Aug. 30, 1960 M. TUCKER 2,950,510

VENT LOCKING MEANS FOR AWNING TYPE WINDOWS

Filed Sept. 22, 1959 4 Sheets-Sheet 1

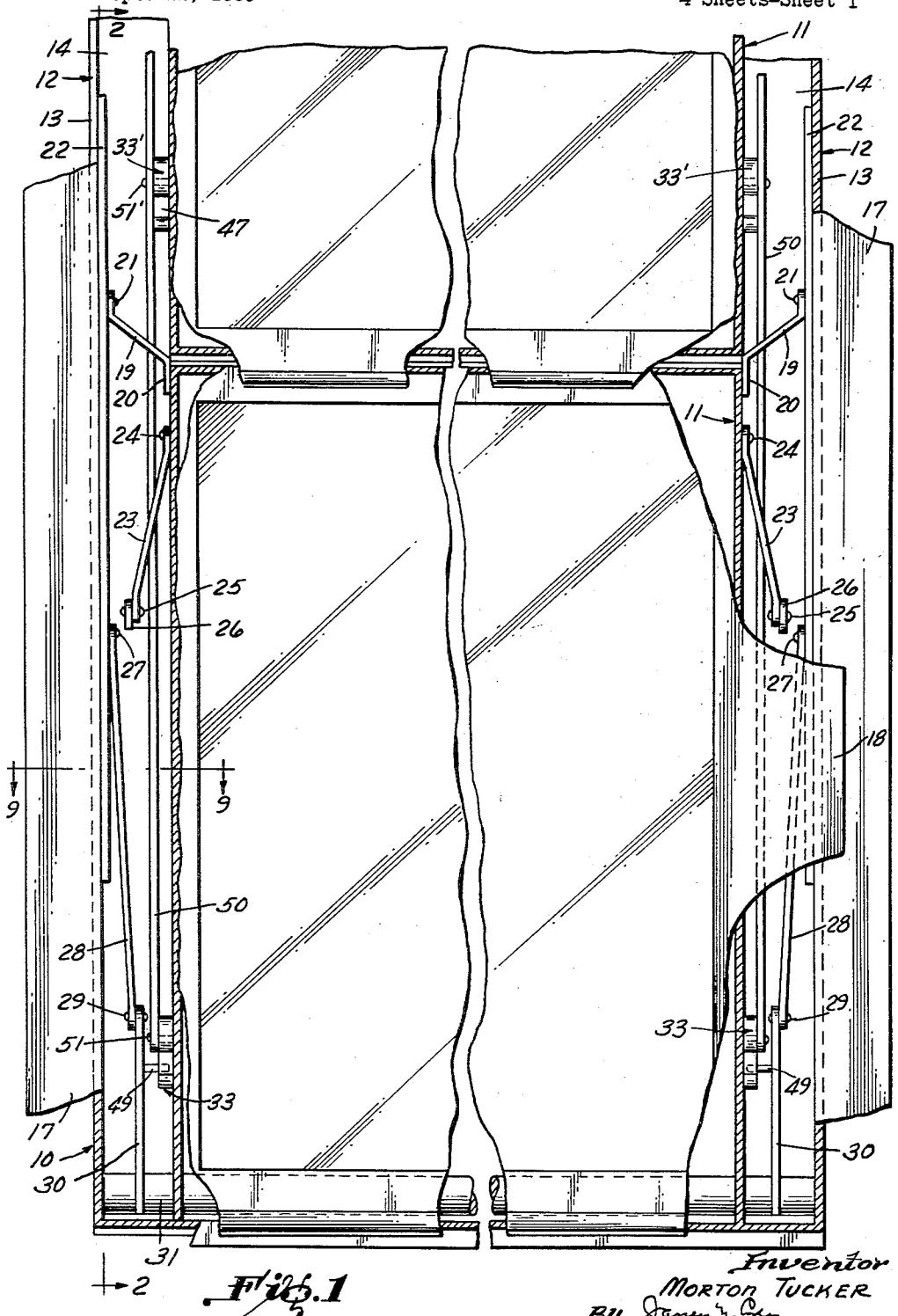


Fig. 1

