Jan. 24, 1939. E. C. SWANSON 2,144,782

WINDOW STRUCTURE

Filed Feb. 24, 1936 5 Sheets-Sheet 1

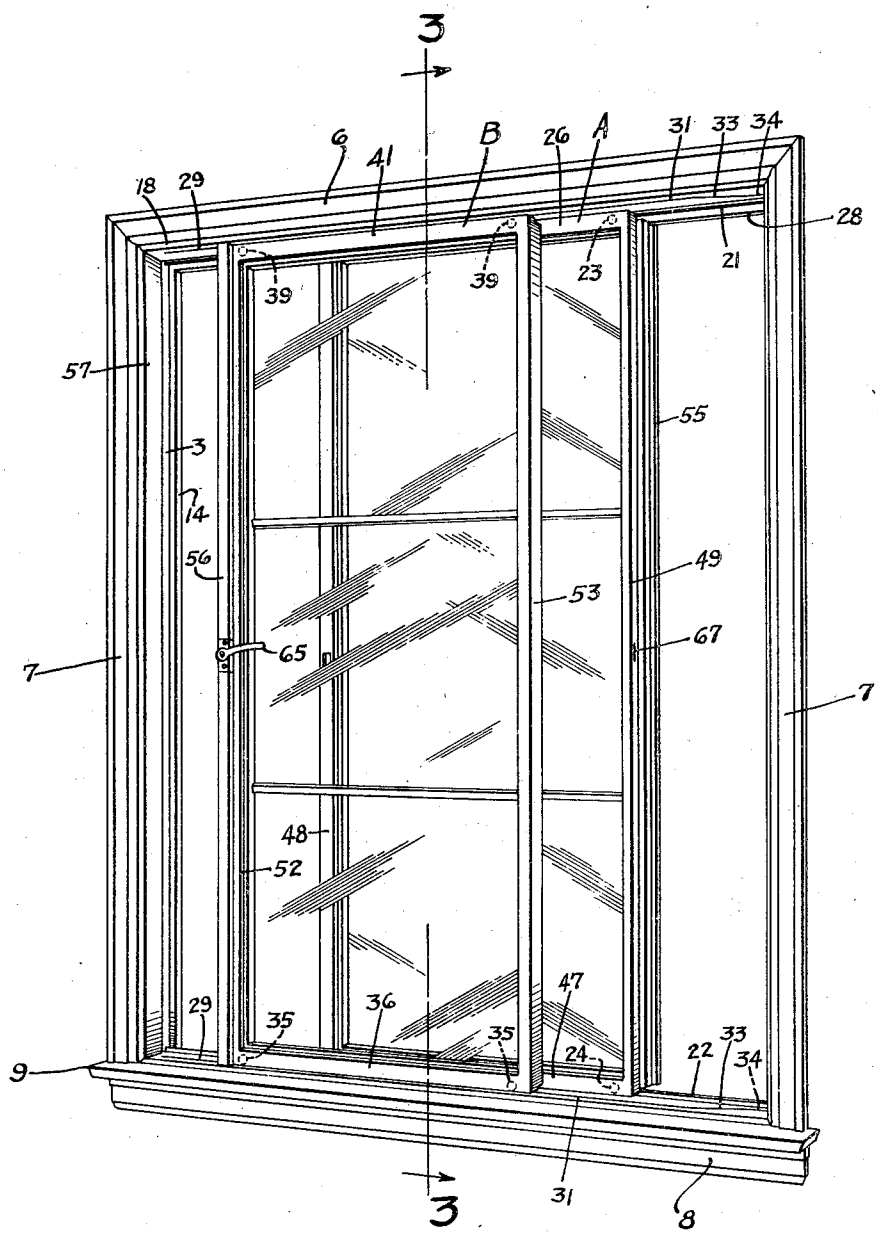


FIG. 1

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WINDOW STRUCTURE

