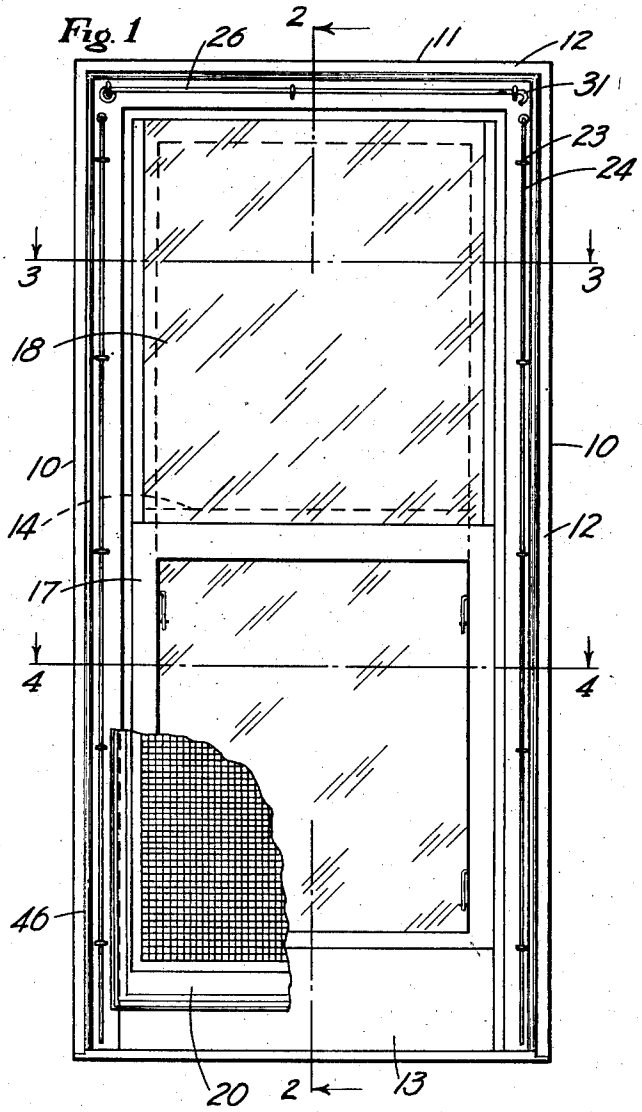
Oct. 30, 1945. J. M. DRAB 2,388,044

STORM WINDOW

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Fig. 1



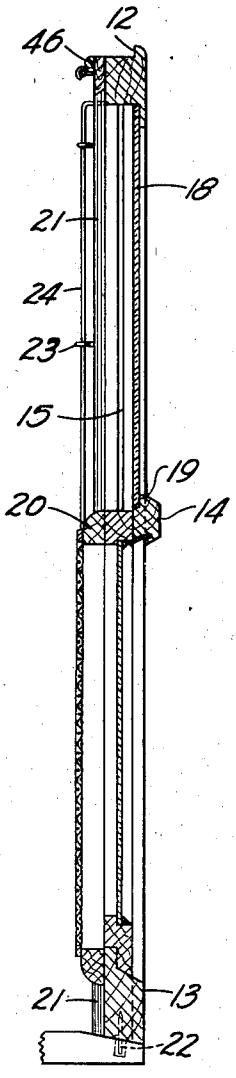


Fig. 2

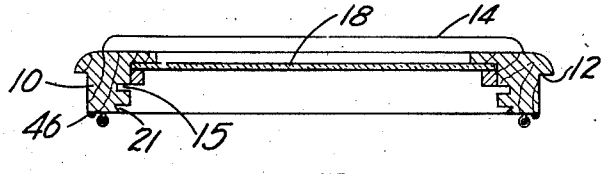


Fig. 3

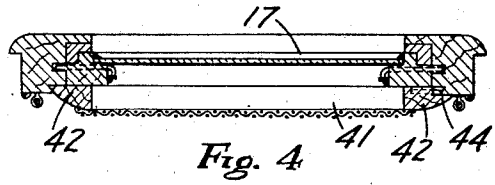


Fig. 4

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STORM WINDOW

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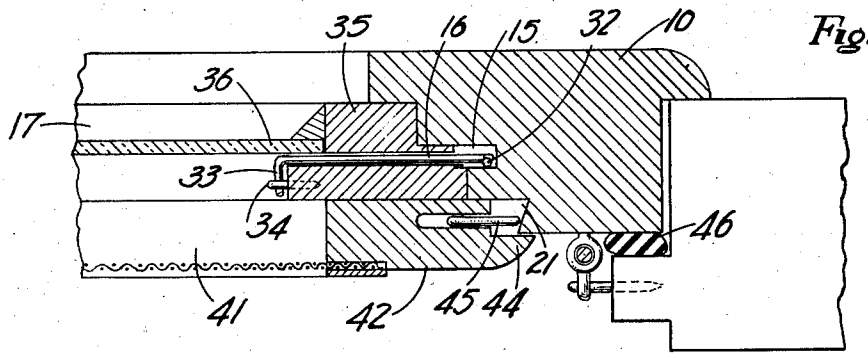


