Feb. 26, 1952 H. A. HESS 2,587,471

SASH CORNER JOINT

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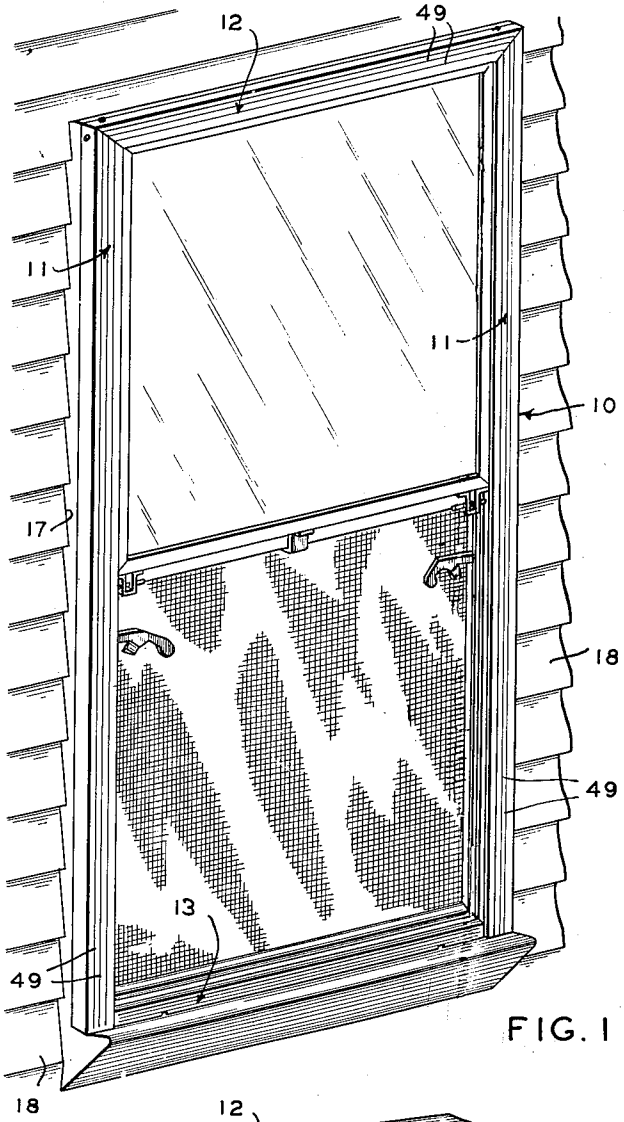


FIG. 1

FIG. 2

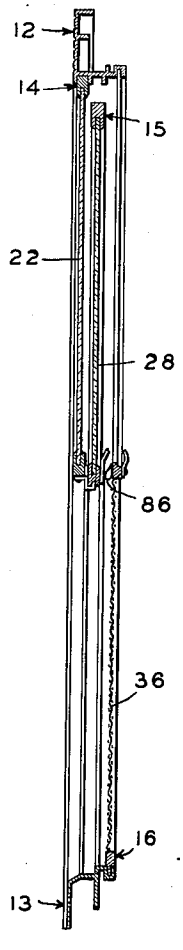
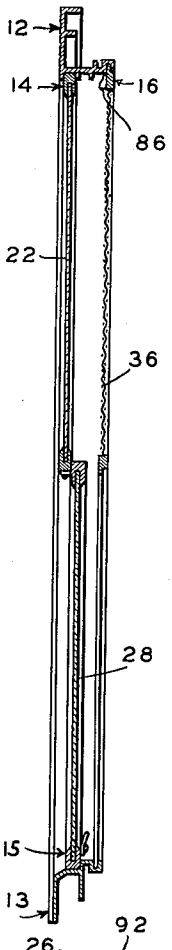


FIG. 3



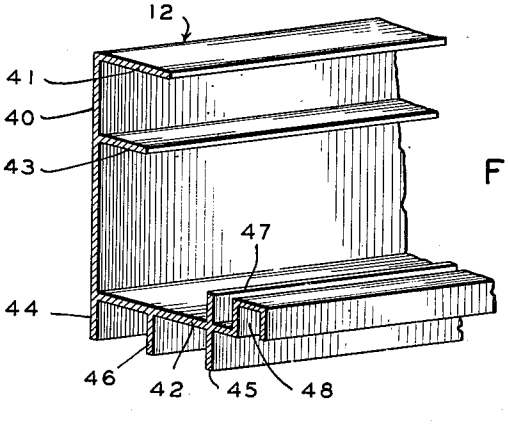


FIG. 9

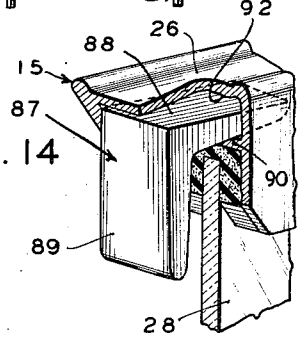


FIG. 14

INVENTOR.