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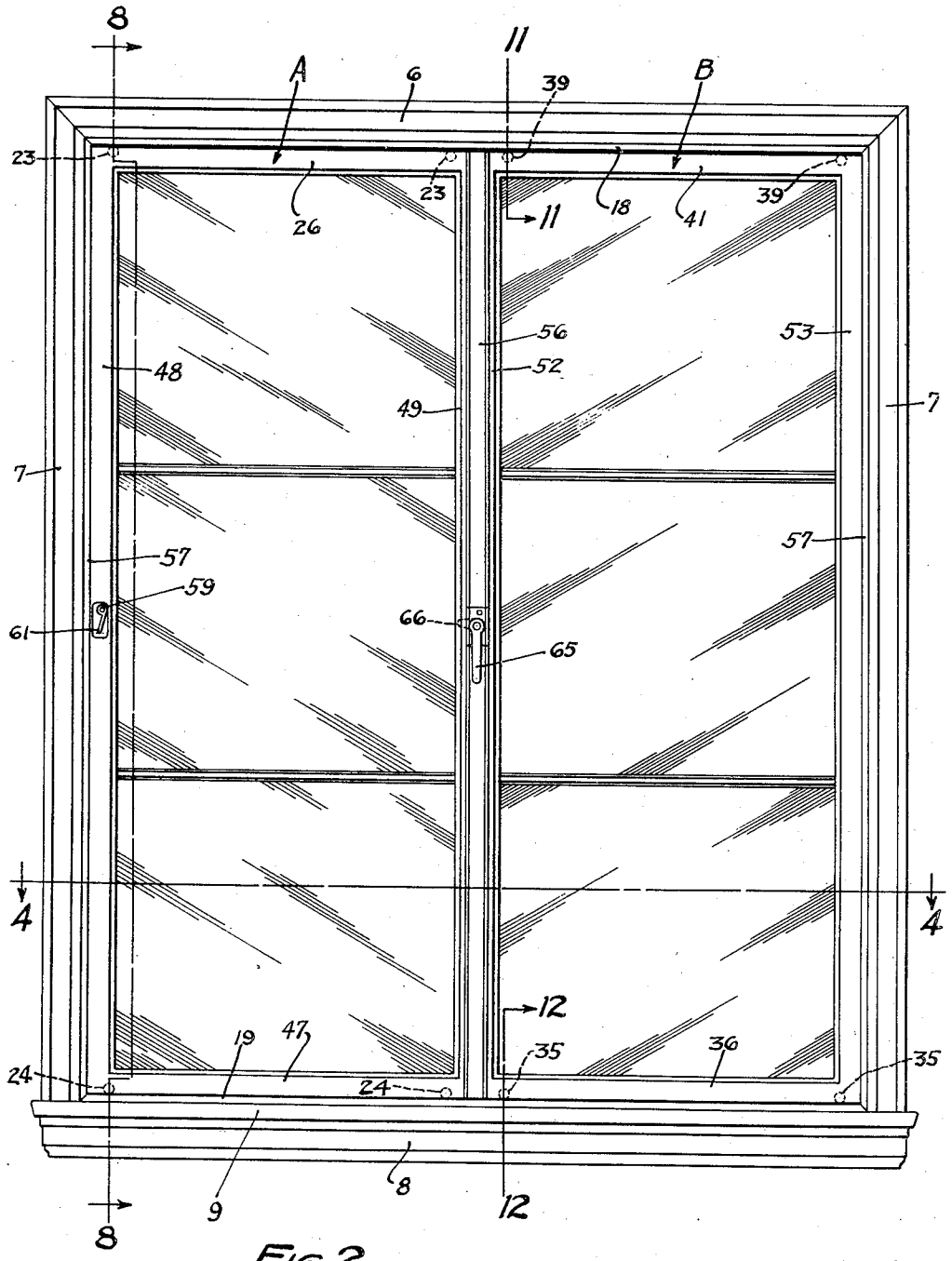


FIG. 2

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WINDOW STRUCTURE

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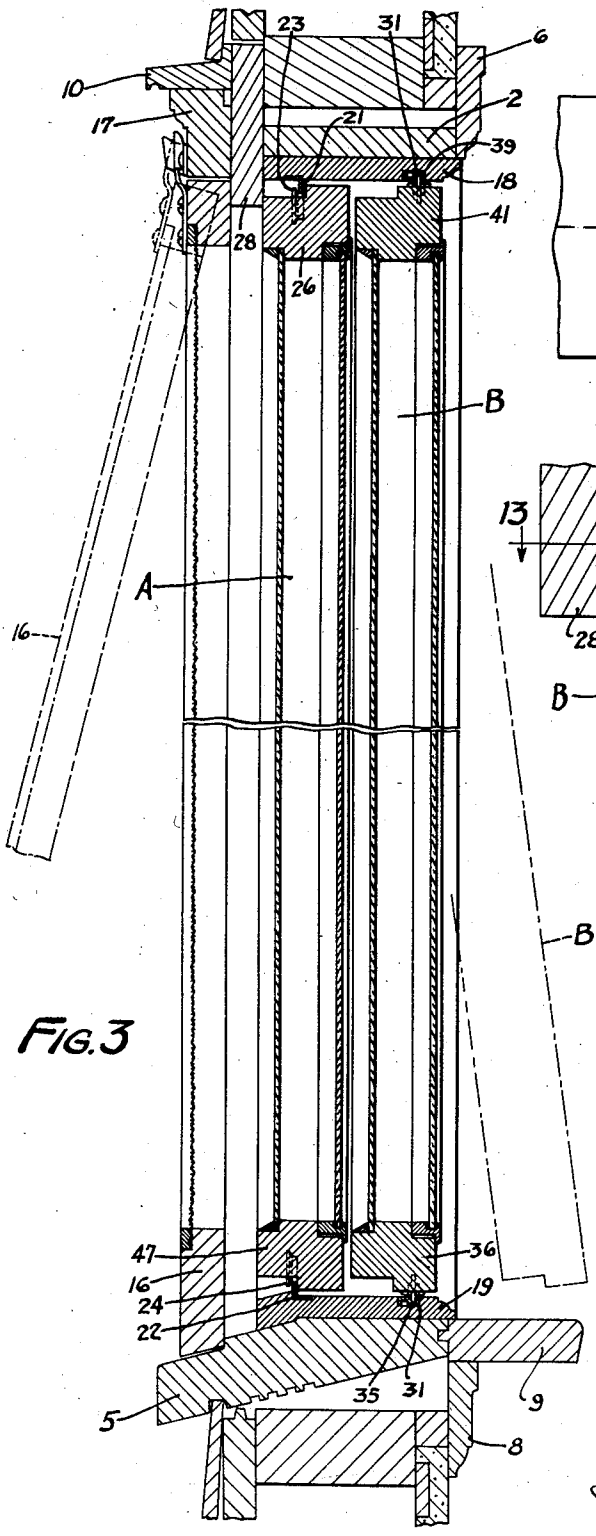