Fig. 5

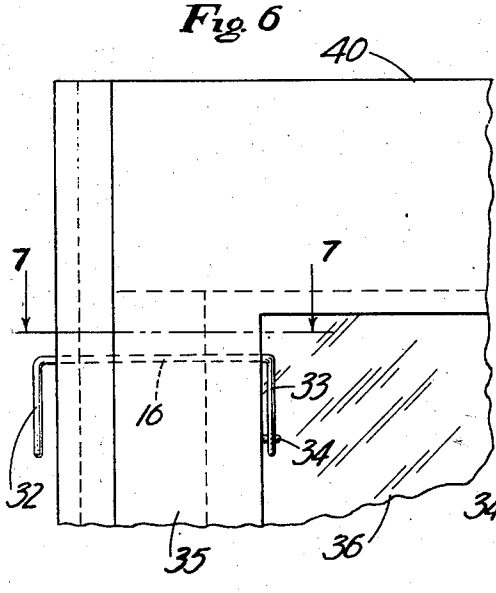


Fig. 6

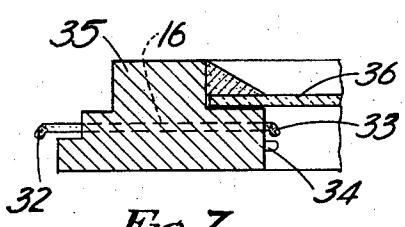


Fig. 7

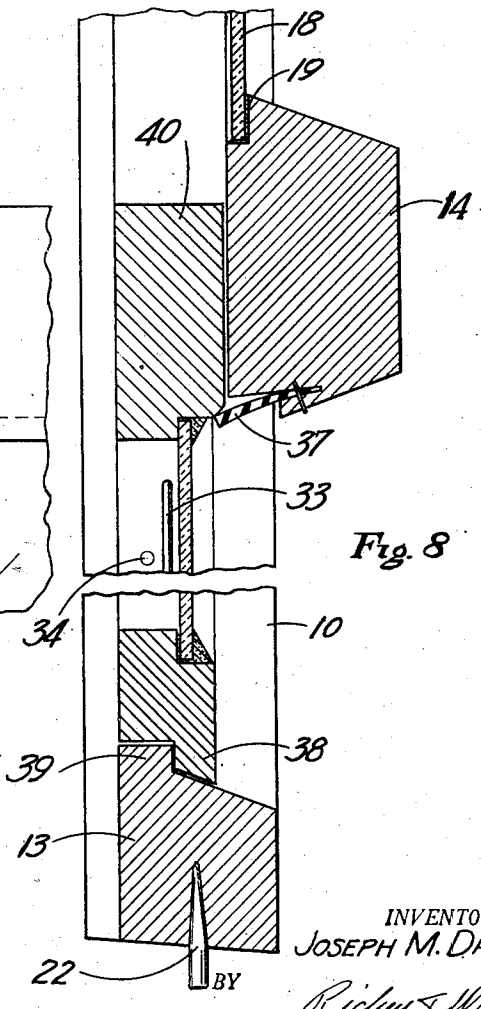


Fig. 8

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Oct. 30, 1945. J. M. DRAB 2,388,044

