March 13, 1962 J. R. HOWARD 3,024,502

WINDOW SLIDER

Filed June 7, 1960

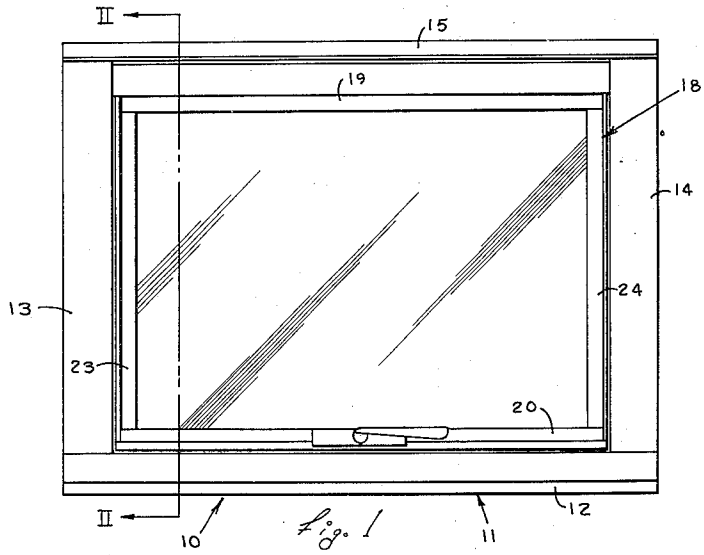


Fig. 1

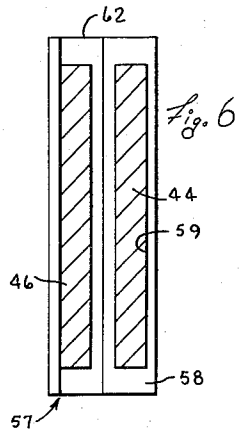


Fig. 6

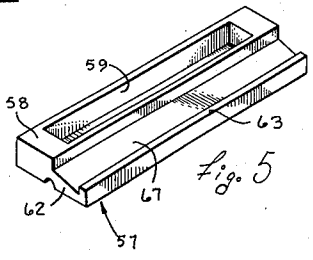


Fig. 5

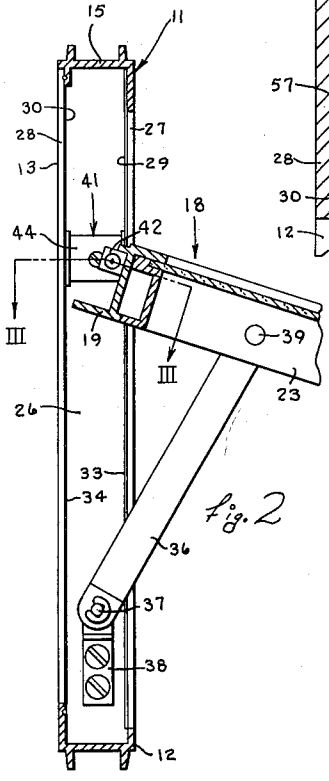


Fig. 2

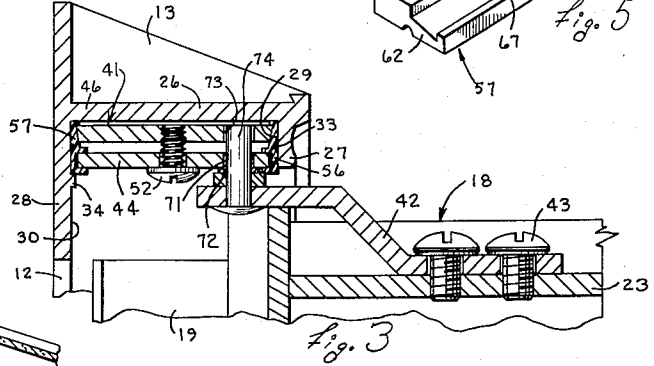


Fig. 3

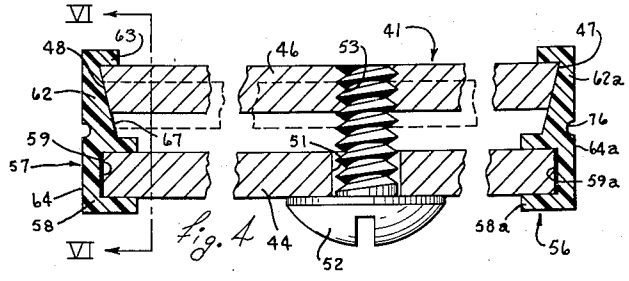


Fig. 4

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WINDOW SLIDER

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This invention relates in general to a mechanism for supporting a sash within a window frame whereby said sash can be moved into and out of a closed position with respect to said frame and, more particularly, to a slider which is part of said mechanism and can be easily adjusted to increase or decrease the ease with which said sash can move with respect to the window frame.