FIG. 3

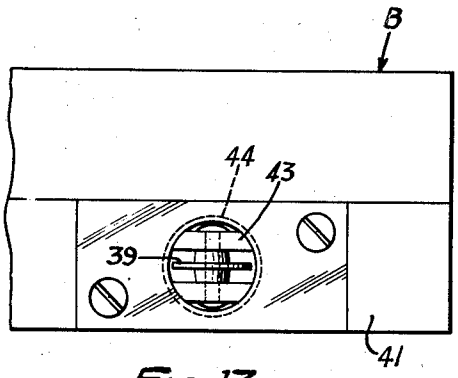


FIG. 13

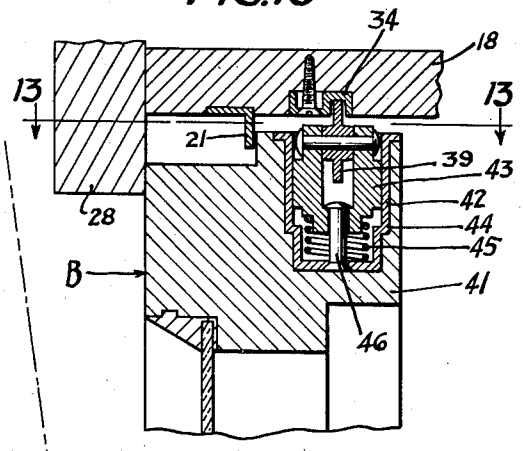


FIG. 11

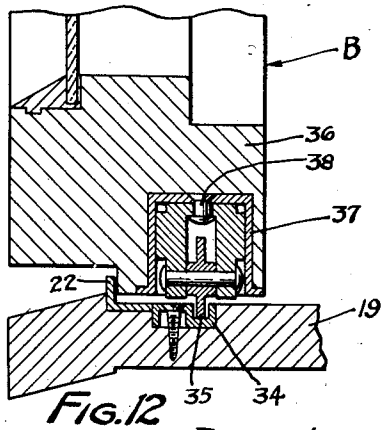


FIG. 12

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WINDOW STRUCTURE

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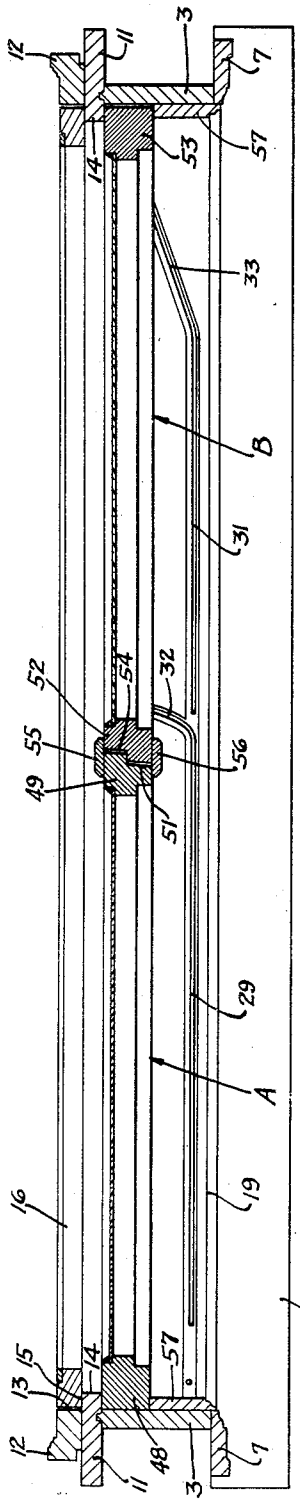