STORM WINDOW

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Fig. 9

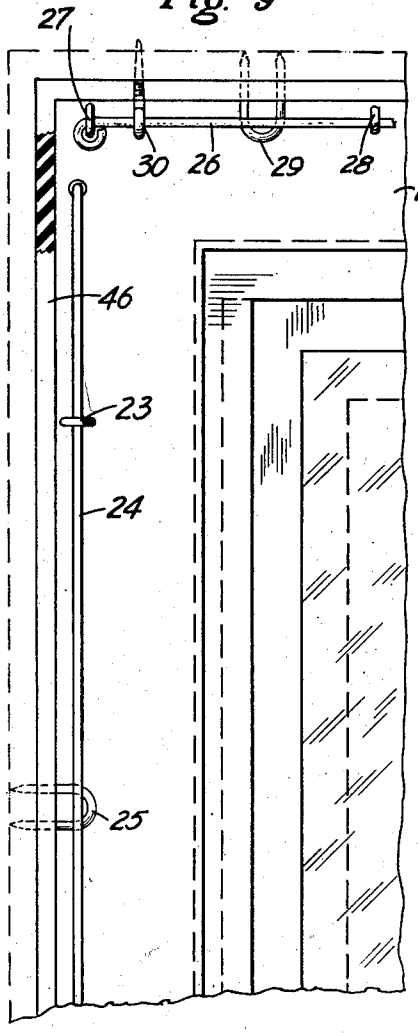


Fig. 10

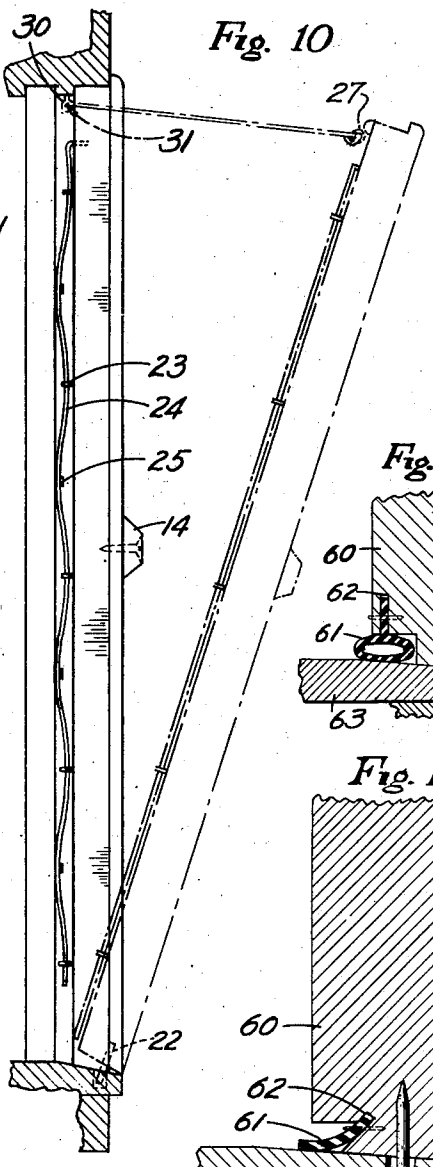


Fig. 13

Fig. 12

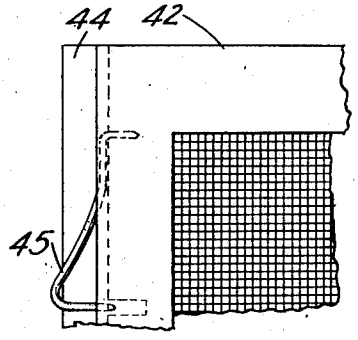


Fig 11

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STORM WINDOW

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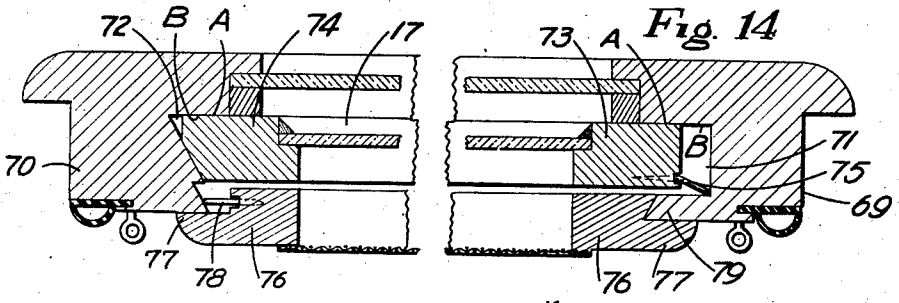


