Sept. 8, 1953 M. J. NARDULLI 2,651,083

WINDOW STRUCTURE

Filed Oct. 18, 1949 3 Sheets-Sheet 1

FIG. 1

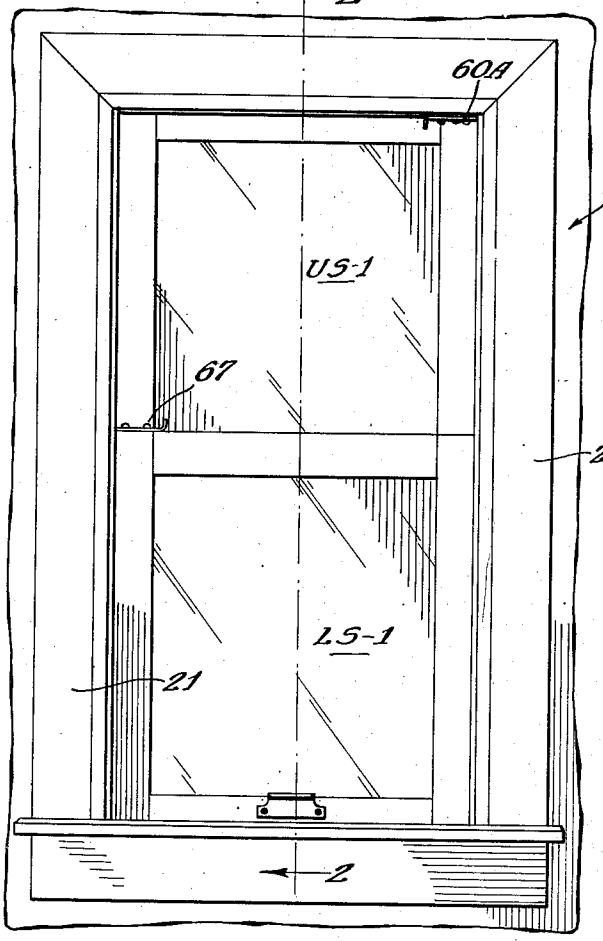


FIG. 2

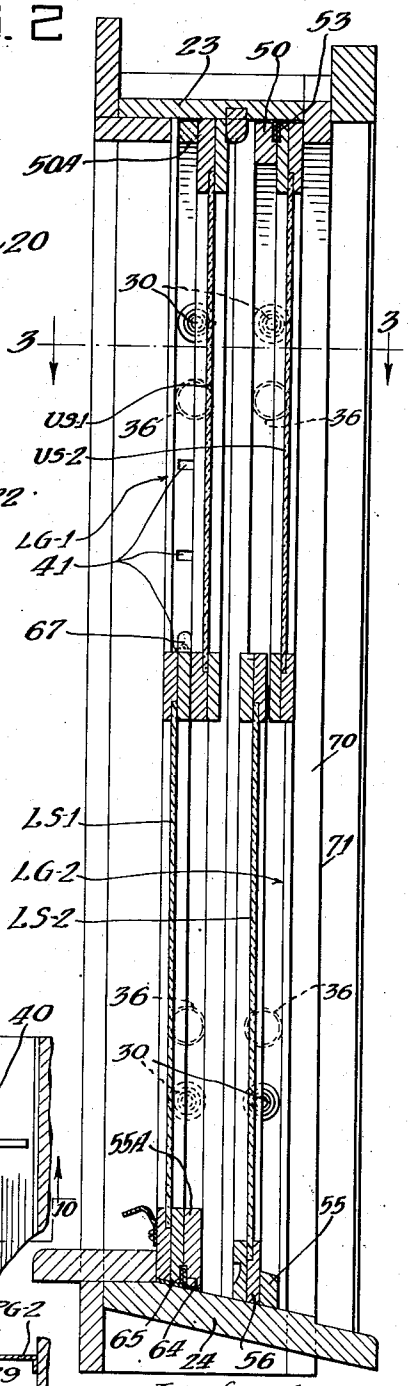


FIG. 8

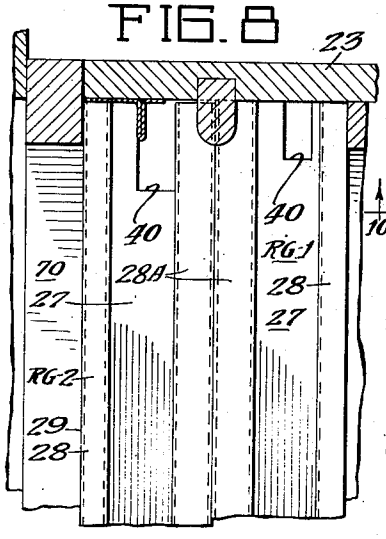


FIG. 9

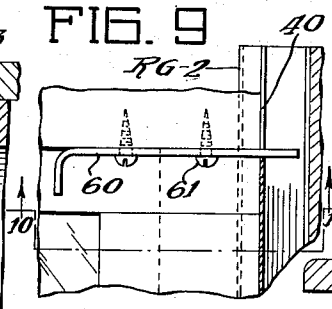
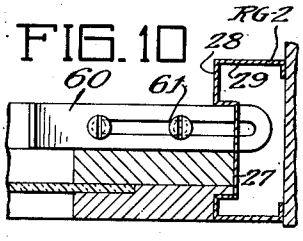