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VENT LOCKING MEANS FOR AWNING TYPE WINDOWS

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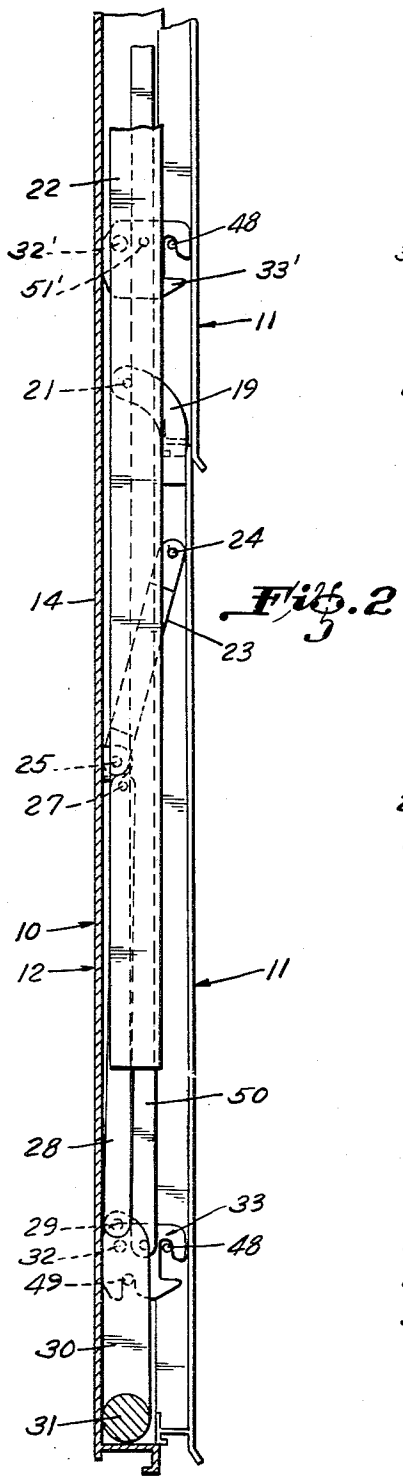


