Sept. 12, 1961 P. H. LAUER 2,999,279

WINDOW STRUCTURE

Filed July 22, 1957 3 Sheets-Sheet 1

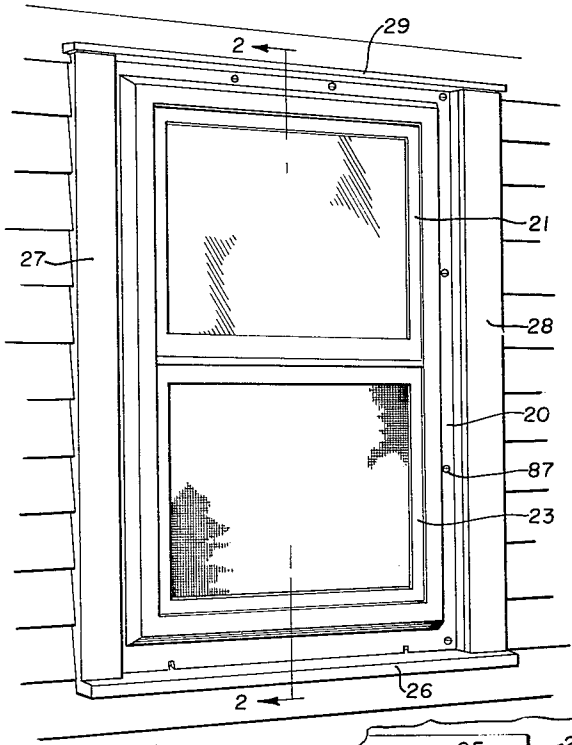

Fig. 1

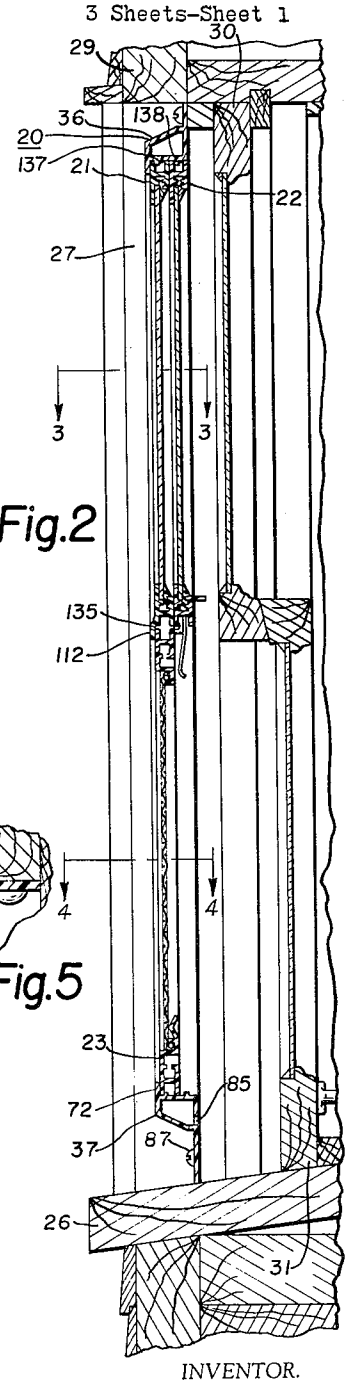

Fig. 2

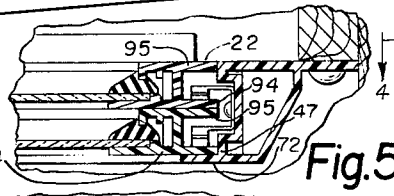

Fig. 5

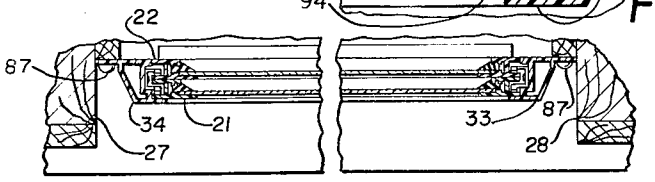

Fig. 3

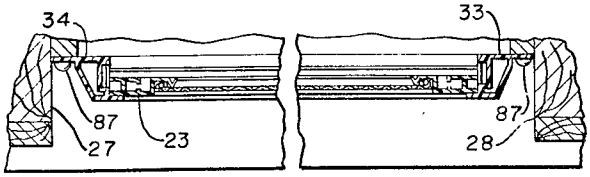

Fig. 4

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WINDOW STRUCTURE

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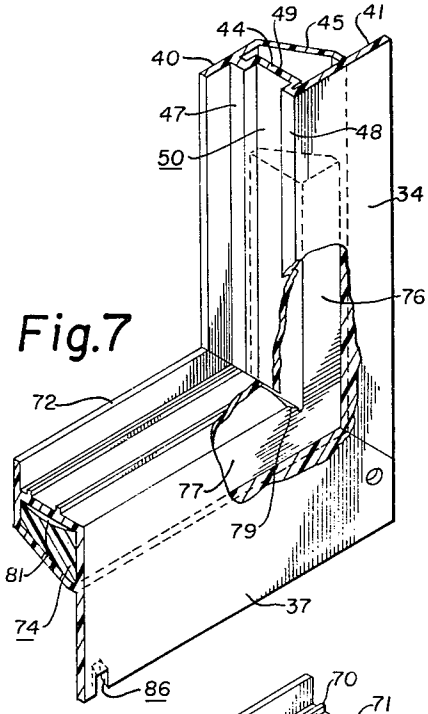