FIG. 10



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FIG. 3

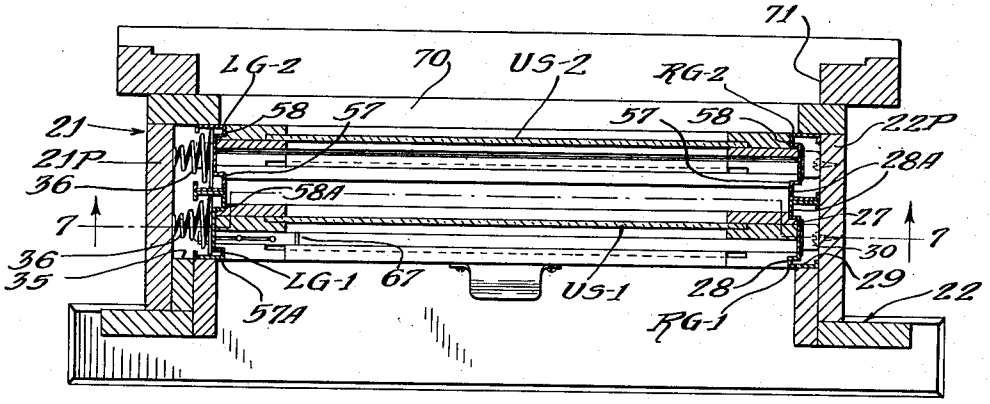


FIG. 4

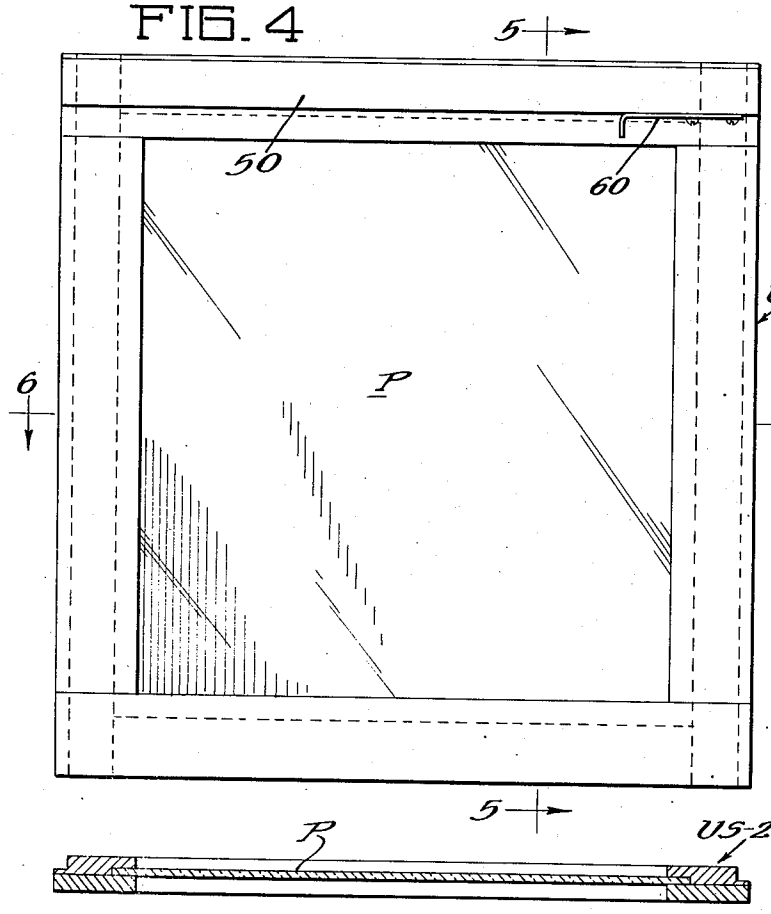


