Feb. 28, 1956 K. H. ERICKSON 2,736,595

OPERATOR FOR WINDOWS WITH SWINGING SASHES

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Fig. 1

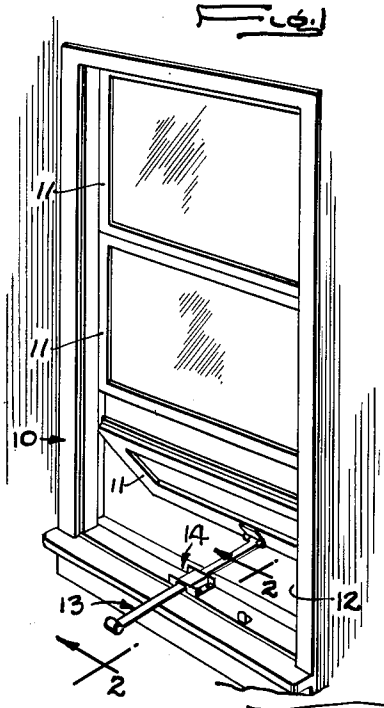


Fig. 2

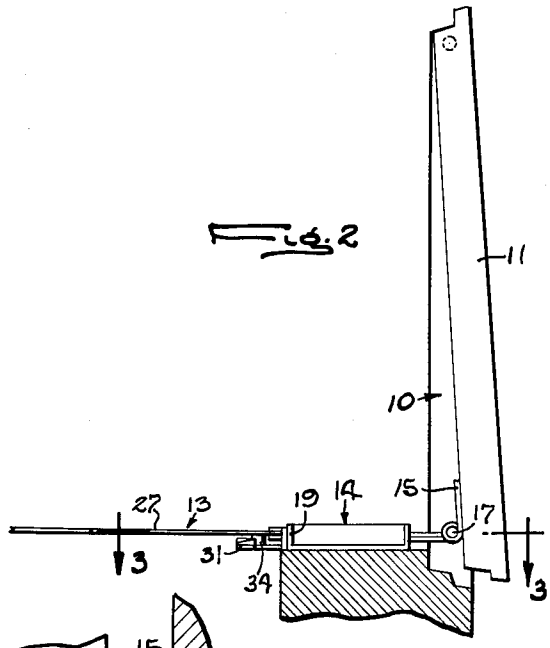


Fig. 3

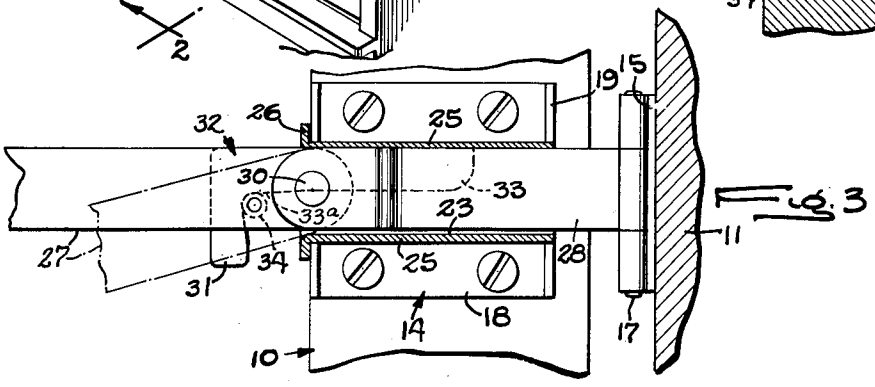
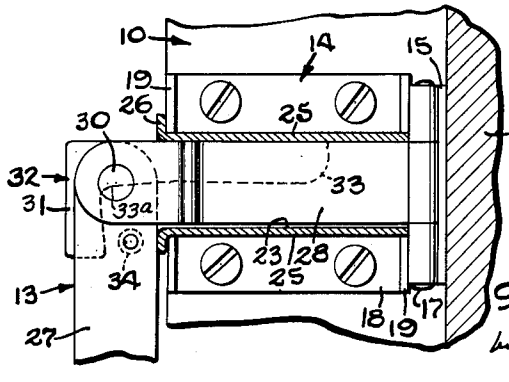