Fig. 14

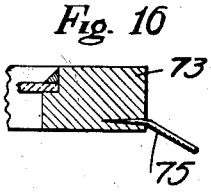


Fig. 16

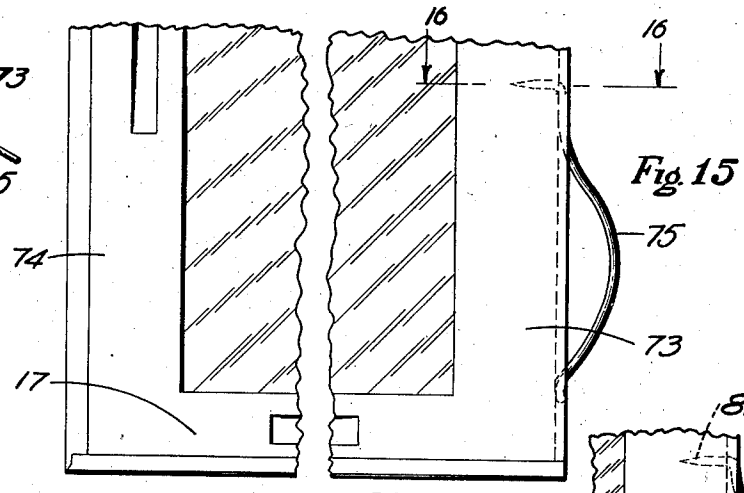


Fig. 15

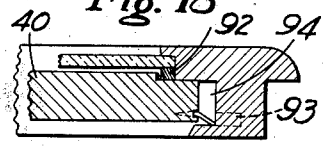


Fig. 18

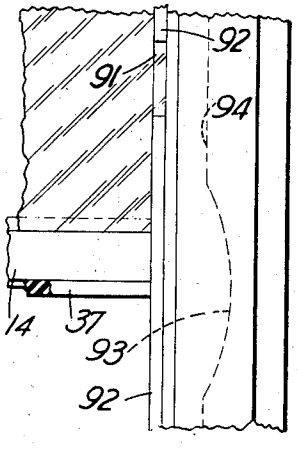


Fig. 19

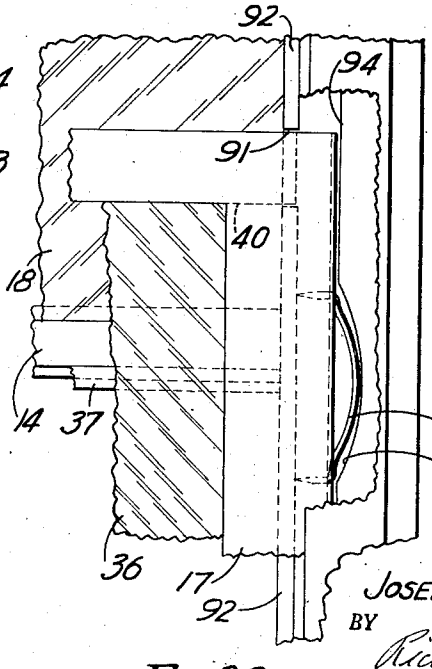


Fig. 20

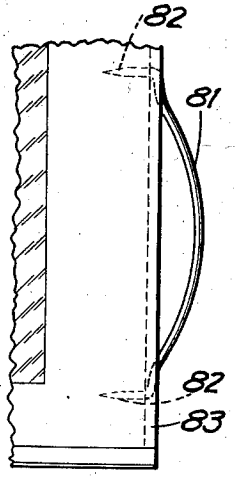


Fig. 17

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Patented Oct. 30, 1945

2,388,044

UNITED STATES PATENT OFFICE

2,388,044

STORM WINDOW

Joseph M. Drab, North Royalton, Ohio

Application January 24, 1945, Serial No. 574,265

15 Claims. (Cl. 160—40)

This invention relates broadly to storm windows and more specifically to an improved structure which embodies generally an organization of sash members, carried by a frame and mounted for sliding movement thereon.

One of the objects of the invention is to provide a storm window embodying a plurality of sliding sash members which are constructed for independent sliding movement over each other and over a fixed pane of glass mounted in the frame.

Another object of the invention is to provide mechanism for the support of a storm window in spring pressed relation upon a window casing.

Another object of the invention is to provide a self contained storm window having a fixed pane of glass therein, a glazed sash slidable thereover and a weather seal between said fixed and sliding members.

Another object of the invention is to provide a weather seal of a character which may be readily deformed by the pressure of the spring supporting structure for the frame when the frame is mounted in its assembled relation upon a window casing.

Another object of the invention is to provide a screen sash structure and supporting mechanism therefor which will facilitate the ready insertion and removal of the screen and the sliding movement thereof within the storm window frame.

Another object of the invention is to provide a mechanism which will facilitate the retention of a sliding sash within the frame and also accommodate the ready removal thereof.

Another object of the invention is to provide a storm window supporting structure which is designed to facilitate the support of the window in an outwardly tilted position for purposes of cleaning.

Other objects and advantages more or less ancillary to the foregoing and the manner in which all the various objects are realized will appear in the following description, which considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

In the drawings:

Fig. 1 is an elevation as viewed from the inner side of the improved window illustrating the several sash members in their lowered position;

Fig. 2 is a vertical section through the assembly shown in Fig. 1, the section being taken on the plane indicated by the line 2—2 in Fig. 1;

Fig. 3 is a transverse section through the storm window shown in Fig. 1, the section being taken on a plane indicated by the line 3—3 in Fig. 1;

Fig. 4 is a transverse section through the storm window assembly, the section being taken on the plane indicated by the line 4—4 in Fig. 1;

Fig. 5 is a transverse sectional view shown upon an enlarged scale through the side rail members of the storm window, the sliding sash and the screen, illustrating the mechanism employed for the securement of the various parts of the assembly;

Fig. 6 is an elevational view of a portion of the storm window shown in Fig. 1, the illustration being shown on an enlarged scale and showing the structure of the sash supporting mechanism;

Fig. 7 is a transverse sectional view through the sash side rail and associated parts shown in Fig. 6, the section being taken on the line 7—7 in such figure;

Fig. 8 is a vertical sectional view through the central and lower portions of the storm window, the section being similar to Fig. 2 but shown on an enlarged scale with the screen removed;

