

Feb. 18, 1941.

E. F. WILEY

2,232,297

OPERATING MECHANISM FOR MULTIPLE-SASH WINDOWS

Filed March 11, 1935

2 Sheets-Sheet 1

Fig. 1.

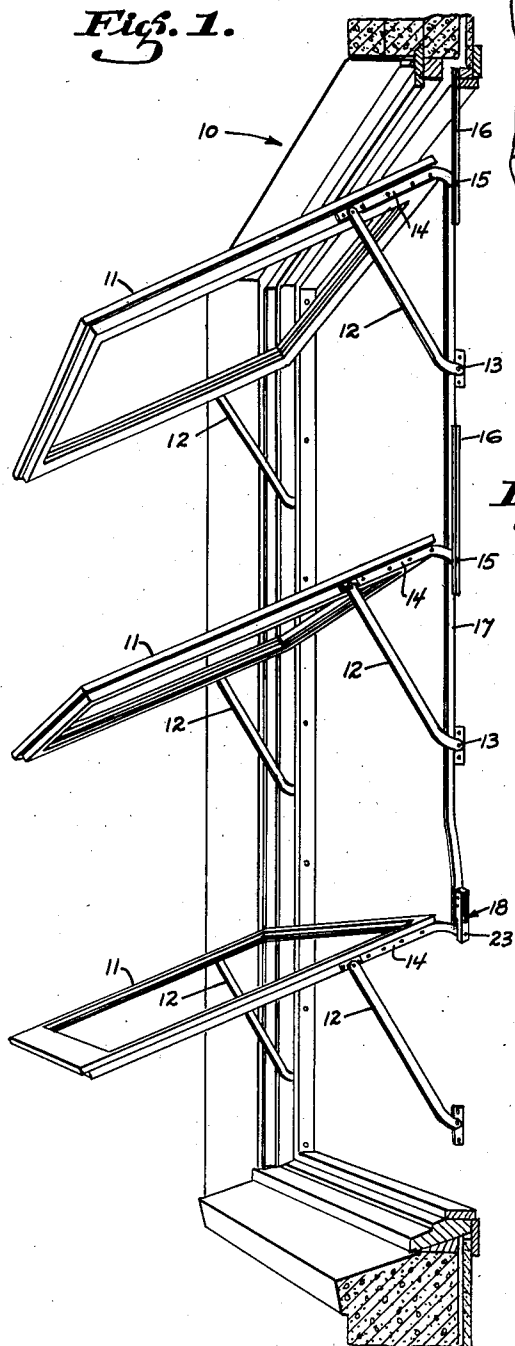


Fig. 2.

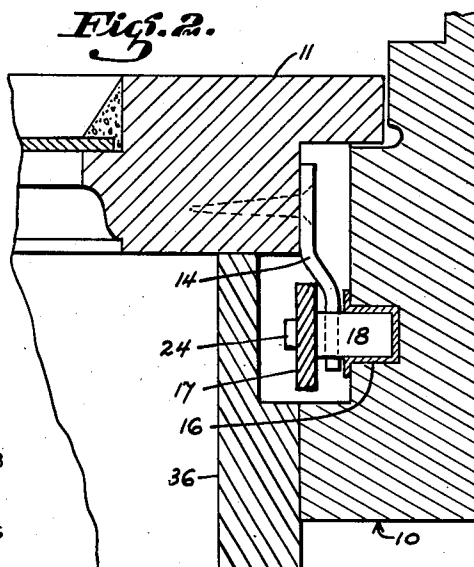


Fig. 3.

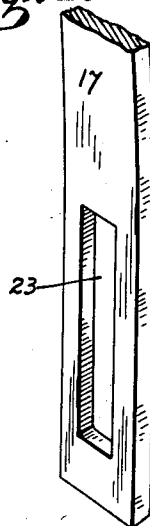
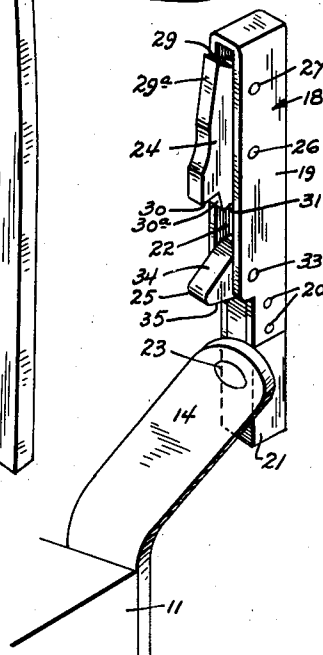


Fig. 4.



