Nov. 7, 1939. A. S. GREIF 2,178,753

REGULATOR AND LOCK FOR SWINGING PANELS

Filed Nov. 1, 1937 4 Sheets-Sheet 1

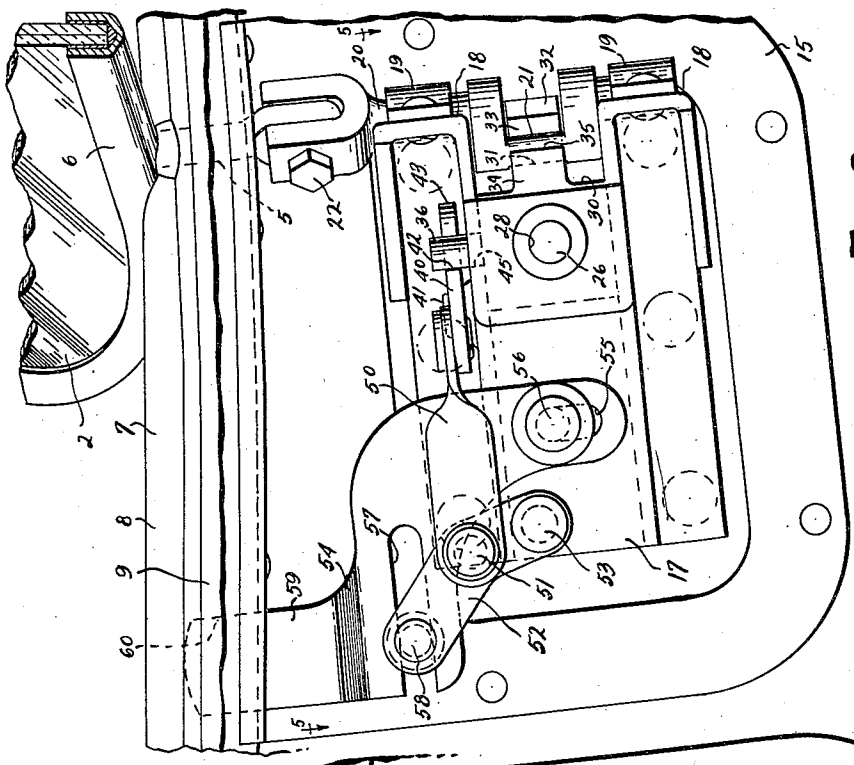


Fig. 3.