HAROLD HESS

BY

A. Yates Dowell

ATTORNEY

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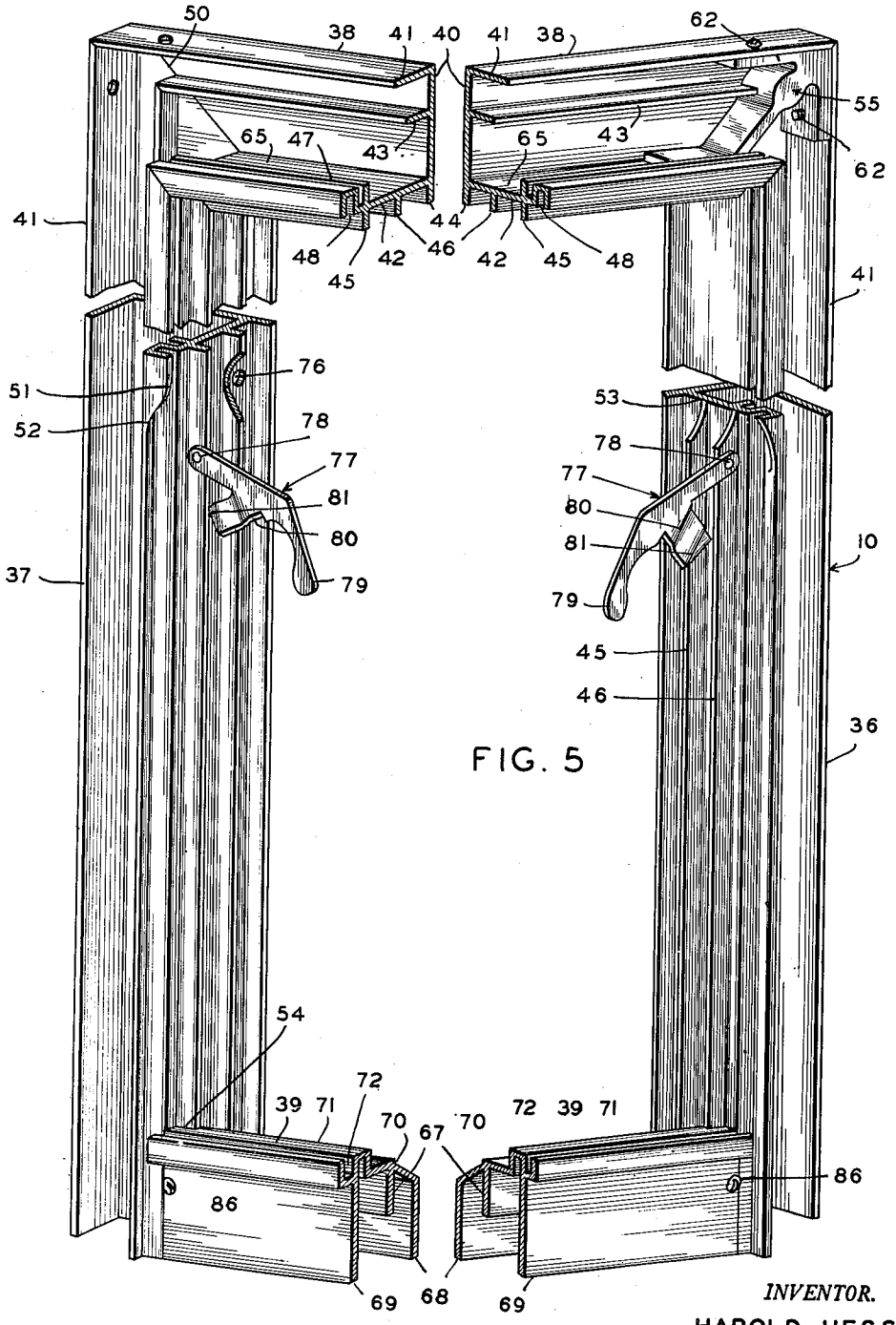