Fig.7

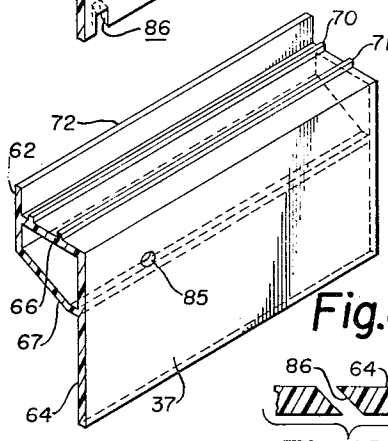

Fig.8

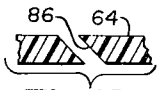

Fig.19

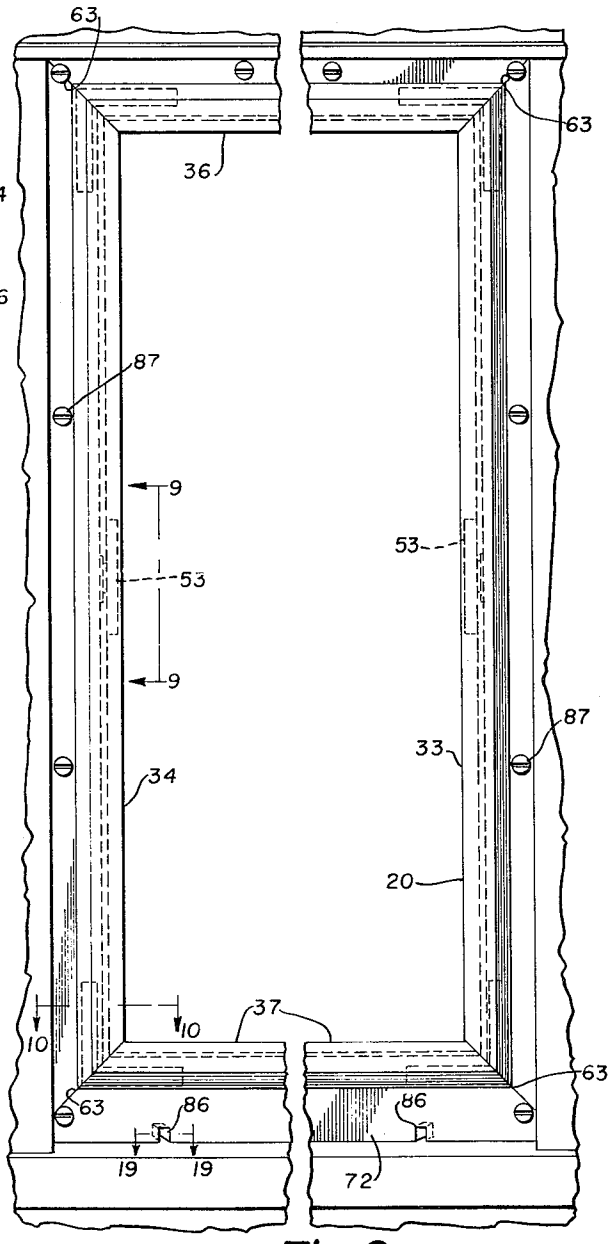

Fig.6

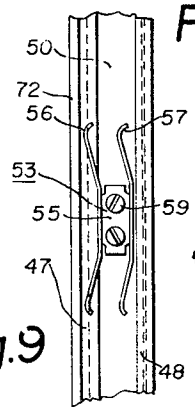

Fig.9

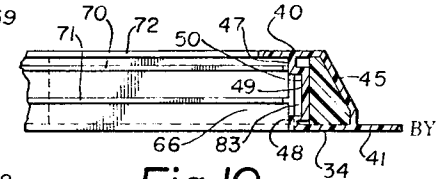

Fig.10

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WINDOW STRUCTURE

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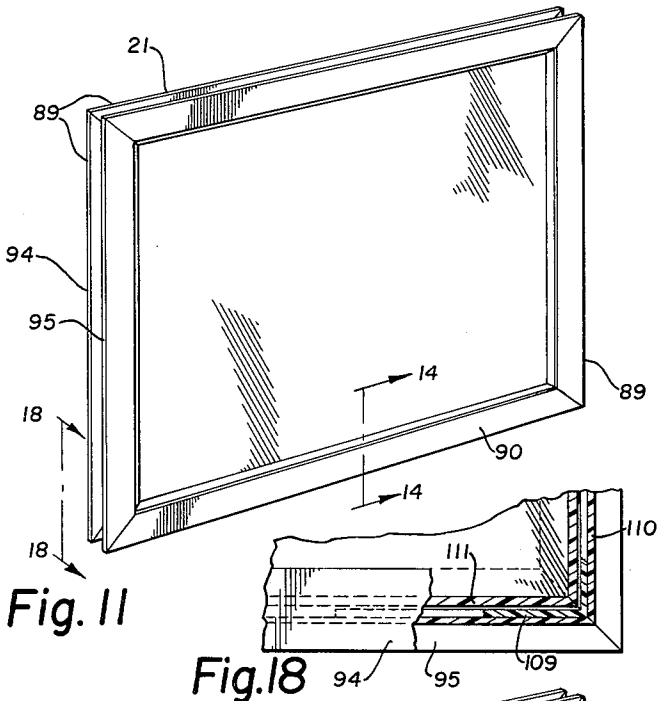

