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2,774,997

SASH AND SASH FRAMES

Filed Aug. 2, 1951

3 Sheets-Sheet 1

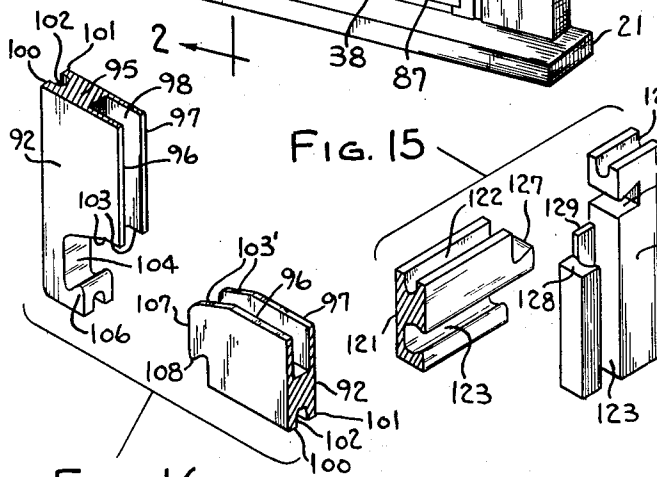
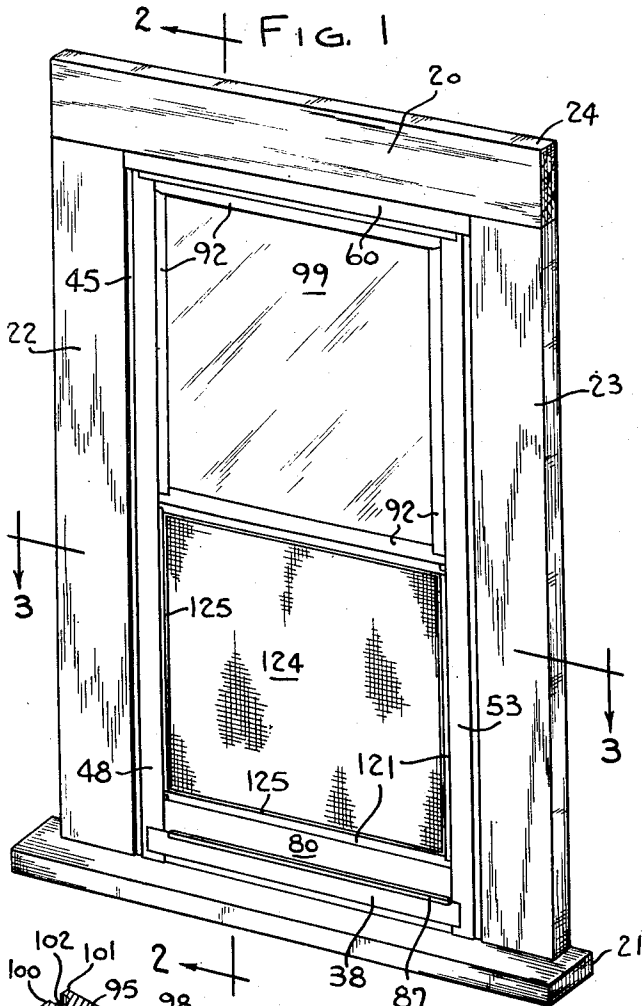
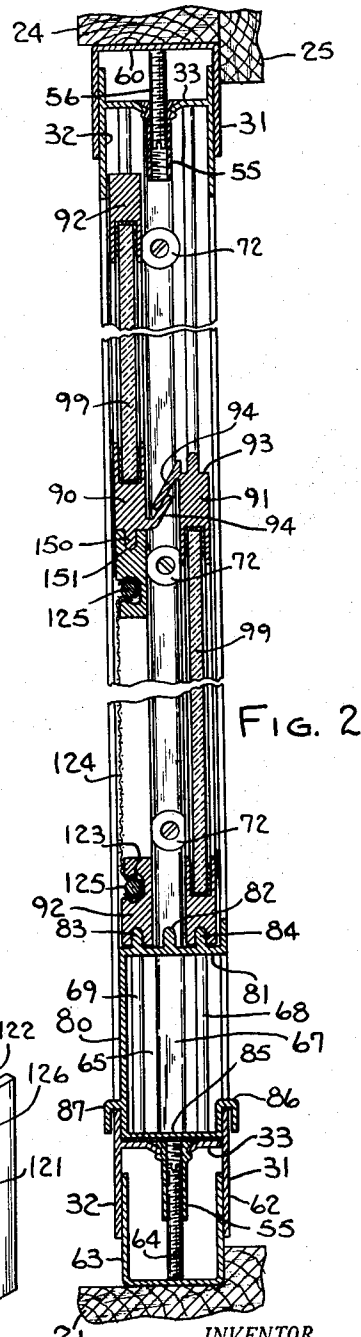


