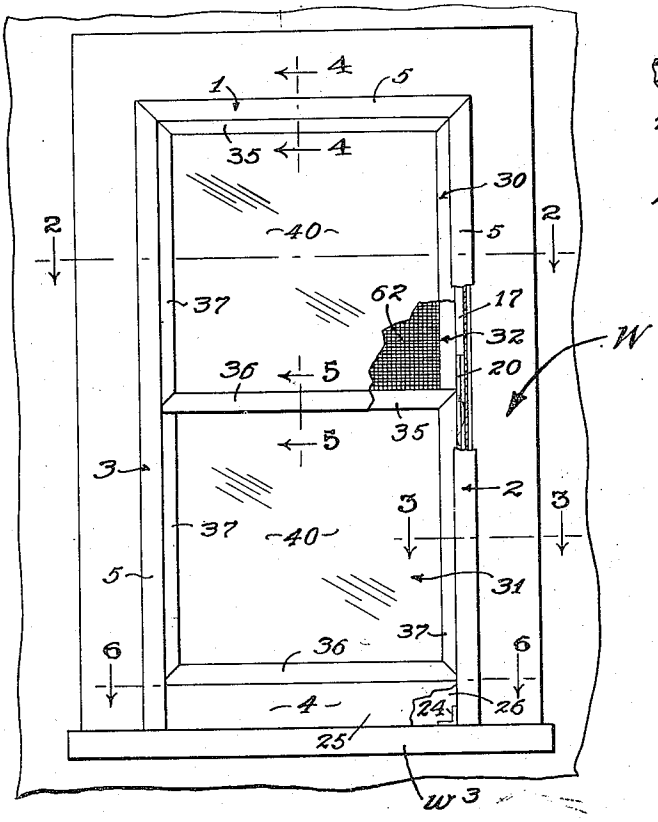
Aug. 5, 1952 L. A. HANSEN 2,605,870

WINDOW CONSTRUCTION

Filed Nov. 27, 1946 2 SHEETS—SHEET 1

FIG. 1



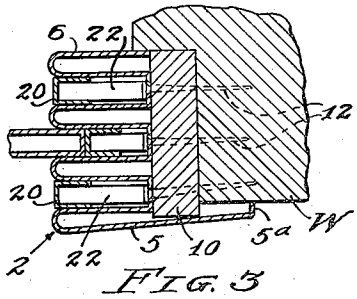


FIG. 3

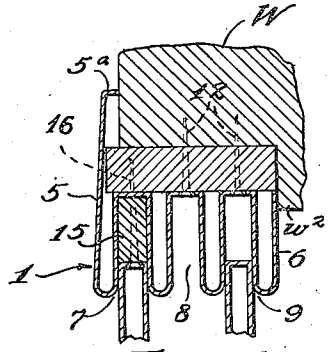


FIG. 4

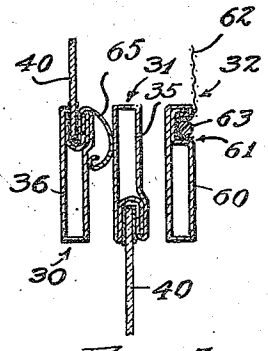


FIG. 5

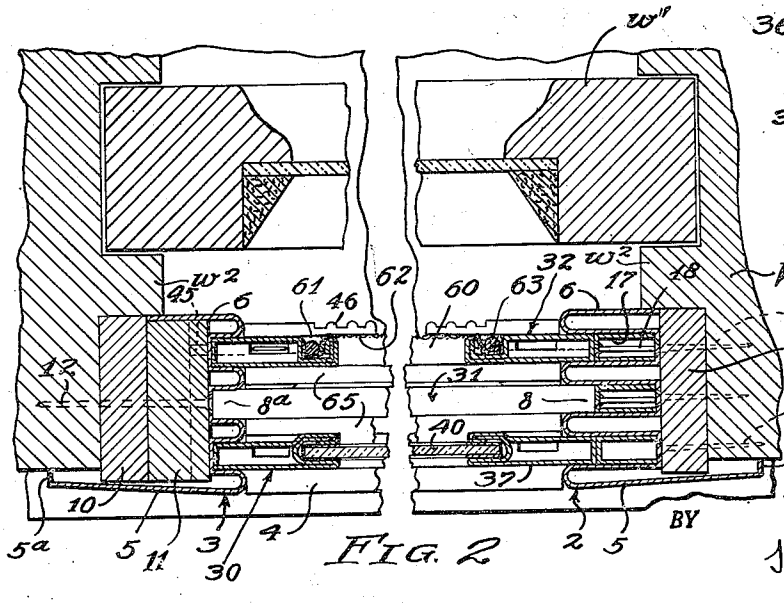


FIG. 2

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WINDOW CONSTRUCTION

Filed Nov. 27, 1946 2 SHEETS—SHEET 2

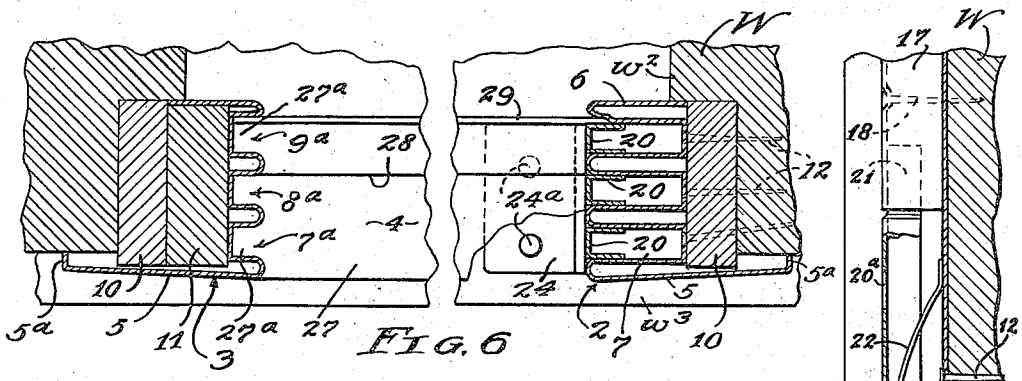


FIG. 6

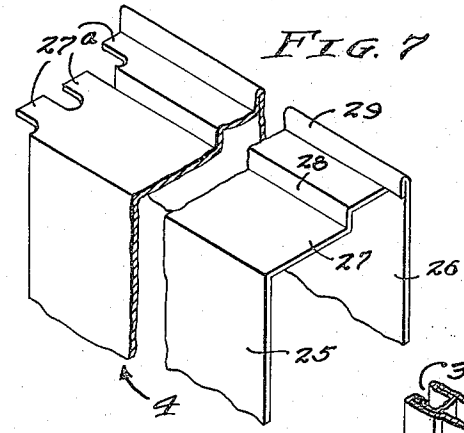


FIG. 7

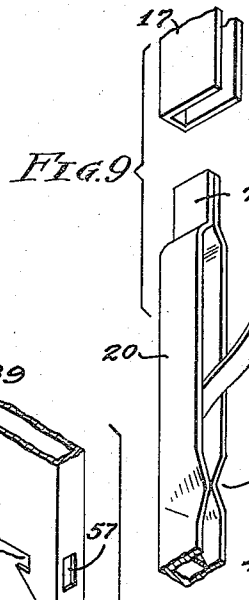


FIG. 9

FIG. 8

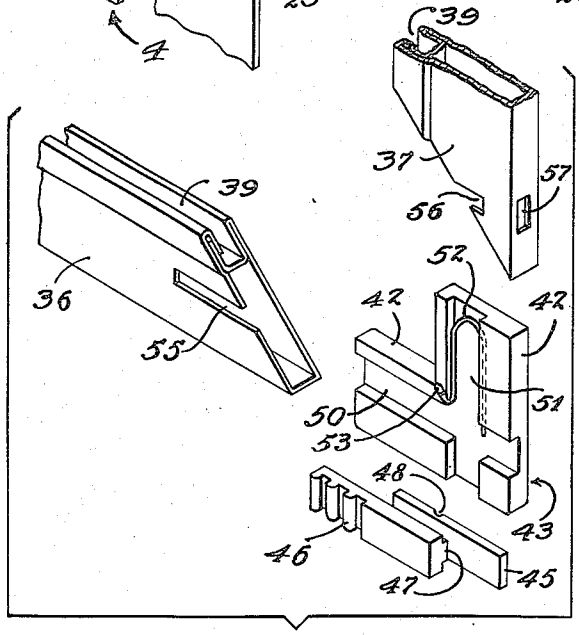


FIG. 12

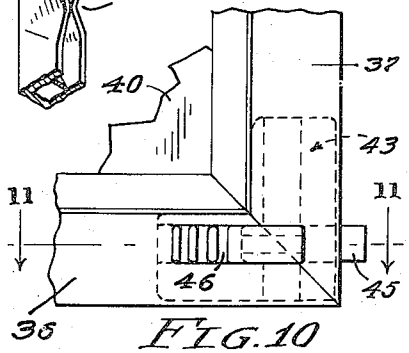


FIG. 10

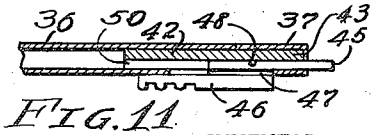


FIG. 11

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UNITED STATES PATENT OFFICE

2,605,870

WINDOW CONSTRUCTION

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Application November 27, 1946, Serial No. 712,676

5 Claims. (Cl. 189—72)

1

This invention relates to window constructions, and more particularly to an improved metal construction for auxiliary or so-called "storm windows" and which preferably includes a screen so that the construction has year round utility.

One of the objects of my invention is to provide an auxiliary window construction in which the frame parts are of such design that they may be readily rolled or formed from sheet metal into strips of appropriate cross section and supplied to the trade, either in pieces cut to length for use with standard size windows, or in long strips from which pieces may be cut for windows of other than standard size. This enables the manufacturer to supply dealers or distributors with all the parts (excepting glass panes and screen) that are required for standard size windows, suitably packaged in compact knock-down condition, to be assembled by the