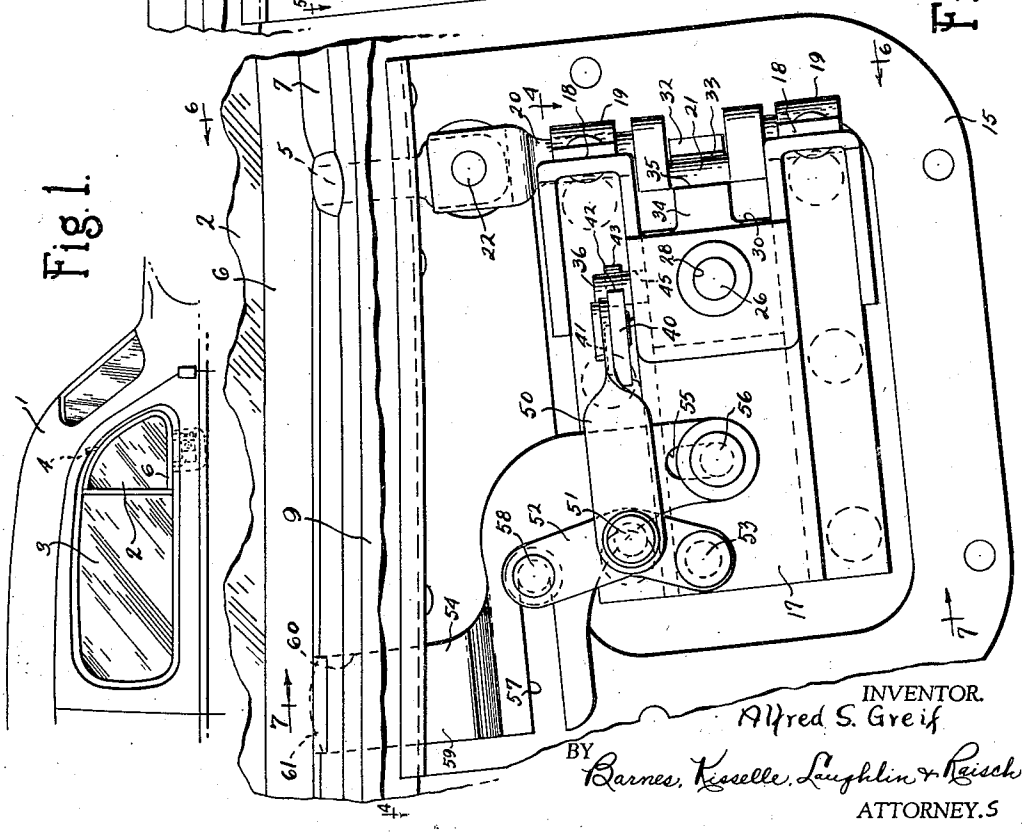


Fig. 2.

Fig. 1.

INVENTOR.
Alfred S. Greif
BY Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS.

Nov. 7, 1939. A. S. GREIF 2,178,753

REGULATOR AND LOCK FOR SWINGING PANELS

Filed Nov. 1, 1937 4 Sheets-Sheet 2

Fig. 4.

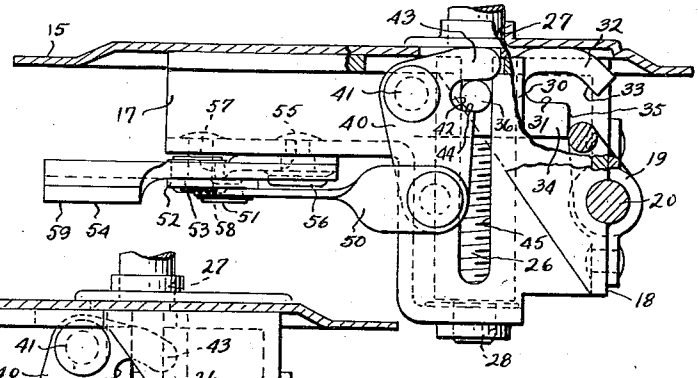
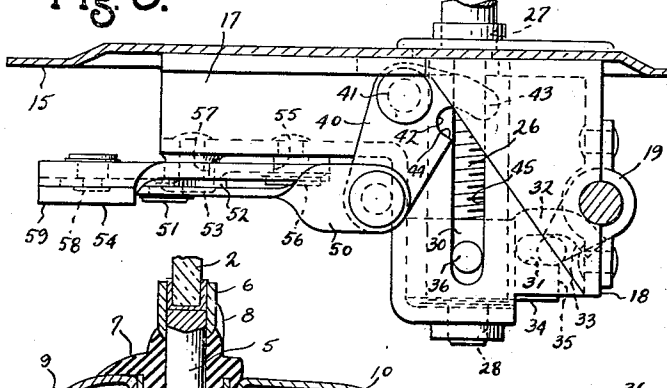


Fig. 5.