FIG. 16



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3 Sheets-Sheet 2

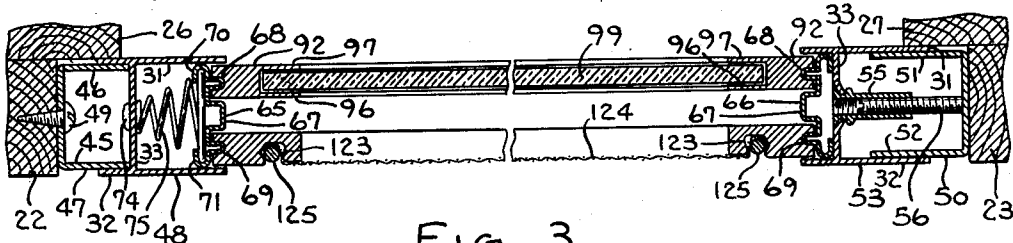


FIG. 3

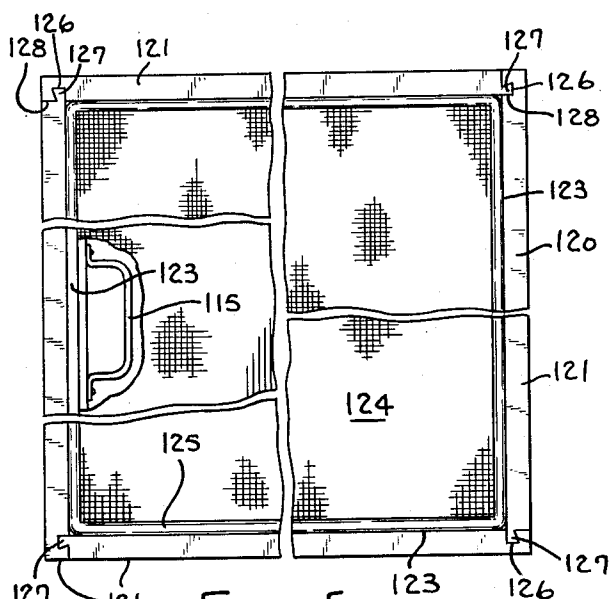


FIG. 5

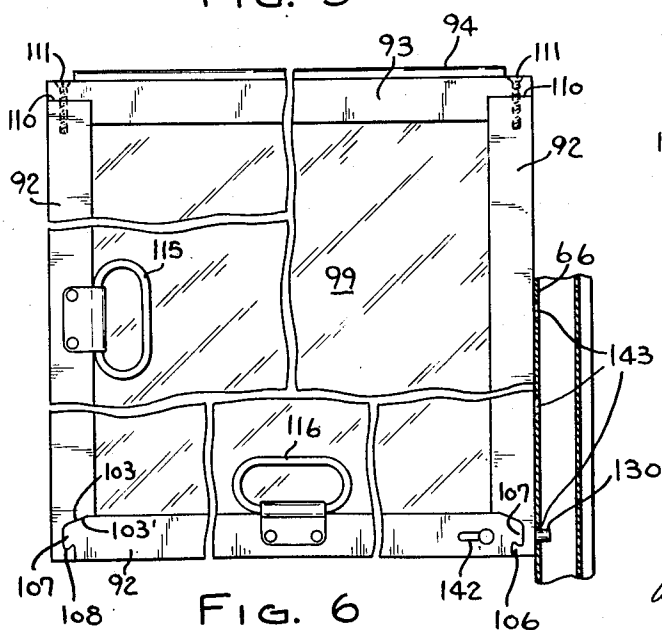


FIG. 6

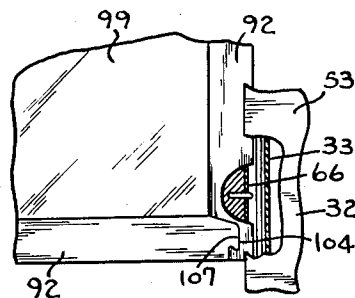


FIG. 7

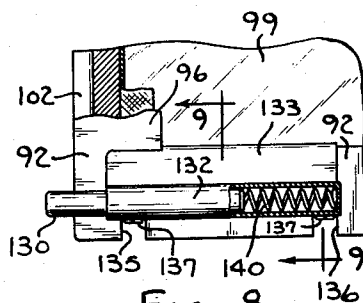


FIG. 8

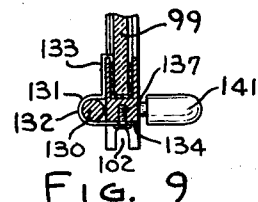


FIG. 9

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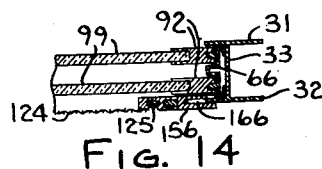
