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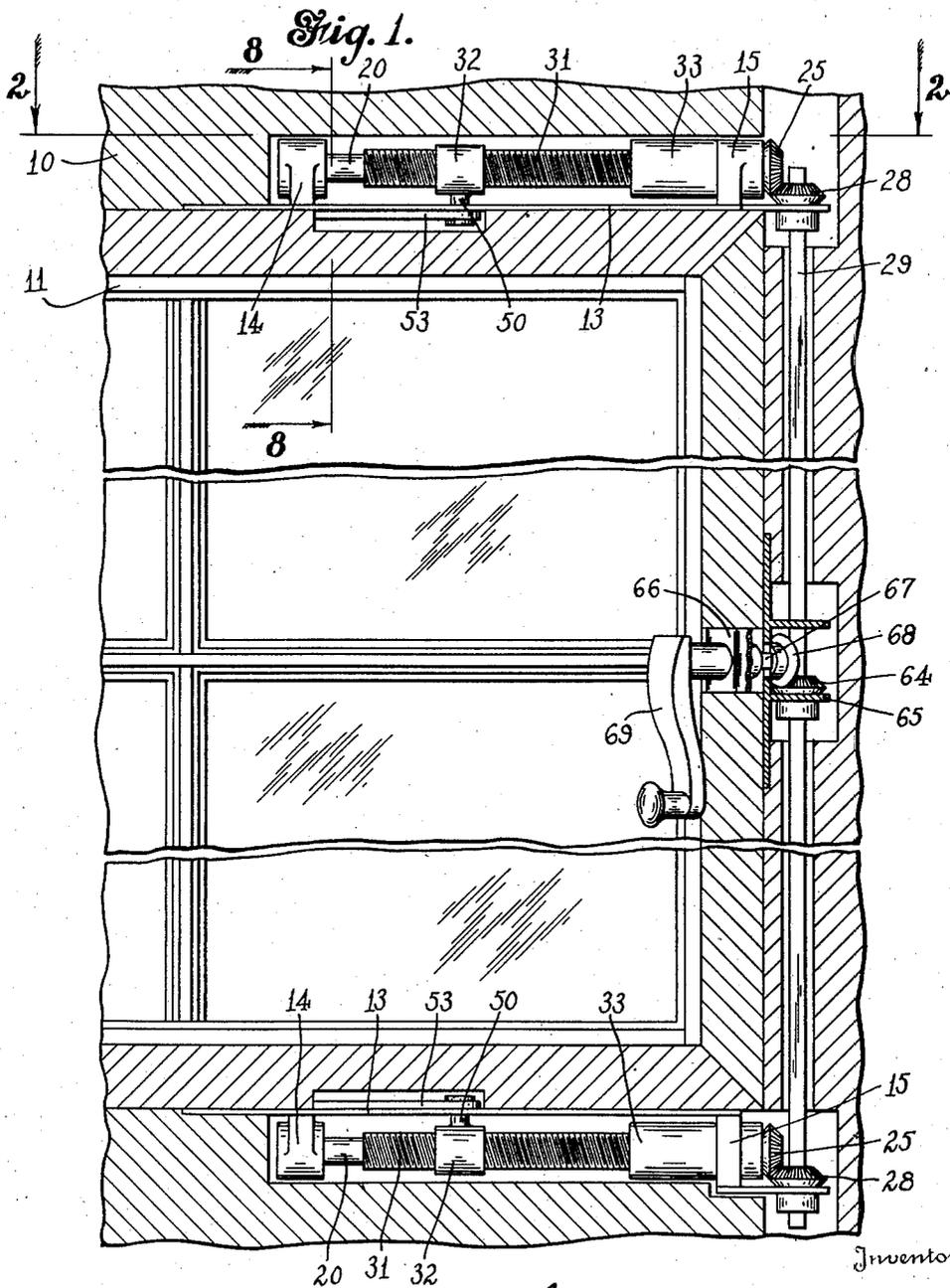
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2,366,613

CASEMENT WINDOW OPERATOR

Filed Aug. 11, 1943

3 Sheets-Sheet 1



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Fig. 2.