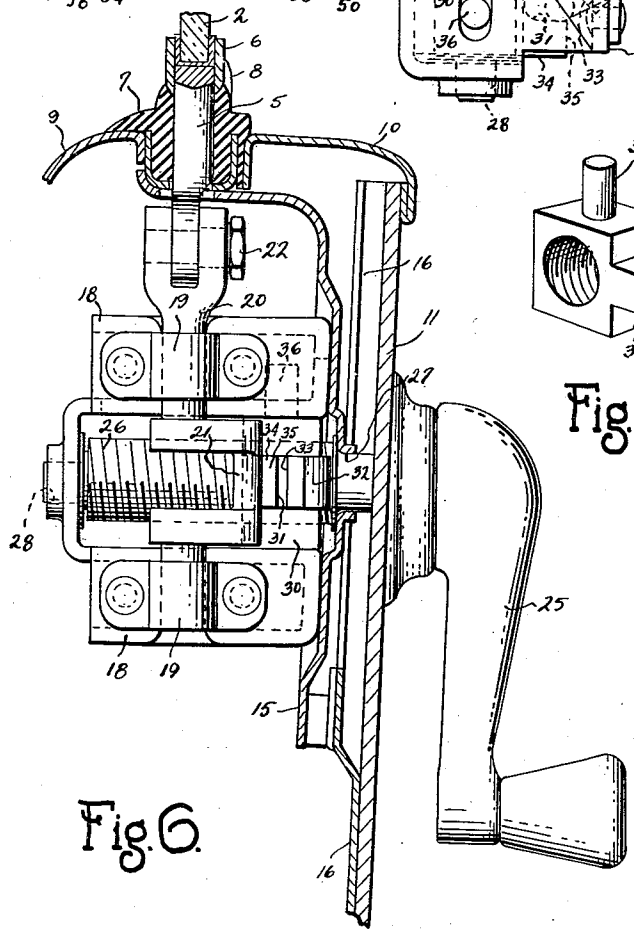


Fig. 6.

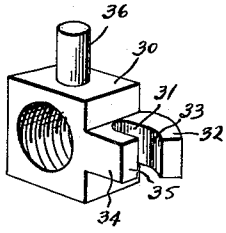


Fig. 8.

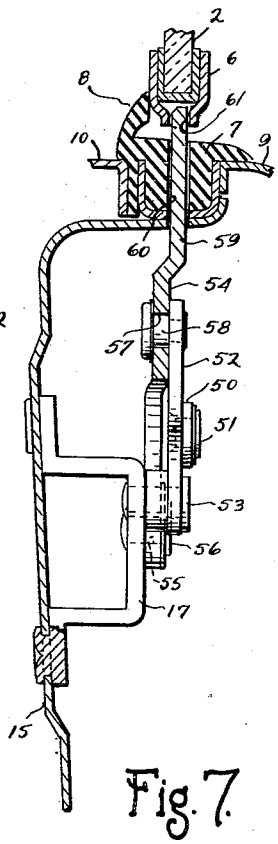


Fig. 7.