FIG. 5

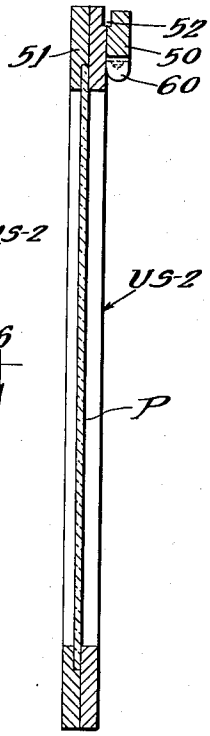


FIG. 6

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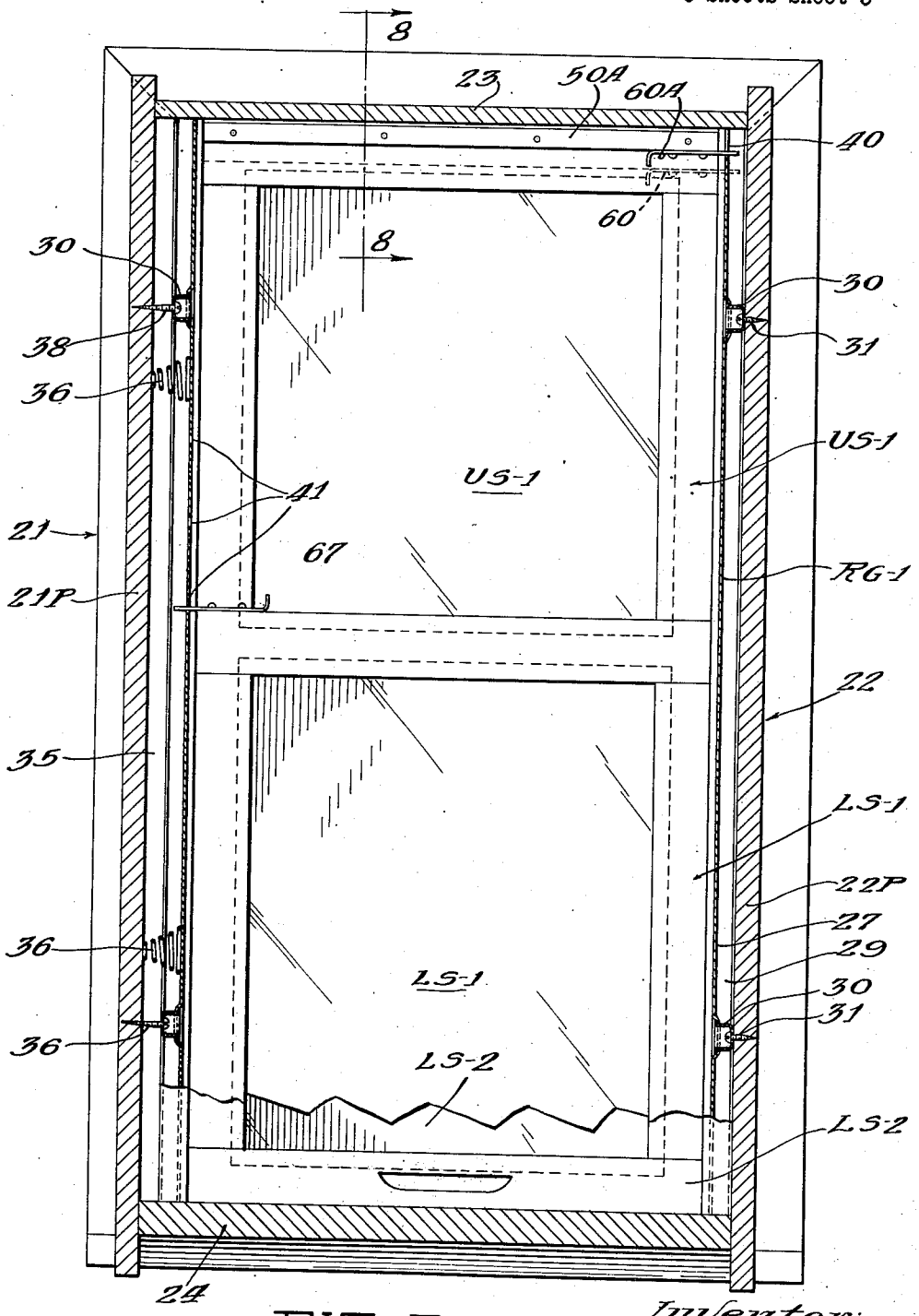