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2 Sheets-Sheet 2

Fig. 5

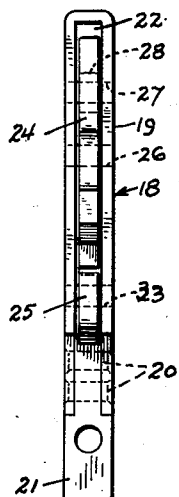


Fig. 6.

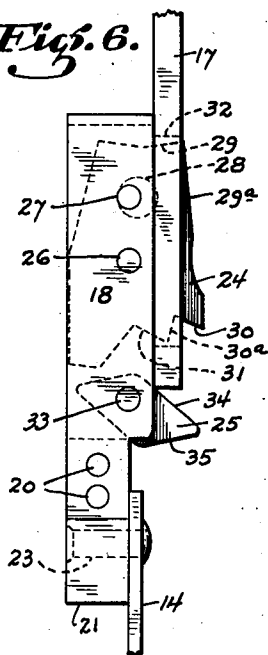


Fig. 7.

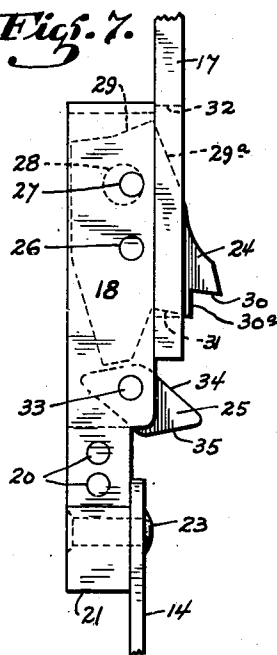


Fig. 8.

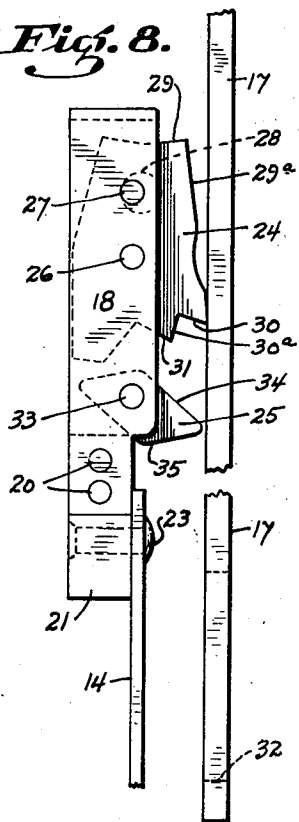
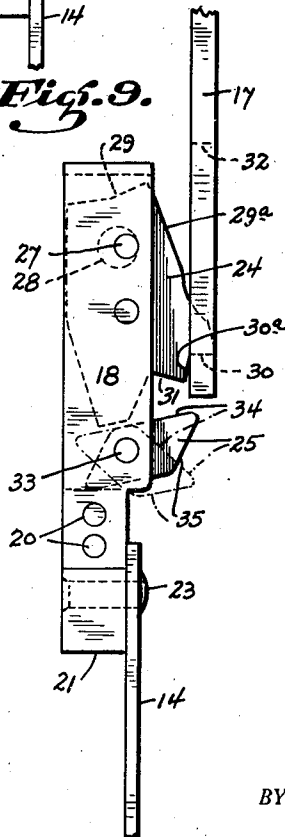


Fig. 9.



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OPERATING MECHANISM FOR MULTIPLE-SASH WINDOWS

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a corporation of California

Application March 11, 1935, Serial No. 10,379

7 Claims. (Cl. 20-42)

This invention relates to improvements in operating mechanism for multiple-sash windows.