Fig. 11

Fig. 18

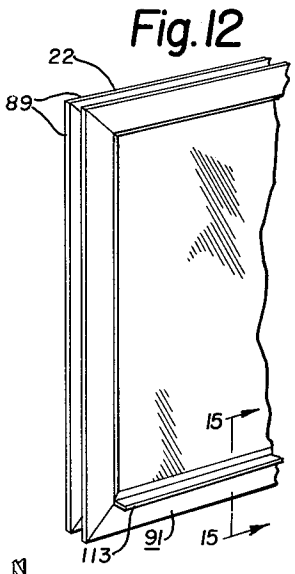

Fig. 12

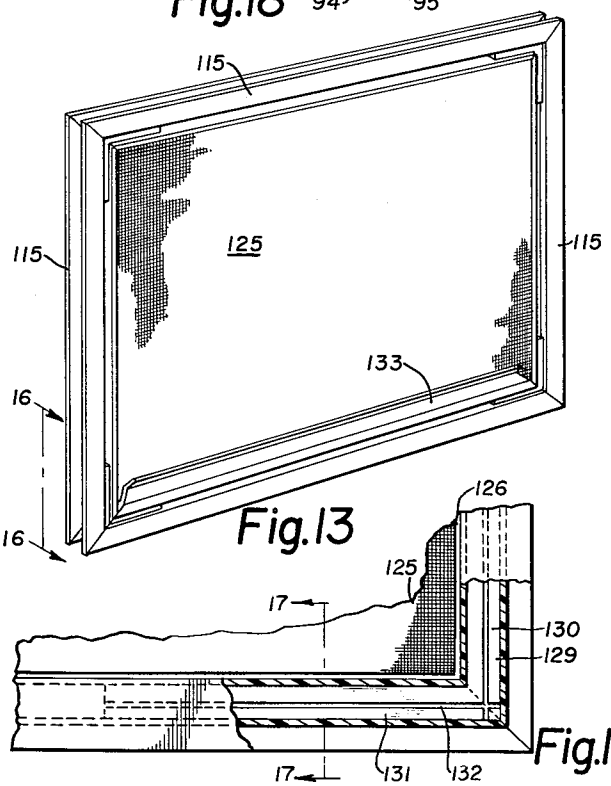

Fig. 13

Fig. 16

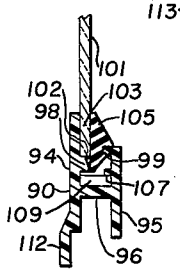

Fig. 14

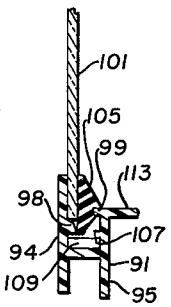

Fig. 15

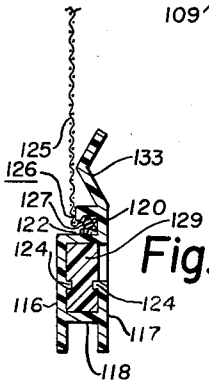

Fig. 17

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United States Patent Office 2,999,279 Patented Sept. 12, 1961