FIG. 7

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UNITED STATES PATENT OFFICE

2,651,083

WINDOW STRUCTURE

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Application October 18, 1949, Serial No. 121,975

2 Claims. (Cl. 20—52.4)

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This invention relates to window structures and particularly to windows having vertically slidable upper and lower sash.

Window structures of the aforesaid character are most commonly exemplified in commerce as double hung windows, in which upper and lower sash are mounted for vertical sliding movement in outer and inner sash guideways afforded in the window frame, and in window structures of the aforesaid character the respective sash are usually held in the desired positions of vertical adjustment by friction or spring means or by weighted or spring-type counterbalances. With such conventional window structures, one complete and full length vertical guideway is required for each individual sash, and it is an important object of the present invention to enable both the upper and lower sash in a window structure of this type to be mounted for accurately guided sliding movement in a single guideway.

Other and related objects are to enable extremely thin and lightweight sash to be employed in such a relation as to permit independent vertical sliding movement thereof in a single vertical guideway, and by reason of the light weight of the sash to simplify the frictional retention of the sash in the desired positions of vertical adjustment.

With conventional double hung window structures, the outer side of the outer guideway is defined by the blind stop of the frame, and outwardly of the blind stop and defined in part thereby, such window frames afford a blind seat. In such structures the provision of storm sash or screens has in the past required mounting of the storm sash or screen in the blind seat or on the blind stop. An important object of the present invention is to so construct and mount the sash of a window structure that the main upper and lower sash may be mounted in the inner guideway of the frame while a storm window may be afforded comprising upper and lower storm sash mounted in the outer guideway of the window frame, thus to afford a main window and a storm window within the physical space normally occupied by the main sash of conventional window structures.

Other objects are to afford a window structure that is particularly adapted for use in modern structures where relatively thin outer wall structures are employed, and to do this by enabling the total thickness of a double hung window to be reduced in such a way that the total thickness of the window frame may be substantially reduced, thereby to conserve on lumber or material cost, and a related object is to accomplish such reduction in thickness in a double hung window structure in such a way that the usual blind stop and blind seat are retained for mounting of conventional screen or storm window structures where this is desired.

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Another object is to enable the sash used as main sash and as storm sash to be identical in basic form and dimensions, thereby to simplify manufacture and inventory problems.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings, which, by way of illustration, show a preferred embodiment and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is an inside elevational view of a window structure embodying the features of the invention;

Fig. 2 is a vertical sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a plan sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is an inside elevational view of one of the upper sash;

Fig. 5 is a vertical sectional view taken substantially along the line 5—5 of Fig. 4;

Fig. 6 is a horizontal sectional view taken substantially along the line 6—6 of Fig. 5;

Fig. 7 is a vertical sectional view taken substantially along the line 7—7 of Fig. 3;

Fig. 8 is a fragmentary vertical sectional view taken substantially along the line 8—8 of Fig. 7;

Fig. 9 is an enlarged fragmental view showing inside of one of the sash and illustrating the way in which it is secured in vertical position; and

Fig. 10 is a fragmentary bottom plan section taken substantially along the line 10—10 of Fig. 9.

For purposes of disclosure, the invention is illustrated as embodied in a window structure 20 wherein a window frame is afforded by vertical frame structures 21 and 22 that are connected at their upper ends by an upper frame member 23 and at their lower ends by a sill structure 24. This window frame structure as herein shown is in all major respects identical with a frame struc-

ture that has been made and sold by R. O. Sales Company of Royal Oak, Michigan, and as heretofore merchandised, this frame structure has been utilized as a mounting for a double hung window structure comprising an upper sash and a lower sash that were held in the desired positions of vertical adjustment by spring means, as will hereinafter be described, but which in other respects were related to each other in substantially the same manner as in ordinary double hung window structures.

