Sept. 23, 1952 L. TOTH 2,611,156

STORM WINDOW

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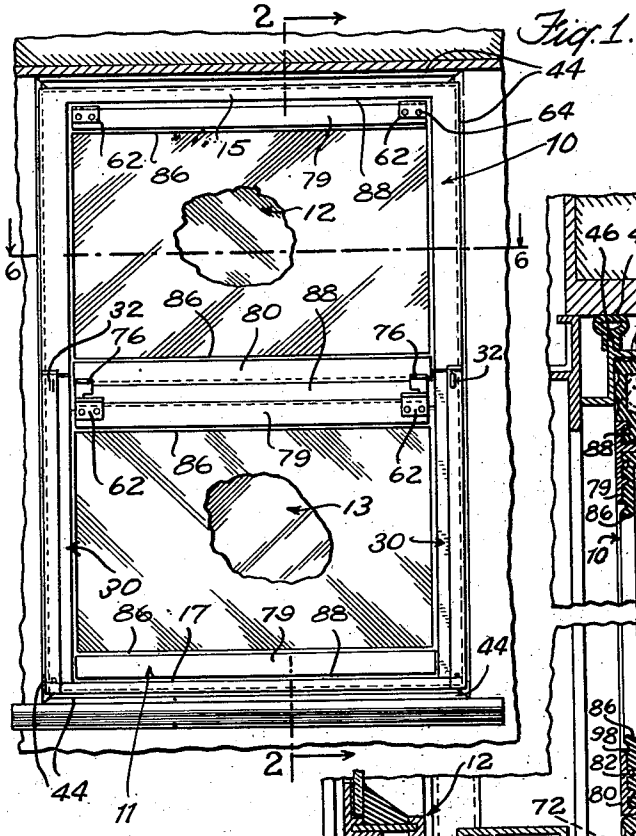


Fig. 1.

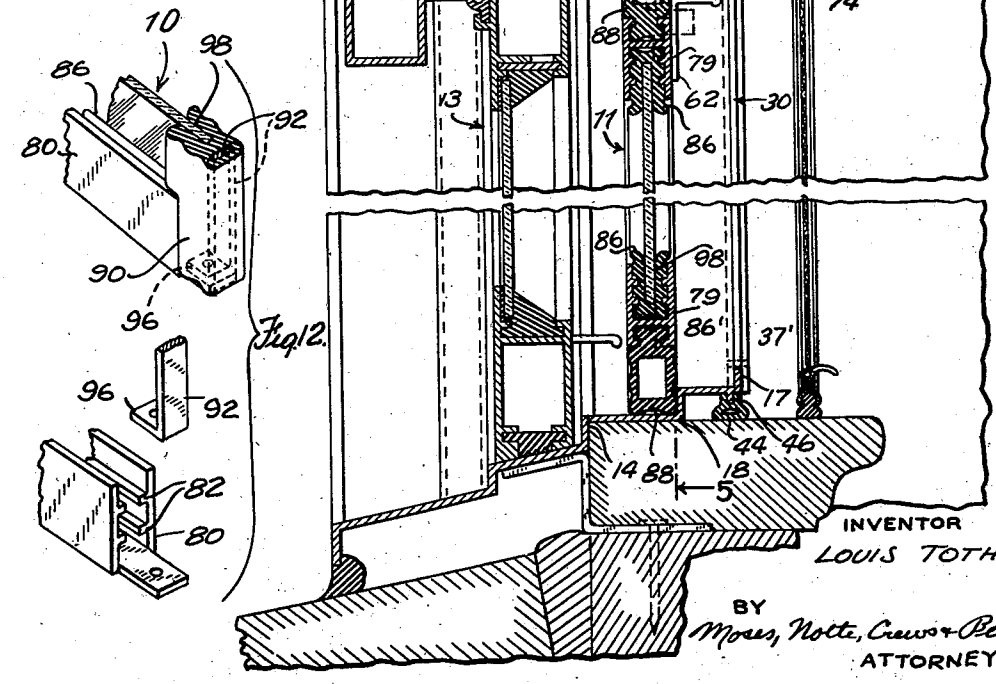


Fig. 2.