Fig. 9 is an elevational view of a fragmentary portion of the storm window shown in Fig. 1, the drawing being shown on an enlarged scale and illustrating the manner in which the spring supporting structure is engaged with the keepers mounted on the window casing;

Fig. 10 is a vertical sectional view through the window opening showing the storm window in place therein and the relation of the parts of the spring supporting structure when the storm window is mounted in the casing. The storm window is further shown in dotted lines in its pivotally adjusted position, as made to accommodate the cleaning of the various panes of glass contained within the storm and other windows in the building structure;

Fig. 11 is an elevational view of a portion of the storm window shown in Fig. 1, illustrating the structure of the screen sash supporting mechanism;

Fig. 12 is a vertical sectional view of the lower portion of a storm window of modified form incorporating a strip of weather seal in the lower edge;

Fig. 13 is a view similar to Fig. 12 illustrating the use of another type of weather seal for the lower edge;

Fig. 14 is a transverse sectional view of a modified side rail structure and the mechanism for the securement of the sliding members therein;

Fig. 15 is an elevation as viewed from the inner side, of the lower portion of the glazed sash shown in Fig. 14 illustrating the compression spring in its unstressed form;

Fig. 16 is a cross section taken on line 16—16 of Fig. 15;

Fig. 17 is an elevational view of a fragmentary portion of a sliding sash illustrating a further modified form of supporting mechanism therefor;

Fig. 18 is a transverse sectional view through the side rail members of the modified form of storm window, the section being taken through the upper rail member of the glazed sash;

Fig. 19 is an elevation as viewed from the inner side of the side rail members shown in Fig. 18 illustrating particularly the recesses to accommodate the removal of the glazed sash; and

Fig. 20 is an elevational view partially broken away, of a portion of the modified storm window showing the relation of parts of the sliding sash positioned for the removal thereof from the frame.

Referring first to Fig. 1, the storm window embodies side rails 10, a top rail 11, having laterally disposed flanges 12, a lower cross member 13 and a transverse mullion 14 in the center. The inner edges of the side rails 10 are formed with grooves 15 for the reception of keys or shoes 16 mounted in a glazed sash 17 carried by the storm window frame structure. The upper portion of the storm window is provided with a glass pane 18 suitably secured in the side rails 10, the upper cross member 11 and preferably embedded in a mastic or cementitious calking material in a ledge 19 in the cross mullion 14. The frame members for the sliding sash 17 are a lesser thickness than the side and top rails 10 and 11 so that the sash when elevated may slide freely over the glass pane 18 and still accommodate the sliding movement of a screen sash 20 supported in mitered grooves 21 (see Figs. 3 and 4) in the side rails 10.

The lower rail 13 of the storm window is provided with dowel pins 22 adapted for engagement within holes drilled in the window sill adjacent the inner side of the storm window assembly. These holes are drilled to provide a substantial clearance over the dowel pins 22 so that the upper portion of the frame may be tilted outwardly as illustrated in Fig. 10 when it is desired to wash the window adjacent thereto and also to facilitate the retraction of the storm sash into intimate engagement with the window casing when the storm window is mounted in place.

The side rails of the storm window are provided with screw eyes 23 arranged for the retention of spring wire clamping members 24 disposed adjacent the marginal edge of the frame and adapted for distortive assembly in interwoven relation with keepers such, for example, as the staples 25 mounted in the window casing (Figs. 9 and 10). The upper ends of the spring wires 24 are bent inwardly and engaged with holes in the side rails 10 of the storm window. The upper portion of the frame is provided with a second spring lock wire 26 supported in the frame by a screw eye 27 and adapted to be similarly interwoven with hooks 28 mounted on the frame and keepers 29 mounted on the inner face of the top of the window casing. An eyelet 30, mounted in the window casing close to the supporting eye 27 is provided for the support of the lock wire 26, the wire being laced therethrough during the assembly of the frame within the casing, so that upon release of the interwoven engagement of the wires 24 and 26 and the keepers 25 and 29 respectively, the hooked end 31 of the rod will engage the eye 30 and support the frame in an outwardly tilted position as indicated by dotted lines in Fig. 10. This adjustment provides access to the upper sash of the window in the building over which the storm window is mounted.