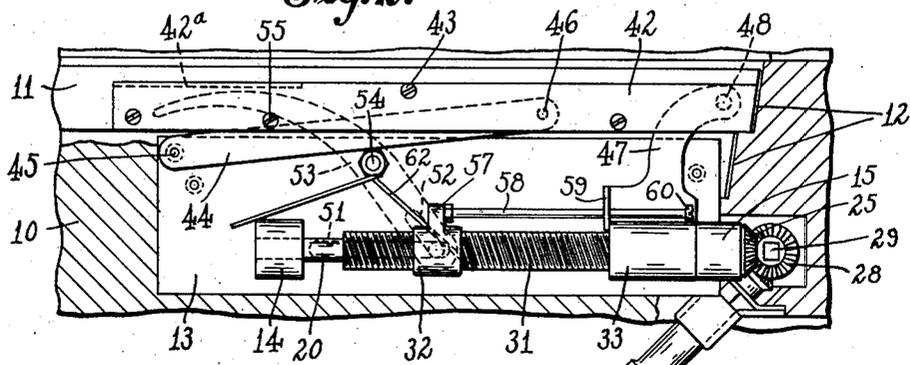


Fig. 3.

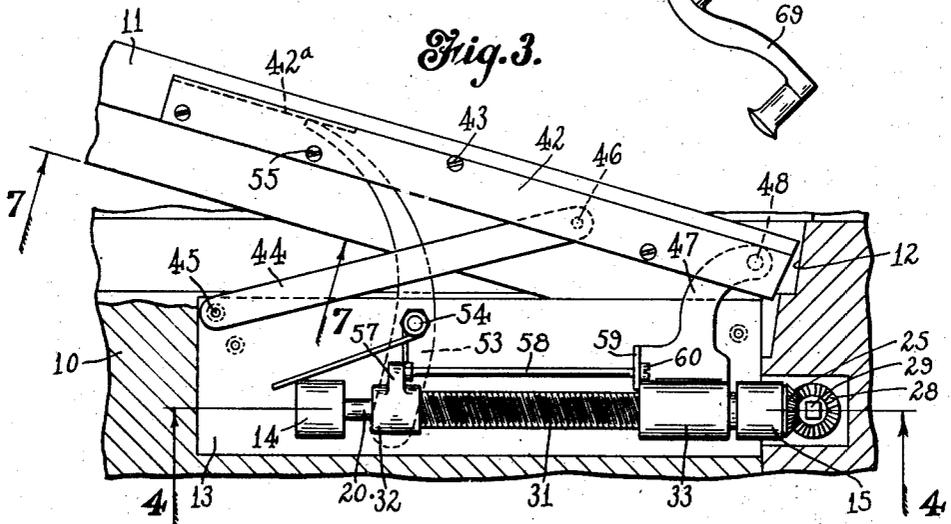


Fig. 4.

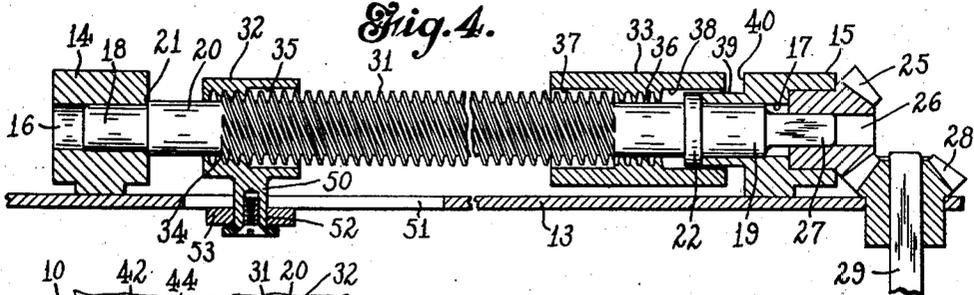
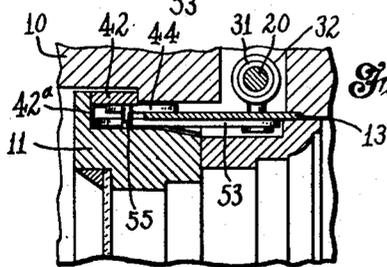


Fig. 8.