INVENTOR.
Alfred S. Greif

BY
Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS

Nov. 7, 1939. A. S. GREIF 2,178,753

REGULATOR AND LOCK FOR SWINGING PANELS

Filed Nov. 1, 1937 4 Sheets-Sheet 3

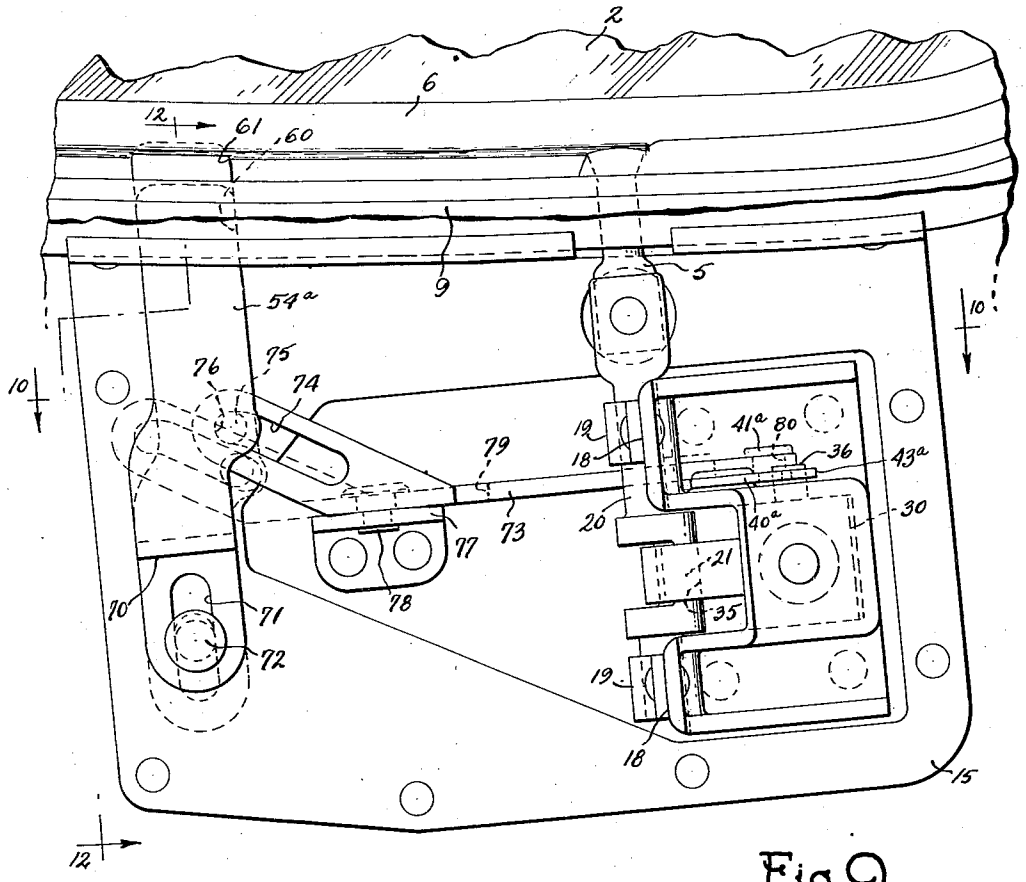


Fig. 9.

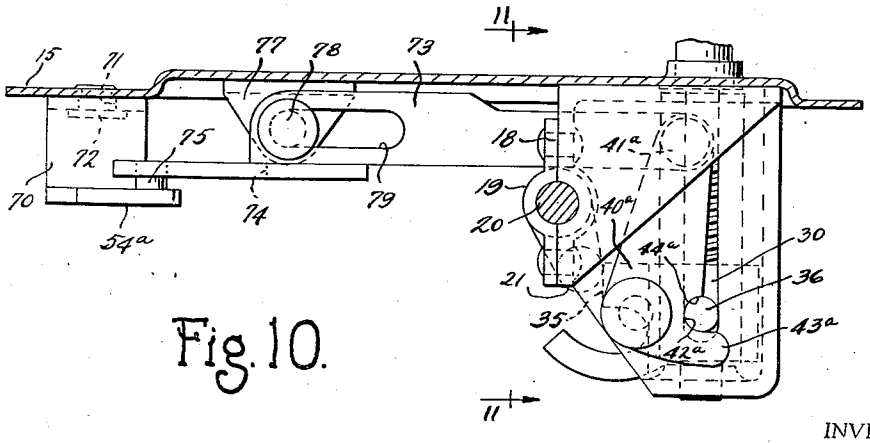


Fig. 10.