In my prior patent, No. 1,934,290, entitled "Awning type window," issued November 7, 1933,

I have described a window comprising a plurality of sashes mounted for swinging movement in one frame and having means connecting the sashes whereby all of them may be opened and closed by manipulation of but one, and having means for rendering the connection between the sashes ineffective whereby one sash could be opened or closed independently of the others. In this prior patent the several sashes are described as being connected together by means of travel bars and a shoe which co-acts with the travel bars to effect connection or disconnection of the one sash relative to the travel bars and the other sashes. The shoe referred to is operated by manipulation of the one sash through which the other sashes are controlled so that auxiliary operating devices carried by the window-frame or elsewhere are entirely unnecessary.

It is to improvements in the structure of a shoe for this purpose and the mechanism associated therewith that the present invention is particularly directed.

It is the object of this invention to provide operating mechanism for multiple-sash windows which will permit any or all of the sashes to be controlled by opening and closing movement of a single sash, and which will include simple and positively operating means capable of being actuated by movement of the controlling sash to place it in or out of its controlling relation with the other sashes.

It is a further object of my invention to provide mechanism through which a single control sash will, upon initial opening movement, impart opening movement to all sashes controlled by it and at the same time be free for closing movement independently of all sashes controlled by it, regardless of the angle to which the sashes have been opened.

It is also within the object of my invention to provide mechanism whereby the control sash will be operatively connected with the other sashes which have been left in an open position by simply opening it to an angle as great or greater than the angle of the other sashes, thereby obviating any necessity of careful positioning of the control sash in order to place it in controlling relation to the other sashes.

One form of my invention is exemplified in the accompanying drawings and described in detail in the following specification, wherein reference

is made to the drawings and wherein further of its objects and advantages are made apparent.

In the drawings,

Fig. 1 is a perspective view of a window with a sash control mechanism embodying my invention, one side of the window-frame being broken away to disclose details of construction;

Fig. 2 is a horizontal sectional view through a frame and sash illustrating the application of my invention;

Fig. 3 is a perspective view of a portion of a travel bar;

Fig. 4 is a perspective view of a shoe member which cooperates with the travel bar illustrated in Fig. 3;

Fig. 5 is a front elevation of the shoe illustrated in Fig. 4; and

Figs. 6, 7, 8 and 9 are side elevations of the same shoe illustrating the positions that it will assume relative to the travel bar during operation of the sashes.

Referring more particularly to the drawings, in Fig. 1 I illustrate one type of window to which my invention may be applied. The window here illustrated comprises a frame 10 and three superposed swinging sashes, illustrated at 11, shown in an open position but capable of being swung to a closed position wherein the three sashes co-operate to form a complete closure with the frame 10.

The sashes are substantially identical in construction, and are pivoted intermediate their top and bottom rails to the outer ends of links 12, the inner ends of which links are pivoted as at 13 to the frame 10. Arms 14, secured to the upper outer edges of each sash, carry trunnions 15 which are slidable in vertically extending channel-shaped guideways 16 provided in the window-frame, as best illustrated in Fig. 2.

The sashes 11, being supported in the manner above described, are free for swinging movement to and away from the frame and such swinging movement is accompanied by vertical sliding movement of the trunnions 15 in the guides 16. A vertically disposed travel bar 17 extends parallel to the guides 16 and is pivotally connected with the arms 14 by means of the outer ends of the trunnions 15, the inner ends of which are received in the guide 16, as above described. Due to the connection of this travel bar with each of the sashes, movement of any one sash will be accompanied by similar movement of the others.

In order that all of the sashes may be controlled by one and in order that they may be controlled independently of the position of the

one controlling sash, I connect one sash to the travel bar 17 by means of a shoe 18. In the drawings the shoe 18 is illustrated as connected to the lower sash, and this ordinarily will be the case due to the fact that the lower sash is more easily accessible than the upper sashes and due to the fact that it is often desirable to close the lower sash while the upper sashes are in an open position. It will be apparent, however, as the description proceeds, that any one of the sashes may be used as a control sash; and it will also be apparent that the number of sashes in a window has no bearing on the application of my invention, which is equally well adapted to windows having any number of sashes. It is likewise immaterial whether the sashes swing inwardly or outwardly, or whether some of the sashes swing inwardly while others swing outwardly.

The details of construction of the shoe by means of which the lower sash 11 is connected with the travel bar are best shown in Figs. 4 and 5; and the positions assumed by the shoe during the several stages of operation of the control sash are illustrated in Figs. 6 to 8, inclusive.