FIG. 4

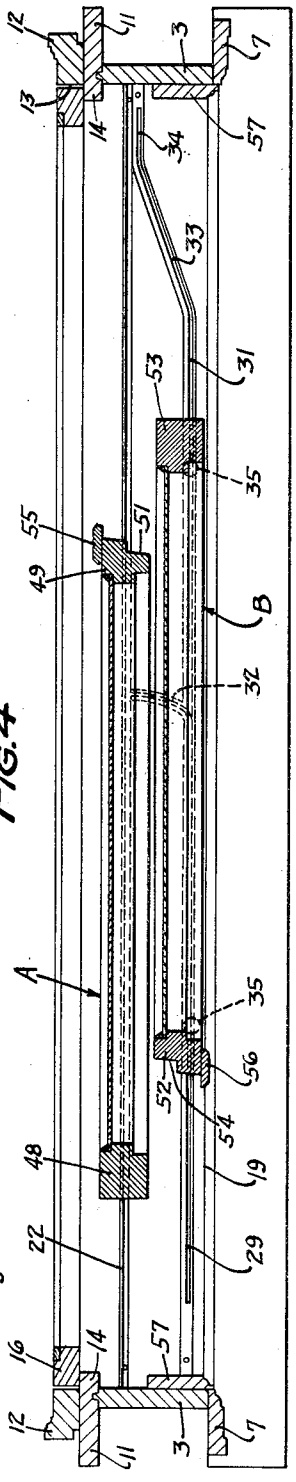


FIG. 6

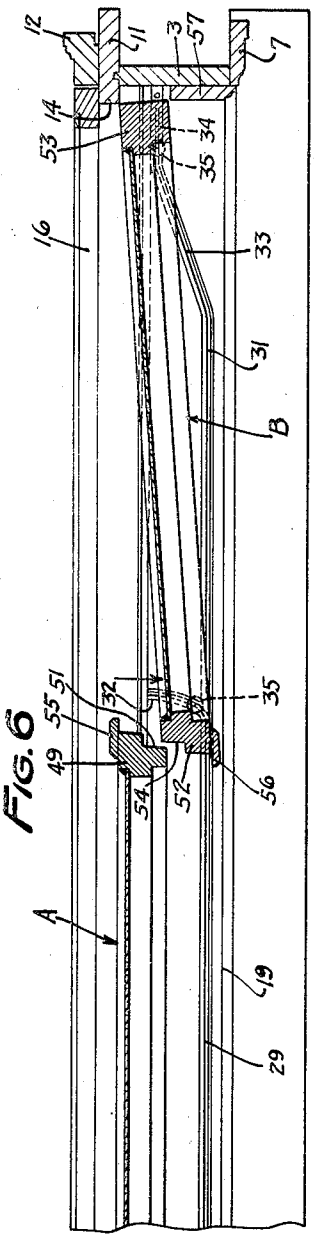


FIG. 5

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WINDOW STRUCTURE

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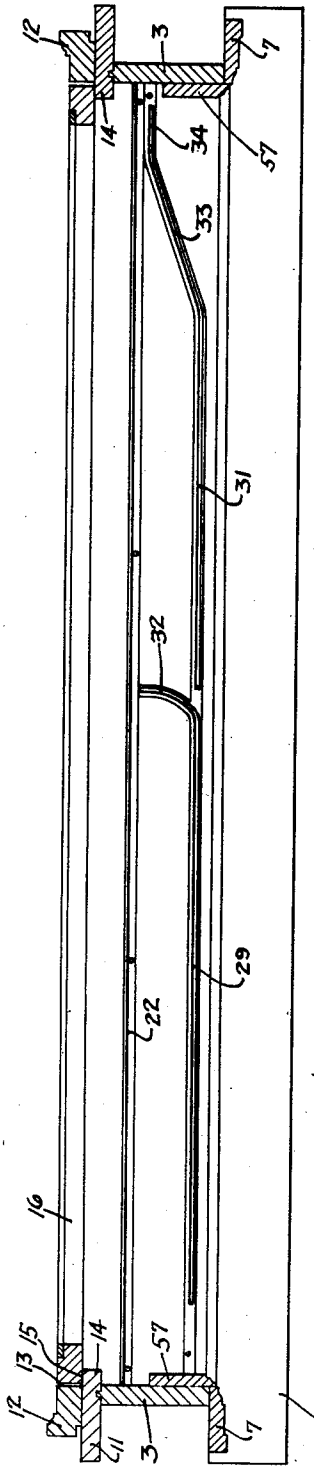


