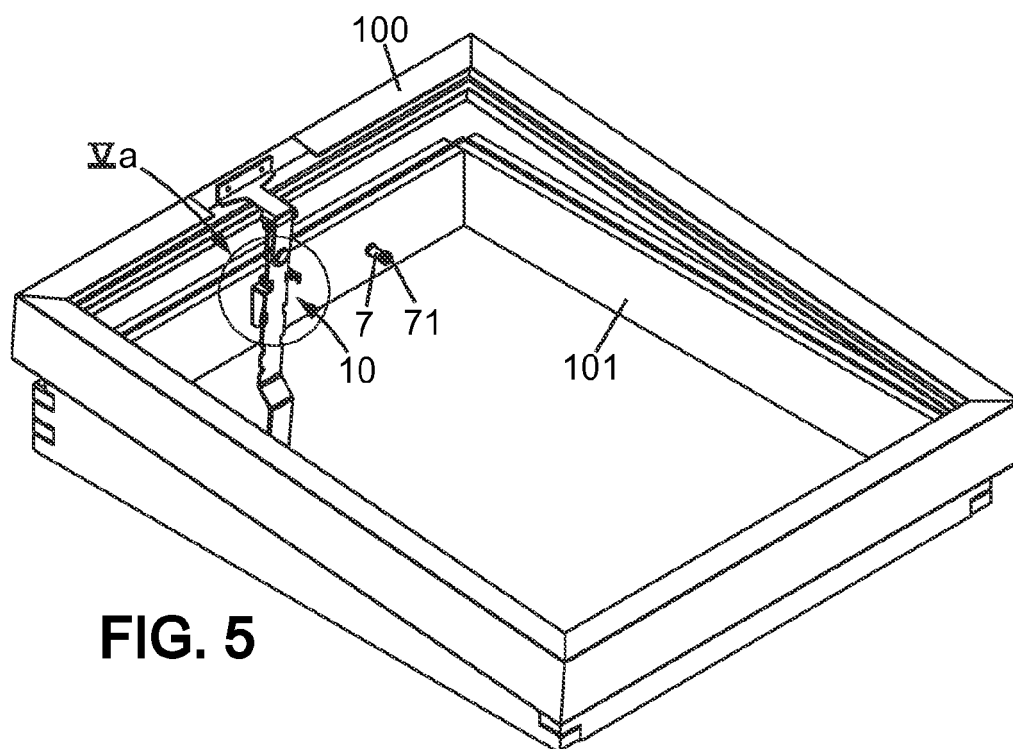


FIG. 5

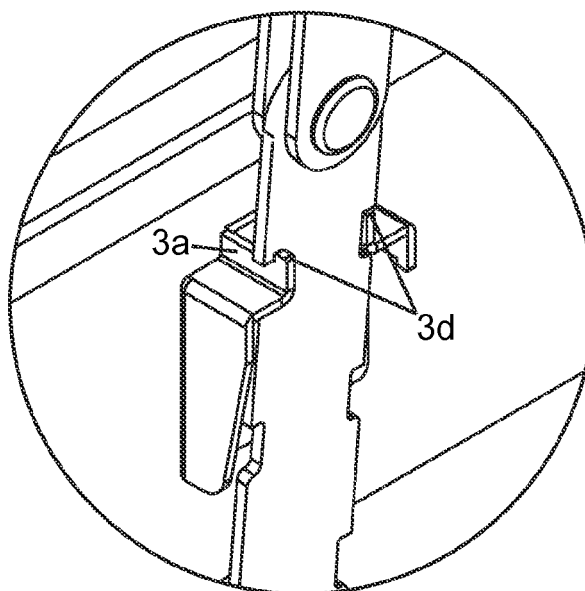


FIG. 5a