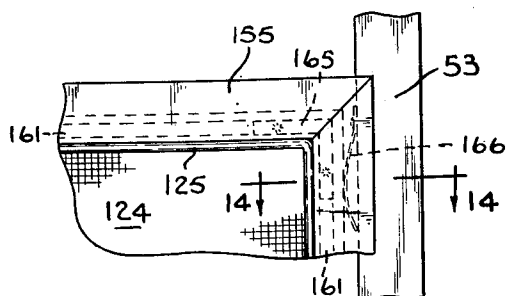
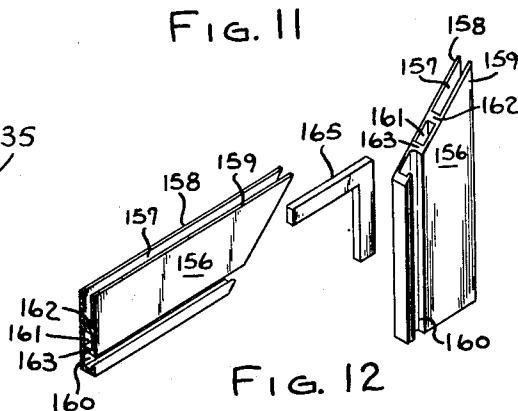
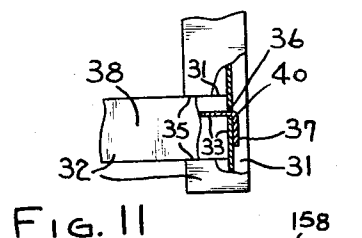
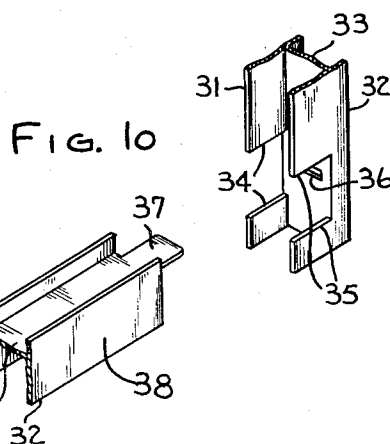
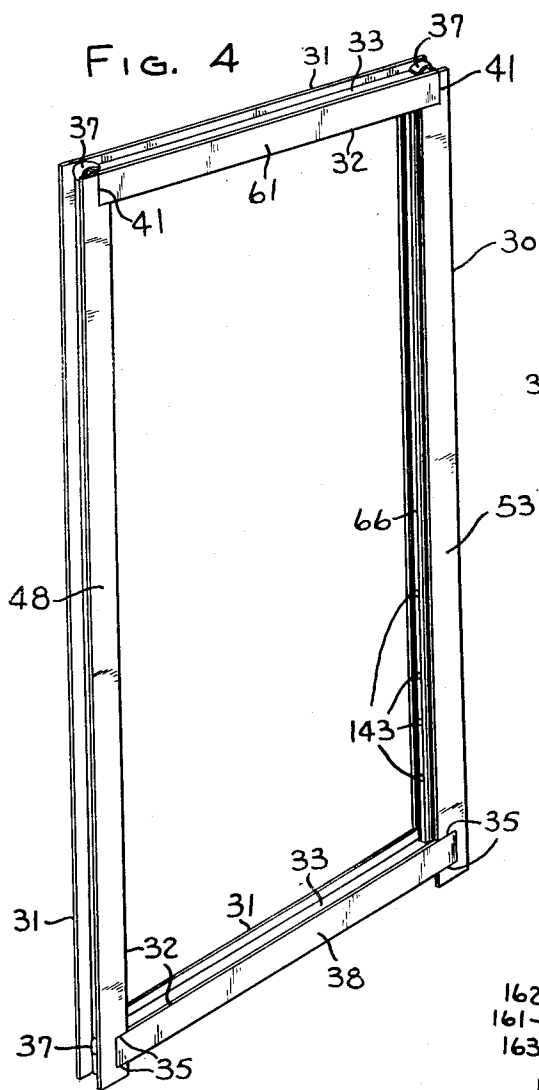
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SASH AND SASH FRAMES

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Application August 2, 1951, Serial No. 239,866

8 Claims. (Cl. 20—12)

My invention relates to improvements in sash and sash frames.