Under and in accordance with the present invention, the mounting of the sash structures in the frame is so arranged and improved that a single guideway, which in prior structures would have served as a guideway for a single sash, may be used to guide an upper sash and a lower sash so that, on one hand, the frame structure may be simplified and reduced in thickness and cost so as to embody but a single guideway, or, on the other hand, where two guideways are provided, a main set of windows embodying an upper sash and a lower sash may be mounted in the inner one of the two guideways, while a set of storm sash embodying upper and lower sash, of the same basic construction as the main set of sash, may be mounted in the other or outer guideway.

Before proceeding to the particular arrangement of the sash under the present invention, it should be pointed out that in the R. O. W. Sales Company frame structure, the guideways on the opposite vertical frame members 21 and 22 are substantially similar with the exception, however, that the inner and outer guideways on the right-hand frame member 22 are stationary, while the guideways on the left-hand frame member 21 are yielding in character so that by moving a window sash to the left against one of the yielding left-hand guideways, the sash may be disengaged from the right-hand guideway and may be removed in an inward direction from the window frame structure 20. While this characteristic is not essential insofar as certain aspects of the present invention may be concerned, the guideway arrangements herein illustrated are of the same general character as those manufactured and sold as aforesaid by R. O. W. Sales Company. Thus, as is best shown in Figs. 3 and 7 of the drawings, the frame structure is provided with an inner set of guideways LG–1 and RG–1, and an outer set of guideways LG–2 and RG–2. Each of these guideways is formed from an elongated sheet metal member that is bent to form a channel shaped guideway 27, and from the opposite edges of the side walls of the channel the metal is extended laterally as at 28 and then in a rearward or reverse direction as at 29 to afford what amounts to an elongated stop of substantial width. It will be observed in Fig. 3 that one of these side stops, as indicated at 28A, is somewhat wider than the other, and in practice these wider stop elements 28A are located so that such stop members 28A are disposed next to each other and afford a relatively wide spacing structure in the position that is normally occupied by the parting bead in a double hung window structure. At spaced points throughout the length of the channel 27, mounting thimbles 30 are provided so that they extend through the bottom of the channel 27 and have their lower or closed end walls disposed in the plane of the mounting flanges 29. With respect to the right-hand guideways RG–1 and RG–2, a screw 31 is extended through the bottom of each of the mounting thimbles 30, so as to thereby

clamp the flanges 29 against a plank member 22P that forms the side element of the left-hand window frame structure.

In respect to the left-hand guide members LG–1 and LG–2, it should be observed that exactly the same structure is employed, but in the left-hand vertical structure 21 of the window frame, a relatively deep mounting groove or space 35 is provided, the bottom of which is afforded by a plank element 21P. The guideway members LG–1 and LG–2 are in this instance positioned in this deep channel so that the bottoms of the flanges 29 are spaced from the plant 29P, and a plurality of springs 36 are put in place between these channels and the plank 21P, thereby to urge the channels or guideway members in a right-hand direction. This outward movement is governed and limited by mounting screws 38 which are similar to the screws 31 but are relatively long, as will be evident in Fig. 7.

The guideway structures that have thus been afforded would ordinarily be used, as hereinbefore pointed out, to receive an inner sash in one guideway and an outer sash in the other guideway, but as herein shown, these two guideways afford a mounting for a storm window structure as well as an ordinary or inner window structure, and in attaining proper cooperation of the various elements, I have resorted to but a slight modification of the guideway structures that have thus been afforded. Thus, I have provided locking openings 40 in the upper end portions of the guideways RG–1 and RG–2, and openings 41 in the guideway LG–1, such openings being adapted to cooperate with means on certain of the sash members, as will hereinafter be described.

In accordance with the present invention, the inner guideway afforded by the members LG–1 and RG–1 is utilized to support and guide a lower sash LS–1 and an upper sash US–1, while the outer guideway that is afforded by the members LG–2 and RG–2 is utilized to support and guide an upper sash US–2 and a lower sash LS–2. It might be pointed out that while these sash may be made in accordance with any desired structural method or of any desired material, I have herein shown such sash as being basically constructed from wood and in accordance with the method and structure disclosed in the copending application of Delegard et al., Serial No. 753,586, filed June 9, 1947, which has now become abandoned.