Fig. 2

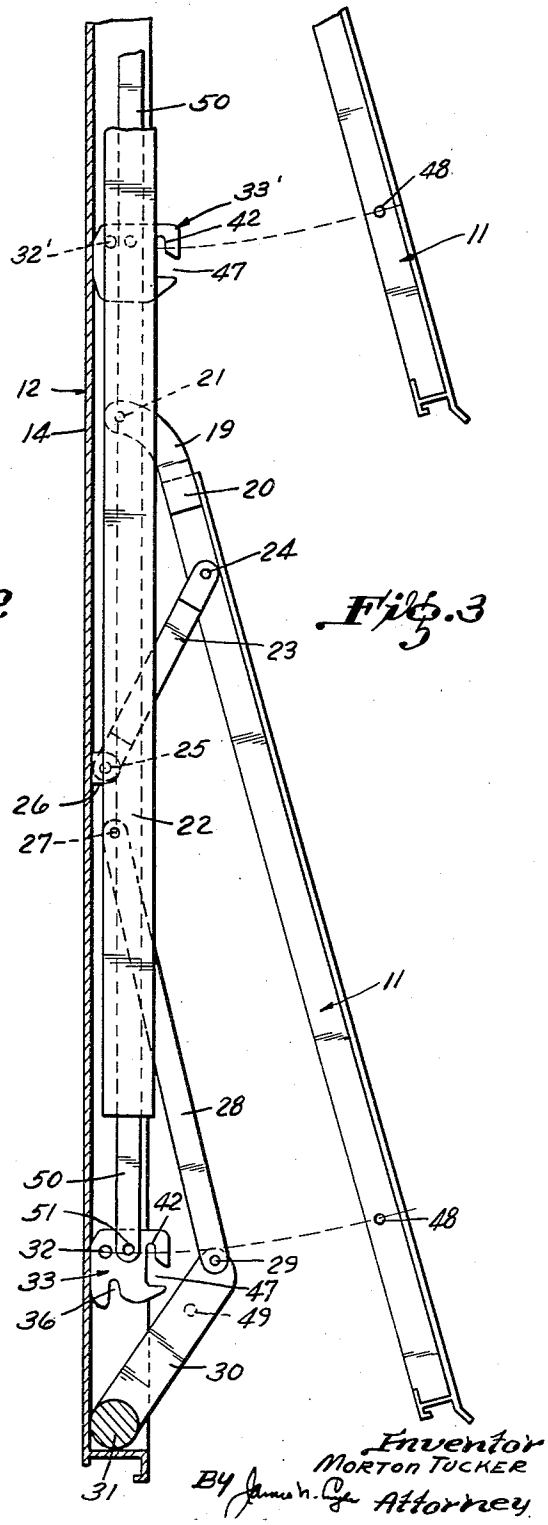


Fig. 3

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VENT LOCKING MEANS FOR AWNING TYPE WINDOWS

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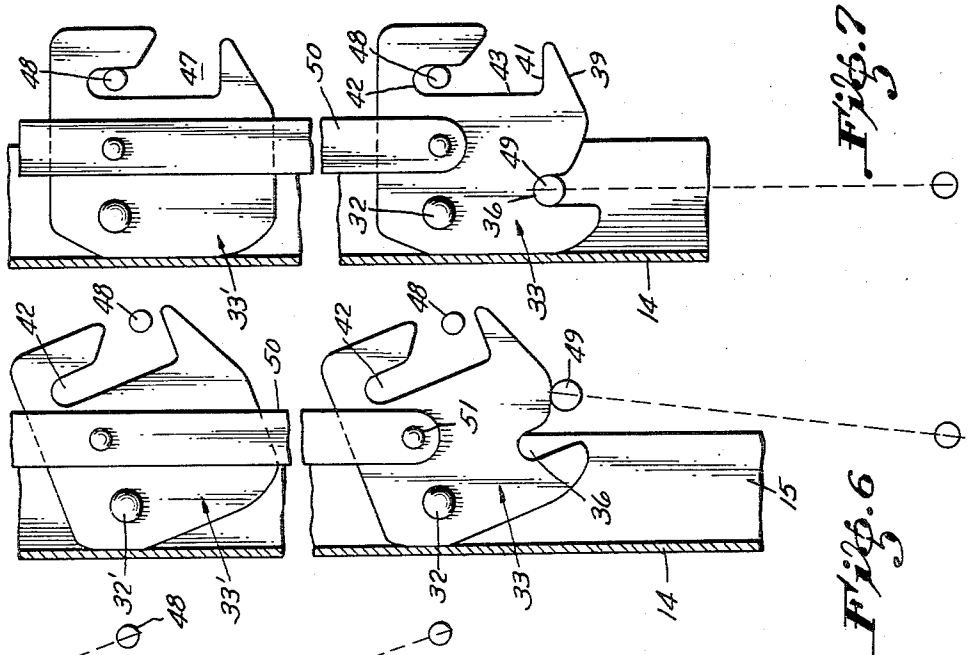


