

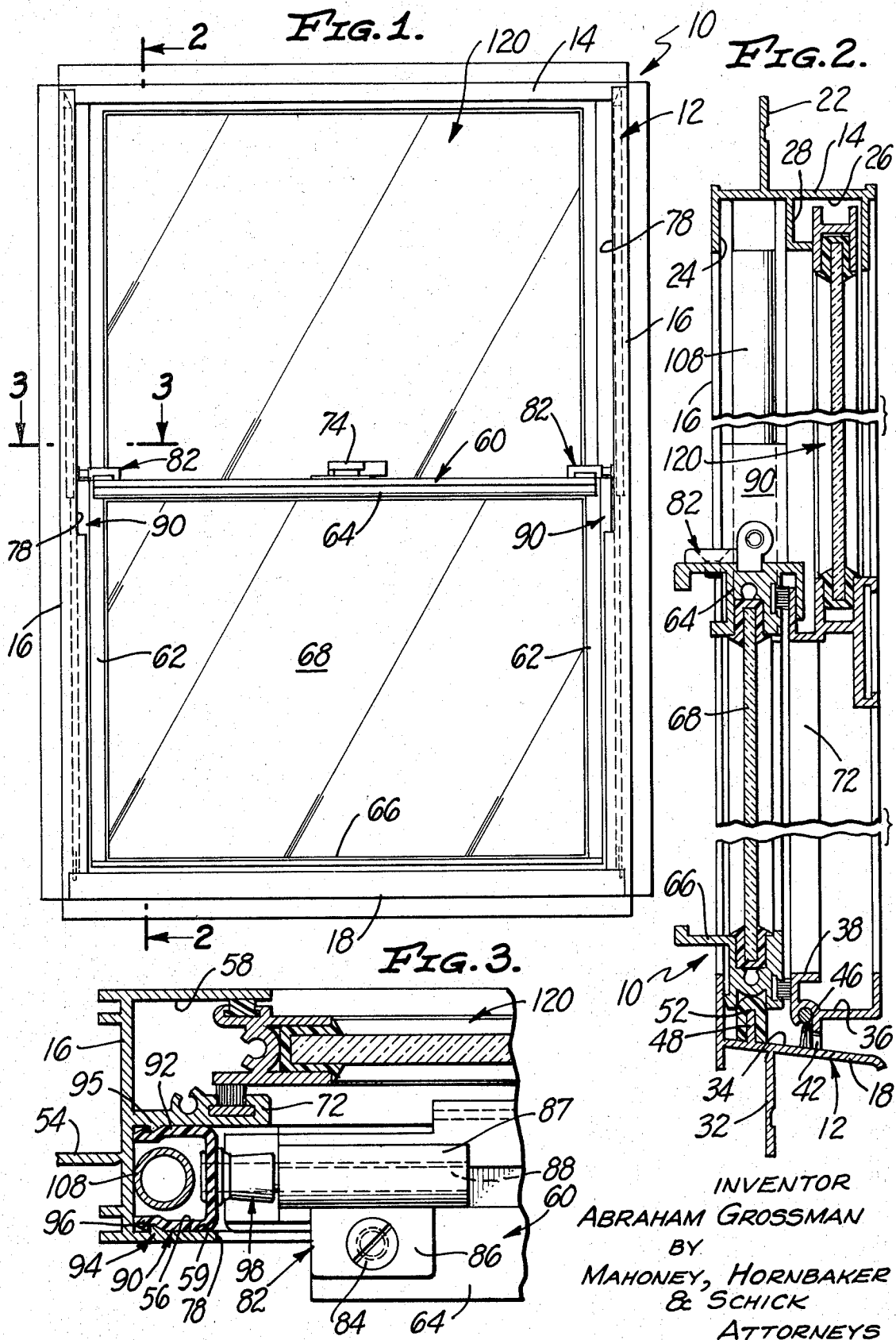
Sept. 22, 1970

A. GROSSMAN
FENESTRATION DEVICE INCORPORATING LINEARLY
MOVABLE AND TILTABLE SASH

3,529,381

Filed Nov. 25, 1968

2 Sheets-Sheet 1



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FIG. 4.