FIG. 5

FIG. 4

INVENTOR.
HAROLD HESS

BY
A. Yates Dowell

ATTORNEY

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SASH CORNER JOINT

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FIG. 6

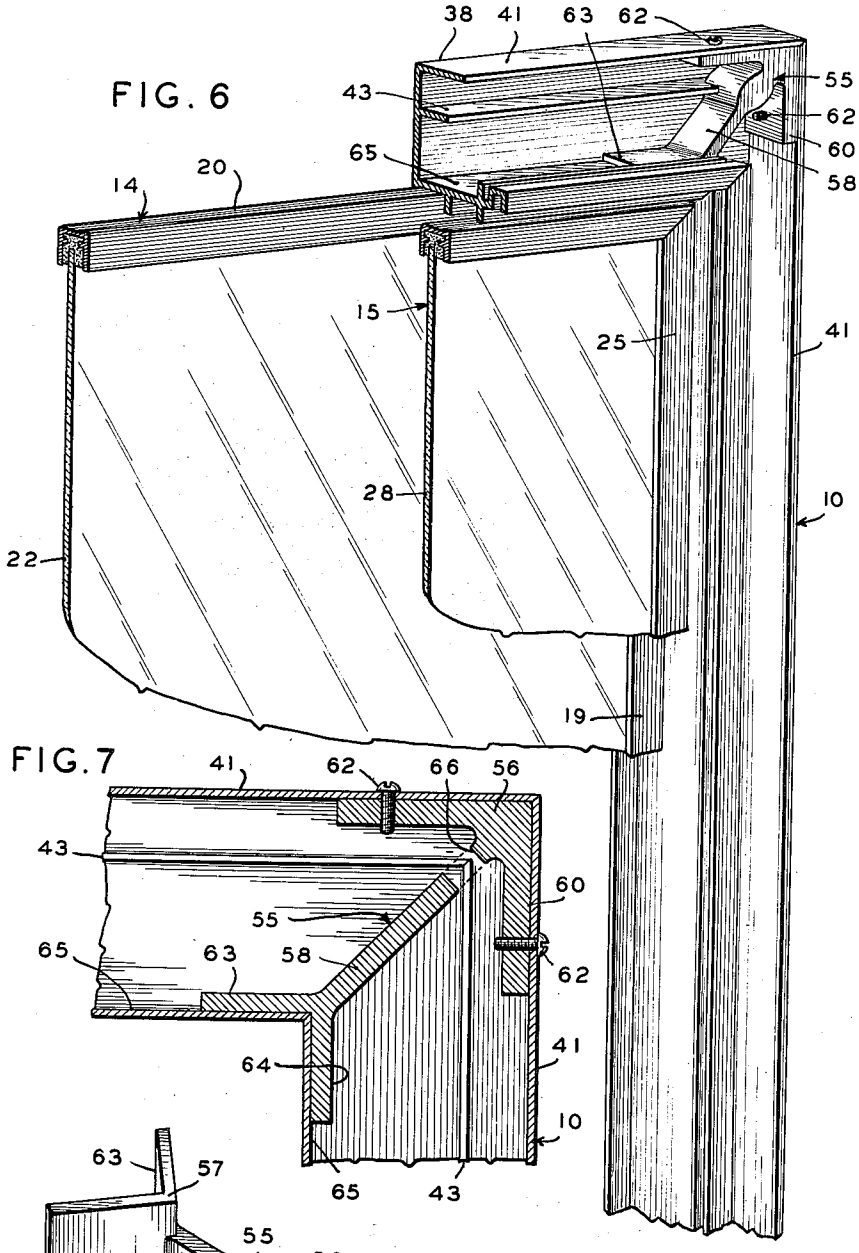


FIG. 7

FIG. 8

INVENTOR.
HAROLD HESS

BY

A. Yates Dowell
ATTORNEY

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SASH CORNER JOINT

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FIG. 10

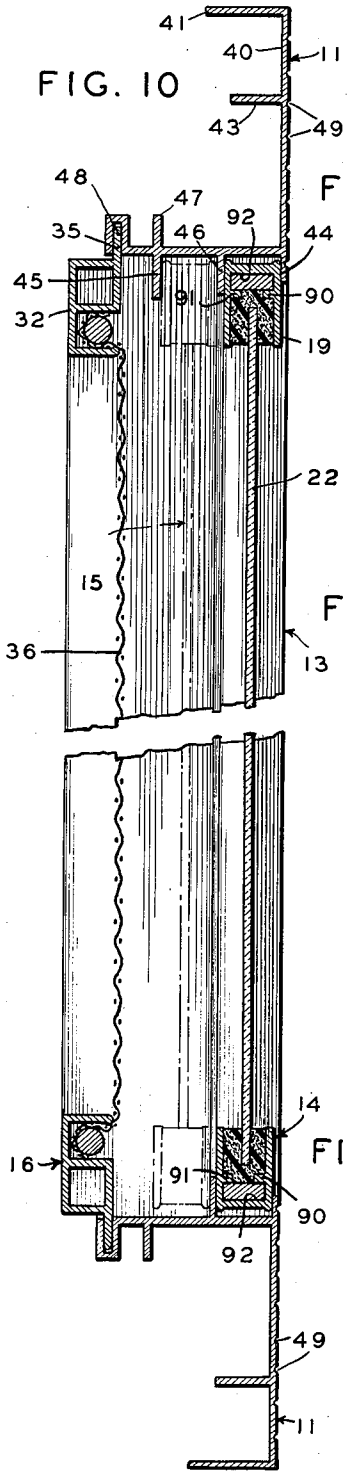


FIG. 11

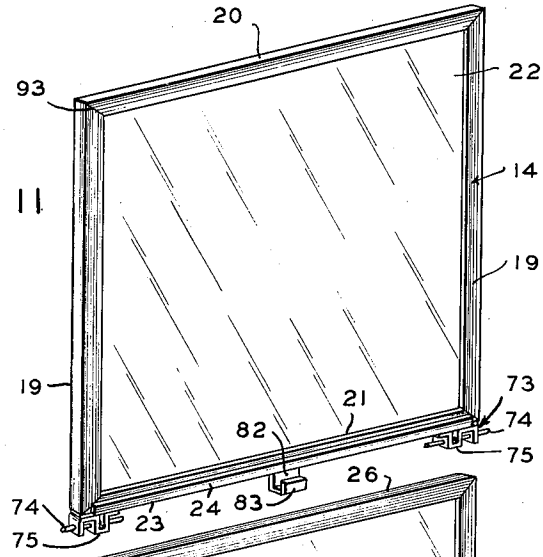


FIG. 12

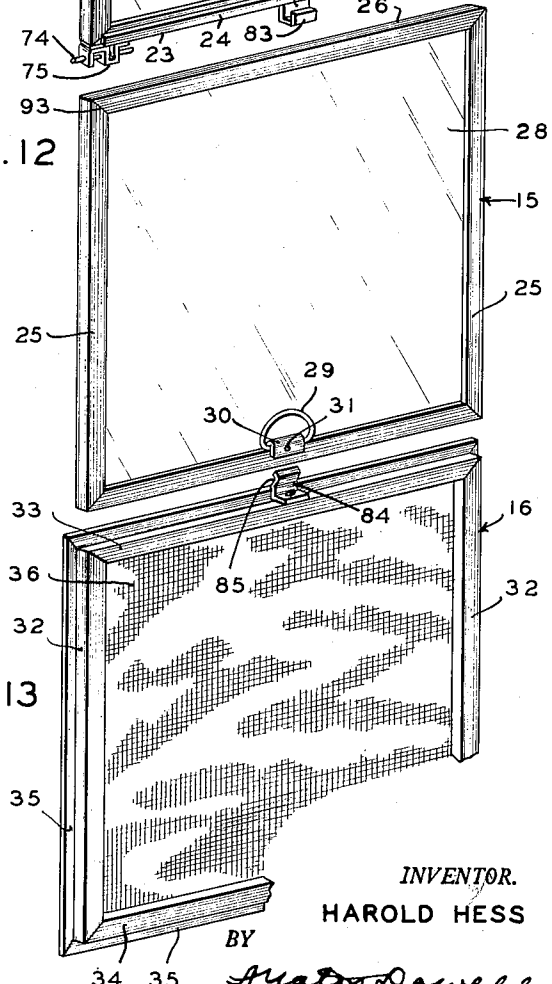


FIG. 13

INVENTOR.
HAROLD HESS
BY
Ayatt & Dowell
ATTORNEY

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2,587,471

UNITED STATES PATENT OFFICE

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SASH CORNER JOINT

Harold A. Hess, Waynesboro, Pa.

Application February 13, 1948, Serial No. 8,077

4 Claims. (Cl. 189—76)

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This invention relates to housing or building construction and more particularly to a combination metal storm sash and screen adapted to be easily applied to existing structures whereby maximum protection against the elements, convenience, pleasing appearance, and ease of operation are assured.

Heretofore many devices of this nature have been produced but the majority of these are relatively expensive to construct and install and also incorporate various types of catches and the like which are quite apt to be beyond the ability of an ordinary housewife to manipulate.

It is therefore an object of this invention to provide a combined metal storm sash and screen of relatively inexpensive construction in which the majority of parts are extruded metal shapes and which may be easily fabricated for application to substantially any size of building opening.

It is a further object of this invention to provide a combined metal storm sash and screen in which provision is made for storing the screen during the winter months and for storing the storm sash during the summer months, all as a more or less integral unit and without the necessity of providing storage space elsewhere in the building for these parts.

It is a further object of this invention to provide a combined metal storm sash and screen in which the various movable parts are securely held in position against rattling and in which an effective seal against the elements is provided.