Fig. 7

Fig. 6

Fig. 5

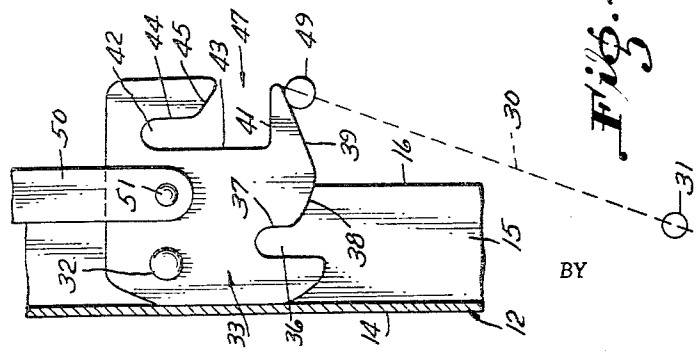


Fig. 4

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VENT LOCKING MEANS FOR AWNING TYPE WINDOWS

Filed Sept. 22, 1959 4 Sheets-Sheet 4

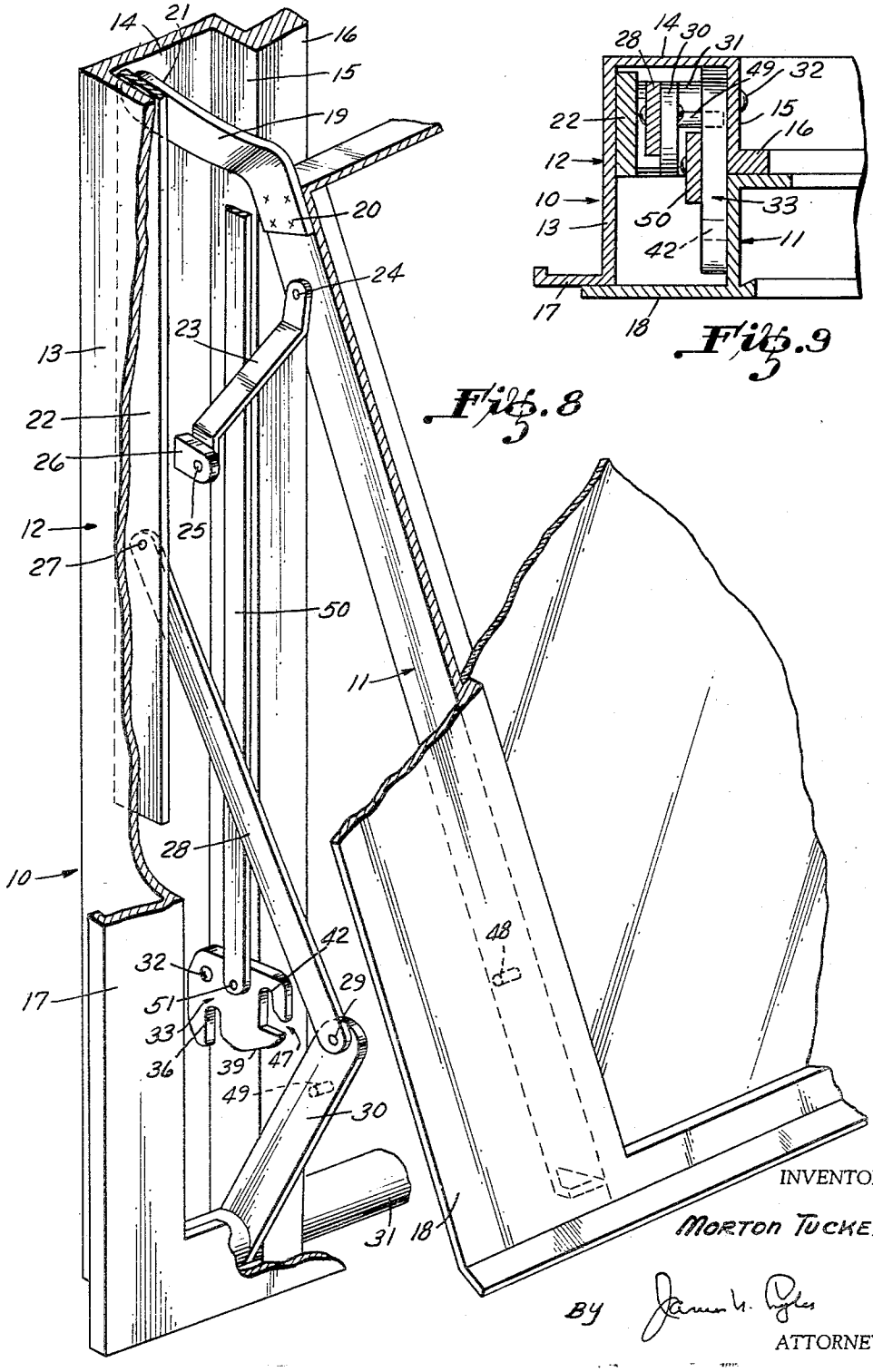


Fig. 8

Fig. 9

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2,950,510

VENT LOCKING MEANS FOR AWNING TYPE WINDOWS

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Filed Sept. 22, 1959, Ser. No. 841,518

1 Claim. (Cl. 20—42)

This invention relates to awning type windows, and more particularly to improved simplified means for locking the vertically swingable sashes of awning type windows.