More particularly stated my invention relates to an insertable frame for existing wooden window frames whereby to provide storm and screen sash mounting for readily removable storm and screen sash. Furthermore, my invention relates to novel assemblable screen and storm sash for use with my improved frame.

Further details of novel features of my invention include the provision of sash and frame component elements especially suited to the combination of my sash and frame whereby the elements may be made as extruded metal shapes adapted to be cut and filed as to length and joint configuration with the simpler forms of metal working tools; provision of novel features of spring biased sash frame ways; and provision of novel means for locking a removable metal frame structure to a window frame.

The above features of my invention are particularly emphasized by provision of my extruded metal shapes so combined and related that my improved sash frame and sash elements may be milled to size at the factory and readily assembled at the job by relatively unskilled workmen who receive the frame and sash components in packaged, knocked-down form.

In the drawings:

Fig. 1 is a view in perspective of the external portions of a conventional wood window frame with my improved storm and screen sash inserted therein against the usual storm window stop.

Fig. 2 is an enlarged vertical section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged section on line 3—3 of Fig. 1.

Fig. 4 is a perspective of my improved frame as it appears in fabricated condition in readiness for insertion in position for use.

Fig. 5 is an exterior elevation, somewhat consolidated as shown, and showing the exterior construction of a screen sash made in accord with my invention.

Fig. 6 is a view similar to Fig. 5 but showing the interior face of a glazed sash made in accord with my invention, a portion of the guide way of my sash frame being shown in vertical section at the right to illustrate the manner in which my sash may be positively held in a particular position of adjustment with respect to my guide way.

Fig. 7 is an elevation of a corner of one of my storm window sash and a fragment of a guide way in conjunction with which the sash is slidably guided, portions of the sash frame and guide way being broken away to show a side pin for the sash and the manner in which it engages the guide way.

Fig. 8 is an elevation of a corner of my storm window sash and my spring pin latch, a portion of the spring pin latch mechanism being broken away to show the combination thereof and the manner in which the latch mechanism is attached to my sash.

Fig. 9 is a section on line 9—9 of Fig. 8 showing fur-

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ther details of the manner in which I secure my spring pin latch to my sash frame.

Fig. 10 is an exploded view in perspective of the separated respective milled shapes of my storm window frame whereby a corner joint is made.

Fig. 11 is a side elevation of parts shown in Fig. 10 after the webbed tongue has been placed in position and swedged to hold the parts in assembly.

Fig. 12 is an exploded view in perspective of my sash elements used to form a mitered corner especially designed for screen sash purposes.

Fig. 13 is a fragmentary view of a corner of a complete screen sash, a fragment of the guide way for such a screen being shown in exterior elevation.

Fig. 14 is a section on line 14—14 of Fig. 13.

Fig. 15 is an exploded view in perspective of the corner forming portions of an alternative form of screen sash elements.

Fig. 16 is an exploded view of the corner forming portions of sash elements shaped for inter-engagement whereby to form a glazed sash.

Like parts are designated by the same reference characters throughout the several views.

As shown in Figs. 1, 2 and 3, a conventional wood window frame 20 includes a sill 21, frame facing 22 at the left and 23 at the right as viewed exteriorly, and a facing cap 24. These facings 22, 23 and 24 are secured to the rails and stiles of the window frame, the top rail 25 being shown in Fig. 2 and the stiles being shown in Fig. 3 at 26 and 27. Top rail 25 and the stiles 26 and 27 are offset from the faces to provide a shoulder against which a storm window may fit according to conventional practice. I fit my new frame for my combination storm and screen sash into the same position heretofore used for conventional storm windows as will be apparent from the following description.

The frame which provides guide ways for my sash and screen elements is made up of one of the several types of extruded material shapes which will be described below.