It is a further object of this invention to provide a combined metal storm sash and screen in which the frame may be assembled by the insertion of six screws or other equivalent fastening elements and in which the storm sashes or screen may be removed from the frame or installed therein from the inside without the removal or introduction of fastening means or other elements which might easily become mutilated or lost.

It is a further object of this invention to provide a simple, yet effective means for securing together the sash parts at the corner of the sash.

Another object of this invention is to provide an improved method of fabricating a metal frame for a storm sash and screen.

Further objects and advantages of the invention will be apparent from the following specification taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective view from the outside of a building and showing the device of this invention in position in a window opening therein;

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Fig. 2, a longitudinal sectional view showing the screen in operative position and the storm sash in storage position;

Fig. 3, a longitudinal sectional view showing the storm sash in operative position and the screen in storage position;

Fig. 4, a perspective view showing the left hand portion of the frame;

Fig. 5, a perspective view showing the right hand portion of the frame;

Fig. 6, a perspective view of the upper right hand portion of the frame showing the two storm sashes in upper or raised position and with parts broken away for greater clarity;

Fig. 7, a detail sectional view showing the manner in which the upper corners of the frame members are secured together;

Fig. 8, a perspective view of the corner joining and clamping member;

Fig. 9, a perspective view of the extruded member forming the lower portion of the frame side rails;

Fig. 10, a horizontal sectional view showing the upper sash in raised position, the lower sash in operative position, and the screen in storage position;

Fig. 11, a perspective view of the upper storm sash;

Fig. 12, a perspective view of the lower storm sash; and

Fig. 13, a perspective view of the screen; and

Fig. 14, a perspective view of the joint at each corner of the sash with parts broken away for greater clarity.

With continued reference to the drawing an outer frame 10 having side rails 11, upper cross member 12 and lower cross member 13, is provided to support upper storm sash 14, lower storm sash 15, and screen 16, the complete assembly being adapted to be received in window opening 17 or the like in the outer wall 18 of a building.

As best shown in Fig. 11, the upper storm sash 14 comprises side rails 19, upper cross member 20, and lower cross member 21. The rails and cross members are of channel construction and when assembled in rectangular form, as shown in Fig. 11, enclose and support a pane of glass 22. The lower cross member 21 of the upper storm sash 14 is provided with a reinforcing strip 23, the inner portion of which is turned up, as at 24, to overlie the inner surface of the lower cross member 21, the portion 24 serving to fill

the space between the upper sash 14 and the lower sash 15.

Lower storm sash 15, as best shown in Fig. 12, is formed of side rails 25, upper cross member 26 and lower cross member 27. The side rails and cross members are of channel construction and serve, when assembled in rectangular form as shown in Fig. 12, to retain a pane of glass 28 therebetween. In order to assist in raising, lowering, or other manipulation of the lower storm sash 15, there is provided on the lower cross member 27 thereof a finger-engaging ring 29 pivotally secured to the lower cross member by an attaching plate 30 and screw threaded or other fastening means 31.

The siderails and upper and lower cross members of the upper storm sash 14 and lower storm sash 15 are secured together in a simple and efficient manner which greatly facilitates the quick and easy assembly of the parts. This fastening means as best shown in Fig. 14 comprises an anchor member 87 having tapered leg portions 88 and 89.

The channel members forming the side rails and upper and lower cross members of the sash are provided with inwardly extending opposed flanges 90 and 91 spaced from the bottom 92 of the channel. In assembling the parts to form the sash the tapered leg portions 88 and 89 are inserted in the space between flanges 90 and 91 and bottom 92 of the channel with sufficient force to insure a tight frictional contact therebetween, this contact being sufficient to hold the parts in assembled relation along the miter joint 93.

It will be observed that the channel members are arranged so that the groove thereof opens into the inside of the sash to receive a pane of glass. The anchor member is formed with substantially parallel sides that snugly fit within the sides of the channel without spreading the channel sides apart. The outer surface of each leg of the anchor member extends at substantially the same angle as the corner of the sash and is shown as a right angle in the drawings. The inner surface of each leg 88 or 89 of the anchor member 87 converges from the vertex of the anchor member towards the free ends of the legs providing a wedging action between the bottom of the channel and the flanges which serves to maintain the sash in assembled relation.

The taper in the legs of the anchor member is such that a substantial length of the flanges and a substantial length of the bottom of the channel tightly engage the anchor member producing a secure joint.

It is thus seen that by this structure there is provided a very simple yet efficient means for facilitating the assembly of the parts and for securely holding them in assembled relationship.

Screen 16, as best shown in Fig. 13, is composed of side rails 32, upper cross member 33, and lower cross member 34. The side rails and cross members are secured together in rectangular form at the corners thereof by welding or the like and each of these members is also provided with an outwardly extending peripheral flange 35, the purpose of which will presently be described. Screen wire 36 may be secured to the side rails and cross members in any desired or well-known manner.