INVENTOR.
Alfred S. Greif

BY
Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS

Nov. 7, 1939. A. S. GREIF 2,178,753

REGULATOR AND LOCK FOR SWINGING PANELS

Filed Nov. 1, 1937 4 Sheets-Sheet 4

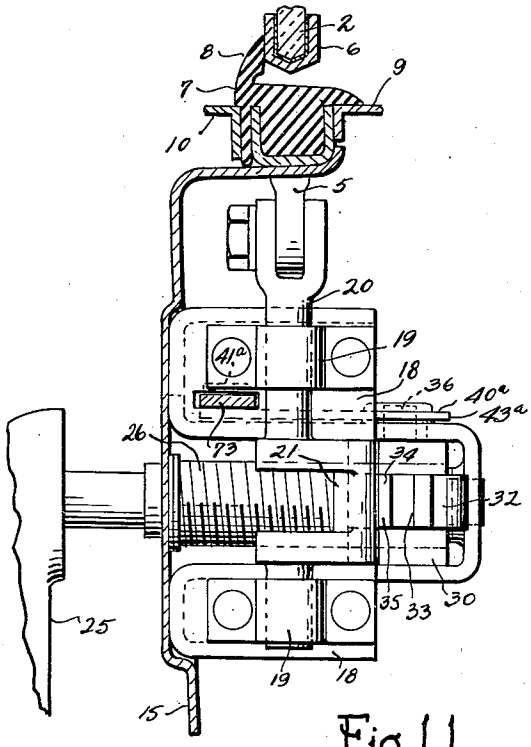


Fig. 11.

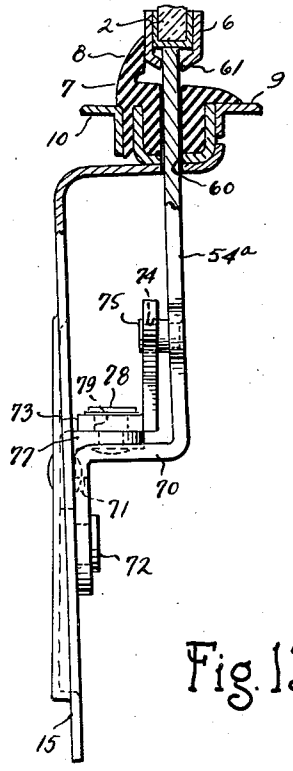


Fig. 12.

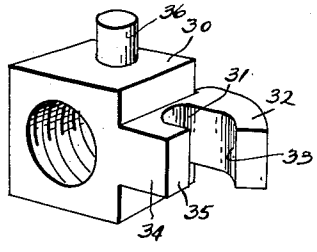


Fig. 13.

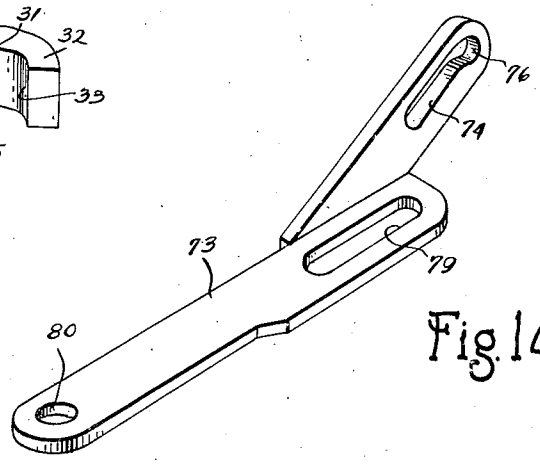


Fig. 14.

INVENTOR.
Alfred S. Greif

BY
Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS

Patented Nov. 7, 1939

2,178,753

UNITED STATES PATENT OFFICE

2,178,753

REGULATOR AND LOCK FOR SWINGING PANELS

Alfred S. Greif, Detroit, Mich., assignor to Ternstedt Manufacturing Company, Detroit, Mich., a corporation of Michigan

Application November 1, 1937, Serial No. 172,081

4 Claims. (Cl. 268—120)

This invention relates to mechanism for operating and locking a swinging panel such as a window panel for closing the whole or part of a window opening. Reference is made particularly to swinging panels for automotive vehicles. Swinging panels are used in combination with a vertically adjustable window panel in the forwardmost side opening of a closed body and are also used considerably for the rear quarter windows for automobiles.