Figs. 4, 10 and 11 show most clearly the H configuration of my frame. The H configuration has two legs 31 and 32 with a web 33 extending between them. It will be noted that the web is considerably closer to one end of the legs than to the other and that I thereby provide a deep channel and a shallow channel for the purposes as described below. To form a right angle joint at the corner of my frame 30, I cut away the longer leg portions along the lines at 34 and 35 and I pierce the web at 36 to provide an opening for a tongue 37 which is a part of the web 33 of a cross member 38. I form the tongue 37 by cutting away a part of the web and a part of the legs 31 and 32 as shown in Fig. 10. Merely by extending the tongue 37 through the pierced opening 36 as shown in Fig. 11, I can draw the cross member 38 into the notch formed by the removal of the portions along the legs 34 and 35. Then by bending down at 40 the extended portion of the tongue 37, I bind the two parts of my frame together in a complete serviceable joint. The joint thus far described is the type of joint for making the frame 30 shown in Fig. 4. A joint at the corner of the frame as shown at the top in Fig. 4 is made in the same way except that the legs are notched as at 41 and the tongue 37 may be swedged or bent to the position shown in Fig. 4 to tie the parts together.

A frame 30 intended to seat against the stiles 26 and 27 of frame 20 is of a size somewhat small for the wood frame opening provided by the frame 20, for reasons which will be apparent from the following description of the manner in which frame 30 is locked in position. An ordinary open channel 45 (Figs. 1 and 3) is shaped to have its legs 46 and 47 fitted within the shallow channel

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of a side member 48 of frame 30, and this channel 45 is secured to face 22 by means of screws 49 (see Fig. 3). A smaller channel 50 having its legs 51 and 52 receivable in the deep channel of side member 53 of frame 30 is positioned to abut facing 23 of window frame 20, and the web 33 of the side member 53 is provided at spaced joints with tubular nuts 55 through which screws 56 may be adjustably brought to bear against channel member 50 to force it outwardly against the edge of facing 23. Thus when my frame 30 is to be included in window frame 20 channel 47 is secured in position against facing 22, the frame 30 is then placed in position as shown in Fig. 3 and the channel 50 is forced outwardly by screws 56 until a lateral telescopic adjustment of the channels 47 and 50 with respect to the side members 48 and 53 has been made. My frame 30 is then clamped in position from which it cannot be removed unless the screws 56 are loosened.

For clamping engagement to the top and bottom of the window frame 20 an exteriorly applied channel member 60 has its legs embracing the sides of the cap 61 of my frame 30. A screw and nut arrangement similar to that already described is used to force this cap 61 upwardly against the wooden frame cap 24.

To close the space between the bottom rail 62 and the sill 21 of the wooden window frame, I provide an inside sill channel 63 which is in a position to be forced outwardly or downwardly by screws 64 operating similarly to the screws 56 heretofore described. Thus the entire frame is secured and locked in position in the wood frame.

Guide ways 65 and 66 at the left and right sides respectively of my frame are identical in cross section and are made of an extruded metal shape, the configuration of which is shown most clearly in Fig. 3, and there is a channel shaped parting stop 67 centrally of the cross section. The legs of the channel shape extend outwardly therefrom in either direction and develop into identical reverse curves 68 and 69, each of which comprises a rib which I use as a guide way for a sash member. Outwardly and then inwardly curved extensions 70 and 71 from these guide ways provide a pair of opposed channels for purposes described below.

One of these guide ways (66) is received in the shallow channel of the side member 53 at the right side of the window as shown in Figs. 1 and 3. It is held there by the washer-like head 72 of tubular nut 55 (see Fig. 2) and is, therefore, rigidly held against web 33 of side member 53.

Guide way 65 is receivable in the deep channel of side member 48 but is resiliently mounted therein upon coil springs 75 which are located at spaced points in this channel. Springs 65 are conically coiled and are so disposed and secured in the channel that the smaller coil thereof is riveted by rivet 74 to web 33 and the largest coil is receivable in the opposed channels formed by extensions 70 and 71. It will be understood that the guide way 65 is slidably engaged with the several springs 75 before the frame 30 is finally secured together at its corners. Spring 75 has such characteristics that the guide way 65 in all natural positions of the springs is retained against side sway by the legs of the side member 48.

Thus as seen in Figs. 1, 2 and 3 the frame 30 is made up of the H-shaped extruded form, is locked in position in the wooden window frame 20, is provided with guide ways 65 and 66 in the deep and shallow channels of the side members 48 and 53, and the frame installation is complete in readiness for the reception of the screen and storm sash plus a filler piece 80.