The frame 10 of this device comprises a right hand side rail 36, a left hand side rail 37, upper cross member 38, and a lower cross member 39. Side rails 36 and 37 and upper cross member 38 are formed from the same extruded metallic shape, the metal employed preferably being aluminum, but obviously any other metal sufficiently light in weight and corrosion resistant would be equally usable. Customarily extruded shapes are produced in relatively long lengths, and since the majority of the frame of this invention is fabricated from the same extruded shape, obviously the construction thereof is relatively economical in view of the fact that only one shape is necessary for the majority of the frame, the required pieces being merely cut off from an extended length thereof. Each of these pieces must be modified to a certain extent, but such modification is considerably less expensive than would be the production of a plurality of different individual shapes or pieces to make up the complete frame.

The basic extruded shape from which the side rails and upper cross member are fabricated may be best understood from an inspection of Figs. 4, 5, 6 and 10 wherein is shown a structural member comprising an outer wall 40 having an outer inturned or marginal flange 41 and an inner inturned flange 42. In order to further strengthen the wall 40 there is provided between flange 41 and flange 42 a strengthening rib 43 formed integrally with the wall 40. Wall 40 extends inwardly for a small distance beyond flange 42 to provide an outer rail or rib 44 and an inner rail or rib 45 is provided adjacent the inner edge of the flange 42 and integral therewith. Midway between rail 44 and rail 45 there is provided an additional rib 46 integral with flange 42, the space between rails 44 and 46 providing a trackway to accommodate sash 14 and the space between rails 45 and 46 providing a trackway to accommodate the lower sash 15. In order to further strengthen the flange 42 there is provided thereon and integral therewith directly opposite the rail 45 a strengthening rib 47.

The inner edge of the flange 42 is formed with a relatively narrow channel or groove 48 providing a trackway to accommodate the flange 35 of the screen 16.

The outer surface of the wall 40 may be provided with longitudinal grooves 49 or other decorative markings in order to enhance the outward appearance of the frame.

The basic extruded shape from which the side rails 36 and 37 and the upper cross member 38 are fabricated need not be modified in any way to form the upper cross member 38 except that the ends thereof are cut at an angle as indicated at 50 to form a miter joint with the upper ends of the side rails 36 and 37. The basic shape forming the left hand side rail 37 is modified to the extent that the inner wall 51 of the relatively narrow trackway 48 is removed from the lower end of the side rail 37 to a point 52 slightly above the midpoint of the side rail. The inner wall 51 of the relatively narrow trackway in the right hand side rail 36 is also similarly removed. The basic shape forming the right hand side rail 36 is further modified by removing the ribs 45 and 46 from the upper end thereof to a point 53 slightly below the midpoint of the side rail 36. The basic shape forming the lower cross member 39 is only modified to the extent of providing slots 54 therein to accommodate the ribs 45 and 46 when the lower cross member is assembled between the lower end of the side rails 36 and 37.

It will thus be seen that the only stock necessary to fabricate the frame for this combined storm sash and screen comprises two extruded metal shapes which may easily be cut up into

the appropriate lengths for each member of the frame, slight modification of these various lengths and assembly being all that is necessary to fabricate the frame, thus resulting in a relatively small stock inventory and a minimum of machine work and labor to complete the frame.

The miter joint 50 uniting the upper end of each side rail with the upper cross member 38 is accomplished in a novel manner by utilizing a joining and clamping member 55 best shown in Fig. 8, the application of which is best shown in Figs. 5, 6 and 7. The member 55 comprises a joining portion 56, a clamping portion 57 and a relatively thin connecting web 58. The portion 57 is provided with contiguous right angular surfaces 59 and 60 which when assembled in the frame are adapted to contact the inner surfaces of the marginal flanges 41 adjacent the joint 50. In order to securely hold the side rails and upper cross member together apertures 61 are provided in the joining portion 56 for the reception of screw threaded fasteners 62 or the like which extend through the marginal flange 41 and into the apertures 61 thus securely fastening the side rails and upper cross member together at the joint 50.

In order to prevent spreading of the inner flanges or legs 42 at the inner end of the joint 50, the clamping portion 57 is provided with contiguous right angular faces 63 and 64 which are adapted to contact and embrace the surfaces 65 of the inner flanges or legs 42 whereby separation thereof is prevented. In order to accommodate the strengthening ribs 43 the connecting web 58 is provided with a recess 66 adjacent the joining portion 56, the recess 66 serving to receive the ends of the ribs 43 at the joint as shown in Figs. 5, 6 and 7.