FIG. 7

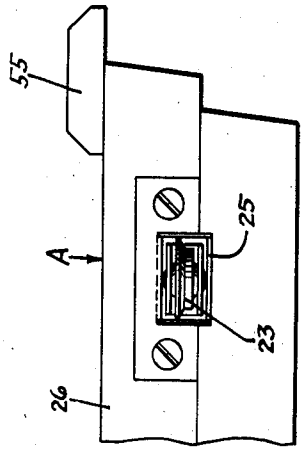


FIG. 9

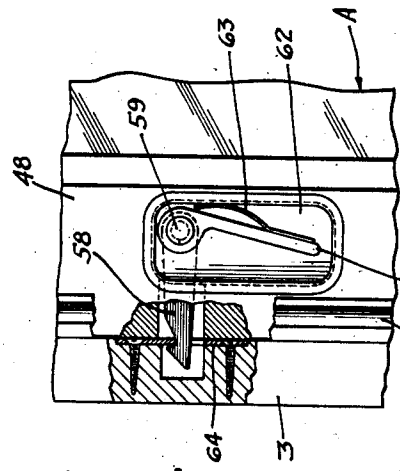


FIG. 10

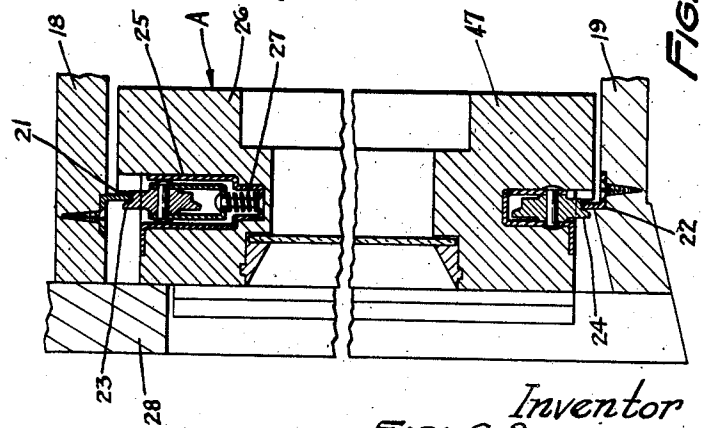


FIG. 8

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2,144,782

UNITED STATES PATENT OFFICE

2,144,782

WINDOW STRUCTURE

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Application February 24, 1936, Serial No. 65,298

3 Claims. (Cl. 20—42)

This invention relates to new and useful improvements in window structures, and more particularly to a window comprising a plurality of horizontally movable sashes.

Horizontal sliding windows of the general character heretofore used, have been more or less undesirable, principally because of the sashes being disposed in different planes, when the window is closed, which impairs the general appearance thereof, and further, because of the difficulties usually encountered to render such windows weather-tight.

The novel window herein disclosed, is comparatively simple in construction and readily lends itself for various uses. It comprises a frame of substantially ordinary construction, provided with suitable guides at its upper and lower portions adapted to receive and guide a plurality of sashes mounted for horizontal sliding movement in the frame. The sashes may be provided with suitable anti-friction elements at their upper and lower portions adapted to engage said guides, whereby the sashes may readily be relatively adjusted or moved in the frame. When the two sashes are in normal closed position, they are disposed in the same plane, whereby they present a very neat appearance from both the exterior and interior of the building and simulate an ordinary casement window.

An object of the present invention, therefore, is to provide a window structure comprising a plurality of sashes mounted for horizontal sliding movement and normally disposed in the same plane, when the sashes are in closed positions, whereby the window has the appearance of an ordinary casement window.

Other objects of the invention are to provide a window of the character disclosed, which is extremely simple and inexpensive to manufacture; to provide a window which does not require any counterbalancing weights or other means for retaining the sashes thereof in closed or adjusted position; which is so constructed that when closed, the window is substantially weather-tight, whereby little or no weather stripping is required; to provide a window having the appearance of an ordinary casement window, but which does not require the usual mullion post between the sashes thereof to seal the joint between the sashes, when in closed position; and, to provide a window comprising a plurality of sashes having suitable anti-friction means embodied in the construction thereof for guiding them along suitable guides provided in the upper and lower members of the window frame, and whereby the sashes may readily be opened or closed without the use of expensive hardware; and, to provide a window of the character disclosed, which may readily be operated to control ventilation through the window and in which the sashes may be readily cleaned from the interior of the building, without removing the sashes, and which also permits the use of ordinary screens and storm sashes.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a perspective view of my improved window structure, showing the sashes partially open;

Figure 2 is an elevational view showing the sashes in closed position;