It would, of course, be possible in some uses of my invention to supply a length of the extruded form identical with the guide ways 65 and 66 in the shallow channel and against web 33 of bottom rail 62, but in most wood window frames 20 the height of an inside finish sill might interfere with the removal of my sash from my guide ways 65 and 66. I, therefore, provide filler piece 80 receivable between the guide ways 65 and 66 at the lower

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ends thereof. This filler piece 80 is a special extruded form having a cross section most clearly shown in Fig. 2. It has the general configuration of a channel and as used in the assembly with my frame 30, the channel lies on its side with the open channel facing inwardly of the frame. As so disposed, the upper leg 81 of the channel is provided with a rib 82 which is in the same plane as the parting stop 67 of guide way 65. In addition, I provide ribs 83 and 84 which lie respectively in the same vertical plane with the reversed curves 68 and 69 used as guide ways for the respective sash members. The lower leg 85 of the channel forming the filler piece 80 develops at 86 and 87 into leg receiving grooves to receive the top margins of the legs 31 and 32 of the lower rail 62 of my frame 30. This filler piece 80, shaped at its ends to fit against the guide ways 65 and 66 is insertable in my frame 30 by pressing one end of it against the guide way 65 so as to compress the springs 75 and the other end of the filler piece may be swung down into the shallow channel of the side member 53 in a lowering motion of the filler piece which will seat the grooves at 86 and 87 upon the legs of the lower rail. The filler piece being in position, my frame 30 is in readiness for reception of sash made in accord with my invention as will now be described.

It will be obvious from the above description and an examination of my drawings that the total thickness of my frame 30 is comparable to the thickness of an ordinary wood storm sash receivable against the stiles 26 and 27 in a wood frame 20. Within the dimension of this total thickness, I have provided, as above described, guide ways for a pair of storm sash 90 and 91, each adapted to move along its own portion of guide way 65—66 at either side of the parting stop 67 in sliding motion in the same way that double hung wood window sash as conventionally made will slide up and down past each other.

Each of the storm sash 90 and 91 is made up of two different extruded forms. Three sides of each of the sash is made up of an extruded form 92 having a cross section shown most clearly in Fig. 16 and the fourth side of each storm sash is made up of the extruded form 93 shown most clearly in Fig. 2. The only difference between these forms is the provision in the form 93 of a hook channel member 94 so shaped, as shown in Fig. 2, as to hook with the complementary hook channel of the extruded form member forming part of the sash moving on an adjacent guide way. The extruded form 92 is somewhat H-shaped but the web 95 thereof has a heavy section. Long legs 96 and 97 of this H configuration provide a deep channel 98 for the reception of glass or other glazing material 99. The shorter legs 100 and 101 provide a channel 102 to receive rib 68 or 69 of a guide way 65 or 66.

To make up a complete sash 90 or 91, I cut lengths of the extruded form 92 for three sides of the sash and a length from the extruded form 93 to complete the fourth side. Joints are formed at the corners as shown in Fig. 16 where it will be seen that the long legs 96 and 97 of the H configuration and a portion of the web 95 are cut away to provide cam surfaces 103, buttress surface 104 and a locking hook 106. Another of the lengths of extruded form 92 to interlock with web surfaces 103, 104 and 106 is provided with a configuration shown in Fig. 16. Here the legs 96 and 97 are cut away to provide complementary cam surfaces 103' to interact with the cam surfaces 103. A tenon 107 is shaped to abut the buttress surface 104 and the tenon 107 is hooked at 108 to engage behind locking hook 106. To engage the tenon 107 and hook 108, the hook 108 is placed in position behind the locking hook 106 and the tenon 107 is swung into position against buttress 104. In the swinging action in which these parts are moved, the cam surface 103 and 103' engage one another to force the projections 106 and 108 into an interlocking position from which they cannot be withdrawn, when a pane of glass or other glazing material is positioned in the deep channel 98.

When three of the sides of the sash have been provided

with the joint shown in Fig. 16, the fourth side of the sash may be closed to complete a sash frame by applying extruded form 93 as shown in Fig. 6, where it will be seen that this form 93 has its hook channel 94. The joint at 110 is a simple half-lap joint held by a screw 111, but when the joints at 110 are complete with the glazing 99 in position, the hook joints at 106—108 are positively held in locked relationship. Handles at 115—116 facilitate the manipulation of the storm sash as indicated below.