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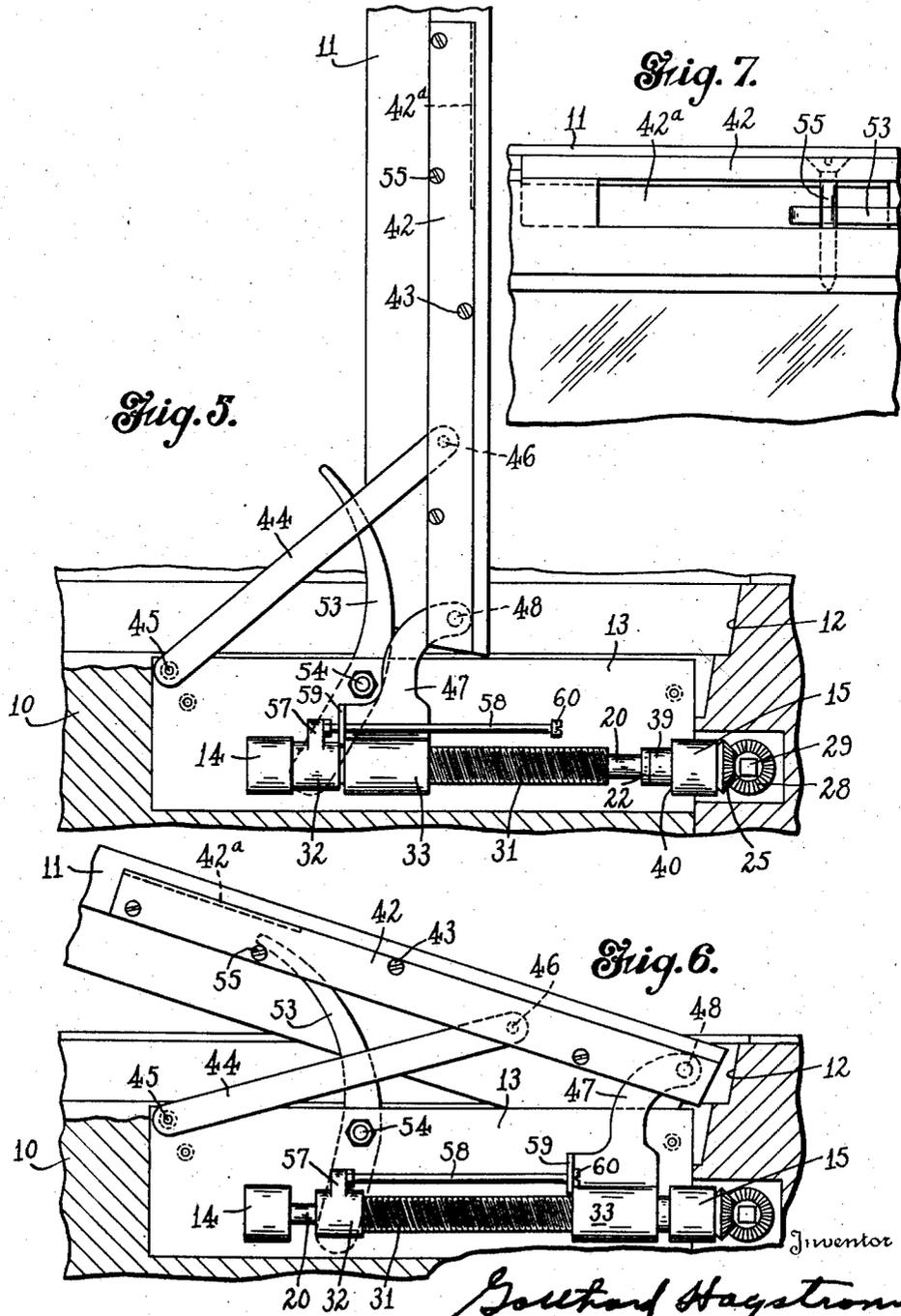
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CASEMENT WINDOW OPERATOR

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CASEMENT WINDOW OPERATOR

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12 Claims. (Cl. 268—120)

This invention relates to casement window operators and, more particularly, to a device of this character which may be connected to the window sash at both top and bottom so that both ends of the window will be forcibly and positively drawn toward the window frame to effect a tight closure.