Fig. 4



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Fig. 5

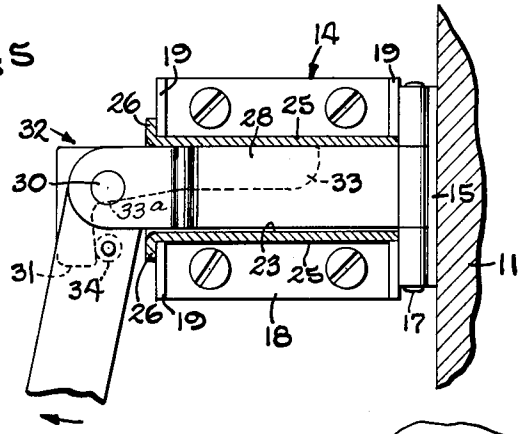


Fig. 6

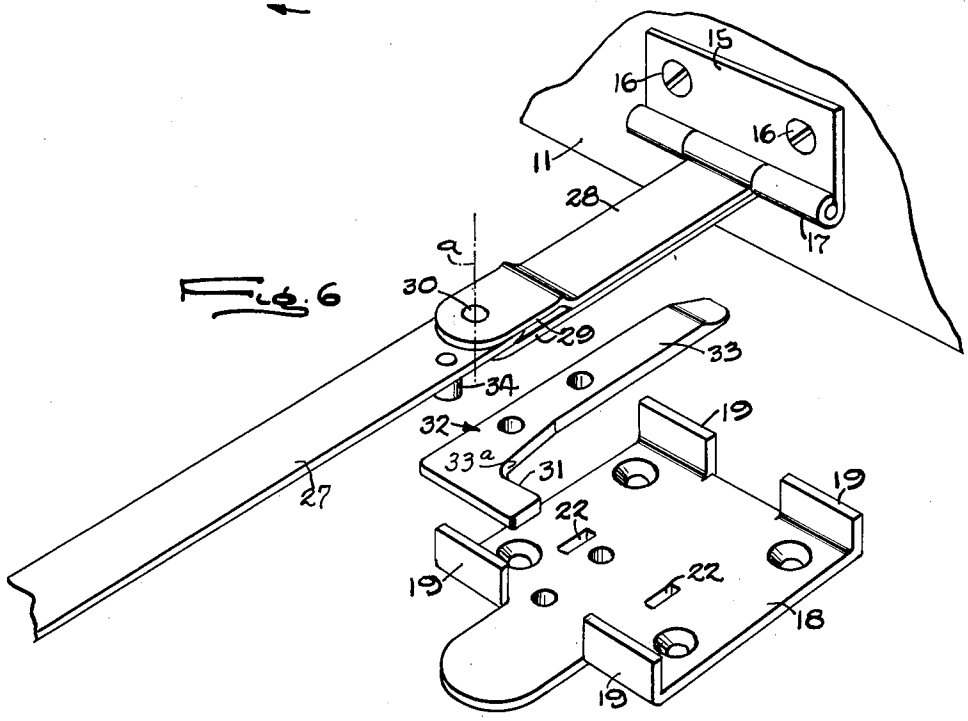
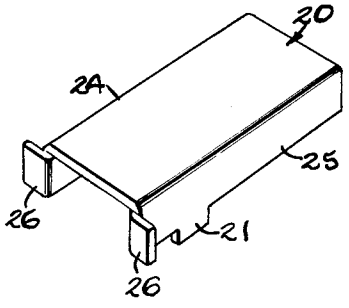


Fig. 7



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United States Patent Office 2,736,595 Patented Feb. 28, 1956

2,736,595

OPERATOR FOR WINDOWS WITH SWINGING SASHES

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Application July 13, 1955, Serial No. 521,821

7 Claims. (Cl. 292—262)

This invention relates to an operator for opening a window with a swinging sash such as in a so-called awning window in which the sash swings on the window frame about a horizontal axis. More particularly, the invention relates to an elongated operator which is secured to the sash and slides endwise in a guide on the frame to open and close the sash.

The general object of the invention is to provide a new and improved operator of the above character which insures complete closing of the sash and which facilitates opening the sash even though the latter should stick in the frame.

Another object is to provide an operator which is formed by two parts pivoted together and arranged so that swinging the outer part out of alinement with the inner part automatically cams the sash to the fully closed position.