2,999,279

WINDOW STRUCTURE

Paul H. Lauer, Cuyahoga Falls, Ohio, assignor to The Falako Corporation

Filed July 22, 1957, Ser. No. 673,350
5 Claims. (Cl. 20—52)

The invention relates in general to combination windows and more particularly to combination windows having the frames and panels thereof made of vinyl plastic material.

An object of the invention is to provide a combination window constructed substantially entirely from vinyl plastic.

Another object of the invention is to provide a combination window construction wherein the combination frame includes hollow plastic side members and hollow plastic top and bottom members mitered at their end portions and fixedly secured together by corner members each extending into a side member and a top or bottom member and being secured thereto by solvent welding or by a suitable adhesive.

Another object of the invention is to provide a combination window frame having a hollow plastic side member which is provided with a groove on an inner portion thereof to partially recess a spring which spring aids in retaining a storm panel and a screen panel within the frame.

Another object of the invention is to provide a combination window frame having a construction to permit the drainage of water therefrom in the event of inclement weather conditions when a storm panel is left open or when a screen panel is in the frame.

Another object of the invention is to provide a combination window frame having a side member with a wall means which serve as tracks for panels and which also serve to recess a spring member which is utilized to retain the panels.

Another object of the invention is to provide a combination window having storm panels with a new and novel construction and means for holding and sealing the panes of glass.

Another object of the invention is to provide a combination window having a screen panel with a new and novel construction.

Another object of the invention is to provide a combination window having side members each of which has first and second vertical extending tracks spaced from each other by an outwardly recessed portion and having first and second panels each having first and second legs only one of which engages one of said tracks with the other of said legs overlying said recessed portion thereby reducing sticking between the side members and the panels and reducing the sticking of the panels upon any distortion of the side members.

Another object of the invention is to provide a combination window which is exceptionally durable, strong, and which is unaffected by cold and heat and which will not burn.

Another object of the invention is to provide a combination window having panels therein which panels are constructed in combination with the side members of the frame to keep sticking of the panels to a minimum.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

FIGURE 1 is an elevational view of the combination window of the present invention in place within the framework of a conventional household window frame;

FIGURE 2 is a side elevational view in section taken along the line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a view taken along the line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged view of the right end portion of FIGURE 3;

FIGURE 6 is a side elevational view of the frame of the combination window with the screen and storm panels removed therefrom;

FIGURE 7 is an isometric view of the lower left-hand corner of the combination window frame shown in FIGURE 6, partially in section;

FIGURE 8 is an isometric view of a portion of the bottom member forming a part of the combination window frame shown in FIGURE 6 and which lies adjacent the portion of the bottom member shown in FIGURE 7;

FIGURE 9 is a view taken along the line 9—9 of FIGURE 6;

FIGURE 10 is a view taken along the line 10—10 of FIGURE 6;

FIGURE 11 is an isometric view of one of the storm panels used making up the combination window;

FIGURE 12 is a partial isometric view of another storm panel making up the combination window;

FIGURE 13 is an isometric view of a screen panel making up the combination window;

FIGURE 14 is a sectional view taken along the line 14—14 of FIGURE 11;

FIGURE 15 is a sectional view taken along the line 15—15 of FIGURE 12;

FIGURE 16 is a fragmentary view taken along the line 16—16 of FIGURE 13;

FIGURE 17 is a sectional view taken along the line 17—17 of FIGURE 16;

FIGURE 18 is a fragmentary view taken along the line 18—18 of FIGURE 11; and

FIGURE 19 is a view taken along the line 19—19 of FIGURE 6.

The combination window of the present invention includes generally a frame 20 within which two storm panels 21 and 22, respectively, and screen panel 23 are adapted to reside. FIGURES 1 through 5 best show the relative location of these component parts with respect to each other and FIGURES 6 through 19 illustrate each component part in more detail.