Figure 3 is a vertical sectional view substantially on the line 3—3 of Figure 1, showing the sashes positioned in parallel relation, as when one or both are open;

Figure 4 is a sectional plan view on the line 4—4 of Figure 2, showing the sashes in closed position and disposed in the same plane;

Figure 5 is a view similar to Figure 4, showing the first operation of opening the window;

Figure 6 is a view showing the two sashes moved toward the center of the opening, from the side jambs of the frame, whereby the window is opened adjacent each side jamb;

Figure 7 is a view similar to Figure 4, with the sashes removed from the frame to more clearly illustrate the guides provided at the top and bottom of the frame for guiding the sashes;

Figure 8 is a detail sectional view on the line 8—8 of Figure 2, on an enlarged scale, showing the means at the top and bottom of the sashes for guiding them in their horizontal movements in the frame;

Figure 9 is a top view of a corner of one of the sashes showing the anti-friction elements provided therein;

Figure 10 is a detail sectional view, showing the means provided for locking one of the sashes in closed position;

Figure 11 is a detail sectional view substantially on the line 11—11 of Figure 2, showing the anti-

friction elements provided at the upper portion of one of the sashes;

Figure 12 is a detail sectional view on the line 12—12 of Figure 2, showing the preferred construction at the bottom of one of the sashes; and

Figure 13 is a detail sectional plan view substantially on the line 13—13 of Figure 11, showing only the sashes.

In the selected embodiment of the invention herein disclosed, there is illustrated in Figures 1, 2, and 3, for purposes of disclosure, a window frame comprising the usual head jamb 2, side jambs 3, and sill 5, all of which are secured together in the usual manner to provide the supporting frame for the sashes, as clearly illustrated in Figures 1 and 2. The frame, as shown in Figure 1, is provided with the usual casing trims 6, 7—7, and 8, and the usual stool 9, which parts provide the usual trim for the interior side of the frame.

The frame is shown provided at its outer side with the usual blind stops 11, and casings 12, shown secured to the blind stops with their inner edges 13 spaced from the adjacent inner edges 14 of the blind stops, thereby to provide a seat 15 for the usual storm sash or screen 16, best shown in Figure 3. The usual cap 10 is shown secured to the casing 17 of the upper outer portion of the frame, as is customary in structures of this general nature.

An important feature of this invention resides in the novel arrangement in the frame of the sashes, generally indicated by the letters A and B. These sashes are mounted for horizontal sliding movement and, when in normal closed position, are disposed in the same plane, as clearly illustrated in Figure 4, whereby the window has the general appearance of an ordinary casement type window.

To thus support the sashes A and B in the frame, suitable plates 18 and 19 are shown secured to the head jamb 2 and sill 5, respectively. A suitable guide or track 21 is secured to the plate 18 and a similar guide 22 is secured to the plate 19 at the bottom of the frame. These two tracks extend from side to side of the frame, as best illustrated in Figures 6 and 7, and are adapted to be engaged by suitable anti-friction elements 23 and 24, respectively, secured to the upper and lower portions of the sash A. The upper elements 23 are preferably resiliently supported in casings 25, shown embedded in the upper rail 26 of the sash A. Suitable springs 27 constantly urge the elements 23 upwardly into contact with the guide rail 21. The guides 21 and 22 are preferably so spaced from the blind stops 14 of the frame and the blind stop 28 at the upper portion thereof, that the blind stops cooperate with the rails 21 and 22 to guide the sash A in its horizontal sliding movement in the opening in the frame. The guides 21 and 22 are substantially straight, as shown in Figure 7, whereby the sash A will travel in substantially a straight line, and in a given plane.

Sash B, as hereinbefore stated, is disposed in the plane of sash A, when in normal closed position, but when moved to an open position, is moved out of said plane, as illustrated in Figures 5 and 6, to a position substantially parallel to sash A.

To thus guide sash B into and out of alinement with sash A, suitable guides 29 and 31 are provided in the lower portion of the frame, as clearly illustrated in Figure 12. The guide 29 has an outwardly turned end portion 32 which terminates adjacent to the guide 22, and the guide 31 has an outwardly inclined portion 33 terminating in a straight portion 34, disposed adjacent to the guide 27. Similarly shaped guides are provided on the plate 18 at the upper portion of the frame, as illustrated in Figures 3 and 11, which cooperate with the guides 29 and 31 to support sash B.

Suitable anti-friction rollers or elements 35 are mounted in the lower rail 36 of the sash B adapted to travel in the guides 29 and 31. These anti-friction elements or rollers are swivelly supported in casings 37 embedded in the rail 36, whereby the rollers 35 are free to rotate about the axis of pivot pins 38, as will readily be understood by reference to Figure 12.