dealers or distributors to include glass panes of the correct size and wire screen of proper area, at the time of making installations in compliance with customers' orders. On the other hand, the dealers or distributors, having the material in stock, may cut pieces of the required length for windows that are not of standard size and then proceed with assembly and installation as in the first instance, the only equipment necessary in such case being a suitable saw. This method of handling avoids shipment of glass with attendant danger of breakage, and saves much space in transportation and storage.

Another object of the invention is to provide an auxiliary window construction that is relatively simple, that is very neat and attractive in appearance, and which is especially convenient of assembly and installation, the members of the window frame requiring no joining together, but being held in proper relation to each other when fitted within and secured to the top and sides of the window in which the frame is to be installed, and which I shall refer to herein as the base window.

Another object of my invention is to provide top and side members for the window frame, each of which is rolled or formed from a single strip of sheet metal into a cross section that affords channels for the sash and an outside flange which overlies the adjacent parts of the base window frame, which flanges yield to differences in dimension of, or irregularities in, different base windows, thereby to facilitate installation and insure a close fitting of the outer edges of said flanges of the frame members against the outer surfaces of the base window frame.

2

A further object of my invention is to provide an auxiliary window construction wherein the sashes are yieldingly retained within the frame for easy sliding movement but firmly enough to avoid rattling and for convenient removal from the frame when occasion requires or when such removal is desirable. By reason of the neat appearance and compact character of my improved auxiliary window construction, the glass and screen sashes may be left in the window frame the year round without objection.

A still further object of my invention is to provide simple and effective means for closing the spaces between adjacent sashes.

Further objects and advantages will become apparent as I proceed to describe the invention in detail by reference to the accompanying drawings wherein like reference characters designate like parts throughout the several views.

In the drawings, Fig. 1 represents a front elevation of my improved auxiliary window construction installed in a base window and as viewed from the outside, with parts broken away; Fig. 2 is a horizontal section on the line 2—2 of Fig. 1 and on a scale greatly enlarged over that of the former view, with the central part of the window broken away; Figs. 3, 4 and 5 are sectional details on the respective lines 3—3, 4—4 and 5—5 of Fig. 1; Fig. 6 is a horizontal section substantially on the line 6—6 of Fig. 1; Fig. 7 is a fragmentary perspective view of the bottom member or sill of the auxiliary window construction; Fig. 8 is a vertical section through the right hand frame member as the parts are viewed in Figs. 1, 2 and 6, showing the lower end of one of the filler strips or channels, and the adjacent end of one of the pressure strips; Fig. 9 is a perspective view showing fragments of the filler and pressure strips disclosed in Fig. 8; Fig. 10 is an inside view of one of the lower corners of a sash equipped with a bolt or slide by which the sash is held at different positions within the frame; Fig. 11 is a sectional detail on the line 11—11 of Fig. 10, with the bolt or slide in elevation, and Fig. 12 is an exploded perspective view of the parts appearing in Figs. 10 and 11.