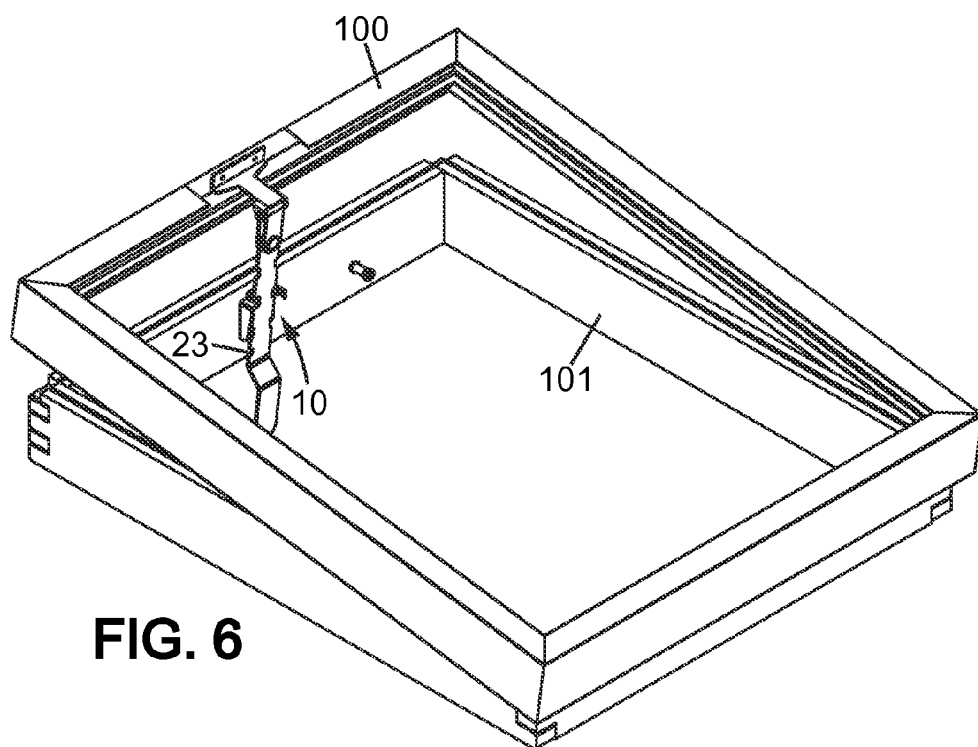


FIG. 6

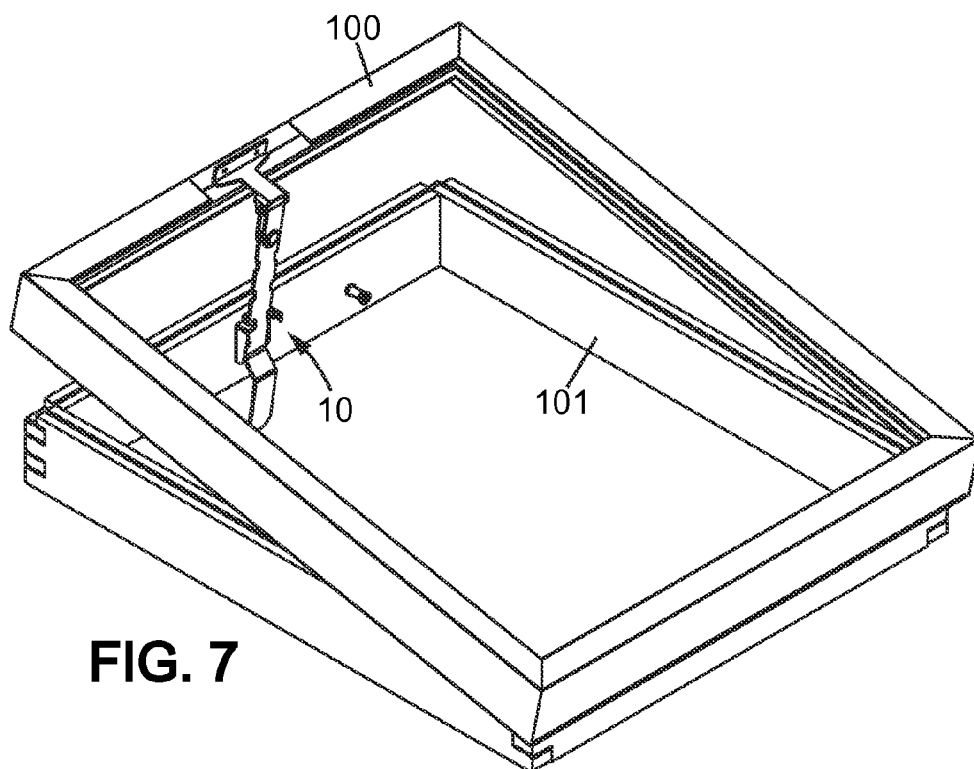


FIG. 7