A more detailed object is to arrange the operator and the guide so that the outer part of the operator is fulcrumed on the guide as it is swung relative to the inner part and acts as a lever in bringing the sash to the closed position.

Another object is to utilize the outer operator part again as a lever as it is returned to alinement with the inner part to initiate opening of the sash and thereby effect the opening movement easily even if the sash should bind.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a perspective view of a window embodying an operator which is constructed in accordance with the present invention.

Fig. 2 is an enlarged fragmentary sectional view taken along the line 2—2 in Fig. 1.

Fig. 3 is an enlarged fragmentary sectional view taken along the line 3—3 in Fig. 2.

Figs. 4 and 5 are fragmentary sectional views similar to Fig. 3 but show the parts in different positions.

Fig. 6 is an exploded fragmentary perspective view of the operator and a portion of the guide.

Fig. 7 is a perspective view of another portion of the guide.

As shown in the drawings for purposes of illustration, the invention is embodied in a window comprising a rectangular frame 10 and one or more sashes 11 closing an opening 12 in the frame. In the present instance, there are three sashes and each is mounted on the frame to swing about a horizontal axis which extends along the upper edge of the sash. The latter is opened by pushing outwardly on its lower edge thus swinging the sash about this axis.

To open the lower sash, an elongated operator 13 is secured at one end to the lower edge of the sash and is guided by a member 14 for endwise movement along a path perpendicular to the opening 12. The operator is secured to the sash by a plate 15 (Fig. 6) which is fastened to the sash by screws 16 and is pivotally connected to the end of the operator by a horizontal hinge 17.

The guide 14 is secured to the sill of the frame 10 and is formed by a flat plate 18 (Fig. 6) which is fastened to the sill by screws and has upturned flanges 19 at its ends. An inverted U-shaped piece 20 (Fig. 7) is disposed on top of the plate and is formed with lugs 21 which project downwardly into holes 22 in the plate to lock the two parts together. At each end of the piece 20, the flanges 19 are cut away as shown in Fig. 6 so that the piece and the plate 18 cooperate to form a tubular channel 23 with the piece defining the top wall 24 and the side walls 25 of the channel. The operator 13 slides endwise in this channel and thus is guided for movement normal to the opening 12. Projecting laterally from the side walls at the outer end of the piece 20 are short flanges 26 which overlap the flanges 19.

Herein the operator 13 is jointed, that is, it is formed by two parts 27 and 28 pivotally connected together, so that, when the sash is closed, the outer part 27 may be swung out of alinement with the inner part 28 as shown in Fig. 4. In this position, the outer part is disposed behind the guide so that it is out of the way and also prevents the operator from being moved, thereby locking the sash 11 closed. The inner part 28 may be a short bar with one end hinged to the plate 15. The other end of the bar is bifurcated and the two spaced portions 29 (Fig. 6) of this end receive between them one end portion of the outer part 27 which may be in the form of an elongated link. The overlapping end portions of the bar and the link are connected by a pivot pin 30 so that the link 27 may be swung relative to the bar 28 about an upright axis *a* defined by the pin.

In accordance with the present invention, the operator 13 is arranged in a novel manner to facilitate the final closing of the sash 11 and, at the same time, to insure that the sash is fully closed. To these ends, the outer part 27 cooperates with an element rigid with the guide 14 to cam the sash to the closed position as this part is swung out of alinement with the inner part 28. Herein, this is achieved by employing the element as a fulcrum for the link 27 whereby the latter acts as a lever for moving the pivot 30 away from the window opening 12. Such movement of the pivot slides the bar 28 and the guide and draws the sash closed.

While the fulcrum element may be any part which is rigid with the frame 10, it is preferred to utilize a part of the guide 14, in this case one of the small flanges 26 on the piece 20, for this purpose. As shown in Fig. 4, the pivot 30 is disposed along the bar 28 in such a position that the sash 11 is fully closed when the link 27 is turned at right angles to the bar and abuts against the back of the guide. When the sash is short of the closed position, the pivot is disposed within the channel 23 (see Fig. 3). Thus, as the link is swung laterally out of alinement with the bar, one edge of the link abuts against one of the flanges 26. Upon continued swinging, the link is fulcrumed on this flange and, as a result, the pivot is moved back out of the channel so that the sash is drawn closed.