FIGURES 1 and 2 show the conventional home window frame which includes a sill 26, side frames 27 and 28, respectively, and a top frame 29. Conventional frames 30 and 31 are adapted to slide up and down in the usual well-known manner. As shown in FIGURE 2, the two storm panels 21 and 22 reside in the upper-half of the frame 20 and the screen panel 23 is shown in position in the lower portion of the frame. The storm panel 22 is used in this position to close the window under inclement weather conditions. This would be the position of the panels in summer weather. In winter weather, the screen panel 23 would be exchanged for the storm panel 22 and would in effect be stored in this position until the next summer.

The combination window frame 20 is shown in detail in FIGURES 6 through 10 and includes a first and second side member 33 and 34, respectively, interconnected at their opposite end portions by top and bottom members 36 and 37, respectively (see FIGURE 6). The side members 33 and 34 are of the same construction and each has front and back walls 40 and 41, respectively, interconnected by inner and outer walls 44 and 45, respectively, to form a hollow construction. A portion of the walls 40 of the side member and of the walls 62 of the top and bottom members form a flange 72 which retain panels in the frame. The inner wall 44 includes first and second side portions 47 and 48, respectively, which side portions

lie generally in the same plane and form first and second tracks, respectively. A recessed portion **49** interconnects the first and second side portions **47** and **48** and this portion is recessed toward the outer wall **45** to form in effect a groove **50** on the inside of the inner wall **44**. The purpose of the groove **50** will be described in more detail hereinafter. A panel retaining spring **53** is located in the groove **50** of each of the side members **33** and **34** (FIGURES 6 and 9). Each of the panel retaining springs has a base portion **55** and first and second retaining leaves **56** and **57**, respectively. The base portion **55** resides within the groove **50** or it might be said is recessed within the groove and screws **59** extend through the base portion and into the inner wall **44** to fixedly secure the retaining spring in place. These springs **53** serve to secure screen and storm panels within the frame **20** as will be described hereinafter. Each of the side members **33** and **34** have opposed end portions which are mitered as at **63** at substantially 45 degrees to the extent thereof to interfit with the end portions of the top and bottom members **36** and **37** which also have their end portions mitered at substantially 45 degrees.

The bottom member **37** (FIGURES 7 and 8) is provided with front and back walls **62** and **64**, respectively, interconnected by inner and outer walls **66** and **67**, respectively, to form a hollow construction. The inner wall **66** of the bottom member **37** has first and second parallel panel retaining projections **70** and **71**, respectively, extending longitudinally thereon. The panel retaining projections **70** and **71**, respectively, lie in substantially the same planes as do the end portions of the retaining leaves **56** and **57**, respectively, of the panel retaining springs **53**. As best seen in FIGURES 2 and 6, the back wall **64** of the bottom member **37** is adapted to engage the sill member **26**. As mentioned hereinabove, the bottom member **37** has its end portions mitered at substantially 45 degrees to the extent thereof which interfit with the mitered end portion of the side members to form 90 degree corners. FIGURE 7 shows the interfitting of the lower end portion of the side member **34** and an end portion of the bottom member **37**. A corner member **74** is provided which has first and second leg portions **76** and **77**, respectively, which leg portions are disposed substantially 90 degrees from each other. The first leg portion **76** resides and is secured within the hollow construction of the side member. The second leg portion **77** has wall means **79** which define a notched portion within which the mitered end of the inner wall **44** of the side member **33** resides. The second leg portion **77** resides and is secured within the hollow construction of the bottom member **37**. This second leg portion has a groove **81** extending across the upper side thereof thus forming a passageway between the second leg portion and the inside of the inner wall **66**. The mitered end of the inner wall **66** of the bottom member **37** engages the first and second tracks **47** and **48**, respectively, thus spacing the same from the recessed portion **49** and this forms an opening **83** (FIGURE 10) to provide communication between the groove **50** in the inner wall **44** of the side member **34** and the groove **81** on the upper side of the second leg portion **77** of the corner member **74**. Wall means **85** define an opening in the back wall **64** of the bottom member **37** between the inner and outer walls **66** and **67** to provide communication from the hollow construction of the bottom member. Wall means **86** define slots through the inner wall **64** of the bottom member at the place where the inner wall engages the sill **26**. As shown in FIGURE 19, these slots extend at an acute angle with respect to the extent of the inner wall **64**. The reason for extending the slot other than at right angles to the extent of the inner wall is to keep light from inside the house or similar structure from shining directly through this opening. This insures that insects which fly toward a light source will not be attracted by the light and will therefore not come in through the slots or openings **86**. The frame **20** is secured in place by screws **87** which extend through the walls **41** and **64** into the frame of the conventional window.