The invention is an improvement upon the structure disclosed in my prior Patent 2,893,728, July 7, 1959, for Vent Locking Means For Awning Type Windows, and it is the object of the invention to provide awning type window locking means which is positive and efficient in operation, economical to manufacture, and suitable for installation upon awning type windows having any desired number of vertically swingable sashes.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the accompanying drawings, forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a fragmentary front elevation of an awning type window having the improved sash locking mechanism of the present invention, parts broken away, and parts in section.

Figure 2 is a vertical section taken substantially on line 2—2 of Figure 1, and showing the awning type window in the closed and locked condition.

Figure 3 is a similar sectional view showing the window sashes in open positions.

Figures 4 through 7 are side elevational views, partly diagrammatic, of disc latches and associated elements of the locking mechanism in various operative positions during the movement of the window sashes from open to closed positions.

Figure 8 is an enlarged fragmentary perspective view of a sash and associated locking and operating means, parts broken away and parts in section.

Figure 9 is a fragmentary horizontal section taken on line 9—9 of Figure 1.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 10 designates generally a main rectangular window frame of the type commonly formed from extruded aluminum members, and being of a size to accommodate any preferred number of vertically swingable window sashes 11, arranged one above another, in the manner usual for awning type windows.

The main frame 10 embodies vertical frame sides 12, which are generally channel-shaped in cross section, to form outer vertical webs 13, rear walls 14, and inner vertical webs 15, carrying vertical abutment flanges 16, against which the sashes 11 bear when the awning type window is closed or locked. The outer vertical web 13 of each main frame side 12 projects forwardly of the inner web 15 and flange 16, for a substantial distance, and carries an integral laterally outwardly extending vertical abutment flange 17, to be engaged by a coacting overlying flange 18 upon each window sash 11. The flange 17 of main frame 10 extends continuously about the entire margin of the rectangular main frame 10.

The construction of the main frame 10 and sashes 11 is largely conventional, and well known in the art, and no further description of these elements is believed to be necessary to a full understanding of the present invention.

Each rectangular sash 11 of the awning type window is provided at its upper corners with outwardly offset hinge arms 19, welded or otherwise rigidly secured thereto at 20. The upper ends of the hinge arms 19 are pivoted at 21 to long vertically shiftable operator bars 22, slidably mounted within the frame sides 12, adjacent to the inner faces of the webs 13. The operator bars 22 are suitably guided for vertical reciprocation by conventional means, not shown.

A pair of fulcrum links 23 for each vertically swingable sash 11 is provided near and below the upper end of each sash, and the upper ends of these fulcrum links are pivoted at 24 to the frame sides of each sash 11, as shown. The lower ends of the fulcrum links 23 are pivoted at 25 to stationary lugs 26, rigidly secured to the rear walls 14 of main frame sides 12, near the transverse centers of the latter. The lugs 26 project forwardly of the rear walls 14, as shown in the drawings.

The vertically shiftable operator bars 22 are pivotally connected near their lower ends, as at 27, with links 28, having their lower ends pivotally secured at 29, to vertically swingable cranks 30, rigidly secured to a transverse horizontal rock shaft 31, arranged within the bottom of the main window frame 10 and having its ends journaled thereon for rotation in a conventional manner. The rock shaft 31 is adapted to be turned by conventional manually operated means, not shown.