It has been found that swinging panels are subject to being forced or pried open, or partially open, so that access can be obtained to a locked vehicle. That is, of course, objectionable since unauthorized persons may obtain access to the car. It is an object of the present invention to provide improved mechanism for regulating and locking swinging panels wherein both operations are performed by a single regulator handle. More particularly, the invention is directed toward the provision of a structure wherein the regulator handle may continue its operating movement subsequent to the closing of the panel, and during this continued movement the locking mechanism is actuated to lock the panel in closed position. Although the regulator handle may be operated subsequent to the closing of the panel the arrangement is such that the panel is positively held closed during this additional movement of the regulator handle, and while the locking member is being shifted to locking position, which position may be that of an engagement with the panel itself or part thereof. These objects will be better understood and other objects appreciated as the following detailed disclosure is considered in connection with the accompanying drawings.

In these drawings are shown two forms of devices which exemplify the invention, it being understood that the invention is not limited to these forms.

Fig. 1 is a general view of a portion of an automobile body illustrating one location where a swinging panel may be used.

Fig. 2 is a side view showing some of the mechanism and illustrating the same in locked position.

Fig. 3 is a view similar to Fig. 2 showing the mechanism in unlocked and panel-open position.

Fig. 4 is a view showing some parts in section and some parts cut away and taken substantially on line 4—4 of Fig. 2.

Fig. 5 is a view similar to Fig. 4 illustrating parts in window-open position and taken substantially on line 5—5 of Fig. 3.

Fig. 6 is a view showing the panel in cross section and some of the mechanism in side elevation substantially on line 6—6 of Fig. 2.

Fig. 7 is a sectional view showing some of the locking mechanism and taken substantially on line 7—7 of Fig. 2.

Fig. 8 is a detail perspective of a travelling nut member.

Fig. 9 is a side view illustrating a modified form of mechanism, showing some of the locking parts in locked and unlocked positions.

Fig. 10 is a view looking from the top of Fig. 9 substantially on line 10—10.

Fig. 11 is a view taken substantially on line 11—11 of Fig. 10.

Fig. 12 is a view showing the parts in locked position and taken substantially on line 12—12 of Fig. 9.

Fig. 13 is a perspective view of a travelling nut.

Fig. 14 is a perspective view of a lock operating link.

First referring to Fig. 1, the body of a car is illustrated at 1 having a window opening with a swinging panel 2 in its forward portion, and a vertically adjustable panel 3 to the rear of the swinging panel. The control and locking mechanism has to do with the control and locking of the swinging panel.

This swinging panel swings on an upwardly and downwardly extending axis, there being an axis member illustrated at 4 and another axis member illustrated at 5 (Fig. 6). The axis member 5 extends through a channel 6 which extends around the edge of the panel 2. A weatherstrip is illustrated at 7 having an edge 8 against which the panel is arranged to seal when in closed position. By making reference to Fig. 6, the general environment will be seen, wherein the outer panel of the vehicle is illustrated at 9, the garnish molding around the window opening illustrated at 10 and an inner panel for the body shown at 11.

There is a back plate 15 which forms a support for the regulator mechanism, and it is arranged to be secured to a suitable supporting member such as an inner metal panel 16. A box member 17 is secured to this back plate, as for example by rivets as shown in Fig. 7, and this box has portions 18 for the reception of caps 19 for the journaling of a crank member 20 having a crank 21, the crank member being secured to the axis member 5 as illustrated at 22. The control handle is illustrated at 25 and it is arranged to operate a screw threaded spindle 26 journaled in the back plate at 27 and in the box or housing as at 28. A nut 30 is mounted upon

the screw threaded spindle to be fed thereon, and it is formed with a slot 31 defined on one side by a relatively long projection 32 having an inclined surface 33, and defined on its other side by a relatively short projection 34 with a relatively flat surface 35. The slot 31 is designed to engage the throw of the crank.