The storm panels **21** and **22** are best seen in FIGURES 11, 12, 14, 15 and 18. Each of the storm panels **21** and **22** includes four side members, three of which are identical and have been identified by the common reference numeral **89** and the fourth side member of panel **21** has been identified by the reference numeral **90**. The fourth side member of the panel **22** has been indicated with the reference numeral **91**. The end portions of all of the side members are mitered at a 45 degree angle to interfit with an adjacent side member. Each of the side members of the storm panels **21** and **22** includes first and second wall members **94** and **95** (FIGURE 14), respectively, which extend in generally spaced parallel planes and which are interconnected together by an interconnecting wall member **96**. These three wall members form a generally H-shaped configuration. A glass panel retaining ledge **98** extends longitudinally on the inside of each of the first wall members **94** and a sealing member retaining ledge **99** extends longitudinally on the inside of each of the second wall members **95** and faces the glass panel retaining ledge **98**. A glass panel **101** having edges **102** and edge portions **103** is provided. The edges **102** engage the glass panel retaining ledges **98** and the edge portions on one side of the glass panel engage the inside of the first wall members **94**. A sealing member **105** engages the edge portions of the glass panel on the other side thereof and has a groove thereon which interfits with the sealing member retaining ledge **99** to secure the sealing member in position. Each of the second wall members **95** is provided with a corner retaining member **107** which extends longitudinally on the inside thereof and this corner retaining member along with the glass panel retaining ledge and the interconnecting wall member **96** constitute wall means for holding a corner member **109**. The corner member **109** is provided with first and second leg portions **110** and **111**, respectively, which connects and holds the end portions of adjacent side members together. The first leg portion **110** resides within the wall means of one side member and the second leg **111** resides within the wall means of an adjacent side member. It is, of course, realized that four of these corner members are utilized in holding and securing the four side members of the storm panel together. The difference between the side member **90** of panel **21** and the side member **91** of the panel **22** is that member **90** is provided with an overhanging lip **112** which is absent from member **91**, and member **91** has a gripping member **113** which is absent from side member **90**. The corner members **109** are secured in position by coating them with an adhesive before putting them into place or by dipping them into a solvent which renders the surface sticky and thus, when the leg portion is inserted within the wall means, it will become securely stuck in place after a short period of time.

The screen panel **23** best shown in FIGURES 13, 16 and 17, includes four side members **115**. Each of these side members **115** has ends which are mitered on a 45 degree angle to interfit with an adjacent side member. Each of the side members shown in FIGURE 17 includes first and second wall members **116** and **117**, respectively, which extend in spaced parallel planes and which are secured together by a connecting wall member **118**, to form a generally H-shaped configuration. A screen securing extension member **120** extends as a continuation of the first wall member **116** and forms a groove **122**. Each of the first and second wall members **116** and **117**, respectively, are provided with a corner retaining ledge **124** extending longitudinally on the inside surface thereof. A screen member **125** is provided which has edge portions **126** which reside in the grooves **122** of the extension members. A securing cable **127** is pressed into the groove over the edge portions of the screen members

to secure the same in the grooves. A screen corner member **129** having first and second leg portions **130** and **131** is provided for connecting the end portions of adjacent side members together. Each of the first and second leg portions has grooves **132** on either side thereof which grooves interfit with the corner retaining ledges **124** when the first and second leg portions of the corner member reside within the first and second wall members of adjacent side members. The corner members **129** of the screen panel are secured in place in the same way as the corner members of the storm panel. The side members of the screen panel are identical with the exception of the bottom side member which has been shown in section in FIGURE 17. The only difference in this side member is that it has been provided with a handle member **133** which extends from the extension member **120**. This is used in handling the screen panel when it is desired to move it with respect to the frame **20**.