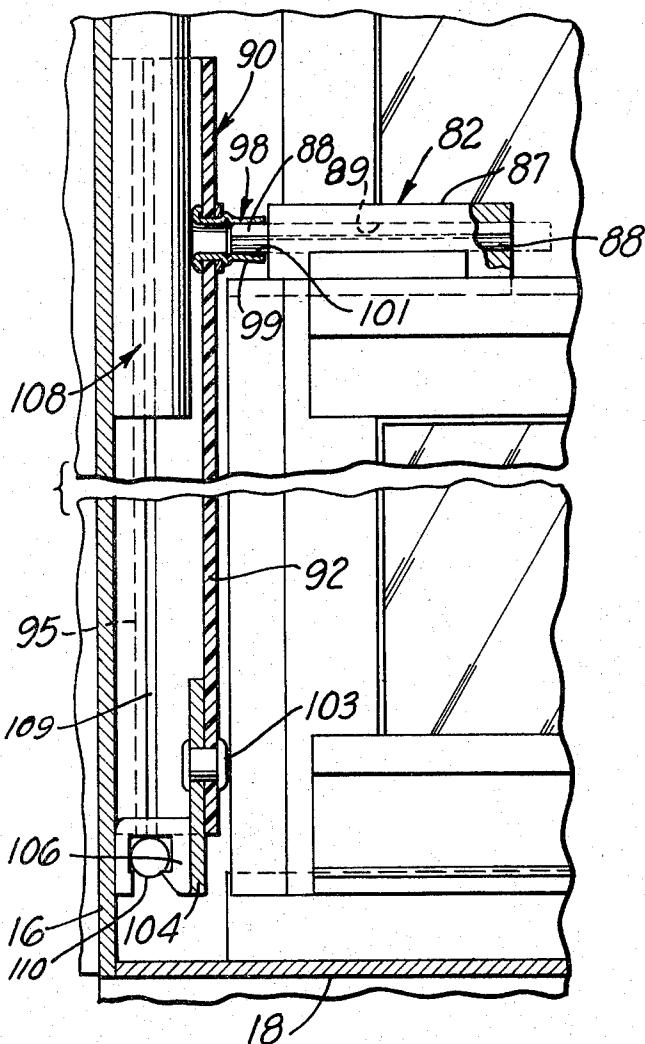


FIG. 5.

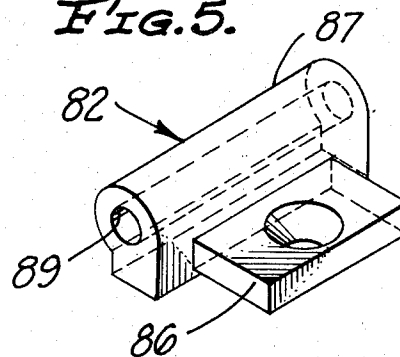


FIG. 6.

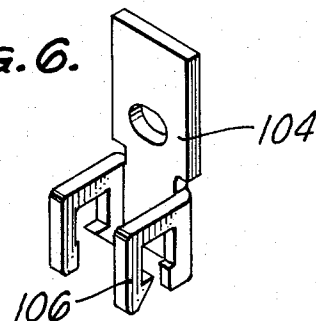


FIG. 8.

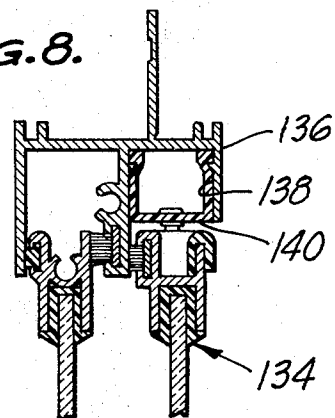
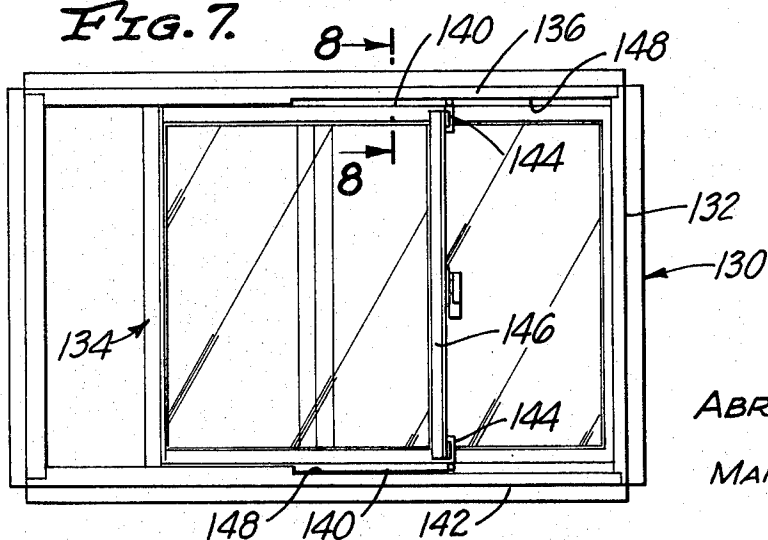