Fig. 12.

INVENTOR
LOUIS TOTH

BY
Moses, Nolte, Crews & Berry
ATTORNEYS

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Fig. 3.

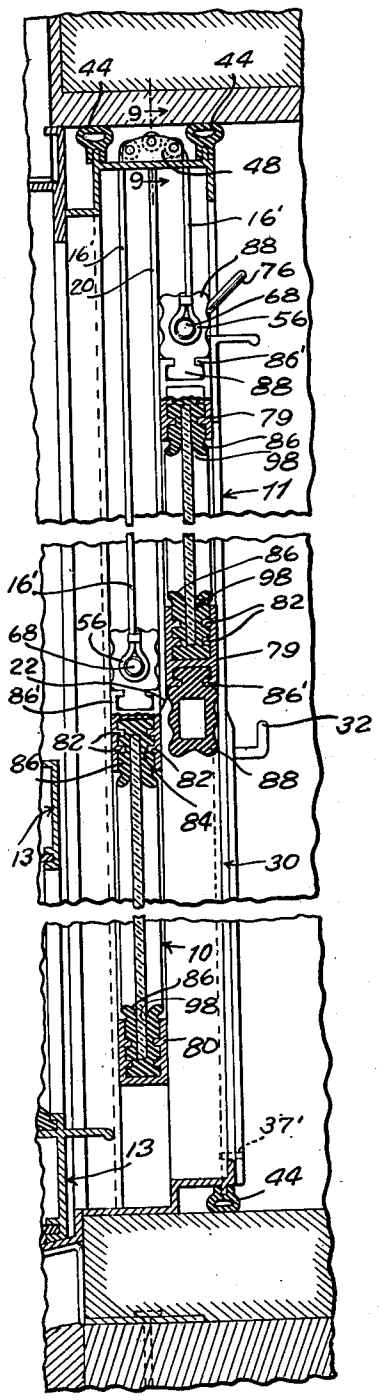
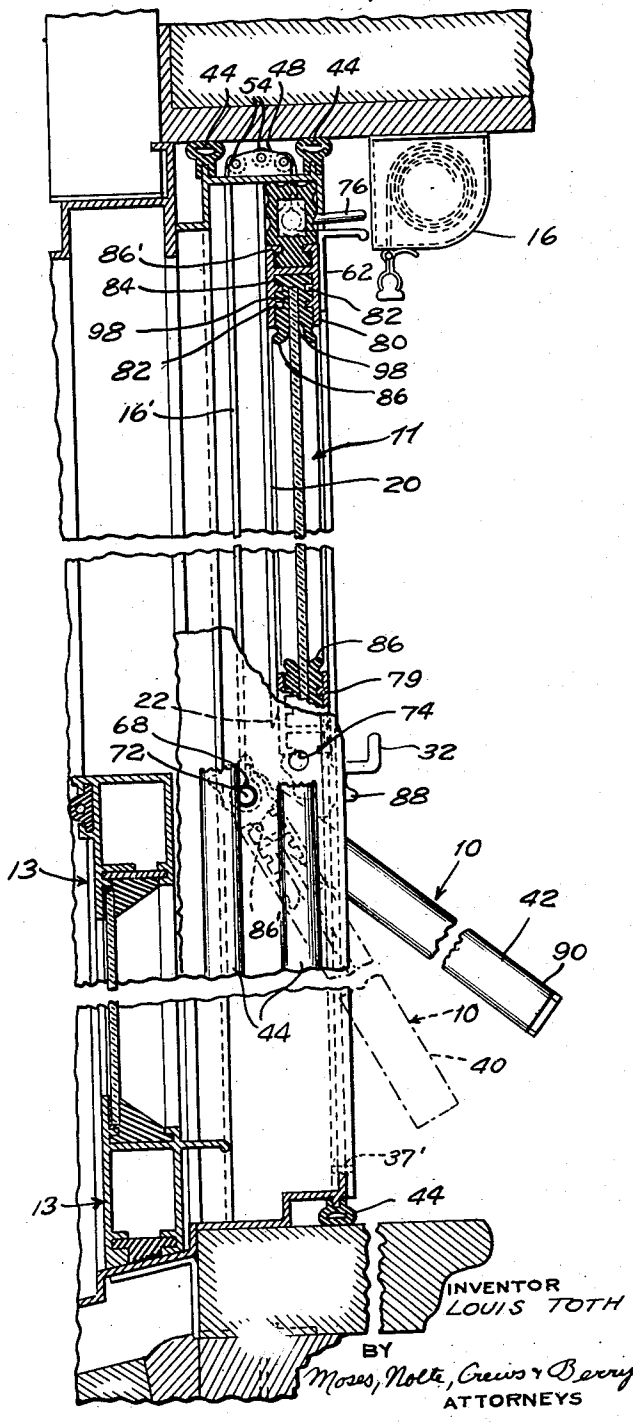