The construction thus far described is substantially conventional, and it will be understood that as many of the sashes 11 as desired may be provided within the main frame 10 of the awning type window. The operator bars 22 are made in any desired length for connection at 21 with the hinge arms 19 of the particular number of sashes employed in the window. Only one pair of the links 28 and cranks 30 are employed in the awning type window, however. The arrangement is such that rotation of the rock shaft 31 swings the cranks 30 vertically, and through the medium of the links 28 shifts the operator bars 22 upwardly or downwardly longitudinally. This causes the hinge arms 19 to have their pivots 21 shifted vertically a corresponding amount, and the fulcrum links 23 connected with the fixed lugs 26 serve during this movement of the operator bars 22 to swing the sashes 11 vertically upon their pivots 21, in one direction or the other, to open or close the sashes. This mode of operation of the awning type window is likewise substantially conventional.

Pivotally secured at 32 to the inner face of each flange 15, near and above the lower end of the lowermost sash 11 and just outwardly of each frame side of the lowermost sash, is a disc latch 33. Each disc latch 33 for the lowermost sash 11 has a rear vertical edge portion 34, adapted to engage the rear wall 14 of main frame side 12 in one adjusted position, Figures 4 and 7. Each disc latch also has an inclined rear edge portion 35, adapted to engage the rear wall 14 in another adjusted position, Figure 6. The pivot 32 for each disc latch 33 is arranged so that the disc latch may pivot freely between its positions shown in Figures 4 and 6, and the abutting engagement of the edges 34 and 35 of the disc latch with the rear wall 14 positively limits the extent of vertical swinging movement of each disc latch 33. As shown in Figures 4 through 7, the major portion of the disc latch 33 projects forwardly of the pivot 32, so that the disc latch under the influence of gravity tends normally to assume the position illustrated in Figure 4, wherein the edge portion 34 is in contact with the rear wall 14.

Each disc latch 33 for the lowermost sash 11 has a

first upstanding slot 36 opening through its lower edge, and one side 37 of the vertical slot 36 is foreshortened, and leads to a dwell cam edge 38, which is substantially horizontal when the disc latch 33 is in the position shown in Figure 6. The dwell cam edge 38 of the disc latch leads to an upwardly inclined cam edge 39, forming the lower side of a forwardly projecting finger 40, having an upper edge 41 which is horizontal when the disc latch is in the position shown in Figure 4. The dwell cam edge 38 causes the disc latch 33 to dwell or remain stationary while pin 49 travels over the edge 38.

Each disc latch 33 has a second or forward upstanding vertical slot 42 having a long vertical rear edge 43, arranged at right angles to the edge 41. The forward slot 42 has a foreshortened forward edge 44, leading to a downwardly inclined cam edge 45, converging with the forward vertical edge 46 of the cam latch 33 as shown. A relatively large forward opening 47 in the disc latch 33, directly above the finger 40 leads into the lower end of the slot 42.

Laterally outwardly projecting pins 48, carried by opposite sides of the lowermost sash 11, near and above its lower end, are adapted to enter the passages 47 and forward slots 42 of disc latches 33, during the operation of the window locking mechanism as will be further described. Laterally inwardly projecting pins 49, carried by the vertically swingable cranks 30, are engageable with the cam edges 39 and dwell edges 38, and are also engageable within the rear slots 36 of the disc latches 33 during the operation of the mechanism, as will be described.

Similar pairs of disc latches 33' for the additional vertically swingable sashes 11 above the lowermost sash in the awning type window are also provided, and pivoted at 32' to the inner flanges 15 of the main frame sides 12. The upper disc latches 33' are identical in construction to the lowermost disc latches 33, except for the fact that the slot 36 and dwell edge 38, leading into the slot, is omitted entirely from each disc latch 33'. The reason for this omission is due to the fact that only one set of the pins 49 is present in the mechanism, for coaction with the lowermost pair of disc latches 33. Each window sash 11 above the lowermost sash carries a pair of the locking pins 48, previously described, for coaction with the slot 42 of the disc latch 33'.