In the views of the drawing wherein it appears, the base window, so-called, is designated W, the construction being simplified for the present purpose in order to avoid unnecessary confusion of lines. A sash of the base window is shown at w' in Fig. 2.

The top member of my improved auxiliary window construction is designated, generally, by the reference numeral 1; the right hand side member, as the parts are viewed in Figs. 1, 2 and

6, by the reference numeral 2, while 3 denotes the left hand side member, and 4 the bottom member or sill.

The top and side members are identical in cross-section and each is made of a continuous piece of sheet metal, preferably aluminum, and are shaped to provide a relatively wide outer flange 5, an inner flange 6 of about half the width of the flange 5 and intermediate reentrant portions that provide channels, those of the top and side members 1 and 2, respectively, being designated 7, 8 and 9, while those of the side member 3 are designated 7a, 8a and 9a, the latter being considerably less in depth than the channels of the members 1 and 2. The reason for the difference in depth of said channels will be brought out hereinafter. In all other respects, member 3 is the same as members 1 and 2.

Preparatory to installing the frame of the auxiliary window, strips 10 of wood or other suitable material are fitted into the front portion of the opening of the base window W, with the rear edges of said strips engaging the window stops w^2. Now, to proceed with the installation: In the cases of the top member 1 and side member 2, the bases or webs of the reentrant portions that form the aforesaid channels, and the edges of the inner flanges 6, all of which are in the same plane, are engaged with the strips 10, said flanges 6 bearing laterally against the stop w^2. As previously stated, the reentrant portions of the member 3 are much more shallow than those of the members 1 and 2, and in the installation of member 3 the space between the bases or webs of said reentrant portions and the adjacent strip 10 is filled by a strip 11 (Figs. 2 and 6). Therefore, in all cases, said reentrant portions are firmly supported. The frame members, along with said strips 10 and 11, are secured by nails or other suitable fastening means to the underlying portions of the base window W, such fastening means, shown as nails in dotted lines in several of the views, being designated 12.

It will be observed that the outer flanges 5 of frame members 1, 2 and 3 are formed along their edges with inturned lips 5a that bear directly against the front surface of the frame of the base window, and said flanges, being resilient, yield to any irregularities or differences in dimension of various base windows so that in all cases a neat and attractive installation is assured, with the lips 5a pressed firmly against the adjacent surface of the base window frame. As will also be seen, by reference to Fig. 1, the ends of the top frame member and the adjacent ends of the side frame members are mitered and fit closely together when said members are secured as aforesaid within the frame of the base window.

As appears from Fig. 4, the front channel 7 of the top frame member 1 contains a filler strip 15 that is held within the channel by fastening means 16. The reason for omitting fillers from the channels 8 and 9 of the member 1 will become apparent later on. Occupying all channels of the side member 2, from adjacent the top of said member downwardly to a point somewhat above the vertical center of said member, are fillers 17 of channel formation (Figs. 1, 2, 8 and 9) that are held in place by fastening means 18. The webs of the fillers 17 are toward the open sides of said channels. Below these fillers 17 are pressure strips 20, also in the form of channels but of about half the depth of the fillers 17; and, as best appears from Fig. 9, the upper ends of the pressure strips are suitably formed to provide tongues 21 that loosely fit within the lower ends of the channels that constitute the fillers 17. This arrangement is clearly illustrated in Fig. 8. The pressure strips 20 extend from the fillers 17 to the lower end of the member 2 and rest upon the sill w^3 of the base window. A suitable number of bowed leaf springs 22 are attached, about midway of their ends, to said pressure strips, as by having their middle portions confined within the channels of said strips in the manner illustrated in Figs. 8 and 9, where the side flanges of the pressure strip are shown as pinched together at 23. It will be readily understood from the foregoing description that the pressure strips are urged by the springs 22 toward the open sides of the channels 7, 8 and 9 of the frame member 2, and that they are held against undue outward movement at their upper ends by the engagement of the tongues 21 within the lower ends of the channel-like fillers 17. Adjacent the sill w^3 the pressure strips are confined within said channels by a stop 24 (Figs. 1 and 6) which may consist of an angle piece, the base flange of which is secured to the sill w^3 by fastening means 24a.