FIG. 7.



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3,529,381

FENESTRATION DEVICE INCORPORATING LINEARLY MOVABLE AND TILT-ABLE SASH

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8 Claims

ABSTRACT OF THE DISCLOSURE

A fenestration device, such as a vertical-hung window, has a perimetrical frame which mounts at least one movable sash and an associated sash for closing the frame opening. The frame provides retention and releasing stations whereby when the movable sash is moved into the releasing station, the movable sash may be pivoted outwardly from the frame. The movable sash is carried by carriage members movable in elongated tracks in the frame and pivot means mutually interconnect adjacent extremities of the carriage means and the movable sash to permit free outward movement of the movable sash when the movable sash is located in the releasing station. However, when the movable sash is located at the retention station, adjacent portions of the frame prevent outward movement of the movable sash.

BACKGROUND OF THE INVENTION

This invention relates to a fenestration device adapted to be utilized in various types of building structures. The device of the invention incorporates at least one movable sash and the frame of the fenestration device incorporates retention and releasing stations so located in said frame that, when the movable sash is moved into the releasing station, it can be pivoted outwardly of the frame to facilitate access to the exterior surface of the light incorporated in the movable sash for cleaning or other purposes.

In my co-pending application, Ser. No. 702,542, filed Feb. 1, 1968, I disclosed a fenestration device wherein the movable sash could be moved outwardly of the associated frame in only one position of the sash at the releasing station of the frame. The present invention has, among other advantages, the very desirable feature of permitting the movable sash to be moved outwardly of the frame in any desired location so long as the sash is initially disposed in a position in which it can be released at the releasing station. After being so released, the sash, which remains pivotally connected to the frame, can be moved up and down through the releasing station to permit easy access to any portion thereof.

One of the most widely utilized fenestration devices is the single hung, vertically oriented window, in which a movable sash is mounted for movement in a window frame and is associated with a fixed sash which is permanently secured in position to close the upper portion of the frame opening while the lower portion of the frame opening is closed by the movable sash. Because of the immovable nature of the fixed sash, considerable difficulty has been encountered in cleaning the exterior surface of the light mounted in the movable sash.

As a matter of fact, the only feasible manner in which a conventional single hung window can be cleaned is to clean both the exterior surfaces of the movable and fixed sash lights from the exterior of the structure in which the window is located. In multiple story buildings, the cleaning of single hung windows entails the use of professional

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window cleaners or the partial cleaning of the external surface of the light in the movable sash.

Similar considerations apply, to a lesser extent, to double hung windows since the sash in a double hung window are both movable and may be manipulated to provide partial access to the exterior surfaces of the lights of both sash. However, cleaning such windows is a tedious and time-consuming process and involves the repeated manipulation of the sash in the frame to complete the cleaning operation. In any event, there is usually a portion of one or both of the sashes which is improperly cleaned due to the difficulty of access thereto.

Similar consideration are applicable with equal cogency to slider-type windows which incorporate one or more movable sash, movable in a horizontal direction, or one movable sash associated with a fixed sash in a manner analogous to that discussed in considering single and double hung windows hereinabove. However, because of the inherent nature of slider windows, it is quite common to provide an intermediate fixed sash with movable sash on opposite sides of the fixed sash and various other combinations of fixed and movable sash are utilized which are not feasible with vertically oriented single and double hung windows.