The lowermost pair of disc latches 33 are interconnected with all of the overlying disc latches 33' of the mechanism, for movement in unison therewith, by vertical shifter links 50, of the necessary length to span the particular number of disc latches employed in the mechanism. The lower ends of the links 50 are pivoted at 51 to the lowermost disc latches 33, forwardly of the pivots 32, as shown. The links 50 are also pivoted at 51' to the overlying disc latches 33', at corresponding points, forwardly of the pivots 32'. The links 50 pass close to the inner faces of the vertical flanges 15 of the main frame sides 12, as shown in the drawings. The links 50 lie adjacent to the outer faces of the disc latches 33 and 33', as viewed in Figures 1 and 8.

In operation, the several sashes 11 of the awning type window are swung in unison from the open position of Figure 3 to the closed position of Figure 2, or vice-versa, by rotating the rock shaft 31 upon its longitudinal axis, by conventional means not shown.

Assuming that the window sashes ars closed, as in Figure 2, and the operating cranks 30 are in the vertical positions shown in Figure 2, the operator bars 22 are elevated a maximum amount and the links 28 are substantially vertically disposed. The pivots 21 of hinge arms 19 have been elevated, and the fulcrum links 23, fixed at their lower ends, have swung the several sashes 11 to their closed positions. The lower disc latches 33 and all of the upper disc latches 33', Figure 2, are now serving to maintain the sashes 11 locked in the closed

position, wherein the sashes bear against the abutment flanges 16.

Assuming further that it is desired to open the awning type window, the rock shaft 31 is turned for swinging the cranks 30 toward their positions shown in Figures 3 and 8.

When this movement of the rock shaft 31 is commenced, and with particular reference to Figures 4 through 7 of the drawings, in their inverse order, initial outward or clockwise swinging movement of the cranks 30, Figure 6, causes the pins 49 to engage the edges 37 of rear slots 36, and to begin turning the disc latch elements 33 counter-clockwise upon their pivot pins 32. The pins 49 of cranks 30 move out of the slots 36, as the disc latches 33 assume their positions of Figure 6 and the pins 49 now travel over the horizontal dwell edges 38 of the disc latches as the several sashes 11 begin to swing open. The previously described interconnection between the disc latches 33 and 33' provided by the links 50 causes all of the disc latches 33 and 33' to swing in unison, under the influence of the pins 49 as indicated in Figure 6.

As the rock shaft 31 continues to turn in the direction for opening the awning type window, the pins 48 of the individual sashes 11, Figure 6, pass from the forward slots 42 and begin to pass through the forward openings 47, as shown. As this movement continues, Figure 5, the sash pins 48 move entirely clear of the disc latches 33 and 33', and the pins 49 of cranks 30 engage the edges 39 and finally assume the position shown in Figure 4 when the awning window is opened. The pins 49 of cranks 30 may now pass beyond and forwardly of the fingers 40 of the disc latches 33, depending upon the extent of opening of the awning window. The discs latches 33 and 33' now return under the influence of gravity to the position indicated in Figure 4 and also in Figure 7, when the window is opened.

With continued reference to Figures 4 through 7, in their regular order, the rock shaft 31 may now be turned in the opposite direction for closing the several sashes of the window. When this occurs, and as the cranks 30 turn counter-clockwise, the pins 49 of these cranks will initially engage the cam edges 39 of the lowermost disc latches 33 as indicated in Figure 4. Further closing movement of the cranks 30 will cause the pins 49 to slide against the cam edges 39 and swing the disc latches 33 counterclockwise, Figure 5, and the upper disc latches 33' will likewise move in unison with the lower disc latches, under the influence of the links 50. Continued closing movement of the cranks 30 will cause the pins 49 to shift the disc latches 33 to their positions shown in Figure 6, wherein the inclined edge portions 35 abut the rear walls 14 of the main frame sides 12. This limits the clockwise turning movement of the disc latches, and the pins 49 now travel onto the dwell edges 38 of the lowermost disc latches 33, Figure 6.

Continued inward or closing movement of the cranks 30 while the pins 49 are engaging the dwell edges 38, allows the disc latches 33 and 33' to dwell or remain stationary, while the pins 48 of all sashes 11 continue to move inwardly and to enter the openings 47 leading to the forward upstanding slots 42.