Fig. 4.



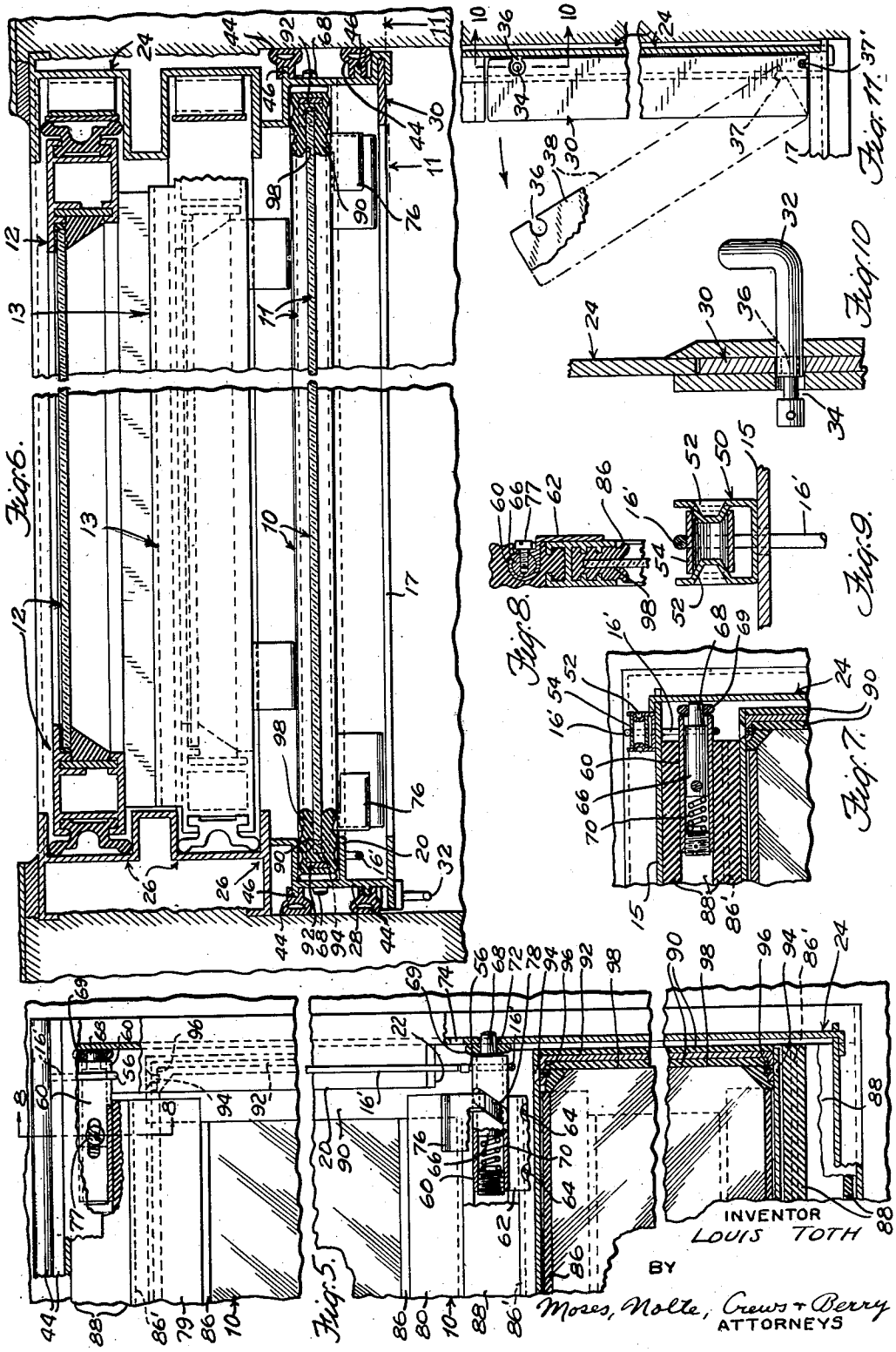
INVENTOR
LOUIS TOTH

BY
Moses, Nolte, Greiss & Berry
ATTORNEYS

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UNITED STATES PATENT OFFICE

2,611,156

STORM WINDOW

Louis Toth, Flushing, N. Y.

Application January 22, 1946, Serial No. 642,640

6 Claims. (Cl. 20—55)

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This invention relates to storm windows designed to create a dead air space between a storm window and an outside window of any suitable type.

It is an object of the invention to provide a storm window which may be conveniently installed inside of the usual window, which may be kept in place throughout the year without removal if desired, and which may be opened for ventilation.

It is a further object of the invention so to design an inner storm window that either or both of its sashes can be swung inwardly in such a manner as to permit cleaning of the inner adjacent faces of the storm window and the outside window which are usually inaccessible. This type of construction makes it possible to clean the outer and the inner windows in business or apartment houses without exposing the cleaner to the danger inherent in cleaning windows where the storm window is hung outside.

It is a still further object of the invention to eliminate the necessity of installing and removing storm windows at the end of a winter season and the consequent storing of them on higher floors or in the basement, thus minimizing the danger of breakage.

Furthermore, it is an object of the invention to provide an inner storm window having an airtight fit with its frame, thereby creating a dead air space between the outside and the inner window so as to minimize heat transfer from the outside to the inside, or vice versa. This makes a construction particularly desirable for use in air conditioned buildings.

A further important object of the invention is to make it possible to place the lower sash of the storm window in vertical alignment with the upper sash during periods of use. This makes the window present a finished appearance and also insures tightness.