Furthermore, slider windows of the type referred to immediately hereinabove frequently are manufactured in very large sizes with the movable and fixed sashes being of dimensions substantially exceeding those encountered in vertically oriented double and single hung windows. The common expedient utilized in cleaning such slider windows has been to lift the movable sash from the frame and to reverse it within the confines of the structure in which the slider is located so that the external surface of the movable sash light is exposed to the cleaning operation. When the movable sash have attained the large sizes which are frequently utilized in commercial applications, lifting the sash is an extremely difficult process because of the large size and weight thereof. This is particularly true in commercial applications where heavier glass or dual glass applications are utilized.

OBJECTS AND SUMMARY OF THE INVENTION

It is, therefore, an object of my invention to provide a fenestration device which includes a perimetrical frame adapted to be inserted in a corresponding opening in a structure with said frame incorporating a retention station and a releasing station for a movable sash mounted in first receptacles in opposed members of the frame.

As previously mentioned, the teachings of the invention are applicable, with equal cogency, to vertically or horizontally oriented windows, but to facilitate the disclosure of the invention, emphasis will be placed upon the incorporation of the teachings in vertically oriented single and double hung windows.

An additional object of my invention is the provision of a window which includes a movable sash mounted in a frame of the aforementioned character and which also includes another sash co-operative with the movable sash to close the opening defined by the frame. In a single hung window, the other sash is fixed in the top portion of the frame. In a double hung window, both sash are movable. In any event, that portion of the frame incorporating the opposed receptacles or tracks for the reception and movement of the movable sash of a single hung window or the innermost movable sash of a double hung window incorporates a retention station and a releasing station, the retention station being adapted to prevent outward movement of the movable sash from the plane of the frame while the releasing station permits such outward movement of the movable sash to facilitate cleaning thereof.

Another object of my invention is the provision of a

window of the aforementioned character wherein carriage means constituted by a pair of elongated carriage members are mounted for movement in the tracks of the frame and the movable sash is pivotally connected to said carriage members so that, when the movable sash has fully entered the releasing station, the pivotal connection between the carriage members and the movable sash permits outward movement of the movable sash from the frame.

However, once the movable sash has been so released, the carriage means can be moved downwardly in the frame to lower the entire movable sash to any position at the releasing station which is desired. Consequently, the movable sash can be handled by relatively short people and easy access can be had to any portion thereof.

An additional object of my invention is the provision of a device of the aforementioned character wherein the aforementioned pivotal connection is constituted by a pair of pivot members mounted on one extremity of the movable sash and by a corresponding pair of pivot members mounted adjacent extremities of the carriage members. Therefore, during the normal operation of the movable sash and during its movement between the retention and releasing stations, the movable sash is always positively and firmly connected in operative relation to the carriage members thus preventing any possibility that inadvertent release of the movable sash from operative relationship with the carriage members may occur.

Another object of my invention is the provision of co-operating retention means between the carriage members and the tracks associated therewith whereby the carriage members are restrained against inadvertent displacement from operative relationship with said tracks and can, nevertheless, be released from said operative relationship if the need should arise.

Another object of my invention is the provision of carriage members constituted by elongated channel-shaped structures providing receptacle means for sash balances adapted to facilitate the raising and lowering of the movable sash.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a single hung window incorporating the teachings of the invention;

FIG. 2 is a vertical sectional view taken on the broken line 2—2 of FIG. 1;

FIG. 3 is a transverse, fragmentary sectional view taken on the broken line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view showing the operative connection between the movable sash and one of the carriage members;

FIG. 5 is an isometric view showing one of the movable sash pivot members;

FIG. 6 is an isometric view of the sash balance clip 104;

FIG. 7 is a front elevational view showing the teachings of the invention applied to a horizontally slidable movable sash; and

FIG. 8 is a vertical sectional view taken on the broken line 8—8 of FIG. 7.

Referring to the drawings, and particularly to FIGS. 1-4 thereof, I show a single hung window 10 incorporating the teachings of the invention and including a perimetrical frame 12 which is adapted to be inserted in a corresponding opening in a structure, not shown. The single hung window disclosed herein is fabricated from a plurality of aluminum extrusions, but it is not intended that the teachings of the invention be limited to the utilization of any particular type of material since it is conceivable that analogous or substitute materials may be utilized in the place of the aluminum extrusions disclosed.