Each of these sash is made up from a basic sash structure of the character disclosed in the aforesaid Delegard and Nardulli application, and such structure will be described herein only in a general way, reference being made to the aforesaid Delegard and Nardulli application for specific details of structure. In Figs. 4, 5 and 6, the upper sash US–2 is illustrated, and in common with all of the other sash herein shown, the sash US–2 has a frame that is made from two opposed and adhesively bonded frame elements, or half-thickness frames, which serve to enclose and support a glass pane P. The sash structures that are thus provided are made up in a series of different standard sizes and may, of course, be utilized in other mounting arrangements. In accordance with the present invention, the upper sash US–2 has a guide rail 50 secured along its upper inner face, or, in other words, along the upper horizontal frame element 51 of the sash frame. This rail 50, at the plane of the juncture with the frame element 51, has an upwardly opening weatherstrip groove 52 formed there-

in in the present instance to receive the rib of a conventional rib strip 53 that is fixed to the top frame member of the window frame.

In a similar manner, the lower sash LS–2 has a guide rail 55 fixed along the outer face of the lower frame member 56 of the sash. The sash US–2 and LS–2 are fitted in the respective guideways RG–2 and LG–2, the inner corners of the vertical frame elements of the sash LS–2 being rabbeted as at 57, while the outer vertical corners of the sash US–2 are rabbeted as at 58. Thus, when the sash US–2 and LS–2 are put in position in the guideways, the adjacent vertical faces of the two sash are arranged to engage each other, while the rabbeted vertical corners 57 and 58 of the respective sash engage the side walls of the guideways RG–2 and LG–2. It will be noted that the thickness of the rail 50 is such that its end portions engage within the guideways LG–2 and RG–2 directly over the lower sash LS–2, while the thickness of the lower rail 55 on the lower sash LS–2 causes similar engagement with the opposite sides of the guideways beneath the upper sash US–2. The rail 50 thus cooperates with the rabbeted corners 58 to guide the upper edge portion of the sash US–2 and hold the same in a vertical position within the guideways, and this same function is attained by the lower rail 55 in respect to the lower sash LS–2, the rail 55 cooperating with the rabbeted corners 57 of the lower sash LS–2 in attaining this guiding action. The intermediate portions of the sash, or, in other words, the lower edge portion of the upper sash and the upper edge portion of the lower sash, are guided at all times by the engagement of the opposite portions of the vertical elements of the frames of the respective sash, and thus the two sash are properly guided at all times in the various vertical adjusting movements of such sash. When the sash are in their closed positions, a meeting rail action is afforded since the upper frame member of the lower sash and the lower frame member of the upper sash are disposed in face to face engagement.

In the present instance where a resilient guideway such as the guideway LG–2 is employed, the releasing movements that may be performed in respect to the lower sash LS–2 would, of course, remove the retaining pressure on the upper sash US–2, and in order to simplify the installing and removing operations, means are afforded in association with the upper sash US–2 for positively retaining the sash in its upper position during mounting or dismounting operations performed in respect to the lower sash LS–2. For this purpose, a horizontally slidable retaining bolt 60 is secured by means such as screws 61 on the lower face of the rail 50 adjacent to the right-hand edge of the sash US–2, as shown in Fig. 1, and this bolt 60 is adapted to pass into the locking opening 40 that is provided as aforesaid in the right-hand guideway RG–2, it being noted that a similar locking opening is provided in the other right-hand guideway.

With the structure that is thus afforded in outer guideways LG–2 and RG–2, the window frame is provided with a complete set of double hung windows that may be moved into different vertical positions so as to be retained in such positions by the spring pressure afforded by the resilient or spring guideway LG–2. In the present instance, the sash LS–2 and US–2 are utilized as storm sash, and the other pair of sash US–1 and LS–1 are utilized as the inner or main windows. Thus, the upper sash US–1 has