Other objects of the invention will appear from the following description:

In the drawings,

Fig. 1 is an inside view, in elevation, of a double-hung window having a double hung inner storm window with its two sashes placed in vertical alignment;

Fig. 2 is a vertical sectional view of the window of Fig. 1 taken on the line 2—2 of Fig. 1 looking in the direction of the arrows and with portions of the view broken away for compactness of illustration;

Fig. 3 is a vertical sectional view of the window, similar in many respects to that of Fig. 2

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but with the two sashes of the storm window displaced from their respective positions in alignment as shown in Fig. 2;

Fig. 4 is a vertical sectional view similar to Fig. 3 showing details of the means whereby the sashes of the inner storm window can be pivoted and swung inwardly for cleaning purposes;

Fig. 5 is a detail sectional view taken substantially on line 5, 5 of Fig. 2 of the storm window in the closed position shown in Fig. 1 with parts broken away and other parts partly in vertical section;

Fig. 6 is a horizontal sectional view of the line 6—6 of Fig. 1 showing the construction of the jambs of the frame, both of the inner and outer window, and the relative positions and relations of the parts;

Fig. 7 is a fragmentary detail view of the upper right hand corner of the upper sash taken on the line 7—7 of Fig. 2 showing the pivoting and sash roller mechanism;

Fig. 8 is a vertical fragmentary sectional view taken on line 8—8 of Fig. 5;

Fig. 9 is a detail sectional view of the roller designed for the suspension, by a cable or other means, of the double hung inner storm window, taken on the line 9—9 of Fig. 3;

Fig. 10 is a detail view, partly in section, of the handle provided for control of the lower jamb strips to permit their removal from the frame when the sash is swung inwardly for cleaning purposes, the view being taken on the line 10—10 of Fig. 11;

Fig. 11 is a detail sectional elevation of a removable strip of a jamb taken on the line 11—11 of Fig. 6; and

Fig. 12 is a perspective view showing the corner construction of one of the storm sashes.