Similar anti-friction rollers 39 are secured to the upper rail 41 of the sash B, and are supported in casings 42 embedded in said rail, as best shown in Figure 11. The rollers 39 are supported in members 43 mounted for rotary movement in suitable casings 44 embedded in the rail 41, as shown. The springs 45 constantly urge the roller supporting members 43 upwardly to hold the rollers 39 in their guides, as clearly illustrated in Figure 1. Pivot pins 46 retain the members 43 in the casings 44 and permit them to rotate freely therein. The frame of sash A is composed of the top rail 26, bottom rail 47, and side members 48 and 49, the latter being provided with a vertically disposed recess 51 extending from the bottom to the top of the sash.

Sash B is composed of the bottom rail 36, top rail 41, and upright frame members 52 and 53. The member 52 is vertically recessed, as shown at 54 in Figure 4, whereby complemental shoulders and recesses are provided in the members 49 and 52 of the sash, which co-act to provide a lap joint between the two sashes, when in closed position. To further seal the joint between the two sashes, suitable sealing strips 55 and 56 are shown secured to the sashes A and B, respectively, which overlap the members 49 and 52, as clearly illustrated in Figure 4, thereby to tightly seal the joint between the sashes, when in closed position. The joints between the sash rails 48 and 52 and the side jambs 3 are sealed by the blind stops 14 and suitable sealing strips or trims 57 secured to the inner faces of the side jambs 3, as clearly illustrated in Figures 4, 5, and 6.

Sash A is shown provided with means for locking it in closed position, whereby it is normally retained in the position shown in Figure 4. A suitable locking means for thus securing sash A in closed position, is shown in Figure 10, and comprises a latch member 58, secured to a stud 59 having a handle 61 mounted for swinging movement within a suitable supporting member 62, secured to the side member 48 of the frame of the sash A. A suitable spring 63 is shown secured to the handle 61 and engages a wall of the member 62, thereby to constantly urge the latch 58 in an upward direction to retain it in locking engagement with a keeper 64, shown secured to the side jamb 3 at the left hand side of the window, when viewed as shown in Figure 2.

Means is also provided for locking the sash B in closed position, and, as shown in Figure 4, may consist of a handle 65 suitably mounted in the inner rail 52 of sash B and having a tongue 66 adapted to be received in a slot 67 provided in the rail 49 of sash A. When the tongue 66 is engaged with the slot 67, sash B cannot be opened, as will readily be understood by reference to Figure 4.

In the operation of this novel window structure, sashes A and B, when the window is closed, will be positioned as shown in Figures 2 and 4. When it is desired to open one or both of the sashes, the rail 52 of sash B is released from the corresponding rail 49 of sash A, by manipulation of the handle 65, whereby the inner side of sash B may be swung inwardly from the position shown in Figure 4 to the position shown in Figure 5, and, as indicated by the arrow in this latter figure. Because of the outwardly turned portions 32 of the guides 29, the inner edge of sash B may readily be swung out of engagement with the corresponding edge of sash A, and the member 52 of sash B will clear the member 49 of sash A, whereby sash B will move out of alinement with sash A to a position substantially in parallel relation thereto, as shown in Figure 6. When the sash B is thus positioned, sash A may be moved inwardly or towards the right from its closed position, when viewed as shown in Figures 2 and 6, thereby opening the window adjacent to the side jambs 3.

The particular shapes of the end portions 32 and 33 of the guides 29 and 31, respectively, guide sash B, whereby it may be conveniently moved into and out of closing position, when sash A is in its normal closed position, as shown in Figure 4.

The anti-friction elements permit the sashes to be freely moved in their horizontal movements and, as a result of thus supporting the sashes in the frame, the danger of the sashes binding in their guides is substantially eliminated. It will also be readily understood, by reference to Figure 4, that when the sashes A and B are in closed position, weather-tight joints are provided between the sashes and the side jambs, and also between the overlapping inner portions of the two sashes. The upper and lower edges or ends of the sashes may readily be made weather-tight by the provision of simple and inexpensive weather stripping, if necessary, whereby the entire window structure is rendered substantially weather-tight, which is a very desirable feature in window structures.

The novel window herein disclosed, readily lends itself for cleaning from within the building, when the sashes are moved inwardly, as shown in Figure 6. It is also to be noted, by reference to Figure 3, that an ordinary screen or storm window 16 may be employed without, in any way, interfering with the sashes A and B.

The novel window herein disclosed, presents the utmost in ease and convenience of operation. It is superior to vertically slidable windows of conventional design, in that no counterbalancing weights or means are required to overcome the force of gravity, as in vertically movable types of windows. When anti-friction rollers and guides, such as herein disclosed, are employed, friction is reduced to a minimum, whereby the sashes may be conveniently operated to open or close the window, and the danger of binding is also substantially eliminated. The sashes may be opened as much or as little as desired, to obtain suitable ventilation. Either sash may be moved, which makes it extremely easy and convenient to clean the inside surfaces of the glass as well as the outside surfaces thereof from the inside of the building, without removing the sashes. As hereinbefore stated, conventional storm sashes and screens may be used, as they may be conveniently hung from the inside of the building when the two sashes are moved to the position shown in Figure 1, whereby full height openings are provided at each side of the sashes, as clearly illustrated in Figure 1.