Preferably, a stop 31 is employed to indicate to the person closing the window that the operator 13 is in the proper position for the link 27 to be swung in behind the guide 14. As shown in Fig. 3, this position is when the pivot axis *a* is substantially alined with the end of the guide. The stop may, as shown in the drawings, be one leg of an L-shaped bar 32 whose other leg 33 is disposed between the operator and the plate 18 and is riveted to the latter. The leg 31 is spaced behind the guide 14 where it is engaged by a pin 34 projecting downwardly from the link 27 adjacent the pivot 30. Thus, the endwise sliding of the operator in the guide is stopped when

the sash is just short of the closed position as illustrated in Fig. 3. At this time, the link is swung out of alinement with the bar to complete the closing of the sash as described above. The end of the link is rounded so that it clears the side walls **25** of the guide upon such swinging.

According to another aspect of the invention, the link **27** also is utilized as a lever for initiating the opening of the sash **11** so that the sash may easily be moved away from the closed position even if it should stick in the frame **10**. For this purpose, the link again is fulcrumed on the guide as it is swung back into alinement with the bar and, upon such swinging, the pivot **30** and hence the bar **28** is moved forward in the guide thereby opening the sash. In this instance, the fulcrum is formed by the pin **34** abutting against the leg or stop **31**. In other words, the link first is swung away from the position shown in Fig. 4 to a position shown in Fig. 5 in which the pin first engages the leg. Upon continued turning, the leg is fulcrumed on the pin and the latter slides along the leg **31** until the link again is in alinement with the bar **28** and the sash is initially opened as illustrated in Fig. 3.

As seen in Fig. 3, the pin **34** abuts the laterally facing surface **33***a* of the leg **33** when the link **27** is alined with the bar **28**. Thus, as the link is swung out to open the window, that is, from the position in Fig. 4 to the position in Fig. 3, the pin abuts against this surface which thereby positions the link to slide through the guide **14**.

It will be observed that, with an operator constructed in accordance with the invention, the sash **11** is locked in the closed position by swinging the link **27** in behind the guide **14** and, as an incident to this swinging, the sash is drawn tightly into the closed position. Also, returning the link into alinement with a bar **28** initiates opening of the sash and overcomes any sticking or binding so that the sash may easily be opened.

I claim as my invention:

1. In a window having a frame and a sash mounted on the frame to swing toward and away from a closed position, the combination of, a guide rigid with the frame and having laterally spaced side walls, a bar extending through and slidable endwise in said guide along said walls, means for securing one end of said bar to said sash, an elongated rigid link having one end overlapping the other end of said bar, a pivot joining the overlapped ends of said bar and said link to permit the link to be swung out of alinement with the bar, said link when in alinement with said bar being slidable endwise into said guide as the bar is projected outwardly to open the sash, an element rigid with said guide and having a surface spaced behind and facing toward the guide, an abutment on said link engageable with said surface when the sash is short of said position, and a part rigid with said guide and engageable with said link when said abutment engages said surface to define a fulcrum about which the link may be swung to cause said pivot to retract the bar and move the sash to the closed position, said part being operable as said link is swung back into alinement with said bar to engage said surface and act as a fulcrum whereby swinging of the link projects the bar outwardly and opens the sash.

2. For use with a window having a frame and a sash mounted on the frame to swing toward and away from a position closing the frame opening, the combination of, a guide mountable on the frame, a bar extending through and slidable endwise in said guide, a device on said bar for securing one end thereof to said window, an elongated rigid link having one end disposed adjacent the other end of said bar, a pivot joining the adjacent ends of said bar and said link to permit the link to be swung out of alinement with the bar and behind said guide when the sash is in the closed position, an element rigid with said guide and having a surface disposed behind and facing the guide, and an abutment rigid with said link behind said pivot and operable to engage said surface

and act as a fulcrum when the link is swung back into alinement with said bar thereby to project the bar outwardly through said guide and move the sash away from the closed position.