In the employment of casement windows which are adapted to be hinged at one edge and swing outwardly from the window frame, it is of course desirable to effect means for closing the sash tightly, and this problem has been one of considerable difficulty. It is desirable to be able to operate or move the window from open to closed position and vice versa by the operation of a single element, and it is also desirable to so construct the window operator that it will act positively on both top and bottom of the sash.

In the present construction, duplicate operators are provided at the top and bottom of the window frame, these operators being actuated, however, by a single manually operated element or crank which serves to simultaneously actuate both of the operators.

It is also desirable in the use of casement windows to be able to clean both sides of the window from the inside of the room. This is usually not possible with the ordinary casement window hinged at one edge to swing about fixed hinges or pivots. In the present instance, cleaning of both sides of the window has been made possible by so hinging the sash that the hinged end thereof will move inwardly away from the frame so that the window cleaner may project his arm through the space between the frame and the hinged edge of the window to a sufficient extent to perform the cleaning operation.

One object of the invention is the provision of a casement window operator of improved construction, such that the window sash will be tightly sealed at both top and bottom and held closely against the window frame.

A further object of the invention is to provide a casement window operator having means to engage and move the window at both top and bottom of the sash, which means will be actuated by a single conveniently located member.

A still further object of the invention is to provide a casement window operator which will positively hold the window sash tightly against the frame at both the top and bottom of the sash and, at the same time, may be readily operated even though the window is covered by a screen.

A still further object of the invention is the provision of a casement window operator which

will not only swing the window sash outwardly with respect to the frame but will move the sash bodily with respect to the frame so that the hinged edge thereof will move inwardly to a position spaced from the adjacent portion of the frame.

A still further object of the invention is to provide substantially duplicate casement window operators at the top and bottom of the window sash and to provide means for actuating these operators from a single point and by means of a single rotatable member.

To these and other ends the invention relates to the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a front elevational view of a portion of a casement window provided with an operator embodying my invention;

Fig. 2 is a sectional view through the window frame, on line 2—2 of Fig. 1, showing the operator in top plan view;

Fig. 3 is a view similar to Fig. 2 but showing the parts in a different position;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Figs. 2 and 3, showing the window in fully open position;

Fig. 6 is a view similar to Figs. 2 and 3, showing the window sash as it approaches a closed position;

Fig. 7 is a sectional view on line 7—7 of Fig. 3; and

Fig. 8 is a sectional view on line 8—8 of Fig. 1.

To illustrate a preferred embodiment of my invention, I have shown in Fig. 1 of the drawings a casement window comprising a frame 10 and a swinging sash 11, the frame being provided with the usual rabbeted portions 12 to effect a tight closure with the sash.

Mounted in the window frame, above and below the sash, are duplicate operating devices which are designed to positively force both top and bottom of the sash to open and closed position evenly and smoothly. As the construction of these operators is identical, it will be necessary to describe one thereof only.

Secured to the window frame is a supporting plate 13 having mounted thereon bearing members 14 and 15, which members are spaced apart and provided with openings 16 and 17 for the reception of the ends 18 and 19 of a shaft 20, this shaft being rotatably mounted in the bearing members 14 and 15.

In order to prevent longitudinal movement of the shaft, it is provided adjacent one end with

a shoulder 21 abutting the bearing member 14 and adjacent the other end with a collar 22 abutting the bearing member 15.

The hub of a beveled gear 25 is rotatably mounted in the bearing member 15, which hub is provided with a non-circular opening 26 to receive the correspondingly-shaped end 27 of the shaft 20 so that rotation of the hub of the gear 25 will effect rotation of the shaft.

Meshing with the teeth of gear 25 are the teeth of a beveled gear 28 carried rotatably by the plate 13, the hub of which gear non-rotatably receives a square shaft 29 which, in the present instance, is substantially vertically disposed. It will be understood that, as shown in Fig. 1, this shaft 29 extends from the operator at the top of the sash to the operator at the bottom of the sash so that it will serve to actuate both operators.