Many different types and styles of substantially conventional window constructions require some type of sliding contact between the window frame and some portion of the sash in order to open or close the sash. In fact some sashes are supported for both sliding and pivotal movement with respect to the window frame upon which the sash is mounted. Particularly where the sash is horizontally pivotal near one rail, it is often difficult to control its sliding action because the amount of surface involved in the sliding action is usually small. That is, the sliding function is usually provided in this type of window by a slider mounted upon the sash and having a small surface engaging the frame. Thus, frequent operation of the sash can cause enough wear in the slider to make the operation of the sash unsatisfactory, if not unsafe.

While this problem also exists in varying degrees in other types of window constructions, such as the conventional, casement window, which is pivoted around a vertical axis, it is believed that the invention is advantageously disclosed by reference to its application to the horizontally projected window in which the problem giving rise to the invention was actually encountered.

Accordingly, a principal object of this invention has been the provision of a sash-supporting mechanism which is engageable between the jambs of a window frame and a sash mounted upon said window frame for effecting movement of said sash into and out of an open position with respect to the window frame.

A further object of this invention has been the provision of a mechanism, as aforesaid, having a frame-engaging slider which is especially adapted for use with a window frame having a pair of spaced, parallel surfaces between which the slider may be disposed for simultaneous, sliding engagement with both surfaces, and wherein said slider is equipped with means for adjusting in small increments the amount of pressure between the engaging surfaces and the opposite side of the slider.

A further object of this invention has been the provision of a slider, as aforesaid, which is inexpensive to fabricate, which requires a minimum of space, which can be easily adjusted without the use of special tools, which can easily be removed for the purpose of replacing worn parts and wherein the number and cost of such replacement parts is maintained at a minimum.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon reading the following descriptive materials and examining the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a window construction embodying the invention as viewed from the interior side of the window.

FIGURE 2 is a sectional view taken along the line II—II in FIGURE 1.

FIGURE 3 is a sectional view taken along the line III—III in FIGURE 2.

FIGURE 4 is an enlarged fragment of FIGURE 3.

FIGURE 5 is a perspective view of a shoe for the slider of the invention.

FIGURE 6 is a sectional view taken along the line VI—VI in FIGURE 4.

For convenience in description, the terms "upper," "lower" and words of similar import will have reference to the window structure, as appearing in FIGURE 1. The terms "inner," "outer" and words of similar import will have reference to the geometric center of the slider of the invention and parts associated therewith. The terms "interior" and "exterior" will have reference to the corresponding sides of a window construction including the invention as normally installed in an outside wall of a building.

General Description

The objects and purposes of the invention, including those set forth above, have been met by providing a window construction including a window frame having a pair of spaced, substantially parallel surfaces extending along at least one side jamb thereof. A slider embodying the invention is disposed between and in simultaneous, sliding engagement with the parallel surfaces on said side jamb. A sash of the horizontally tilting type is pivotally secured near one end of its upper rail to the slider. A pivot arm extends between, and is pivotally mounted at its opposite ends upon said side jamb near its lower end and the adjacent sash element between its upper and lower ends. Accordingly, by moving the slider downwardly and upwardly the sash is opened and closed, respectively, with respect to the window frame.

In a preferred embodiment, the sash is pivotally mounted upon and between two sliders located at opposite ends of the upper rail, said sliders being mounted in the vertical jambs of the window frame. Each of the sliders is comprised of a pair of similar, rectangular plates which are held in spaced, parallel arrangement adjacent to one of the side jambs of the window frame by a pair of preferably identical shoes which engage the opposite vertical edges of the plates. The shoes are simultaneously in snug, sliding engagement with the opposed parallel surfaces on the corresponding side jambs. The plates are preferably fabricated from rigid, sturdy materials, such as aluminum, and the shoes are preferably fabricated from a self-lubricating material, such as nylon, for promoting slidability. The inner opposing sides of the shoe and the adjacent, engaging edges of one of the two plates in the slider have mating, planar faces which converge toward the other plate. Thus, by moving the two plates toward each other, the shoes are caused to move away from each other and thereby more snugly engage the opposing surfaces on the side jambs engaged thereby.

Detailed Construction

The window construction **10** (FIGURE 1), with which the invention is herein disclosed for illustrative purposes, is comprised of a casing or frame **11** including a sill **12**, a pair of vertical jambs **13** and **14** and a header **15**. A sash **16**, having upper and lower rails **18** and **20**, and a pair of side elements or stiles **23** and **24**, is supported upon and within the frame **11** for combined vertically slidable and horizontally tilting movement.