The sliding sash 17 is retained against lateral movement by the keys or shoes 16 which are preferably formed of rods disposed for sliding movement within the side rails 35 and formed with depending end portions 32 engaged within the groove 15 in the side rails 10. The rods or shoes are further formed with similar depending end portions 33 adapted for torsional spring pressed engagement with pintles or keepers 34 set into the side rails 35 of the sash 17. As will be seen in Fig. 5, the shoes 16 are disposed in contiguous relation with the pane of glass 36 carried by the sash and are arranged for manipulation from the inner side of the storm window, that is for access from within the room for which the storm window is provided. When a shoe 16 is moved outwardly for engagement within the groove the end portion 33 thereof will lie in contiguous relation with the inner edge of the side rail 35 of the sash and upon application of a torsional strain the opposed end of the rod or shoe 32 will bear against the inner wall of the groove and may be held in frictional engagement therewith when the inner end of the depending arm 33 is snapped or sprung over the keeper 34. The upper portion of the sash 17 is sealed against weather when arranged in its lowered position by a resilient weather strip 37 secured to the lower face of the mullion 14. As will be seen in Fig. 8, the top rail 40 of the sash 17 is of greater thickness than the side and bottom rails so as to form a ledge or abutment for engagement with the weather strip 37 when the window is arranged in its lowered position. The lower rail of the glazed sash 17 is formed with a depending tongue 38 arranged to overlie the outer face of a bead or rib 39 formed in the lower rail 13 of the storm window and thus form a weatherproof seal.

The screen 41, as will be seen in Figs. 4 and 5, comprises a rectangular sash formed with beveled side rails 42, one of which is adapted for seated engagement in the mitered or dove-tailed groove 21, the opposed side rail being cut away to provide a flange 44 disposed to overlie the inner face of the contiguous side rail 10 of the frame. The side rail of the screen sash having the flange 44 therein is provided with spring shoes or fingers 45 having one end thereof embedded in said side rail of the screen, the opposed end thereof being bent inwardly for re-entrant engagement within a clearance hole drilled in said side rail of the screen providing a looped portion for spring pressed engagement within the contiguous dove-tailed groove 21. The beveled portion of the opposed side rail is thereby urged into seated engagement with the dove-tailed groove in the opposed wall of the frame 10 preventing lateral displacement of the frame. When it is desired to remove the screen sash from the storm window assembly, pressure against the portion of the sash having the spring fingers 45 therein will permit collapse thereof and accommodate the release of the beveled portion of the frame from the dove-tail 21.

The inner face of the storm window is provided with a resilient molding strip 46 bradded or otherwise secured to the side and top rails 10 and 11 and adapted for intimate engagement with the face of the window casing. This strip may be formed of a resilient material capable of yielding under compressive effort imposed thereon by the spring clamping bars 24 or if desired may be

made of a deformable plastic material which will take a permanent set, conformable with any irregularities on the surface of the casing, under application of the retractive effort of the spring clamping medium.

In operation the storm window is mounted upon the casing by first inserting the dowels 22 in the openings in the window sill provided therefor, inserting the lock wire 26 through the eyelet 30, and, if desired, leaving the window suspended in the tilted position shown in Fig. 10. Next the window is retracted against the casing and the spring members 24 and 26 are interwoven with the keepers 25 and 29 respectively. Under certain climatic conditions the glazed sash 17 may be elevated to the position desired and the screen adjusted to its lowered position to prevent insects from entering the room in which the assembly is installed. If on the other hand the screen is not required the screen sash 41 may be moved to the top of the frame and the glazed sash adjusted vertically to attain the desired degree of ventilation. In either adjustment it will be noted that the sash 17 may be moved independent of the screen 41 and that both will slide past the fixed pane of glass 18.

As will be seen in Figs. 12 and 13, the modified form of bottom rail 60 embodies a resilient weather seal strip 61 secured in a groove 62 in the lower face of the rail.

The inner and lower faces of the rail 60 are cut away to accommodate the assembly of the weather strip and the deformation thereof when brought into abutting relation with the sill 63.

Referring next to Figs. 14 to 20, the modified structure embodies frame members 69 and 70 with grooves 71 and 72 therein for the retention of the side members 73 and 74 of the glazed sash 17.

The bottom of groove 72 defines an acute angle with the outer face thereof and the edge of the contiguous side rail 74 of the frame 17 is beveled to conform to said groove.

The opposed side rail 73 is engaged within the groove 71 in the frame member 69, said groove being substantially rectangular in cross section and of a suitable width to accommodate the slidable adjustment of the sash 17 therein. A retaining spring wire shoe 75 protrudes from the edge of the sliding sash side rail 73 in a gradual returning arc, the free end thereof being in slidable engagement with the edge of said rail. As will be seen in Fig. 16 the spring wire 75, in its unstressed form, is disposed inwardly from the plane of the glazed sash. Thus the wire in its assembled position exerts an outward thrust on the rail 73 as well as a lateral thrust on the sash 17. The outward thrust maintains a weathertight engagement of the face A of the rail 73 with the wall B of the groove 71. The lateral thrust on the sash forces the opposite side rail 74 thereof against the contiguous beveled groove, producing an outward component of thrust resulting in intimate engagement of the face A of the rail 74 and the wall B of the groove 72. Removal of the glazed sash is effected by forcing the sash laterally to collapse the spring wire 75, thus allowing the opposed side rail 74 to be swung free of the storm window frame.