The shaft 20 is threaded as shown at 31 and, mounted upon the shaft, are collars 32 and 33. Collar 32 is provided with internal screw threads 34 designed to operatively engage threaded portion 31 of the shaft 20 and is also provided with an internally smooth portion 35 designed to slide over these threads.

The collar 33 is provided with internal screw threads 36 intermediate its length and is provided at one side of these threads with an internally smooth bore 37 designed to slide over threads 31 and at the other end with a smooth bore portion 38 designed to slide over the reduced end 39 of the bearing member 15, so that the outer edge of the collar 33 may, in some positions of the parts, abut against a shoulder 40 on the bearing member 15.

Secured to the window sash, adjacent the supporting plate 13, is a second plate 42 which may be held in place by the screws 43 and, as shown in Fig. 8, the sash is slotted or cut away below this plate to receive certain connecting members which connect the operator parts previously described with the sash, which previously described parts, it will be recalled, are mounted on the frame.

One of these members comprises a link 44 pivoted to the plate 13 at 45 and to the plate 42 at 46. In addition, an arm 47, which is carried by the collar 33, is provided with a rearwardly curved portion, the end of which is pivoted at 48 to the plate 42.

As shown in Fig. 4, the collar 32 is provided with a vertically projecting boss 50 which extends through a slot 51 provided in the plate 13, the end of this boss being loosely received in an elongated opening 52 in a lever 53 pivoted to the plate 13 at 54. As shown in Figs. 2, 3, and 6, for example, the lever 53 is of curved formation and the outer free end thereof extends toward the window sash so that in certain positions of the latter it may enter the slot below the plate 42 and contact with a wear-plate 42^a secured to the plate 42 and extending at substantially right angles to the latter plate or in a vertical direction. The outer end of the lever 53 is also designed to engage behind a pin or screw 55 screwed to the window sash through the plate 42 and serves to draw the sash tightly to closed position.

Secured to the collar 32 is a lug 57, to which is fixed a rod 58 passing loosely through a flange 59 upstandingly mounted on the arm 47 secured to the collar 33. The free end of this rod is provided with a head 60 which is too large to pass through the opening in the flange 59. It will be obvious with this construction that, while as shown in Fig. 2 the collar 32 will be permitted

a certain range of relative movement to and from the collar 33 due to the fact that the rod 58 will slide freely through the flange 59, nevertheless the amount of separation of collars 32 and 33 will be limited when the head 60 of the rod 58 strikes the flange 59, as shown in Fig. 3. If, at this time, further movement of the collar 32 toward the left takes place, it will tend to also draw the collar 33 toward the left.

A spring 62, mounted on the pivot 54, acts on the depending portion 50 of the collar 32 to urge the latter toward the left as shown in Figs. 2 to 4 so that, when this collar has been moved to a position in which its threads 34 are disengaged from the threads 31, it will tend to remain in such position until positively moved in opposite direction.

As shown in Fig. 1, the shaft 29 is rotatably carried by the frame of the window and carries, intermediate its ends, a beveled gear 64 which is non-rotatably mounted on the shaft and which is supported by means of a plate 65 in which it is rotatably mounted, this plate being, in turn, supported by a bracket 66 secured to the window frame. A shaft 67 is rotatably mounted in the bracket and secured to this shaft, is a gear 68, the teeth of which mesh with the gear 64. The shaft 67 may be rotated by the crank 69.

The operation of my device may now be briefly described.

When the crank 69 is rotated, the shaft 29 will likewise be rotated, thus serving to rotate the gears 28 at the upper and lower ends of this shaft and actuate the operators. As the action is identical at the top and bottom of the sash, it will be necessary to describe the action of one of the operators only.