As shown in FIGURES 2 and 3, the vertical jamb **13** has a channel-shaped portion including a web **26** and a pair of inwardly extending flanges **27** and **28** which are preferably perpendicular to the web **26** and have opposing spaced and parallel inner surfaces **29** and **30**, respectively. The surfaces **29** and **30** have lengthwise parallel ridges **33** and **34**, respectively, which project generally toward each other, for reasons appearing hereinafter. The vertical jamb **14** (FIGURE 1) is preferably, but not necessarily, substantially identical in construction with the vertical jamb **13**, described above.

The sash 18 (FIGURE 2) is connected to the frame 11 by means including a link arm 36, which is pivotally connected at one end to the pivot pin 37 on the bracket 38, which is secured to the inner surface of the web 26 near the lower end of the vertical jamb 13. The other end of the link arm 36 is pivotally secured to the sash element 33 by the pivot pin 39. Another link arm, not shown, which may be substantially identical to the link arm 36, may be connected in a similar manner between the vertical jamb 14 and the sash element 24 (FIGURE 1).

The sash 18 (FIGURE 3) is pivotally and slidably connected to the frame 11 by means including the slider 41 and the hinge bar 42, which is rigidly secured by the screws 43 to the sash element 23 near its upper end. The hinge bar 42 preferably intersects the lengthwise axis of the top rail 19 adjacent to one end thereof.

The slider 41 is comprised of a pair of rectangular, rigid and preferably flat plates 44 and 46 which are disposed between the flanges 27 and 28, substantially parallel with the web 26. The outer plate 46 has vertical edges 47 and 48 which are slightly but noticeably divergent with respect to the surfaces 29 and 30, respectively, on the flanges 27 and 28 in the direction toward the inner plate 44. That is, the edges 47 and 48 lie within two planes which converge toward the inner plate 44. As shown in FIGURE 4, the inner plate 44 has an opening 51 through which the screw 52 is slidably received for threaded reception into the threaded opening 53 in the outer plate 46.

A pair of shoes 56 and 57 (FIGURE 3), which are preferably identical, are disposed adjacent to the flanges 27 and 28, respectively. The shoe 57, for example (FIGURES 4, 5 and 6) includes a holding portion 58 which is elongated substantially rectangular and has an elongated rectangular recess 59 in its inner surface into which the adjacent edge of the inner plate 44 is slidably and snugly received. The outer face 64 of the shoe 57 (FIGURES 3 and 4) is substantially planar for sliding engagement with the surface 30 on the flange 28.

The shoe 57 (FIGURES 4 and 5) has a flange 62 which is integral with and extends along and away from one side of the body member of mounting portion 58. The free edge of the flange 62 has an inwardly projecting bead 63 which extends lengthwise thereof. The outer face 64 of the shoe 57 is flat and preferably extends from the bead 63 to the remote edge of the mounting portion 58 to provide a planar surface slidably engageable with the surface 30 on the flange 28. The inner face 67 of the flange 62 is convergent with respect to the outer face 64, in the same direction and preferably in the same amount that the edge 48 of plate 46 is convergent with respect to the surface 30. The inner face 67 snugly and matingly engages the edge 48 of the plate 46 when the face 64 of the shoe 57 is against the surface 30 on flange 28. The distance between the bead 63 and the holding portion 58 is greater than the thickness of the outer plate 46 to permit movement of said outer plate toward or away from the inner plate 44 in response to tightening or loosening of the screw 52. The arrangement and inclinations of the engaging surfaces between the plate 46, the shoe 57 and the flange 28 will cause the shoe 57 to be moved more snugly against the surface 30 in response to the tightening of the screw 52.

The shoe 56 (FIGURE 3) is preferably identical with the shoe 57 in this particular embodiment. Accordingly, the above detailed description of the shoe 57 and associated parts of the plates 44 and 46 applies in substance to the shoe 56, which has a holding portion 58*a* and a flange 62*a*.

The inner plate 44 (FIGURE 3) has an opening 71 through which the bushing 72 is snugly received. The outer plate 46 has an opening 73 coaxial with the bushing 72. A hinge pin 74 is secured to the hinge bar 42 near its free end for snug, rotatable reception into and through the bushing 72, as well as the opening 73. The opening 73 may be larger than the diameter of the hinge pin 74 to avoid interference therebetween.

Another slider, not shown, which may be identical with the slider 41, may, if desired, be mounted in the vertical jamb 14 for connection to the sash 18 in substantially the same manner and for the same purposes as discussed above with respect to the slider 41.