The general construction and relation of the parts of the inner storm window is best illustrated in Figs. 2, 3, and 4 of the drawings, in which 10 represents the upper of the pair of sashes of the storm window, and 11 the lower of the pair of sashes of the storm window. 12 and 13 are the upper and lower sashes, respectively, of the usual outside double hung window of a building. These sashes of the outer window may have any usual construction, such as metal sash rails of the general construction shown in Fig. 2. The precise construction of the outer window is not a part of this invention but for purposes of illustration a construction is shown which forms the subject matter of an application for patent filed by me December 28, 1945, Serial No. 637,635, now abandoned.

It may be desirable, in some instances, to have an integral sill 14 for the inner and outer windows. However, in the illustrated form of the invention, the frame of the inner window is constructed of separate pieces of extruded metal, such as the header shown at 15 in Figs. 2 and 3 in which the header of the frame of the inner window is a separate piece, not integrally joined to the frame of the outer window.

For the purpose of illustration only, there is shown at 16 an inner screen which may be rolled up at the top of the window within the room, but adjacent the storm window. This screen, however, is not a feature of the invention and is shown merely to illustrate the relative positions of the various parts of the double-hung storm window.

The sill of the inner storm window has the configurations shown from the point indicated by the position of the numeral 14 to that indicated by the position of the numeral 17 of Fig. 2; and is a separate strip of extruded metal not integrally joined to the sill of the outer window. As shown in this section of the frame, the sill is provided with a shoulder at 18 and an upstanding flange at 17 which form the lower channels for the storm window sashes. The header 15 has a channel wide enough to accommodate the two sashes of the inner window with a parting strip 20 between the two. This parting strip extends only about half of the vertical distance between the header and the sill of the frame, as will be noted in Figs. 3 and 4 where the parting strip terminates at the point indicated by 22. Since the parting strip does not extend below this point 22, there is a common undivided channel at least double the width of either sash in the lower part of the jamb for purposes which will be explained.

The configurations of the jambs of the window frame of both the inner and outer usual windows may be like those shown in Fig. 6 at 24 and 26. The jamb shown in cross-section at 24 is an integral piece of extruded metal which provides sash channels and parting strips for both the inner and outer windows. The frame shown at 26 at the left hand of Fig. 6 consists of two parts with a separate jamb for the inner storm window shown at 28 in Fig. 6. The innermost flange of the jambs of the lower portion of the storm window is removable as is indicated by the construction shown at 30 of Figs. 6 and 11. These flange portions constitute removable sash retaining strips, which complete the inner channels of the jambs of the storm window. They are held in position normally by the device shown in Fig. 10, comprising a handle 32 with a portion thereof constricted as at 34, which restricted portion closely fits the slit of a slotted hole 36. The flange is so dimensioned that an outward pull of the handle 32 brings the constricted portion of the handle within hole 36 whereupon the strip can be swung outwardly and away from its normal position to that shown at 38 in Fig. 11; and further movement of the flange permits its complete removal from the window. The lower end of the flange is provided with slot 37 which disengages the pin 37' in the frame. When this flange is thus completely removed, both from the right and left hand sides of the lower jamb of the inner storm window, it then becomes possible to swing inwardly either sash of the window into a position illustrated at 40 or 42 in Fig. 4.

The frame of the inner storm window including the jamb members, the sill and the header are held in position in the walls of the building by strips of resilient plastic material of the general configuration indicated at 44 in Figs. 2, 3, 4, and 6. These strips of resilient material are attached to the said frame by slipping two ribs of the strip over ribs 46 of the frame. The body portion of the resilient strips is generally tubular in design; and it can therefore collapse somewhat, as indicated in all sections showing the strips 44 so that the frame of the inner window can be forced into position and held firmly in engagement thereby with the adjacent walls of the building. This feature makes it possible to add an inner storm window to a normal double hung window at any time subsequent to its original construction.