The parts are shown in Fig. 2 of the drawings in the position which they occupy when the window is closed. In this position, it will be apparent that the collar 33 abuts the shoulder 40 on the bearing member 15 and that the threads 36 have passed beyond the point at which they would engage the threads 31. At this time, therefore, rotation of the shaft does not directly effect movement of the collar 33. It does, however, effect movement of the collar 32, for, as seen in Fig. 2, the threads of this collar are engaged with the threads 31 of the shaft 20. Therefore, rotation of the shaft 20 in the proper direction serves to move the collar 32 toward the left which tends to swing the lever 53 in a clockwise direction about its pivot 44. The free curved end of this lever is moved outwardly against the wear plate 42^a and thus tends to push the sash outwardly about the pivot 48 and the sash moves from the position shown in Fig. 2 to that shown in Fig. 3, the rod 58 sliding freely through the flange 59, and it will also be noted that the collar 33 has moved to the left to a slight extent, thus permitting the pivot point 48 to move to a slight extent to permit the sash to swing.

At this time, the parts are in the position shown in Figs. 3 and 4, and it will be noted that the collar 32 has been moved substantially to the end of its threaded engagement with the shaft 20, and also that the head 60 of the rod 58 is in engagement with the flange 59 so that any further movement of the collar 32 toward the left will also move the collar 33 in this direction and engage its internal threads 36 with the threads 31 of shaft 20. Continued rotation of the shaft 20, therefore, effects engagement of the threads of collar 33 with those of shaft 20 and also carries the collar 32 beyond the threads of shaft 31 so

that near the end of the movement of the arm 53 by collar 32 the collar 33 will be picked up by threads 31 and moved toward the left from the position shown in Fig. 4 to that shown in Fig. 5 in which the sash is in fully open position. During this latter range of movement, the hinge edge of the sash will be moved inwardly away from the window frame, as shown, and the sash will swing about its pivot 46 with the link 44. In this position of the parts, the hinged edge of the sash is spaced from the window frame a sufficient extent to permit one cleaning the window to project his arm between the sash and the frame.

It will be seen therefore that, in opening the window, the lever 53 imparts the initial movement of the sash by contacting the wear plate 42^a and pushing the sash outwardly, and that, when this lever has been moved to a position in which it is about to be disengaged from the sash as shown in Fig. 3, the collar 33 is brought into engagement with the threaded portion 31 of the shaft 20 and is picked up and moved toward the left, completing the opening movement by drawing the rear edge of the sash inwardly away from the frame. When the parts are in fully open position as shown in Fig. 5, the collar 32 is not in engagement with the threads 31 but the collar 36 is in such engagement.

A reverse rotation of the crank 69 and therefore reverse rotation of the shaft 20 effects the closing of the window. During the initial part of the closing movement, the collar 33 is moved to the right from the position shown in Fig. 5, thus moving the rear edge of the sash toward the frame and swinging the sash about the pivot 46 of the link 44 to substantially the position shown in Fig. 6. At this time, due to the engagement of the head 60 of the rod 58 with the flange 69, the collar 32 is moved toward the right to engage its threads 34 with the threads 31, which occurs substantially at the time the threads of the collar 33 reach the righthand end of the threads 31. The collar 33 is therefore free of the threads 31 and the collar 32 is picked up and moves the lever 53 in an anti-clockwise direction. As shown in Fig. 6, this movement of the lever effects engagement of its free end behind the pin or screw 55, and continued movement of this lever exerts a pull upon the sash by means of this screw to draw it to closed position. During this latter phase of the closing movement of the sash, the collar 33 moves from the position shown in Fig. 6 to its fully closed position shown in Fig. 2 and the sash will be positively and firmly drawn against the frame at both top and bottom.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. An operator for a casement window comprising a sash and a frame, a pair of members movably mounted on the frame and engaged with the sash at spaced points to move the latter, said members comprising internally threaded spaced collars, a threaded shaft on which said collars are mounted, means for rotating said shaft, one of said collars being normally disengaged from the threads of the shaft, and means actuated by said other collar for engaging said first collar with the threads of the shaft.

2. An operator for a casement window comprising a sash and a frame, a pair of members

movably mounted on the frame and engaged with the sash to move the latter, said members comprising internally threaded spaced collars, a threaded shaft on which said collars are mounted, means connecting said collars to draw one into engagement with said threads when the other reaches a point adjacent the ends of the threads whereby said collars are moved successively, and means for rotating said shaft.