The sliding screen sash shown in Fig. 14 comprises two side rail members 76 having flanges 77 thereon which are disposed in intimate overlapped relation with the inner faces of the frame members 69 and 70. The edge of one side rail member adjacent the flanged portion thereof is cut away to accommodate the operation of a spring shoe 78 as heretofore described. The opposed side rail of the screen is formed for interlocking engagement with a beveled tongue 79 defining the inner wall of groove 71 in the frame member 69.

Fig. 17 illustrates a further modified form of spring wire shoe 81 applicable to both sliding sashes. Both ends 82 of the wire are driven laterally into the edge of the flange 83, the intermediate portion thereof being of arcuate configuration and formed to protrude from said flange in a plane oblique to the plane of the sash, as shown in Fig. 18.

As will be seen in Figs. 18 and 19 a notch 91 is formed in the glass retaining strip 92 to engage the ledge 40 in the upper rail of the glazed sash, thus accommodating the lateral adjustment and removal thereof. A recess 93 of the contour of the spring 81 is provided in the bottom of the retaining groove 94 to relieve the compressive effort of the spring 81 when the glazed sash is moved for registration of the ledge 40 with the notch 91. Hence when the spring is seated in the groove 94 the lateral thrust upon the sliding sash 17 is materially diminished and the removal of the sash may be effected with very little effort. The notch 91 and recess 93 are disposed to be in operative position when the sliding sash is partially raised from its lowered position.

The improved storm window will obviously eliminate the handling of the screen element and will provide all the utilities and advantages thereof when used in mid seasons or in geographical locations where it is desirable to obtain the benefits of the storm window, variable ventilation and the use of the screen within the same period of time. The assembly will, moreover, avoid unnecessary handling of the screen when the window is employed for year around installation to attain the combined advantages afforded by the assembly.

The improved storm window will obviously eliminate the seasonal removal and installation of the screen and sash members and the storage thereof. When screen protection only is desired, the sliding sash may be elevated and the screen lowered to its operative position. When storm sash protection only is desired, the positions are reversed, providing a completely weather sealed storm sash. However, any combination of sash ventilation and screen protection may be effected by intermediate adjustment of the glazed sash when the screen is in its lower position.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the various modified forms disclosed herein are intended for assembly in or with the storm sash and that the specific terminology employed in connection therewith is not intended to be restrictive or confining. It is to be further understood that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. A storm window comprising a frame having grooves in the side rails thereof, a pane of glass affixed in the upper portion of said frame, a glazed sash mounted in said frame parallel with and adjacent to said pane, resilient rods mounted for reciprocative movement in the side rails of said sash, bent portions defining arms on said rods

disposed adjacent the inner and outer faces of the side rails of said sash, keepers in said sash adjacent the inner arms of said rods, the outer arm on each rod being engageable with one of said grooves in said frame and being held in spring pressed relation with a side wall of the groove when the rod is torsioned with the inner arm sprung over said keeper.

2. A storm window comprising a frame having a plurality of grooves in the side rails thereof, a pane of glass affixed in the upper portion of said frame, a glazed sash mounted for sliding movement over said pane, a screen covered sash mounted for sliding movement over said glazed sash, rods mounted for sliding movement in the side rails of said glazed sash, a keeper mounted on said sash, arms on said rods engageable respectively with a contiguous groove in said frame, and with said keepers, a beveled edge on one of the side rails of the screen covered sash engaged with a contiguous groove in said frame and spring fingers in the opposed side rail of the last named sash engaged with a contiguous groove in the frame for the retention of the sash.

3. A storm window comprising a frame, a pane of glass mounted in the upper portion thereof, a mullion in said frame supporting the lower edge of said pane, a resilient weather strip mounted on said mullion, a glazed sash mounted in said frame for sliding movement over said pane, said sash embodying top, bottom and side rails, the top rail in said sash being of greater thickness than the side and bottom rails and defining an abutment engageable with said weather strip when the sash is adjusted in its lowered position.

4. In a window embodying a casing, a storm window comprising a frame, embodying side rails formed to partially overlie the window casing, a pane of glass affixed in the upper portion of said frame, a glazed sash mounted for sliding movement in said frame over said pane, spring wire strips mounted on the inner faces of the side rails of said frame adjacent the window casing, keepers mounted in the casing normal to said spring wire strips, whereby said storm window may be retained in spring pressed relation against the casing when the spring wire strips are deformatively interlaced between said keepers.

5. In a window embodying a casing, a storm window comprising a frame embodying side rails formed to partially overlie the window casing, a pane of glass affixed in the upper portion of said frame, a glazed sash mounted for sliding movement in said frame over said pane, spring wire strips mounted on the inner faces of the side rails of said frame adjacent the window casing, keepers mounted in the casing normal to said spring wire strips, a second spring wire strip mounted on the top rail of said frame adjacent the top member of the window casing, a keeper mounted in the casing adjacent said strip, whereby said storm window may be retained in spring pressed relation against the casing when the spring wire strips are deformatively interlaced between said keepers.