At each side of the header of the frame of the storm window, there is provided a suspension for the two sashes consisting of a plurality of roller bearings, illustrated here by three rollers, disposed between the header of the frame and the adjacent walls of the building at a point illustrated at 48 in Figs. 2, 3, 4, and 7. The construction of this roller bearing is best illustrated by Fig. 9, which shows, in cross-section, a channel 50 made from a piece of sheet metal having two legs bent at a right angle to the web connecting them, and indentations 52 stamped therein which provide pivot supports for short pieces of tubing 54 suitably dimensioned to revolve on the indentations 52 as bearings when a cable or other sash suspension cord 16' moves over the rollers 54.

The relation of the sash suspension cord 16' to the roller bearings is illustrated clearly in Fig. 9 and also in Figs. 3 and 4 which show the cord or cable passing over the rollers aforesaid; cord 16' may be attached by loops or other means to the sides of the upper rails of the sashes as illustrated at 56 in Figs. 3 and 5. From Figs. 2, 3, and 4, it will be noted that the rollers 54 are disposed along an arc which extends in such a manner that the peripheries of the two outer rollers are in alignment with the center lines of the inner and outer sashes of the storm window, so that the said sashes hang vertically downward from the cable 16' attached to said sashes and passing over the rollers. This construction reduces the vertical space which would ordinarily be required for a circular pulley of proper diameter, such as is usually employed.

The attachment of the cable suspension of the sashes to the rails thereof may be provided by a tubular member 60 shown in detail in Figs. 5 and 8. This member may be attached to the upper rail of a sash by means shown in Figs. 1, 5, 7 and 8 including a downwardly-projecting flange 62 welded or screwed as at 64 in Figs. 1 and 5, to the sash rail. It houses a plunger 66 having an end 68 of reduced diameter. A rubber or other pliable washer 69 may be installed on the end 68 to cushion its engagement with jambs 24 and 26. Plunger 68 is spring-pressed as by a spring 70 and is normally urged outwardly so that 68 will enter holes 72 or 74 in the jamb at approximately its central point, i. e., in the position shown in Figs. 4 and 5. In this position, the reduced end 68, when lodged in hole 72, provides a pivot upon which the upper sash 10 can swing inwardly into the positions shown at 40 or 42 in Fig. 4, but only after the retaining strips 30 of the lower halves of the jambs (see Figs. 6 and 11) have been removed from the jambs by pulling the handle 32 out to a position which, as previously described, permits removal of the strips 30 from the jambs. The lower sash, on the other

hand, is similarly pivoted in the hole 74 which, it will be noted in Fig. 4, is adjacent to the hole 72 but slightly above its horizontal level and located in the sash channel of the lower sash.

The parting rail 20, as previously stated, does not extend below the point 22 where the common sash channel in the lower portion in the jamb is more than twice the width of either sash. Having such a width, the channel permits movement of sash 11 from the right hand side of the common sash channel to a parallel position at the left hand side of that channel, thereby placing sash 11 in vertical alignment with the upper sash 10, i. e., with the upper outside window as illustrated in Fig. 2. In accomplishing this, the lower end of the lower sash 11 is first inserted behind the shoulder 18 of the sill and then the upper end of the sash is swung inwardly into the position shown in Fig. 2. Having arrived in this position, it will be automatically locked by entrance of the reduced end 68 of plunger 66 into the hole 72, urged by the spring 70.