When it is desired to put the screen and storm panels into the frame **20** as shown in FIGURE 2, the panel **21** is inserted into the lower portion of the frame shown in FIGURE 6 below the retaining springs **53**. The panel is placed in the frame so that the first wall member **94** of the side members of the storm panel abut the flange **72** on the window frame. In this position, the first wall member or leg **94** of the storm panel engages the first track **47** and second wall member or leg **95** of the storm panel overlies the groove **50** of the side members **33** and **34** (see FIGURE 5). The storm panel **21** is then moved upwardly into the position shown in FIGURES 2, 3 and 5. When in this position, the first leaf **56** of the retaining spring **53** engages the first wall member **84** of the two vertical side members **89** of the storm panel **21** to hold this storm panel in this position. The upper side member of the storm panel **21** is held from moving outwardly of the frame by means of the flange **72** and is prevented from moving rearwardly by means of the engagement with the panel retaining projection **137** on the top member of the frame **20** which corresponds to the panel retaining projection **70** on the bottom member of the frame **20**. The screen panel **23** is next placed in position by putting it into the position shown in FIGURE 2 where the wall member **116** of the screen panel is securely held between the panel retaining projection **70** and the flange **72**. The screen panel will come into this position because there is a gap as at **135** (FIGURE 2) which allows the screen panel to be moved upwardly so that the wall **116** will drop over the retaining projection **70** and finally reside in the position shown in FIGURE 2. This gap **135** is closed by means of the overhanging lip **112** on the member **90** of the storm panel **21**. The storm panel **22** is next placed within the frame **20** as best shown in FIGURES 2, 3, and 5. In this position, the wall member **94** of the storm panel **22** engages the wall member **95** of the storm panel **21**. The second leaf **57** of the spring **53** engages the wall member **94** of the storm panel **22** to hold it in the position shown in FIGURE 2. It is also secured in place by means of a panel retaining projection **138** on the top member **36**. With the storm panel **22** in the position shown in FIGURE 2, it can be lowered to any vertical position within the frame **20** to either partially or completely close the screen panel **23**. Under winter weather conditions, the storm panel **22** is placed in the position of the screen panel **23** and the screen panel **23** is stored in the position of the storm panel **22** shown in FIGURE 2.

Because of the construction of the side members **33** and **34** of the frame **20**, wherein the recessed portion **49** provides the groove **50** so that when the storm panels **21** and **22** slide adjacent each other (see FIGURE 5) and because the panels have only a portion thereof engaging the side members represented by the wall member or leg **94** engaging the track **47** and the wall member or leg **94** of panel **22** engaging the track **48**, there will be little or no sticking between the storm panels **21** and **22**.

After the combination window has been in place in a home for a period of time, there sometimes results in a shifting and sagging of the home. This often results in a twisting of the members and as a result a certain amount of force and distortion upon the combination window and framework. In the conventional type window, if there is much displacement of the combination window where the frame engages the panels, excessive sticking will result. Because of the construction of the present invention, only a portion of each panel slides on the side members of the frame, and little, if any, sticking will result. In the event that the screen panel is in the position shown in FIGURE 2 and rainy weather conditions result without a closing of the screen, any water which blows through the screen and into the groove **50** or between the side members or onto the upper surface of the bottom member will find its way to the opening **83** (FIGURE 10) and will form and flow in the groove **81** into the hollow construction of the bottom member **37**. From there it will find its way through the hole **85** down on to the sill **26**. From the sill **26**, the water will flow through slots **86** on down the sill and on to the ground.

In addition to the hereinabove given purpose, the construction of the side members **33** and **34** with the recessed portion **49** forms the groove **50** and also serves to recess the base portion **55** of the retaining springs **53**. If the base portion were not recessed, then it would conflict with and prohibit the movement of the storm and screen panel relative thereto. In effect, the only portion of the spring members which should be out in the same plane as the storm and screen panels are the leaves **56** and **57**.

The method and means of constructing the storm and screen panel so as to secure the pane of glass and screen thereof are also of a novel construction and add to the utility of the hereinafter claimed structure. The use of vinyl plastic for the construction of the major portion of the combination window provides a weatherproof material and also one which will not burn. The combination window construction herein shown is also very economical to manufacture and is exceptional with regard to its strength characteristics.

The openings **86** in the wall **64** may be for the sake of example only, 0.75 inch wide, .625 inch high and .080 inch long. Outside air is admitted through the above described openings **86**, circulates over the end of the sills which are, of course, invariably low and which always retain moisture. After the air passes over this moisture laden surface, it is discharged back into the outside atmosphere by passing between the junction of the combination window frame and the inside of the conventional window framework within which it resides. This constrction reduces the moisture menace to a minimum and also constitutes a condensation barrier.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. In a window frame structure including a side member and a bottom member, said side member having front and back walls interconnected by inner and outer walls to form a closed hollow construction, said inner wall comprising first and second side portions lying generally in the same plane and forming first and second tracks, and a recessed portion recessed toward said outer wall and interconnecting said first and second side portions, said recessed portion forming a groove in said inner wall of said side member, a panel retaining spring member having a base portion and first and second retaining leaves, said base portion residing in said groove, screw