The final, simple step in the installation of the auxiliary window frame consists in the emplacement of the bottom member or sill 4. This member consists of a relatively deep channel and, as best shown in Fig. 7, it includes front and rear walls 25 and 26, respectively, and a top wall 27. This wall is stepped up from the plane it occupies in the zones of the channels 7, 7a and 8, 8a, to a somewhat higher plane in the zone of the channels 9, 9a thereby to provide a vertical shoulder 28. The member 4 is constructed of suitable sheet metal, preferably aluminum, and where the rear wall joins the top wall, the metal is crimped to provide an upstanding bead 29. The front wall 25 is of a length to fit snugly between the front flanges of the members 2 and 3, while the rear wall and bead 29 are long enough to project into the rear channels 9, 9a, the adjacent walls of said channels being shown as inset to accommodate said rear wall and bead so that the front surface of the bead is substantially flush with the corresponding surfaces of the walls of said channels. It will also be observed (Fig. 6) that the aforesaid shoulder 28 is substantially flush with the rear walls of the channels 8, 8a.

The left hand end of the top wall 27 is notched for the accommodation of the parts of the frame member 3 which separate the channels thereof, leaving tabs 27a that occupy said channels, as clearly appears from Figs. 6 and 7. Accordingly, the left hand end of the member or sill 4 is held firmly against fore-and-aft movement, while the right hand end of said member or sill is held against such movement by the rear walls of the channels 9, 9a and by the stop 24, the rear end of the latter being closely adjacent the rear wall 26 of said member. To sustain the front wall of the member 4 from being sprung inwardly, the stop 24 may be of a length substantially equal to the normal distance between the front and rear walls of said member.

The above described frame is equipped with three sashes, two of which are fitted with panes of glass or other transparent material, and across the third of which is stretched a sheet of screen material. In certain of the appended claims, the term "panel" is used to designate either a pane,

or a sheet of screen material, or in plural to designate both.

The two sashes that carry the panes are of identical construction, the one toward the outside of the window being designated generally by the reference numeral **30**, and the other or intermediate sash by the numeral **31**. **32** denotes, generally, the screen sash. Each of the sashes **30** and **31** is made up of top, bottom and side members **35**, **36** and **37**, respectively. All of these members are identical in cross section, being tubular and formed from aluminum or other suitable material, to the cross section shown in Figs. 2, 5 and 12 so as to provide along their inner edges grooves **39**.

In the fabrication of either of the sashes **30** or **31**, a pane **40** of glass or other transparent material is cut to proper size. The sash members **35**, **36** and **37** are then applied to the four edges of the pane **40** in some such manner as I shall now describe. Starting, for instance, with the sash member **35**, a strip of suitable packing or sealing material is either applied to the edge of the pane or to the walls of the groove **39** of the sash member, and said member is then forced over the edge of the pane with said edge tightly fitting within the groove. Next, one of the branches **42** of an L-shaped fitting **43** (Figs. 10, 11 and 12) is forced into each end of the sash member **35**, with the other branch **42** of said fitting projecting along one of the lateral edges of the pane. Now, the side members **37** are forced over the lateral edges of the pane and, at the same time, moved along said edges so as to project their ends over the remaining branches of the aforesaid fittings **43** until the mitered ends of the side members engage the complementary shaped ends of the top member.