The frame 10 includes a head 14, parallel jamb members 16 and a sill 18 which are operatively connected to each other by means of screw fasteners, not shown.

The head 14 is constituted by an aluminum extrusion having a mounting fin 22 provided thereupon and incorporates elongated inner and outer channels 24 and 26 which are separated by an intermediate L-shaped rib 28. The sill 18 incorporates a mounting fin 32 and incorporates inner and outer channels 34 and 36 respectively, said channels being divided by a partition wall 38 in which drainage openings 42 are formed, said drainage openings being covered by weather-stripping 46 disposed in overlying relationship therewith.

A vertically oriented rib 48 is encompassed by a U-shaped sealing strip or bumper 52, for a purpose which will be described in greater detail below. The bumper may be fabricated from vinyl plastic or from any other suitable material.

Each of the jambs 16 includes a mounting fin 54 and first and second receptacles or guide channels 56 and 58, respectively, the first receptacles 56 being the inner receptacles and the second receptacles 58 being the outer receptacles. The innermost portions of the receptacles 56 provide tracks 59, for a purpose which will be described in greater detail below.

Mounted for vertical movement in the first receptacles 56 of the jamb 16 is a movable sash 60, said movable sash including opposed stiles 62, a top rail 64 and a bottom rail 66 secured in operative relationship with one another by screw fasteners, not shown, and supporting a pane of glass or light 68. The first and second receptacles or channels 56 and 58 are separated from each other by a continuous rib 72, as best shown in FIG. 3 of the drawings. A sweep lock 74 is provided for locking the movable sash against movement in a conventional manner.

The frame 12 of the window 10 incorporates a retention station constituted by the lower portion of the frame and a releasing station at the upper portion of the frame defined by elongated notches 78 formed in the jambs 16 and communicating with the first receptacles or channels 58 in which the movable sash 60 is translated. The length of the notches 78 is slightly greater than the overall length of the movable sash as best shown in FIG. 5 of the drawings.

Secured to the top rail 64 of the movable sash 60 are pivot members 82 which may be fabricated from aluminum or similar material and which are affixed in operative relationship with said top rail by means of screws 84, as best shown in FIG. 3 of the drawings. The overall configuration of the pivot members 82, as best shown in FIGS. 3 and 5 of the drawings, includes a mounting base 86 and an elongated boss 87 having an elongated pivot 88 mounted in a correspondingly elongated bore 89, as best shown in FIG. 4 of the drawings. The pivot pin 88 is constituted by what is commonly known as a roll pin which is fabricated from sheet metal and which has an elongated slot therein permitting it to be driven into the elongated bore 89 of the boss 87 and to be retained therein by the inherent resilience of the material from which it is fabricated.

Mounted for movement in the tracks 59 provided by the innermost portions of the receptacles 56, as best shown in FIGS. 1-4 of the drawings, is carriage means 90, said carriage means being constituted by elongated channel-shaped carriage members 92 which may be fabricated from any suitable material such as the well-known polyvinyl chloride plastic material or from aluminum extrusions. The lengths of the carriage members 92 correspond generally to the height of the movable sash and they are slidably movable in the tracks 59 between the retention station at the lower extremity of the frame 12 and the releasing station at the upper extremity of the frame 12.

Co-operative retention means 94 is provided between the tracks 56 and the carriage members 92, as best shown in FIG. 3 of the drawings. The retention means on the tracks 59 is provided by a pair of opposed continuous ridges 95 and corresponding detent means 96 on the car-

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riage members 92 engages with said ridges 95 by snapping over the same upon the insertion of the carriage members so that the respective carriage members 92 are demountable but securely engaged within the associated tracks 59. Such positive engagement of the carriage members 92 with the tracks 59 permit the members to be subject to torsional loads of the spiral balance without twisting or distortion.

Mounted adjacent the upper extremities of each of the carriage members 92, as best shown in FIGS. 3 and 4 of the drawings, is a pivot member 98. In the present embodiment of the invention, the pivot member 98 is constituted by a hollow rivet 99 which incorporates a bore 101, as best shown in FIG. 4 of the drawings, for the reception of the extremity of the pivot pin 88 projecting from the bore 89.