It will thus be seen that by provision of the joining and clamping member 58 there is provided a simple and economical means for securing a rigid miter joint between two members substantially rectangular in cross section and in which only two fastening means are required to secure the joining and clamping member in place to complete the joint.

The lower cross member 39, the desired length of which is cut from an extruded shape, is a generally channel shaped member provided with an internal strengthening rib 67 and outer and inner flanges 68 and 69 respectively. The upper surface of the lower cross member 39 is inclined downwardly as at 70 to provide adequate drainage and this upper surface is also provided with an outwardly facing shoulder 71 against which the inner side of the lower sash 15 is adapted to abut. Adjacent the inner edge of the lower cross member 39 there is provided a relatively narrow groove 72 which is adapted to receive the lower peripheral flange 35 of the screen 16 when the screen is in lowermost position. The upper sash 14 is held in its normal raised position by fastening means 73 which may conveniently take the form of pins 74 slidably mounted in apertures in brackets 75 secured to each end of the lower surface of upper sash 14. Pins 74, when extended, are adapted to project into apertures 76 provided in side rails 36 and 37, it only being necessary to withdraw the pins 74 when it is desired to lower or remove the upper sash 14 from its normal raised position.

Means in the form of friction clamping members 77 are provided for securing the lower sash 15 in any desired position and for preventing undue rattling of this sash in the frame under the action of the forces of nature. Clamping means 77 may conveniently be pivoted to the side rails 36 and 37 by a rivet or the like 78 extending through the clamping member and into the rib 45. The clamping member 77 is provided with an actuating finger engaging portion 79 and a clamping portion 80 having a tapered or bevelled inner edge 81 which is adapted to engage between the side surface of the rib 46 and the inner surfaces of the side rails 25 of the lower sash 15 whereby the lower sash is jammed or clamped against the rib 46 to retain the same in place at any desired elevation or to prevent rattling thereof when in lowermost position.

It is to be noted that the clamping members 77 are formed from a flat sheet metal stamping, the major portion of the member being in one plane and only the portion including the bevelled edge 81 being offset to permit mounting on the outer side of rib 46 and at the same time provide for the engagement of bevelled edge 81 with the rear surface of the rib and the side rails of the lower sash.

In order to retain the lower sash 15 in its extreme upper position whereby maximum window opening may be obtained during the summer months, there is provided on the lower cross member 21 of the upper sash 14 a hook shaped supporting member 82 having a portion 83 which is adapted to engage the lower surface of the lower cross member 27 of the lower sash 15 and support this sash in raised position.

In order to retain the screen 16 in its extreme upper position as during the winter months, the upper cross member 33 thereof is provided with a spring catch 84 having a portion 85 which is adapted to snap over the inner edge of the upper cross member 38 of the frame 10 to frictionally retain the screen in upper position, it only being necessary to apply a slight downward force in order to disengage the catch 84 to permit movement of the screen to lowermost position.

In order to prevent the entrance of insects or the like between the screen 16 and the lower sash 15, there is provided on the outer surface of the upper cross member 33 of the screen a resilient strip 86 formed of rubber or the like and extending throughout the entire length of the upper cross member, the strip 86 being adapted when the screen is in lowermost position to engage the inner surface of the lower cross member 27 of the lower sash 15, thus providing a seal therebetween.

The provision of the joining and clamping means 55 permits a simple and novel method of assembly of the frame which may be accomplished by securing the member 55 in place to either the upper cross member 38 or one of the side rails 36 and 37 and thereafter bringing the other member into position and securing it to the member 55 thereby completing the joint. The joint may also be assembled by bringing the side rails and upper cross members into juxta-position and thereafter applying the member 55 to complete the joint although the first described method is preferable.

The complete method of fabricating the frame is also very simple and novel in that it is only necessary to provide two types of extruded stock from which the various parts are cut in the required lengths, certain of the parts being thereafter modified to provide the necessary structural features therein. The side rails and upper cross member are then assembled in the manner described above and the frame completed by intro-

ducing the lower cross member between the lower ends of the side rails and securing the same in place by screw threaded fastening means or the like 86 extending through the inner wall 69 of the lower cross member 39 and through ribs 45 and 46; thus completing a rigid structure secured together by only six fastening elements.

The frame is applied to the window opening of a building adjacent the outer surface thereof, as best shown in Fig. 1, and may be secured in place by screw threaded fasteners or in any other desired or convenient manner. The entire assembly is intended to be left in position the year round and by the structure described above provides storm sash for winter use and storage space for the lower storm sash whereby the lower portion of the window may be opened and covered with a screen for ventilation during the summer months or at any other desired time, the screen also being secured in a raised out of the way position during non-use thereof, as during the winter months, it being only necessary to exert a slight downward force thereon in order to move the screen into operative position.