The ridge 34 on flange 28 is preferably spaced from the web 26 a distance about equal to the width of the shoe 57 (or shoe 56) so that the shoe can be slidably disposed between the web and the ridge. The shoe 56 (and the shoe 57) has a lengthwise groove 76 (FIGURE 4) in its outer face 64*a* into which the ridge 33 on flange 29 is slidably received when the flange 62*a* is against the web 26.

Operation

The sash 18 (FIGURE 1) is opened with respect to the casing 11 by pushing outwardly upon the lower rail 20. This causes the sash 18 to pivot with respect to the link bar 36 as the upper end of the sash 18, as well as the slider 41 thereon, moves downwardly along the vertical jamb 13.

If, during such opening of the sash 18 the slider 31 moves too freely along the vertical jamb 13, it can be adjusted to engage the jamb more snugly by tightening the screw 52, whereby the plates 44 and 46 are moved toward each other and accordingly, the shoes 56 and 57 are moved outwardly against the surfaces 29 and 30. If opening of the sash 18 requires an excessive amount of urging, then the slider 41 is engaging the vertical jamb 13 too snugly. This problem is overcome simply by loosening the screw 52 which is clearly visible, as shown in FIGURE 2, when the sash 18 is in open or partially open position. By loosening the screw 52, the outer plate 46 is permitted to move away from the inner plate 44 so that said shoes can move towards each other and away from the respective surfaces 29 and 30. If the plate 46 does not automatically move away from the plate 44, due to the inclined plane action between the edges of the plate 46 and the shoes 56 and 57, a light tapping on the head of the screw 52 will effect such movement.

Normally, the inner plate 44 will not be completely bottomed in both of the recesses 59 and 59*a* so that no substantial amount of pressure will be applied upon the shoes 56 and 57 by the inner plate 44 toward the surfaces 29 and 30.

It will be apparent that, under some circumstances, it may be desirable to reverse the positions of the plates 44 and 46 and, accordingly, reverse the positions of the shoes 56 and 57 in a corresponding manner. Thus, plate 46, having the inclined plane relationship with the shoes, would be on the inside of the slider 41 instead of the outside thereof, as shown in FIGURE 3.

Thus, although a particular preferred embodiment of the invention has been disclosed above for illustrative purposes, it will be recognized and understood that variations and modifications of the disclosed structure, which lie within the scope of the appended claims, are fully contemplated.

What is claimed is:

1. A slidable fixture for supporting a sash within a window frame, said frame including an elongated, channel-shaped, frame element having a web and a pair of spaced, parallel flanges, said fixture comprising: a pair of parallel, spaced, adjustment plates parallel with said web and extending between said surfaces, the plate adjacent said web having surfaces on the opposite edges thereof sloping away from said flanges and converging toward the center of the other adjustment plate; a pair of shoes disposed between the edges of said plates and said flanges, said shoes having parallel, remote surfaces slidably engaging said flanges, each shoe having three, spaced, inwardly projecting flanges, said other adjustment plate being located between the middle flange and the flange of each

shoe which is remote from said web and being held thereby against substantial movement toward and away from said web, the first-mentioned adjustment plate being located between said middle flange and the flange of each shoe which is adjacent said web and being movable therebetween in a direction transverse to said web, said shoes each having a sloping surface between said middle flange and said adjacent flange, which sloping surfaces converge in a direction toward said other adjustment plate and slidably engage the sloping surfaces of said one adjustment plate; and means for moving said one adjustment plate toward and away from said other adjustment plate.

2. A slidable fixture according to claim 1 including a link pivotally connected to said adjustment plates and said sash.

3. A slidable fixture according to claim 2 wherein said shoes are made of a self-lubricating plastic.

4. A slidable fixture for supporting a sash within a window frame, said frame including an elongated, channel-shaped, frame element having a web and a pair of spaced, parallel flanges substantially perpendicular to said web, said fixture comprising: a pair of spaced, rigid plates parallel with said web and extending substantially between said flanges, the plate adjacent said web having surfaces on the opposite edges thereof sloping with respect to said flanges and converging toward the center of the other plate; a pair of shoes disposed between the said edges of said plates and said flanges, said shoes being formed from material having self-lubricating characteristics and having parallel, remote surfaces slidably engaging said flanges, the adjacent surfaces of said shoes having means projecting therefrom between said plates for positioning said shoes with respect to said other plate, and holding means on said adjacent surfaces and on one side of said projecting means and cooperating therewith for holding said other plate against movement with respect to said shoes toward said web, the adjacent surfaces of said shoes having sloping portions on the other side of said projecting means, which sloping portions converge in a direction toward said other plate and slidably engage the sloping surfaces of said adjacent plate; and means for moving said adjacent plate toward and away from said other plate.

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