The assembly of the co-operative pivot members 82 and 98 is accomplished by locating the elongated boss 87 adjacent the bore 101 of the pivot member 98 and driving the pivot pin 88 into said bore. Consequently, the movable sash 60 is permanently, but pivotally, affixed in operative relationship with the associated carriage means 90 constituted by the elongated carriage members 92. However, the movable sash can be readily disengaged from operative relationship with the carriage members 92 by releasing the mounting screws 84 and removing the pivot pins 88 from operative relationship with the bore 101 of the pivot member 98. After this has been accomplished, the movable sash can be readily lifted from operative engagement with the frame at the releasing station. If desired, of course, the carriage members 92 can also be released from operative engagement with the frame by snapping them out of the tracks 59 and releasing the retention means 94.

Secured to the lower extremity of each of the carriage members, as by means of a rivet 103, are sash balance engaging clips 104 which have gripping portions 106 for engaging the lower extremity of a conventional sash balance 108. The sash balances 108, as best shown in FIGS. 3 and 4 of the drawings, have their housings located within the carriage members 92 so that, when the movable sash 60 is in the lowermost position, the lower extremity of the sash balance housing is disposed within the confines of the upper portion of the respective carriage member 92 and when the movable sash 60 is in the uppermost position, the housing of the sash balance on each side of the window is completely encompassed by the respective carriage member 92.

The sash balances 108 are of the conventional spiral type and have a connecting shaft 109 depending therefrom and incorporating a transversely oriented connecting bar 110 which is adapted to engage between the gripping portions 106 of the sash balance engaging clips 104 in the manner shown in FIG. 4 of the drawings.

Mounted in the second or outer receptacles 58 is a fixed sash 120 which, as best shown in FIGS. 1-3 of the drawings, is adapted to co-operate with the movable sash to close the frame opening. However, a movable sash can be substituted for the fixed sash 120 to provide what is known in the trade as a double hung window.

The cleaning problems encountered in cleaning the outer surface of the light of the movable sash 60, where the movable sash 60 of a conventional single hung window is not pivoted outwardly, arise from the fact that the movable sash must be raised in an attempt to achieve access to the exterior surface of its light. When so raised, the outer sash automatically prevents access to the exterior surfaces of the light because the inner sash is moved into overlying relationship with the outer sash. Consequently, adequate cleaning of the single hung window and, more particularly, the movable sashes thereof, can only be accomplished by exterior cleaning.

However, no such difficulty is encountered with the single hung window 10 construction in accordance with the teachings of the invention since, when the movable

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sash exterior surface is to be cleaned, the movable sash is moved upwardly from the retention station to the releasing station of the frame 12 as defined by the elongated notches 78 in the jambs of the frame.

As the movable sash 60 is urged upwardly, the carriage members 92 are carried upwardly because of the pivotal connection between the upper extremity of the movable sash 60 and the upper extremities of the carriage members 92. When the carriage members 92 are located at the releasing station, the lower extremity of the movable sash 60 is above the lower extremities of the notches 78 defining the releasing station. Consequently, the movable sash 60 can be urged outwardly of the frame 12. After having been initially urged outwardly, the movable sash can then be lowered to a position which is satisfactory to the person cleaning the sash.

In other words, the carriage members 92 can be moved downwardly within the associated tracks 59 until the movable sash 60 is located almost in a completely horizontal position.

This is a considerable asset since the movable sash can be readily cleaned by shorter individuals. In addition, the movable sash, by virtue of its pivotal connection to the carriage members 92, is always under the control of the spring balances 108 which materially assist in raising and lowering the sash at the releasing station.

It should be noted that there is a critical relationship between the height of the movable sash 60 and the elongated notches 78 which define the releasing station of the frame 12. In other words, the elongated notches 78 must be slightly longer than the height of the movable sash to facilitate the pivoting of the movable sash 60 outwardly of the frame 12.

The length of the elongated notches 78 is such that, until the movable sash 60 is moved completely into the releasing station, it cannot be inadvertently tilted outwardly.