3. In a window having a frame and a sash mounted on the frame to swing toward and away from a closed position, the combination of, a guide rigid with the frame and having laterally spaced side walls, a bar extending through and slidable endwise in said guide along said walls, means for securing one end of said bar to said sash, an elongated rigid link having one end overlapping the other end of said bar, a pivot joining the overlapped ends of said bar and said link to permit the link to be swung out of alinement with the bar, said link when in alinement with said bar being slidable endwise into said guide as the bar is projected outwardly to open the sash, an element rigid with said guide and having a surface spaced behind and facing toward the guide, an abutment on said link engageable with said surface when the sash is short of said position, and a part rigid with said guide and engageable with said link when said abutment engages said surface to define a fulcrum about which the link may be swung to cause said pivot to retract the bar and move the sash to the closed position.

4. For use with a window having a frame and a sash mounted on the frame to swing toward and away from a position closing the frame opening, the combination of, a guide mountable on the frame, a bar extending through and slidable endwise in said guide in a direction perpendicular to the frame opening, a device on said bar for securing one end thereof to the sash, an elongated rigid link having one end overlapping the other end of said bar, a pivot joining the overlapped ends of said bar and said link to permit the link to be swung out of alinement with the bar and behind said guide, an abutment disposed between said pivot and the opposite end of said link and projecting laterally from said link to move along a straight path as said link and bar slide in said guide, a stop rigid with said guide and extending across said path to be engaged by said abutment, said stop being disposed behind said guide to stop the sliding of said bar and link when the sash is short of the closed position, and a part rigid with said guide and engageable with said link to define a fulcrum about which the link may be swung to cause said pivot to retract said bar and move the sash to the closed position, said abutment swinging forwardly and away from said stop upon such swinging of said link.

5. For use with a window having a frame and a sash mounted on the frame to swing toward and away from a position closing the frame opening, the combination of, a guide rigid with the frame, an elongated bar having one end secured to said sash and projecting outwardly away from the sash, an elongated rigid link pivotally connected at one end to the other end of said bar to cooperate with the bar in forming an operator to open and close the sash, said bar and said link when in longitudinal alinement being slidable endwise through said guide to swing said sash and said link being swingable out of such alinement and into a position behind the guide when the sash is in the closed position, an abutment rigid with said link and disposed between the free end of the link and the pivotal connection between the link and the bar to swing along a predetermined path as the link is swung into alinement with the bar, and an elongated abutment surface extending across said path, said abutment engaging said surface and sliding along the latter thereby to act as a fulcrum and cause the bar to slide in the guide and move the sash away from the closed position.

6. For use with a window having a frame and a sash mounted on the frame to swing toward and away from a position closing the frame opening, the combination of, a tubular guide mountable on said frame and having

two rigid laterally spaced side walls defining between them an elongated channel which extends perpendicular to said frame opening and is of predetermined width, a bar of substantially the same width as said channel extending through and slidable endwise through the channel, a device on said bar for securing one end thereof to the sash, an elongated rigid link substantially the same width as said channel and having one end overlapping the other end of said bar, a pivot joining the overlapped ends of said bar and said link to permit the link to be swung out of alinement with the bar and spaced inwardly from one side edge of the link, and means operable to stop the sliding of said link and bar when the sash is short of the closed position and said pivot is substantially alined with the end of the wall alongside said one side edge, the end of said one wall defining a fulcrum which is engaged by said one edge and about which said link may be swung to cause said pivot to retract said bar and move the sash to the closed position.

7. For use with a window having a frame and a sash mounted on the frame to swing toward and away from a position closing the frame opening, the combination of, a guide rigid with the frame, an elongated bar having one end secured to said sash and projecting outwardly away from the sash, an elongated rigid link pivotally connected at one end to the other end of said bar to cooperate with the bar in forming an operator to open

and close the sash, said bar and said link when in longitudinal alinement being slidable endwise through said guide to swing said sash and said link being swingable out of such alinement and into a position behind the guide when the sash is in the closed position, an abutment rigid with said link and disposed between the free end of the link and the pivotal connection between the link and the bar to move along a predetermined linear path as said bar and said link slide through said guide and to swing back and forth with the link as the latter is swung into and out of alinement with the bar, and a member rigid with and projecting rearwardly from said guide and having a first abutment surface extending alongside said path and a second abutment surface extending laterally from said first surface to be engaged by said abutment as said link is swung into alinement with said bar, said abutment engaging said second surface and sliding along the latter until stopped by said first surface whereby the link is alined with the bar and the sash is moved away from the closed position.

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