Referring to Fig. 5, the shoe is illustrated as consisting of a body portion built up of an inverted U-shaped strip 19 secured at its ends by means of rivets 20 to a spreader 21. The side walls of this body portion formed by the strip 19 are spaced apart to form a slot 22 and, if desired, the shoe may be made of a solid piece of metal having the slot 22 milled therein. A rivet 23 is shown to form a pivoted connection between the shoe and the arm 14 of the control sash, and the back of the shoe is slidably received in the guide 16 in the window-frame. Disposed within the slot 22 of the shoe are a latch 24 and a tumbler 25. A pivot pin 26 supports the latch for rocking movement relative to the shoe, which rocking movement is limited by a pin 27 extending between the side plates of the shoe and passing through an enlarged hole 28 in the latch. The pivot pin 26 is disposed as nearly as possible at the center of gravity of the member forming the latch so that the latch will tend to remain in whatever position it is placed. The hole 28 cooperates with the pin 27 to permit the upper end of the latch to swing outwardly to expose an upper shoulder 29, as in Fig. 6, and inwardly to conceal said shoulder and present an inclined surface, 29a, as in Fig. 7. The lower edge of the latch is provided with a lower outer shoulder 30 and a lower inner shoulder 31, both of which shoulders project beyond the front face of the shoe in either position of the latch. A flat surface 30a occupies the space between the shoulders 30 and 31 for a purpose hereinafter to be described.

The tumbler 25 is pivotally supported on a pin 33 and extends outwardly from the shoe to present an upper inclined surface 34 and a lower inclined surface 35. The inner end of the tumbler is shaped to engage the spreader 21 to limit its pivotal movement to the extremes illustrated by dotted lines and full lines in Fig. 9.

The lowermost end of the travel bar, which cooperates with the shoe to form a connection between the control sash and the other sashes, may be bent inwardly slightly, as illustrated in Fig. 1, so that it will, through the inherent resiliency of the metal of which it is formed, be urged toward the face of the shoe; and the extreme lower end of the travel bar is provided

with an elongated opening or slot 32 engageable with the latch 24 to form an operating connection between the control sash and the travel bar. The manner in which the control sash is connected with and released from connection with the travel bar is illustrated in Figs. 6, 7, 8 and 9, wherein the relative positions of the lower end of the travel bar and the shoe are illustrated during the different stages of operation of the window.

It will be recalled from the description of Fig. 1 that upon opening movement of the control sash, which is the lowermost sash in this illustration, the shoe 18 will be moved downwardly; and that upon closing movement of said sash, the shoe will be moved upwardly. It is obvious that if the control sash is connected by this shoe to the travel bar, the other sashes, which are permanently connected therewith, will follow the movement of the control sash; whereas, if this connection is broken, the control sash may be moved independently.

Fig. 6 illustrates the normal position of the shoe and travel bar with all of the sashes in their closed position. In this view, both the upper shoulder and the lower inner shoulder of the latch 24 are in position to be engaged with the slot 32 in the travel bar. Upon initial opening movement of the lower sash, the shoe moves downwardly, tilting the latch to the position of Fig. 7 where the upper shoulder 29 is retracted and the lower shoulder firmly engages the travel bar. Upon further opening movement the shoe draws the travel bar downwardly with it to open the other sashes connected therewith. All of the sashes are opened to the same angle, which is determined by the angle of the control sash. It may then be desired to close the control sash, leaving the other sashes in their open position. Upon closing movement of the control sash, the shoe moves upwardly, as illustrated in Fig. 8. During this upward movement the travel bar rides over the incline 29a of the latch 24, and the incline 34 of the tumbler 25. As the shoe moves upwardly, the pressure of the travel bar swings the latch about its pivot to project the upper shoulder again. Thus, during the closing movement of the control sash, there is no operative connection between the latch 24 and the travel bar.