6. In a window embodying a casing, a storm window comprising a frame embodying side rails formed to partially overlie the window casing, a pane of glass affixed in the upper portion of said frame, a glazed sash mounted for sliding movement in said frame over said pane, spring wire strips mounted on the inner faces of the top and side rails of said frame adjacent the edges thereof, screw eyes disposed in spaced relation with each other, mounted on said frame for the support of said strips, and protrusions on the casing normal to said strips for engagement therewith when the strips are sprung thereover.

7. In a window embodying a casing and a sill having a recess therein, a storm window for said window comprising top, bottom and side rails, a pane of glass seated in the top rail and upper portions of the side rails, a glazed sash mounted for sliding movement in the side rails over said pane of glass, a dowel in the bottom rail of said storm window engageable with the recess in the window sill, a spring wire mounted on the top rail of the storm window adjacent the outer edge thereof, an inturned loop in the end thereof, a screw eye mounted in the top member of the casing engaged with said spring wire, a hook mounted in the top rail of the storm window for the support of said spring wire, said screw eye constituting a keeper for the spring wire when the wire is sprung over said hook and constituting a stop to arrest outward tilting movement of the storm window when engaged with the inturned loop in the spring wire.

8. A storm window comprising a frame embodying side, top and bottom rails, flanges on the outer edges of the top and side rails disposed to overlie the walls defining the window openings, a resilient bead mounted on said rails, and spring means capable of deforming said bead mounted on said frame and engaged with means mounted on the walls forming the window opening, for the support of the frame.

9. A storm window comprising a frame having a beveled guideway in one of the side rails thereof and a rectangular guideway in the opposed side rail, said rectangular guideway having arcuate grooves therein, a sash member mounted for sliding movement in said guideways, arcuate springs on one side of said sash adapted for re-entrant engagement in said grooves, said springs being inclined inwardly to exert compressive strains against the bottom and one of the side walls of said rectangular guideway when engaged therewith and being disposed in their unstressed form when seated in said grooves.

10. A storm window comprising a frame embodying side rails, top and bottom cross rails and an intermediate cross rail, a pane of glass affixed in said frame between the top and intermediate cross rails, said side rails having grooves therein, a glazed sash mounted for sliding movement in the grooves in said frame contiguous said fixed pane of glass, a screened sash mounted for sliding movement in the grooves in said frame, contiguous said glazed sash, spring means for the retention of said sash against lateral movement when torsional strain is imposed thereon and spring means for the retention of said frame within a window casing.

11. A storm window comprising a frame embodying side and top rails, flanges thereon disposed for abutting engagement with the outer face of a window casing, a center cross rail in said frame, a pane of glass affixed in said frame between said top and center cross rails, a bottom rail in said frame, said side rails having grooves therein, a pair of sash members mounted for sliding movement within said grooves, spring means in said sash members for the retention thereof within said frame when tensioned, spring means on the top and side rails of said frame for the retention of said frame and dowels in said bottom rail for the retention of the frame.

12. A window comprising a frame, top, bottom and side rails in said frame, a pane of glass affixed

in the upper portion of said frame, said side rails having beveled grooves therein, a pair of sash members mounted for sliding movement in said frame, beveled flanges on one side of said sash members engaged respectively with the contiguous beveled grooves in the side rails, springs in the opposed sides of said sash members urging the sash into seated engagement with the beveled grooves, the dimension between the side of the sash in which the springs are mounted and the contiguous groove in the frame being substantially equal to the depth of the undercut portions of the beveled grooves, whereby said sash may be removed by pressing the sash sidewise and drawing the sash inwardly until the beveled flanges on the sash clear the walls defining the beveled grooves in the frame.

13. A storm window comprising a frame, an upper fixed pane of glass therein, a glazed sliding sash therein, spring means on said frame adapted to facilitate the retention and ready removal thereof and spring means on said sash adapted to facilitate the retention and ready removal thereof.

14. A window structure comprising a frame having a beveled groove in one side rail thereof and a square cornered groove in the other side rail thereof, a sash member, a beveled edge on one side thereof engaged with said beveled groove in the frame rail and a spring in the opposite edge of the sash engaged with a side wall of said square cornered groove, said spring bearing against the bottom and a side of said square cornered groove and urging said sash in lateral and sash broadside directions.

15. A storm window comprising a frame embodying side, top and bottom rails, flanges on the outer edges of the top and side rails disposed to overlie the walls defining the window openings, yieldable strips mounted on said rails, means for holding said frame upon the walls defining the window openings, said strips being deformed under the influence of said means for holding said frame.

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