The nut has a stud 36 which is arranged to operate the locking mechanism. This locking mechanism comprises a lever 40 pivoted to the housing as at 41 and having a recess 42 defined on one side by a relatively long finger 43 and on the other side by a lower abutment or wall 44. The stud 36 operates in a slot 45 of the housing and it is arranged to rock the lever 41 by engaging the finger 43 and abutment 44, and it is also arranged to be accommodated by the notch 42. A link 50 is pivoted to the lever 40 (Fig. 5), and at its opposite end is pivoted as at 51 to a rocker arm 52, in turn pivotally mounted on the housing as at 53 (Fig. 3). A locking bar is illustrated at 54 having a connection with the housing which takes the form of a slot 55 in the locking bar, which receives a stud 56 on the housing. The locking bar has a slot 57 which receives a pin 58 on the rocker arm 52. The locking bar has a locking portion 59 arranged to extend through openings in the back plate and through the sealing strip and associated metal part or parts, as shown in Fig. 7, the openings in all of these elements being generally shown at 60. The channel 6 around the edge of the panel is fashioned with an opening 61 which constitutes a keeper for the locking portion of the locking member.

This structure constitutes one form of device for carrying out the invention, and its operation might best be considered before proceeding with the other form. When the crank is turned the nut is fed one way or the other on the screw threaded shaft. When the throw of the crank is engaged in the notch 31 it will be appreciated that the crank is rocked, resulting in swinging movement of the panel. The open position of the parts is illustrated in Fig. 5, this illustrating substantially maximum open position. Now as the handle is rotated to feed the nut upwardly (as Fig. 5 is viewed) the crank is turned and the window is closed. When the window is completely closed no further motion is imparted thereto, but the crank may be further operated to actuate the locking mechanism. Fig. 4 shows how the nut has moved upwardly (as Fig. 4 is viewed), and the throw of the crank is actually moved out of the notch. When the throw of the crank is so positioned that it engages the flat surface 35, the window is closed and the nut may be fed further upwardly (as indicated in Fig. 4) without rotating the crank, the crank merely resting upon the surface 35 and serving to hold the panel tightly closed. In this final movement, while the throw of the crank is sliding along the surface 35, stud 36 engages the finger 43 and rocks the lever 40 from the position shown in Fig. 5 to the position shown in Fig. 4. This, through the link 50, rocks the arm 52 and the pin and slot connections 57—58, causes the lock member 54 to be projected upwardly (as Figs. 2 and 3 are viewed) until its end is projected into the keeper 61 as shown in Fig. 7. It will be understood that the locking member 54 is slidably guided at each end, one end being on the stud 56 and the other in the openings 60.

The panel is now closed and locked. To open the panel the handle is turned in the opposite direction. In this initial movement the surface 35 slides along under the throw of the crank so that no swinging movement is imparted to the window; at this time the stud 36 engages the shoulder 44 and rocks the lever 40 from the position shown in Fig. 4 to the position shown in Fig. 5. This retracts the locking member and disengages it from the keeper 61. At this time the throw of the crank is engaged by the surface 33 and thereafter the throw of the crank is engaged in the notch 31 and the window panel may be swung and adjusted as desired.

In the modified form shown in Figs. 9 to 14 inclusive, many of the parts have the same general characteristics, and in order to avoid unnecessary duplication in description the same reference characters are applied. Such parts include the window panel and the parts directly associated therewith, such as its axis member, the back plate, the threaded spindle, the traveling nut and the crank and its mounting.

The locking member 54*a* slides in the aperture 60, is offset as at 70 and has a slotted portion 71 operating on a stud 72. A slide 73 has an aperture 74 in an inclined portion in which is received a stud 75 carried by the locking member. This aperture has its upper end portion positioned substantially perpendicular relative to the sliding lock, as illustrated at 76. A bracket 77 is secured to the back plate and carries a stud 78 positioned in an aperture 79 of the slide member. This slide member has an aperture 80 in one end and it is pivotally connected at 41*a* with a lever 40*a* substantially corresponding to lever 40 of the previously described form and having the same projection or notch arrangement indicated by the characters 43*a*, 44*a* and 42*a*.