According to the present embodiment of the invention, each lower corner of each sash is equipped with a bolt **45**. As shown in Figs. 10, 11 and 12, the bolt is provided with a finger piece **46** that is connected to said bolt by a neck **47**. Preferably, the bolt, finger piece and neck are integral parts of a unit which may be die cast or otherwise produced, and the bolt **45** has, on its inner side, a groove **48**. The angle fittings **43** are provided with intersecting grooves **50** and **51** that are parallel with the branches **42**. While these grooves are unnecessary in the fittings that are incorporated in the upper corner of the sash, for the sake of economy and to simplify assembly, fittings of the same design are used in all corners. With respect to the fittings that are to be incorporated in the lower corners of the sash, U-shaped wire springs **52** (Fig. 12) are inserted in the vertical slots **51** thereof, one end of the spring being hooked laterally and engaged in a notch **53** of the fitting, while the other end of the spring projects into the horizontal slot **50**. The bolt **45** is next placed within the slot **50** with the last mentioned end of the spring **52** occupying the groove **48** of the bolt. In preparing the members **36** and **37** for incorporation in the sash, slots **55** and **56** are made in their inside walls, and in the horizontal plane of the slot **56** of each side member **37**, an aperture **57** is made in the edge wall of said member for the passage of the bolt **45**.

Proceeding with the assembly of the sash: the two lower angle fittings **43**, equipped with the springs **52** and the bolts **45** as aforesaid, have their horizontal branches pressed into the ends of the sash member **36** with the necks **47** of the bolt units occupying the slots **55**. With the bolts **45** retracted in opposition to the springs **52**, the other branches of the angle fittings are inserted into the end of the adjacent sash member **37** and the sash member **36** is forced over the lower edge of the pane **40** until the mitered ends of the members **36** and **37** meet, whereupon the bolts are released and are projected by the spring **52** through the aperture **57**.

The frame members **60** of the screen sash **32** are formed to the cross section shown in Figs. 2 and 5 to provide a laterally opening groove **61**. A sheet **62** of screen material is stretched across the sash frame and its edge portions are crimped into the grooves **61** and are held therein by forcing into said groove, within the crimped portion of the screen material, rod like retaining elements **63**, which are shown as circular in cross section and they are preferably made of plastic. The frame of the screen sash is assembled in substantially the same manner as the frames of the other sashes, and they incorporate in their lower corners the bolts **45**.

Each sash is inserted into the frame by first engaging one of its lateral edges in the appropriate channel of the side member **2** against the pressure strip **20**. The sash is now thrust laterally so as to compress the springs **22** enough to permit the opposite edge of the sash to be swung into the plane of the corresponding channel of the opposite side member of the frame. Now, by releasing lateral pressure on the sash, it will be forced in a direction to engage its other lateral edge in the channel of the frame member **3**. The sash, thus positioned centrally in the frame, may be slid up and down, its edge adjacent the pressure strip **20** and filler **17** riding smoothly over both. Each sash, however, is adapted to be held in fully elevated position, fully lowered position, or in an intermediate position or positions, by engagement of its bolts **45** within suitably located recesses or slots in the bottom wall of the corresponding channel of the frame member **3**, and in the web of the pressure strip **20** wherewith the sash is engaged. A slot of one of the pressure strips is designated **20a** in Fig. 8.

Normally, in cold weather, the sashes occupy the positions in which they are shown in the drawings, the outer sash **30** and screen sash **32** being in fully elevated position and the intermediate sash **31** in lowered or closed position. In such position, the lower rear edge portion of the sash **31** bears against the shoulder **28** of the bottom member or sill **4**, so as to effectively close the joint between said sash and sill, and in order to close the spaces between the lower edge of the outer sash **30** and the top of the intermediate sash **31**, when the sashes are in the positions aforesaid, a resilient sealing strip **65** is provided. This strip is preferably made of very thin resilient rust-proof metal. It is formed to the cross section shown in Fig. 5, and is interlocked, with the adjacent edge portion of the pane **40**, within the groove of the member **36** of sash **30**. A similar sealing strip is attached to the inner side of the member **36** of sash **31** so as to close the space between said member and the top member of the screen sash **32** when, as during the summer, the intermediate sash **31** is up and the screen sash is down.

For ventilating purposes, either the intermediate sash **31** may be raised, or the outer sash may be lowered, and held in fully open or partially opened position by the engagement of the bolts **45** with the appropriate ones of the aforesaid slots or recesses. When it is desired to use the screen, both of the sashes **30** and **31** are left

in elevated position, as above explained, and the screen sash is lowered. If, for any reason, it should prove objectionable to leave the screen sash in the window frame during the winter, it may be readily disengaged from the frame in the manner already described, and stored until it is again needed.