By the time that the several sashes 11 have been swung to the fully closed position, Figure 2, the pins 48 of the sashes are positioned to enter the slots 42, and the pins 49 of cranks 30 have now passed off of the dwell edges 38 and are positioned to enter the slots 36 of the lowermost disc latches 33, Figure 7. The cranks 30 are now substantially vertically disposed, as in Figure 2, and the disc latches 33 and 33' return by gravity to the active or locking positions shown in Figure 7 and also in Figure 2. At this time, the vertical edge portions 34 of the disc latches return into engagement with the rear walls 14, as shown.

It is thus seen that the mechanism which I have pro-

vided securely locks all of the window sashes **11** in the closed position in a weather-proof manner. The locking mechanism functions automatically when the window sashes move toward their open positions to free the locking pins **49** and **48**, as described above.

The arrangement of the slots **36** and **42**, and associated elements in the disc latches **33** and **33'** is simpler and more economical in construction than the corresponding arrangement shown in my mentioned prior patent. The disc latches **33** and **33'** may be conveniently formed from sheet metal by stamping, and it is unnecessary to employ castings or to have the slots of the disc latches formed in opposite sides thereof and only partly therethrough, as in the mechanism of my prior patent. In the present mechanism, the slots **36** and **42** are formed entirely through the sheet metal disc latches **33** and **33'**, and the construction of these elements is simpler and less expensive. Additionally, with the present mechanism, the operation of the entire window mechanism is rendered more positive and smoother.

The lost motion inherently present in the pivots of the window sash swinging linkages is sufficient to allow the pins **49** of cranks **30** to turn the disc latches **33** upon their pivots **32**, before the sashes **11** begin to swing open, and this lost motion in the linkages prevents binding of the sash pins **48** with the slots of the disc latches when the windows are opened.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention of the scope of the subjoined claim.

Having thus described my invention, I claim:

An awning type window structure comprising a frame, upper and lower sashes, means to pivotally mount the sashes upon the frame, hinge arms secured to the sashes, vertically swinging cranks, means to mount the cranks upon the frame and to turn the cranks, means operated by the movement of the cranks to move the hinge arms, upper and lower disc latches arranged near the lower ends of the upper and lower sashes and adjacent to the sides of such sashes, pivot means mounting each disc latch upon the frame, each disc latch having a rear longitudinal edge which engages the face of the frame when each disc latch is moved to the vertical position, each disc latch being provided with a second longitudinal edge at the top of the first longitudinal edge and disposed at an angle with relation thereto, the pivot means of each disc latch being near and opposite to the meeting ends of the rear longitudinal edges of each disc latch, each disc latch being provided near and spaced from its forward longitudinal edge with an elongated slot which is parallel with the rear longitudinal edge of each disc latch and is vertical when each disc latch is vertical, the last-named slot passing through the opposite side faces of each disc latch, each disc latch being provided at its forward edge with a large opening which leads into the lower end of the slot of each disc latch, each large opening having a lower edge which is horizontal when each disc latch is vertical, each disc latch being provided at the top of the large opening with an inclined edge which leads to the lower end of said slot, said large opening passing through the opposite side faces of each disc latch, each lower disc latch also having a rear slot which is vertical when the lower disc latch is vertical, each rear slot extending through the opposite faces of each lower disc latch, each lower disc latch having a forwardly extending vertically inclined cam face beneath and adjacent to the large opening of each lower disc latch and having a dwell cam face extending between the vertically inclined cam face and the rear slot of each lower disc latch, laterally extending pins secured to the sides of the sash frames near their lower ends for movement into the large openings and rear vertical slots of the upper and lower disc latches, and laterally extending pins secured to the cranks near their upper ends and arranged to engage the lower inclined cam faces of the lower disc latches and the dwell cam faces and to enter the rear vertical slots of the lower disc latches, the last-named pins engaging the longitudinal edges of the lower rear slots and having a gear action therewith to quickly and positively swing the lower disc latches to the closed vertical position.

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