a similar and somewhat smaller guide rail 50A fixed on the inner surface of the upper element of the sash frame, this guide rail 50A in the present instance having a smaller vertical dimension than the guide rail 50 since it is unnecessary to provide a groove 52 in the rail 50A. The lower sash LS–1 in the present instance has a guide rail 55A that is similar in its general location to the rail 55, but has a greater vertical dimension so that a groove 64 may be formed in its lower edge to receive a usual rib strip 65 that is mounted on the window sill. The upper guide rail 50A has a lock 60A fixed thereon that is adapted to be engaged with the locking opening 40 in the guideway RG–1 for the same purpose as previously described in respect to the locking bolt 60. The upper frame element of the sash LS–1 has a similar locking bolt 67 fixed thereon so that this bolt may be selectably engaged with any one of the locking openings 41 that are formed in the left-hand guideway LG–1, thereby to enable the sash LS–1 to be locked in any one of several vertical and partially open positions, it being noted that the lower one of the openings 41 provides for the locking of the lower sash LS–1 in its fully closed position. The inner sash members LS–1 and US–1 are similarly rabbeted at 57A and at 58A so that a similar guiding action is attained in respect to these sash.

It will be observed that the sash arrangement that is provided under the present invention enables two sash to be mounted in a single vertical guideway, and these sash are held in the proper vertical relation during sliding movements thereof by cooperation of the sash with the guideways and with each other. It will be apparent that through the arrangement that is afforded by the present invention, the window structures may be materially simplified and the window structures may be made relatively thin so that the proper window closures may be disposed within a relatively narrow dimension. Moreover, the present invention makes it possible to locate a storm sash and a main sash structure within the space normally occupied by a double hung window structure, and it will be observed that in the present arrangement, an outer stop 70 and a blind seat 71 are afforded so that the usual half-screen may be mounted on the outer stop 70, or a complete or full-screen may be mounted in the blind seat in accordance with usual practice.

It will be apparent that the present invention materially simplifies the provision of sliding window structures and materially reduces the cost of affording those structures.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims:

I claim:

1. In a window structure, a frame having side jambs, a transverse upper member and a lower sill, means on the respective jambs having a pair of opposed parallel vertical guideways of predetermined width and disposed one on each of said jambs and each embodying an inner stop and an outer stop, an upper sash and a lower sash disposed in vertical sliding movement in said pair of opposed guideways, said upper sash having a sash frame embodying top, bottom and side frame elements and disposed in said guideways with

said side frame elements engaging said outer stops, the sash frame of said upper sash having a thickness equal to substantially less than said predetermined width of said guideways and said top frame element having a check rail fixed on its inner face and of a width such that it engages said inner stops of said guideways to hold the upper end portion of said upper sash against said outer stops, a lower sash having a sash frame embodying top, bottom and side frame elements and disposed in said guideways with said side frame elements thereof engaging said inner stops, said sash frame of said lower sash having a thickness equal to substantially less than said predetermined width of said guideways and said bottom frame element of said lower sash having a check rail fixed to the outer face thereof and of a width such that it engages said outer stops to hold the lower end of said lower sash against said inner stops, said lower frame element of said upper sash and said upper frame element of said lower sash being disposed opposite each other within said guideways so that each sash acts as one side of a runway for the other sash.

2. In a window structure, a frame having side jambs, a transverse upper member and a lower sill, means on the respective jambs having a pair of opposed parallel vertical guideways of predetermined width and each embodying an inner stop and an outer stop, an upper sash and a lower sash both disposed in said pair of guideways and each having a sash frame embodying top, bottom and side sash frame elements and said frames each being of a thickness substantially less than the said predetermined width of said guideways,

said upper and lower sash being disposed in said pair of guideways with their edges located in said guideways with said upper sash engaging said outer stops and said lower sash engaging said inner stops, and check rails fixed respectively on the inner face of the upper frame element of said upper sash and the outer face of the lower frame element of said lower sash to make said upper frame element of said upper sash and the lower frame element of said lower sash of such thickness as to completely fill the space between said inner and outer stops.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
51,918	Calderwood	Jan. 9, 1866
565,774	Montgomery et al.	Aug. 11, 1896
675,263	Brown	May 28, 1901
941,629	Duering	Nov. 30, 1909
1,704,373	Robbins	Mar. 5, 1929
1,727,613	Loetscher	Sept. 10, 1929
1,818,411	Lischick	Aug. 11, 1931
2,288,936	Casey	July 7, 1942
2,412,190	Womack	Dec. 3, 1946
2,430,059	Krantz	Nov. 4, 1947
2,547,315	Gray	Apr. 3, 1951
2,561,511	Holmes	July 24, 1951

FOREIGN PATENTS

Number	Country	Date
169,457	Germany	1906
318,801	France	1902
642,933	Germany	1937