The upper and lower sash as well as the screen may be easily removed from the frame at the inner side thereof, the screen by raising the same slightly until the lower flange 35 is out of engagement with the groove 72 in the lower cross member 39 whereby the lower portion of the screen may be tilted inwardly and the screen removed from the frame due to the termination of the trackway 48 at the point 52 slightly above the midpoint of the side rails. The lower sash may be removed by raising the same to a position wherein the lower cross member 27 thereof is above the termination of the rib 46 in the right hand side rail 36 whereupon the right hand side of the lower sash may be tilted inwardly a sufficient distance to remove the entire sash from the frame. The upper sash may likewise be removed from the frame by withdrawing the pin 74 from the aperture 76 and lowering the sash slightly until the upper cross member 20 thereof is out of engagement with the groove formed by ribs 44 and 46 whereupon the right hand side of the upper sash 19 may be tilted inwardly a sufficient distance to permit complete removal of the sash from the frame.

It will thus be seen that by the structure above described there has been provided a relatively simple and inexpensive construction which when applied to a building presents a pleasing appearance and one which is not subject to excessive weathering or deterioration and in which provision is made for the easy manipulation of storm sashes and a screen for proper use thereof at all times of the year, depending on the climate or weather at that particular time, and in which the sashes or screen may be removed from the inside of the building in order to clean or effect repairs thereon.

It will be ovious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A rectangular metal sash comprising side rails and upper and lower cross members of channel cross section, opposed inwardly extending flanges in said channels spaced from the bottom thereof, said side rails and upper and lower cross members abutting each other along a miter joint at each corner of said sash, means for securing said side rails and cross members together at each corner comprising anchor members having tapered legs disposed at substantially right angles, said legs being tightly received in the space between said flanges and the bottom of said channel and engaging a substantial length of said flanges and a substantial length of the bottom of said channel whereby the elements of said sash are secured in assembled relation.

2. A metal window sash comprising a frame having top, bottom and side rails arranged in mitered abutting end to end relation at each corner, each rail being of channel shape section with a bottom having a flat inner surface and side walls extending from the bottom of the channel shaped rail inwardly of the frame, each side wall having its inner surface arranged at right angles to said bottom inner surface, a flange positioned on the inner surface of each of said side walls intermediate the bottom and the free edge of said side wall and extending toward the opposite side wall, an L-shaped anchor member at each corner of the frame having each leg extending into the end of the adjacent channel with the outer surfaces of the anchor member arranged at right angles and the inner surfaces tapering from the vertex of the L-shaped anchor member to the free ends of each leg, the side surfaces of said anchor member being substantially parallel and spaced apart a distance equal to the spacing of the inner surfaces of said side walls, the inner and outer surfaces of said anchor member being spaced apart a sufficient distance to wedgingly engage a substantial length of the inner surface of the bottom of the channel and a substantial length of the surfaces of said flanges facing the bottom of the channel for securing and maintaining the window sash in assembled relation.

3. A window construction comprising a frame having rails of channel shape section, flanges positioned between the bottom of the channel and the free edges of the sides thereof, said flanges extending inwardly in opposed relation with the inner edges thereof being spaced apart, an anchor member having legs extending at right angles to each other, said channel members terminating with a miter end and adjacent channel members having their miter ends abutting to provide a right angle corner, said anchor member having the outer surfaces of the legs arranged at precisely right angles and the inner surfaces tapering from the vertex toward the free end of each leg, the side surfaces of the anchor members being substantially parallel to each other and being spaced apart substantially the distance between the inner surfaces of the sides of the channel shaped rails whereby a snug fit is obtained between said anchor member and said side of the channels and the inner and outer surfaces of the tapered legs of said anchor members wedgingly engage a substantial length of the bottom of the channel shaped rails and a substantial length of the inwardly extending flanges.

4. A window construction comprising a frame having rails of channel shaped section, flanges positioned between the bottom of the channel and the free edges of the sides thereof, said flanges extending inwardly in opposed relation with the inner edges thereof being spaced apart, an anchor member having legs extending at an angle to each other, said channel members ter-

minating in a miter end, adjacent channel members having their miter ends abutting to provide a corner, said anchor member having the outer surfaces of the legs arranged at substantially the angle of the corner and the inner surface tapering from the vertex toward the free end of each leg, the side surfaces of the anchor members being spaced apart a distance not greater than the distance between the inner surface of the sides of the channel shaped rails whereby a snug fit is obtained between said anchor member and said channel shaped rails, and the inner and outer surfaces of the tapering legs of said anchor members wedgingly engage a substantial length of the bottom of the channel shaped rails and a substantial length of the inwardly extending flanges.

HAROLD A. HESS.

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