In addition to the two storm sash 90 and 91, I provide a screen sash 120 made up as shown in Fig. 5 through the use of extruded form 121 and a type of joint therefor as shown in Fig. 15. Here each side of the frame for sash 120 is identical with each other side if the screen is square and in any event the joints at all four corners are identically formed (see Fig. 5).

The extruded form 121 is generally rectangular but is channeled at 122 for engagement with these guide ways, and channeled at 123 for reception of screening 124 and a locking wire 125.

Corner joint as shown in Fig. 15 is substantially a dove-tail joint as applied to the particular extruded form 121. A dove-tail channel 126 is shaped to receive a complementary dove-tail male portion 127 and these are received together in a lateral motion as is well known in this art. Stepped surfaces at 128 and 129 are so shaped that channel 123 is continuous but follows a right angled path at the joint.

When the screen frame 120 has been made up as at Fig. 5 a screen wire 124 cut to a size receivable over the channels 123 along the four sides of the frame is locked to the frame by the high pressure insertion of locking wire 124 into the groove so as to press the margins of the screen and the wire into channel 123.

The dimensions of the completed sash 90, 91 and 120 are of a width slightly greater than the space between the fixed guide way 66 and the spring biased guide way 65 when the springs 75 behind guide way 65 are in repose. Thus the sash may be inserted between the guide ways as shown in Fig. 3 by pressing one margin of the sash against the resiliently mounted guide way 65 sufficiently to partially collapse springs 75 by then swinging the sash into position for alignment against a rib of the fixed guide way 66 against which the sash will then be held for guided sliding action. I have found that springs 75 may easily be selected to provide sufficient friction between sash of a particular weight and the guide ways so that the sash will remain in any position to which it is manually adjusted.

If it is desired that a particular sash shall remain in uppermost position in the guide ways or in some other selected position of adjustment, I affix a spring operated latch pin 130 adjacent one corner of the inside face of the sash as shown most clearly in Figs. 6, 8 and 9. This latch pin is mounted in a latch pin housing 131 which has a tubular guide way 132 for the latch pin itself, and a hooked bracket 133 to extend over the lip of one of the long legs 96 (see Fig. 9). Two anchor strips, such as the one shown at 134, extend into notches 135 and 136 and screws 137 hold them securely anchored to the sash latch. Within the tubular guide way 132 the latch pin 130 is freely reciprocable but is biased to the position shown in Fig. 8 by a spring 140. To provide for manual withdrawal of the latch pin 130, I provide a latch pin handle 141 mounted directly to the pin and provided with a slot at 142 for free movement of the pin within limits prescribed by the lengths of the slot. Apertures 143 at spaced points along guide way 65 provide alternative points at which the latch pin 130 may engage the guide way as shown in Fig. 6 to lock the sash in a particular position of adjustment.

It will thus be seen that the latch pin housing 131 may be formed of one piece of sheet metal such as stainless steel, and that only two screws are necessary to assemble

the latch pin in its housing upon a sash in accord with my invention.

In the use of the storm and screen sash shown in Figs. 1, 2 and 3, it is possible to have three sash operating in two planes. Lower sash 91 equipped with latch pin 130 may be raised and lowered as desired to open the window for ventilation through the screen 124, and it is possible to insert the screen 124 with its sash frame 120 because the upper storm sash 90 may be forced up into the deep channel of the frame rail 61, during the inserting process involving the screen 120. After the screen is in position in the guide ways, the upper storm sash 90 may be lowered to engage a lower parting rib 150 into parting rib groove 151 (see Fig. 2). Of course, while the screen is being inserted in the guide ways and upper sash 90 is thrust upwardly to the unusual degree required to give adequate space for the insertion of the screen the hook channel members 94 of the respective storm sash will force the storm sash 91 somewhat upwardly. However, after the screen has been inserted and the upper storm sash 90 has assumed its upper normal position, the hook channels will take the position shown in Fig. 2.

Under some circumstances and under the particular requirements for ventilation deemed necessary by some users of my screen and storm sash, it is preferred that the guide ways be left clear of any screen sash so that the respective storm sash 90 and 91 may be freely moved in their respective planes. I, therefore, provide a screen sash 155 as shown in Figs. 12, 13 and 14 made up of a special extruded form 156 (see Fig. 12). This form has a deep channel 157 between legs 158 and 159 so that the deep channel opens outwardly of a frame made of this form. The opposite margin of the form provides a screen locking channel 160 useable in the same way that the channel 123 is used in conjunction with form 121. Between the screen locking channel 160 and the deep channel 157 is a box channel 161 formed by two webs 162 and 163. To form a corner joint using the form 156, I miter the respective sash elements as shown in Fig. 12, and use a locking insert 165, which is a right-angled corner piece receivable in the box channel 161. When the special mitered ends made up of form 156 are brought together with the locking insert 165 received in the respective box channels of the two parts forming the joint, it is only necessary to heavily prick punch the metal over the box channel to securely lock the two parts in final assembly. Of course, when the locking wire 125 and the screens 124 are additionally locked in place, a double interlock of the mitered joint is accomplished.