One of the most important features of the window constructed in accordance with my invention lies in the fact that, when the movable sash 60 is located in the uppermost position in which it can be moved outwardly through the elongated notches 78 defining the releasing station, the tension exerted upon the carriage members 92 by the sash balances 108 is minimal since the connecting shafts 109 of the sash balances are almost completely retracted into the housings of the sash balances 108. Furthermore, the movable sash 60 is located in its uppermost position so that there is no necessity for the use of auxiliary locks or latches adapted to maintain the movable sash 60 at the releasing station.

Another important feature of the invention is the fact that since the releasing station is located in the upper portion of the frame of the window, adequate weathering is provided for the movable sash 60 since the uncut portions of the jamb members 16 overlie the stiles 62 of the movable sash 60, as best shown in FIG. 1 of the drawings, to prevent wind loads from deflecting the movable sash 60 when it is located in the closed position.

Shown in FIG. 7 of the drawings is a sliding window 130 incorporated in frame 132 and having a movable sliding sash 134. The head 136, as best shown in FIG. 8 of the drawings, includes a track 138 in which is mounted a carriage member 140. A similar carriage member 140 is mounted in the sill 142 of the frame 132 and pivot members 144 are provided on the stile 146 of the sliding window to permit the sliding window to be pivoted outwardly of the frame 132 at the releasing station constituted by the elongated notches 148 in the head and sill.

Therefore, the movable sash 134 can be pivoted into the room area at the releasing station to eliminate the necessity for bodily removing the movable sash for cleaning purposes. Of course, there is no necessity for the sash balances described in the previous embodiment of the invention, since such sash balances are only utilized where the sash is subject to gravitational effects.

I claim:

1. In a fenestration device, the combination of: a perimetrical frame adapted to be inserted in a corresponding opening in a building structure, said frame having opposed sash receiving receptacles in opposite portions thereof which define elongated tracks, said frame including a lower movable sash retention station and an upper movable sash releasing station; carriage means mounted in said tracks for movement between said retention and releasing stations; a movable sash pivotally mounted on said carriage means for movement on said carriage means between said retention and releasing stations, said movable sash being disposed in its closed position in respect to the opening defined by said frame when it is located at said retention station of said frame; another sash mounted in said frame for co-operative closure of said frame opening in conjunction with said movable sash and sash balances connected to said carriage means and receivable within said carriage means whereby, when said movable sash is located at said upper releasing station, said balances exert a minimum tension on said movable sash, to permit easy movement thereof at said retention station.

2. A fenestration device as defined in claim 1 in which the pivotal connection between said carriage means and said movable sash is located adjacent one extremity of said movable sash and the contiguous extremities of said carriage means.

3. A fenestration device as defined in claim 1 in which said carriage means are constituted by a pair of elongated carriage members mounted for movement in the respective tracks of said frame.

4. A fenestration device as defined in claim 1 in which said tracks have retention means incorporated therein and said carriage means has corresponding detent means engageable with said retention means to prevent inadvertent displacement of said carriage means from operative relationship with said tracks.

5. In a fenestration device, the combination of: a perimetrical frame receivable in a corresponding opening in a structure, said frame having opposed frame members each incorporating first and second sash receiving receptacles, said frame having a lower retention and an upper releasing station and said first sash receiving receptacles providing elongated, oppositely disposed tracks;

a carriage member mounted in each of said tracks for movement from one extremity to the other of said tracks between said retention and releasing stations; a movable sash mounted in said first receptacles between said carriage members for movement in said frame between said retention and releasing stations; another sash co-operative with said movable sash mounted in said second receptacles of said frame and co-operative with said movable sash to close the frame openings; and co-operative pivot members on the upper extremity of said movable sash and the upper extremity of each of said carriage members for permitting said movable sash to be pivoted outwardly on said carriage member from said first receptacles of said frame when it is located at said upper releasing station.

6. A fenestration device as defined in claim 5 in which said carriage members are elongated and releasably mounted in said tracks.

7. A fenestration device of the character of claim 6 in which said tracks and said carriage members have mutually engageable retention means thereupon for preventing the inadvertent displacement of said carriage members from operative relationship with said tracks.

8. A fenestration device as claimed in claim 5 in which said carriage members are elongated and each include a recess for the reception of sash balances, said carriage members each having securement means thereupon for connecting said sash balances in operative relationship with the respective carriage member.

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