When it is desired to remove the lower sash 11 from this aligned position, a handle 76 attached to plunger 60 through oblique slot 78 is pressed downwardly, thus compressing spring 70 and withdrawing the constricted portion 68 from the hole 72. When this has been effected, the upper portion of the lower sash can then be swung inwardly; and after being raised a short distance can then be pulled from behind the shoulder 18 and then can be moved upwardly into its own proper channel, so as to assume the position shown in Fig. 4, with its resilient weather strip contacting with the header of the frame. The upper end of the lower sash can also be released from its vertical alignment with its upper sash shown in Fig. 2, by withdrawing the reduced end 68 from hole 72 and by moving the upper end of the lower sash upward, thus permitting the end 68 to enter into hole 74. Since upper sash 10 is shorter than lower sash 11, it can be pivoted in hole 72 and can then be swung inwardly to the positions 40 and 42 shown in that figure. It will be understood that sash 11 can be pivoted in hole 74 and that with either sash thus swung inwardly, access is provided to the inner window pane surface of the storm sash and of the outer window sash for cleaning purposes. Plunger 60 of the upper sash 10 does not have a handle such as 76 attached thereto, because it would interfere with vertical movement of both sashes. Accordingly, withdrawal of such plunger 60 from hole 72 must be effected by sidewise manual pressure exerted upon screw head 77 (Fig. 5) after its shank has been unscrewed sufficiently to release screwhead 77 from any tightened and clamped position.

Both horizontal rails of the lower storm sash and the upper rail of the upper sash may be formed of extruded metal and have a configuration in cross section roughly resembling the figure H shown at 79 in Figs. 3 and 4. The lower rail of the upper sash has the configuration shown at 80 in Figs. 3 and 4, which latter resembles a channel beam, namely, two parallel straight upstanding flanges connecting by a straight web. The inner surfaces of these flanges may be provided with ribs 82 designed to enter channels 84 in the plastic glazing strip 86.

The essential difference between the configurations 79 and 80 of the horizontal rails is that rails 79 are provided with outstanding hooked flanges 86' which enter into corresponding channels in extruded pliable strips, such as that shown at 88 in Figs. 2 and 3 disposed along the outer edges of the horizontal sash rails. This weather strip section 88 being hollow, as shown, is deformed fairly easily (see, for example, 88 in Fig. 4) so that it can accommodate itself to inequalities in the sill when it is in the position shown in Fig. 2 and can likewise bend sufficiently to permit of its sliding over the shoulder 18 when removal of the lower sash from vertical position becomes necessary.

The stiles of the window sash, on the other hand, are constructed primarily of extruded pliable plastic strips which have the configuration shown at 90 in Fig. 6. Embedded in the bases of these pliable stiles 90 are metal strips 92 which, as will be noted upon reference to Figs. 5 and 12 extend from the lower to the upper sash rails to which each stile strip may be secured by a screw 94 entering a right-angled flange 96 with which the metal stile strips are provided at each end. By this means, the sash frame is assembled after the glass pane has been inserted in its appropriate channel 98 in all of the four glazing strips which encompass the window pane when it is in position.

Having described my invention, what I claim is:

1. A storm window comprising a frame including a pair of jambs having jamb channels, upper and lower storm sashes slidably mounted in said jamb channels, said jamb channels being wide enough to hold said upper and lower sashes when moved into side by side relationship, the lower one of said sashes being movable longitudinally and laterally in said jamb channels into the same plane as the other sash, parting strips partly dividing said jamb channels into two parallel vertical portions, said parting strips extending downwardly in the upper part of the frame and terminating near the lower edge of the lower rail of the upper sash when the upper sash is moved to the top of the frame, the jambs having sockets therein in line with the upper sash and adjacent to the lower edge of the lower rail of said upper sash when the sash is at the top of the frame, the top rail of said upper sash carrying retractable bolts adapted to be projected into said sockets when the sash is moved into the lower part of the frame the sockets being at least as far above the lower cross member of the frame as the bolts are above the lower edge of the lower rail of the upper sash.

2. In storm window construction, a frame including a header, sill and channelled jambs, upper and lower sashes mounted in the jamb channels, said jamb channels being wide enough to receive said sashes side by side, said sashes being movable into the same plane when the window is closed and being of such area that when so moved into the same plane they completely close the window opening, the meeting rails of said sashes having broad substantially horizontal abutment surfaces extending substantially the full width of said rails, the sill of the frame having a shoulder therein about midway of the width thereof, the lower edge of the bottom rail of the lower sash seating against said shoulder when said sashes are brought into alignment, at least one of the rails of the lower sash being yieldable sufficiently to permit said lower sash to be sprung out of alignment with the upper sash when the window is to be opened.