In this form, the reciprocation of the nut rocks the crank to swing the window panel and when the nut is near one end of its movement the throw of the crank rides on the surface 35. As the nut moves, the stud 36 swings the lever 40*a* and thus shifts the slide member 73. When the slide member is shifted to the right as shown in full lines in Fig. 9, the stud 75 rides up the inclined slot 74 and lifts the locking bar into locking position in the keeper 61. At the end of this movement stud 75 lies in the end 76 of the slot so that the locking member is held strongly in locking position. As the slide member 73 moves toward the dotted line position shown in Fig. 9, which movement takes place when the handle is rotated in the direction designed to swing the window open, the pin 75 is caused to slide downwardly in the inclined slot 74 and the locking member 54*a* is moved to unlocking position. These movements of the slide 73 occur while the throw of the crank is riding on the surface 35 of the nut as previously described.

I claim:

1. An operating and locking mechanism for a window panel which is adapted to close and open a window opening or part thereof, comprising in combination, a swinging panel, an operator including a screw threaded spindle, a nut on the spindle arranged to be reciprocated along the length thereof, said nut having a notch, an abutment surface on one side of the notch, a projection on the other side of the notch extending beyond the abutment surface, a crank for swinging the panel and arranged to be engaged in the notch, said nut being movable to a point where the crank becomes disengaged from the notch and rests upon the abutment surface, at which time the panel is closed, and locking means operably associated with the nut inde-

pendently of the crank to be actuated into panel-locking position as the nut is moved while the crank rests and slides upon the abutment surface in a direction away from the notch, and to be moved into unlocking position as the nut moves while the crank rests and slides upon the abutment surface in a direction toward the notch, said projection serving to engage the crank and urge the same into the notch upon continuation of last named movement of the nut.

2. An operating and locking mechanism for a window panel which is adapted to close and open a window opening or part thereof, comprising in combination, a swinging panel, a screw threaded shaft, a reciprocable nut member threaded on the shaft, a locking member movable to and from panel engaging position, a lever operably connected with the locking member and having a notch bounded upon one side by a projecting finger, a projection on the reciprocable nut member movable into engagement with the finger when the panel is closed for rocking the lever and shifting the locking member into locking position, said projection serving to rock the lever in the opposite direction as it moves out of the notch upon reverse movement of the reciprocable member, to move the locking member out of locking position, and means establishing an operable connection between the reciprocable nut member and the panel for swinging the panel and having a last play action for movement of the reciprocable nut member without panel movement when said projection is in engagement with said finger and notch.

3. An operating and locking mechanism for a window panel which is adapted to close and open a window opening or part thereof, comprising in combination, a swinging panel, a screw-threaded operating member, a reciprocable member threaded on the operating member and operably connected to the panel for swinging the same, a slidably mounted locking member movable to and from locking position with respect to the panel, a slide member, means on the reciprocable member operably engageable with and disengageable from the slide member for shifting the slide member substantially when the panel is closed, said slide member being positioned substantially perpendicular relative to the sliding locking member, and a pin and inclined slot connection between the slide member and locking member.

4. An operating and locking mechanism for a window panel which is adapted to close and open a window opening or part thereof, comprising in combination, a swinging panel, a reciprocable member operably connected thereto for swinging the same, a slidably mounted locking member movable to and from locking position with respect to the panel, a slide member, means on the reciprocable member for shifting the slide member substantially when the panel is closed, said slide member being positioned substantially perpendicular relative to the sliding locking member, a pin and inclined slot connection between the sliding member and locking member, said inclined slot having a portion positioned substantially perpendicular to the direction of the sliding movement of the locking member for receiving the pin when the locking member is in locked position.

ALFRED S. GREIF.