means securing said base portion in said groove with said leaves spaced from said inner wall and adapted to retain panels within said combination window frame, said side member having an end portion mitered at substantially 45 degrees to the extent thereof, said bottom member having front and back walls interconnected by inner and outer walls to form a closed hollow construction, said inner wall of said bottom member having first and second parallel panel retaining projections extending longitudinally thereon, said back wall of said bottom member adapted to engage a sill member, said bottom member having an end portion mitered at substantially 45 degrees to the extent thereof and interfitting with said mitered end portion of said side member to form a 90 degree corner, a corner member having first and second leg portions disposed substantially 90 degrees apart, said first leg portion residing and secured within said hollow construction of said side member, said second leg portion having wall means defining a notched portion which notched portion receives the mitered end of said inner wall of said side member, said second leg portion residing and secured within said hollow construction of said bottom member, said second leg portion having a groove extending across the upper side thereof, said mitered end of said inner wall of said bottom member engaging said first and second tracks and being spaced from the recessed portion to form an opening to provide communication between said goove in said inner wall of said side member and said groove on said upper side of said second leg of said corner member, wall means defining an opening to provide communication from said hollow construction of said bottom member, and wall means defining a slot through said back wall of said bottom member, said slot extending at an acute angle with respect to the extent of said back wall of said bottom member.

2. A window frame structure comprising opposed side members and first and second panel members, said opposed side members having flanges extending therefrom, said first and second panel members being in sliding engagement with each other and each having first and second legs, each said side member having first and second tracks separated by wall means defining a recessed portion, a spring member secured to each side member and each having a base portion and first and second leaves, said base portions residing in said respective recessed portions with said first leaf of each spring member engaging said first legs of said first panel to hold same against said flange, said second leaf of each spring member engaging said first legs of said second panel to hold same against said first panel, said first legs of said first panel member engaging said first tracks of said opposed side members for sliding engagement therewith, said second legs of said first panel member overlying said recessed portion, said first legs of said second panel member overlying said recessed portion, and said second legs of said second panel member engaging said second tracks of said opposed side members for sliding engagement therewith.

3. A window frame structure including a side member and a bottom member, each said side and bottom member comprising front and back walls interconnected by inside and outside walls to define hollow constructions, adjacent ends of said side and bottom members being mitered to interfit with each other, said inside wall of said side member having a recessed portion defining a groove extending lengthwise of said side member, a corner member having first and second leg portions, said first leg portion residing in the hollow construction of said side member and said second leg portion residing in the hollow construction of said bottom member thereby securing said side and bottom members together, said mitered end of said inside wall of said bottom member engaging said mitered end of said inside wall of said side member with said recessed portion being spaced therefrom to define an opening, wall means defining a groove in said second leg portion of said corner member, said groove in said second leg portion connecting with said opening to provide communication between said groove of said side member and said hollow construction of said bottom member, and wall means in said bottom member defining an opening from the hollow construction thereof.

4. A window frame structure including a side member and a bottom member, each said side and bottom member comprising front and back walls interconnected by inside and outside walls to define hollow constructions, adjacent ends of said side and bottom members being mitered to interfit with each other, said inside wall of said side member having a recessed portion defining a groove extending lengthwise of said side member, a corner member having first and second leg portions, said first leg portion residing in the hollow construction of said side member and said second leg portion residing in the hollow construction of said bottom member thereby securing said side and bottom members together, said mitered end of said inside wall of said bottom member engaging said mitered end of said inside wall of said side member with said recessed portion being spaced therefrom to define an opening, wall means defining a groove in said second leg portion of said corner member, said groove in said second leg portion connecting with said opening to provide communication between said groove of said side member and said hollow construction of said bottom member.

5. A window frame and panel structure comprising opposed side members and first and second panel members slidable along their side edges between said opposed side members, said first and second panel members being in face-to-face sliding engagement with each other, each said side member having first and second walls facing the side edges of the panel members and defining first and second tracks with each track having substantially parallel sides and a web, said first and second tracks being separated by wall means which defines a recessed portion with respect to said tracks, said second track having an inwardly facing flange at the outer side thereof, each said panel member including first and second spaced legs extending toward said first and second tracks and each having an end surface defining said side edge, said end surface of said first leg of said first panel member abuttably engaging said web of said first track for sliding engagement therewith and guiding said first panel relative to said opposed side members, said end surface of said second leg of said first panel member overlying said recessed portion, said end surface of said first leg of said second panel member overlying said recessed portion and said end surface of said second leg of said second panel member abuttably engaging both said web and said inwardly facing flange of said second track for sliding engagement therewith and guiding said second panel relative to said opposed side members.

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