A spring sash made up of form 156 has within one of the deep channels 157 a set of leaf springs 166 to resist the entry of any member into the channel, I then provide sash of such lateral dimension for a screen 155 that a leg of a stile 48 or 53 may be received into the channel 157 against the spring beside the leaf springs 166 and the screen may then take its position as indicated in Fig. 14 whereby to leave the guide ways for storm sash unobstructed.

I claim:

1. In a device of the character described, a subframe having side members of H-shaped cross section, each such member having a transverse web and inwardly and outwardly directed flanges providing inner and outer channels, the inwardly projecting flanges of one of said members being the longer and the outwardly directed flanges of the other of said members being the longer, way-strips fitted longitudinally between the inner flanges of each of said members and provided with guide ribs, the strip being seated against the web of the member wherein the outwardly projecting flanges are the longest, compression spring means seated in the inner channel of the member in which the inwardly directed flanges are the longer, said spring means being in supporting relation to the guide strip in said last mentioned channel, and sash having marginal grooves in bearing engage-

ment with the corresponding ribs of the respective strips.

2. The device of claim 1 in which the strip supported by the spring has a rolled edge with an inwardly directing flange spaced from the strip whereby to form a channel, and a spring seat member engaged in the channel.

3. A window frame adapted for insertion in a frame opening, said frame comprising first and outermost side channels having portions adapted for seating contact with the window opening, and second channels respectively telescopically engaged with said outermost side channels, one of said second channels having a fixed terminal position respecting the outermost channel with which it is engaged and another second channel having an adjustable terminal position respecting the outermost channel with which it is engaged, said other second channel being provided with means for said adjustment comprising means for tightening said outermost channels against said window opening whereby to securely seat said frame in said opening, said fixed second channel being provided with a sash guide way having a resilient mounting on which said sash guide way is yieldable laterally in said channel, the adjustable second channel being provided with a sash guide way having a mounting fixed therein.

4. A window sash guideway adapted for mounting at the side of a window opening, said guideway comprising a strip having its face toward the window opening provided with spaced sash guide ridges and an intervening parting stop, the edge margins of the strip comprising facing channels at the back of the strip, a mounting coil spring having an end coil thereof engaged in said channels.

5. A supplemental window frame structure receivable within a conventional window frame against its conventional storm sash seat, said supplemental window structure comprising a jamb member and means fixedly mounting said jamb member in said seat, a supplemental window frame side jamb channel, telescopic means releasably connecting said jamb member and window frame side jamb channel, means forming a sash guideway receivable in said jamb side channel, said means being laterally movable in said channel, and a laterally resilient expander in said channel, said expander comprising means to concurrently bias the sash guideway against the sash and the jamb channel against the jamb member to resiliently maintain the parts in assembled relation.

6. A supplemental window structure adapted to be seated in the storm sash seat about the window opening of a conventional window frame, said structure comprising a first jamb member, means for mounting said

first jamb member in said seat at one side of the window opening, a first frame jamb channel having flanges telescopically engaged with said first jamb member, said first frame jamb channel having oppositely extending flanges and a first sash guideway confined therebetween, window sash engaged with said sash guideway, a second sash guideway at the opposite side of said sash, a second frame jamb channel having flanges confining said second sash guideway, a second jamb member mounted against the said seat at the opposite side of the window opening, said second frame jamb channel having flanges telescopically engaged with said jamb member, said first frame jamb channel being provided with a resilient expander concurrently biasing said first frame jamb channel into telescopic engagement with said first jamb member and said guideways toward said sash whereby to resiliently maintain the parts in assembled relationship and concurrently frictionally oppose sash movement along said guideways.

7. The device of claim 6 in which said second frame jamb channel is provided with a web having means in lateral thrust engagement with said second jamb, said means being laterally adjustable whereby to accommodate said window structure to window frames having different dimensions.

8. The device of claim 7 in which said thrust means comprises a screw, said web being provided with a tubular nut through which said screw is threaded.

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