3. A storm window comprising a frame including a pair of jambs having jamb channels, said jamb channels being wide enough to hold said upper and lower sashes when moved into side by

side relationship, at least one of said sashes being movable laterally in said jamb channels into the same plane as the other sash, said sashes when brought into the same plane being of such dimensions as to completely fill the opening of the storm window frame so as to form a complete weather tight storm window, the meeting rails of said sashes having broad substantially horizontal abutment surfaces extending substantially the full width of said rails, pulley means at the head of the storm window frame and a flexible member running over said pulley means and connected at one end to the upper sash and at the other end to the lower sash, the upper rail of the upper sash and both the upper and lower rails of the lower sash having yieldable resilient marginal portions, said resilient marginal portions being compressible to an extent to permit the lower sash to be swung out of alignment with the upper sash when the window is to be opened.

4. A storm window comprising a frame for insertion in a window opening, said storm window frame including a pair of jambs having jamb channels therein, upper and lower storm sashes mounted in said jamb channels, said jamb channels being wide enough to hold said upper and lower sashes when moved into side by side relationship, at least one of said sashes being movable longitudinally and laterally in said jamb channels into the same plane as the other sash, said sashes when brought into the same plane being of such dimensions as to fill the opening of the storm window frame so as to form a complete weather tight storm window, pulley means at the head of the storm window frame and a flexible member running over said pulley means and connected at one end to the upper sash and at the other end to the lower sash, said frame having a header comprising inner and outer projecting flanges having elastic strips thereon for engagement with the window opening, said pulley means being mounted on the header between said flanges.

5. A storm window comprising a frame including a pair of jambs having jamb channels, upper and lower storm sashes slidably mounted in said jamb channels, said jamb channels being wide enough to hold said upper and lower sashes when moved into side by side relationship, the lower one of said sashes being movable longitudinally and laterally in said jamb channels into the same plane as the upper sash, parting strips partly dividing said jamb channels into two parallel vertical portions, said parting strips extending downwardly in the upper part of the frame and terminating near the lower edge of the lower rail of the upper sash when the upper sash is moved to the top of the frame, the jambs having sockets therein in line with the upper sash adjacent to the lower edge of the lower rail of said upper sash when the sash is at the top of the frame, the upper rail of said upper sash carrying retractable bolts adapted to be projected into said sockets when the sash is moved into the lower part of the frame, the sockets being at least as far above the lower cross member of the frame as the bolts are above the lower edge of the lower rail of the upper sash, the lower rail of the lower sash having a hollow resistant plastic strip forming the bottom part thereof, said plastic strip being capable of yielding laterally to permit outward swinging of the upper sash when the bolts on the upper sash are projected into said sockets.

6. A storm window comprising a frame including a pair of channelled jambs, upper and lower storm sashes slidably mounted in the jamb channels, the upper sash being shorter than the lower sash, said jamb channels being wide enough to hold said upper and lower storm sashes when moved into side by side relationship, said lower sash being movable longitudinally and laterally in the jamb channels into the same plane as the upper sash, said jambs having pairs of sockets near the center thereof, one pair of sockets being located in the plane of the sashes when in alignment, the other pair of sockets being in the part of the jamb channels not occupied by the sashes in such position, retractable bolts carried by the top rail of the upper sash for engagement with said first pair of sockets, and retractable bolts carried by the top rail of the lower sash for engagement with said second pair of sockets when the lower sash is moved out of alignment with said upper sash, said first pair of sockets being at least as far above the lower cross-member of the frame as the bolts carried by the top rail of the upper sash are above the lower edge of the lower rail of the upper sash, said second pair of sockets being at least as far above the lower cross-member of the frame as the bolts on the top rail of the lower sash are above the lower edge of the lower rail of the lower sash.

LOUIS TOTH.

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