Ideal ventilation may be had with this type of window, as it may be had from either side, or both sides, and indirect ventilation may be had by only slightly opening sash B, thereby creating an indirect route for the movement of air through the opening, because of the unique construction of the meeting styles or members 49 and 52 of the two sashes. If desired, removable double glazing may be used on this type of window in place of the conventional type of storm sash, by simply providing suitable means for supporting the glazing on the sash frames.

The novel window herein disclosed also makes it possible to standardize the size or thickness of the frame through the wall, whereby this novel window may be used in almost any wall construction, as it is not necessary to provide pockets for weights or other counterbalancing means. It also can be used in thin walls, as both sashes are in the same plane, when in closed position and, if necessary, the guides controlling the movement of sash B may be carried by the trim members within the building, if the wall thickness is limited.

The window has the appearance of a conventional type casement window when the sashes are in closed position. No mullions or division posts are required between the two sashes, thereby providing a maximum amount of glass area for any given opening and, at the same time, giving the effect of modern appearance. The window is simple and inexpensive in construction and because it does not require expensive hardware, as in the case of an outswinging casement sash or window, it may be manufactured at small cost. The window also readily lends itself for installation purposes because of its simple construction, it being understood that if it is to be weather stripped, the weather stripping may be applied directly to the sashes when the latter are removed from the frame, thereby greatly simplifying the operation of applying weather stripping thereto.

To remove the sashes from the frame, it is only necessary to move them inwardly toward the center of the opening, as shown in Figures 1 and 6, away from the side jambs, after which each sash may readily be grasped at its opposite edges and thrust upwardly until the anti-friction rollers at the bottom thereof move out of engagement with its respective guides. When the rollers are thus disengaged from the guides, the sashes may readily be removed from the frame, it being understood that because of the resilient mounting of the anti-friction rollers at the upper portions of the sashes, the sashes are adapted to relatively move vertically in the frame sufficiently to permit the lower rollers to be moved out of engagement with their respective guides, as indicated by the dotted lines in Figure 3.

I claim as my invention:

1. In a window structure, a frame comprising a head and side jambs, and a sill, a plurality of sashes mounted for horizontal sliding movement in said frame, outer and inner tracks for said sashes, the outer track being substantially straight and extending substantially the full width of the frame, the inner track having its major portion disposed in parallel relation to the outer track and having at one end an inclined portion terminating in a relatively short straight portion disposed adjacent to one end of the outer track and substantially parallel thereto, an out-

wardly turned branch portion on the inner track adjacent its intermediate portion, means on the sashes engaging said tracks, and said jambs having vertically disposed grooves adapted to receive the outer edges of the sashes, thereby to provide weather-proof joints between said outer edges and the jambs, and said branch track cooperating with said inclined and relatively straight portion of the inner track to guide the outer edge of the sash supported on the inner track into the groove in the adjacent side jambs, when the window is closed.

2. In a window structure, a frame comprising a head and side jambs, and a sill, a plurality of sashes mounted for horizontal sliding movement in said frame, outer and inner tracks for said sashes, the outer track being substantially straight and extending substantially the full width of the frame, the inner track having its major portion disposed in parallel relation to the outer track and having at one end an inclined portion terminating in a relatively short straight portion disposed adjacent to one end of the outer track and substantially parallel thereto, an outwardly turned branch portion on the inner track adjacent its intermediate portion, guide means on the sashes engaging said tracks, and means pivotally mounting said guide means on the inner sash, whereby said inner sash may assume different angular positions with respect to the outer sash as said guide means travel along the inner track.

3. In a window structure, a frame comprising a head and side jambs, and a sill, a plurality of sashes mounted for horizontal sliding movement in said frame, outer and inner tracks for said sashes, the outer track being substantially straight and extending substantially the full width of the frame, the inner track having its major portion disposed in parallel relation to the outer track and having at one end an inclined portion terminating in a relatively short straight portion disposed adjacent to one end of the outer track and substantially parallel thereto, an outwardly turned branch portion on the inner track adjacent its intermediate portion, guide means on the sashes engaging said tracks, means pivotally mounting said guide means on the inner sash, whereby said inner sash may assume different angular positions with respect to the outer sash as said guide means travel along the inner track, and means yieldably supporting certain of said guide means, whereby to facilitate removal of said sashes from said frame.

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