In order to close all of the sashes by manipulation of the control sash, the latter is again moved to an open position, which movement is accompanied by downward movement of the shoe. During this downward movement of the shoe, the tumbler 25 operates to insure engagement of the travel bar with the surface 30a of the latch. As the shoe moves downwardly, the tumbler engages the travel bar which swings the tumbler to the full-line position of Fig. 9. The travel bar rides over the surface 35 and just as the control sash is opened to the angle of the other sashes, the travel bar leaves the tumbler which causes it to come to rest on the surface 30a of the latch and in engagement with the lower outer shoulder 30. If the opening movement of the control sash is continued, the other sashes will follow, due to the engagement of the travel bar with the shoulder 30. However, as soon as the opening movement is discontinued, the resiliency of the travel bar causes it to press inwardly on the surface 30a of the latch, which is thereby tripped to the position shown in Fig. 6 where its upper shoulder 29 will engage with the travel bar. The control sash is then closed, the

moving the shoe upwardly to impart the same movement to the travel bar and close the other sashes.

In Fig. 2 I show a stop 36 which, if desired, may be secured to the window-frame to trim the frame neatly, to serve as an abutment for the sash in closed position, and to conceal the operating mechanism.

With the mechanism above described, opening of the control sash will cause opening of all other sashes controlled thereby. The control sash may then be closed independently and will be entirely free of the others until it is again opened as far as the others, whereupon it will again assume its controlling relation to them. It should here be noted that even if the control sash is opened farther than the others, it will, upon subsequent closing movement, also cause them to close. This latter feature is a decided improvement over structures in which the control sash must be moved to a certain position in order to effect the desired engagement.

I have, for the purpose of illustration, shown my invention as applied to a window comprising three outwardly-swinging sashes and in which the lower sash is employed to control the others. It is, however, to be understood that the invention is in no way limited to this particular disclosure, as it may be used in many types of windows regardless of the number of sashes, the direction that they swing, or the particular sash that is chosen to control the others.

In connection with the structure of the shoe 18, it should be noted that neither the latch nor the tumbler depends upon gravity for its operation, and it is thus possible to invert the shoe for use in certain combinations of sashes where it may be used to better advantage in an inverted position.

It should also be understood that variations and changes may be resorted to in the construction and arrangement of the several parts of the invention as above described, within the scope of the appended claims.

Having described my invention, what I claim and desire to secure by Letters Patent is

1. In a window comprising a plurality of sashes controlled by operation of one sash, means whereby opening of the control sash to any angle will cause opening of the other sashes, said means operating automatically upon opening movement of the control sash to permit it to be independently closed, and means whereby subsequent opening of the control sash to the same or a greater angle will effect its connection with the other sashes for closing all sashes simultaneously.

2. In a window comprising a plurality of sash-

es controlled by operation of one sash, means whereby opening of the control sash to any angle will cause opening of the other sashes, means operating automatically upon opening movement whereby the control sash may be independently closed, and means whereby opening of the control sash to the same angle will connect it with the other sashes for further opening movement or for closing movement.

3. In an operating mechanism for multiple-sash windows comprising a travel bar and a shoe, movable longitudinally of the travel bar, means for connecting the shoe and travel bar comprising a pivoted latch having an upper latching shoulder and a lower latching shoulder, and a pivoted tumbler engageable with the travel bar to control engagement of the travel bar and latch upon their relative movement.

4. In an operating mechanism of the character described for multiple-sash windows, a travel bar having an opening formed therein, a shoe movable relative to the travel bar, and means for connecting the shoe and travel bar comprising a latch pivoted to the shoe and having latching shoulders engageable in said opening, and a tumbler pivoted to the shoe and engageable with the travel bar to control engagement of the travel bar and latch upon their relative movement.

5. In a window having separately swinging sash, means releasably connecting said sash for simultaneous operation, and means effective upon commencement of the initial opening movement of one sash to condition the connecting means to permit independent closing of said sash, whereby all the sash may be opened to any desired angle simultaneously with the said one sash, and the said one sash may be independently closed.

6. In a window of the character described, a plurality of sashes, means for controlling all of said sashes by operation of one sash, and means operable automatically upon commencement of the opening movement of the control sash for releasing the control sash to permit it to be closed while the other sashes are open.

7. In a window of the character described, a plurality of sashes, means for controlling all of said sashes by operation of one sash, and means operable automatically upon commencement of the opening movement of the control sash for releasing the control sash to permit it to be closed while the other sashes are open, said means also being operable upon opening of the control sash as far or farther than the other sashes to reestablish its controlling relation.

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