3. An operator for a casement window comprising a sash and a frame, a pair of members movably mounted on the frame and engaged with the sash to move the latter, said members comprising internally threaded spaced collars, a threaded shaft on which said collars are mounted, means for rotating said shaft, one of said collars being connected to the sash to move one edge thereof away from the frame and the other collar being connected to the other edge of the sash to move it way from the frame, one of said collars being normally disengaged from the threads of the shaft, and means actuated by said other collar for engaging said first collar with the threads of the shaft.

4. An operator for a casement window comprising a sash and a frame, a pair of members movably mounted on the frame and engaged with the sash to move the latter, said members comprising internally threaded spaced collars, a threaded shaft on which said collars are mounted, one of said collars being normally disengaged with the threads on the shaft, means for engaging said collar with the threads of the shaft by the movement of said other collar, and means for rotating said shaft.

5. An operator for a casement window comprising a sash and a frame, a pair of members movably mounted on the frame, connections between said members and the sash to effect movement of the latter in opposite directions, one of said members being pivotally connected to the sash adjacent one edge of the latter, and a lever actuated by the other of said members and engaged with the sash only when the latter is near its closed position.

6. In an operator for casement windows comprising a frame and a swinging sash, a plurality of members movably mounted on the frame, one of said members being pivotally connected to the sash adjacent one edge thereof and adapted to move said edge of the sash inwardly away from the adjacent portion of the frame, and means actuated by the other of said members to impart initial swinging movement to the sash about the pivot of said first member, said last-named means comprising a lever pivoted to the frame and to said other member, and said lever having a free end impinging against the sash.

7. In an operator for casement windows comprising a frame and a swinging sash, a plurality of members movably mounted on the frame and engaged with the sash to move the latter, one of said members being pivotally connected to the sash adjacent one edge thereof and adapted to move said edge of the sash inwardly away from the adjacent portion of the frame, and means actuated by the other of said members to impart initial swinging movement to the sash about the pivot of said first member, said means releasing said sash at the end of such initial movement and re-engaging the sash upon a closing movement thereof to draw the sash to tightly closed position.

8. An operator for a casement window comprising a sash and a frame, a pair of members

movably mounted on the frame, one of said members being pivotally connected to the sash adjacent one edge thereof, said members comprising internally threaded spaced collars, a threaded shaft on which said collars are mounted, means actuated by the other of said members and engageable with the sash to swing said sash outwardly to impart an initial opening movement thereto and to engage said sash upon a closing movement of the latter and draw it to tightly closed position, and means for rotating said shaft in reverse directions.

9. In an operator for casement windows comprising a frame and a swinging sash, means mounted on the frame for movement longitudinally thereof to impart an initial opening movement to the sash, additional means mounted on the frame for movement longitudinally thereof to give the sash a further opening movement, and a manually operated member to move both said means longitudinally and in the same direction to effect a full opening movement of the sash, one of said means being inactive while the other is being actuated.

10. In an operator for casement windows comprising a frame and a swinging sash, means mounted on the frame for movement longitudinally thereof to impart an initial opening movement to the sash, additional means mounted on the frame for movement longitudinally thereof to give the sash a further opening movement, and a manually operated member to move both said means longitudinally and in the same direction to effect a full opening movement of the sash, one of said means being normally dis-

gaged from said member, and connections between said means whereby movement of the other thereof effects engagement of said one means with said member.

11. In an operator for casement windows comprising a frame and a swinging sash, a plurality of members mounted on the frame for movement longitudinally thereof, a single means adapted to be successively engaged with said members for effecting movement thereof, one of said members being pivoted to the sash adjacent one side edge thereof whereby longitudinal movement of said member moves the hinged edge of the sash away from the frame, and connections between said second member and the sash for imparting to the sash a swinging movement about said pivot when said second member is moved.

12. In an operator for casement windows comprising a frame and a swinging sash, a plurality of members mounted on the frame for movement longitudinally thereof, a single means adapted to be successively engaged with said members for effecting movement thereof, one of said members being pivoted to the sash adjacent one side edge thereof whereby longitudinal movement of said member moves the hinged edge of the sash away from the frame, connections between said second member and the sash for imparting to the sash a swinging movement about said pivot when said second member is moved, one of said members being normally disengaged from said means, and a connection between said members whereby movement of one thereof engages the other with said means.

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