The reason for omitting a filler, such as **15** (Fig. 4), from each of the channels **8** and **9** of the top frame member **1**, is to allow the screen sash **32** to be elevated enough to afford convenient access to the finger pieces of the bolts **45** of the intermediate sash **31**, when the latter is up, and, likewise, to permit the intermediate sash to be lifted out of the way of the bolt actuating finger pieces of the outer sash **30** when it is fully elevated.

Having thus described my invention, what I claim is:

1. In an auxiliary window construction, a frame for placement in a base window, said base window including stops spaced rearwardly from the plane of its front surface, each side member of said frame consisting of a one-piece resilient sheet metal unit including an inner flange for engagement with the front face of said stops, a relatively wider imperforate outer flange arranged to overlie said front surface, and reentrant portions between said flanges providing sash receiving channels, said flanges being initially spaced apart a distance less than the spacing of the front face of said stop from the front surface of the base window whereby the outer flange is placed under tension when the member is installed in the base window, fastening means having heads disposed within said sash receiving channels, said fastening means being adapted to project outwardly into the part of the base window forwardly of said stop, strips for insertion between said part of the base window and the opposed parts of the side members, and through which said fastening means extends, and sashes between said members with their lateral edges slidable in said channels.

2. In a window construction, a frame wherein each side member is provided with sash receiving channels, those of one member being considerably deeper than those of the other member, sashes disposed between said members with their lateral edges slidable in the channels of the opposed members, the sashes extending the full depth of the shallow channels and a corresponding distance into the deeper channels, fillers occupying the spaces between the bottoms of the deeper channels and the adjacent edges of the sashes and being of a length not to exceed the vertical dimension of the sashes, one end of each filler being adjacent an end of the corresponding frame member, pressure strips of less depth than the fillers extending from the ends of the fillers to the opposite end of said corresponding frame member, spring means interposed between the pressure strips and the bottoms of the channels for urging the pressure strips against the sashes, the adjacent ends of the pressure strip and filler having, on the one hand, a recess, and on the other, a tongue projecting into said recess, and stop means adjacent the opposite ends of the pressure strips for retaining said strips within the channels.

3. In a window construction, a frame wherein each side member consists of a metal unit having sash receiving channels, the channels of one member being considerably deeper than those of the other member, sashes disposed between said members with their lateral edges slidable in said channels, the sashes extending into the shallow channels the full depth of the latter and into the deeper channels a corresponding distance, fillers of a length not exceeding the vertical dimension of the sash occupying the space between the bottom of each deep channel and the adjacent edge of the sash, said fillers being U-shaped in cross section and arranged with their open sides toward the bottoms of the channels, one end of each filler being adjacent an end of the corresponding frame member, pressure strips extending from the fillers to the other end of said corresponding frame member, each pressure strip being U-shaped in cross-section and of substantially less depth than the filler and contracted at its end adjacent the corresponding filler to provide a tongue which projects into the filler, stop means adjacent said other end of the corresponding frame member for retaining the pressure strips within the channels, and spring means interposed between the pressure strips and the bottoms of the channels for urging the pressure strips against the adjacent edges of the sashes.

4. In a window construction, a frame including opposed side members each having sash receiving channels, the channels of one member being considerably deeper than those of the other member, sheet metal pressure strips slidable in the deeper channels, said pressure strips being U-shaped in cross section and arranged with their open sides toward the bottoms of the channels, springs tending to force the pressure strips toward the open sides of the channels, said springs consisting of elongated narrow pieces of resilient metal bowed from end to end and interposed between the bottoms of the channels and the opposed walls of the pressure strips, said springs being held in position by inwardly displaced portions of the sides of said strips, stop means retaining the pressure strips within the channels, and sashes supported by and between the opposed members of the frame with their lateral edges slidable in said channels and with the pressure strips bearing against the edges of the sashes.

5. A window construction as defined by claim 4, wherein the middle portions of the springs are contiguous to the closed sides of the U-shaped pressure strips and are held in position by inturned parts of the sides of said strips.

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