

Jan. 23, 1940.

P. H. KUYPER

2,188,050

WINDOW STRUCTURE

Filed Oct. 15, 1936

4 Sheets-Sheet 1

Fig. 1.

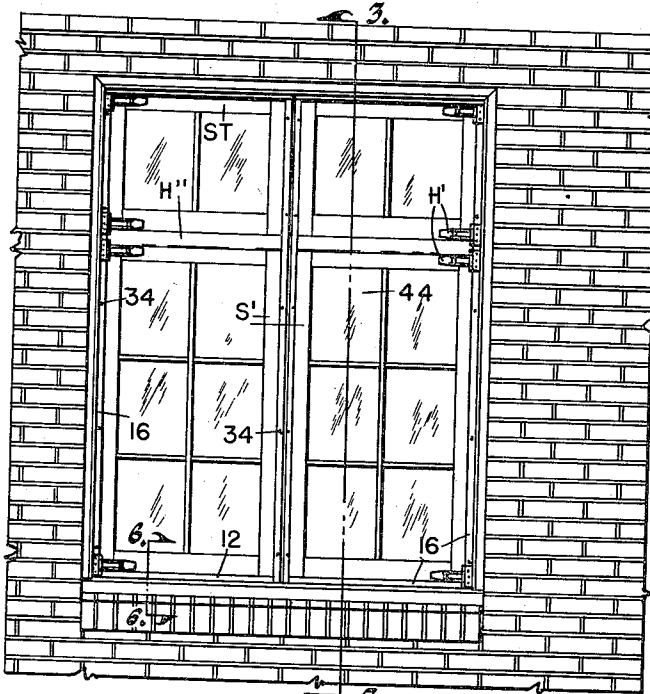


Fig. 12.

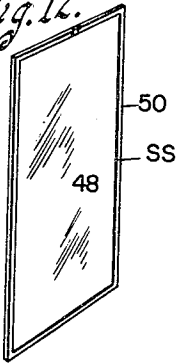


Fig. 13.

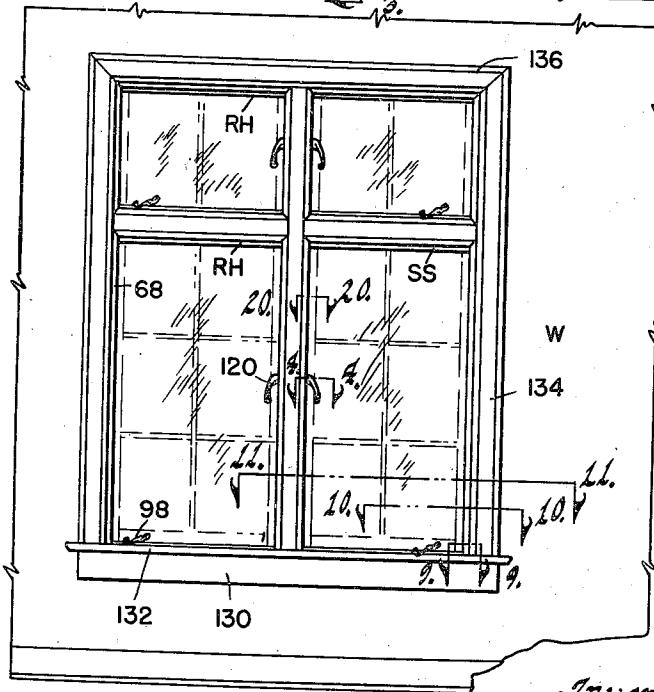
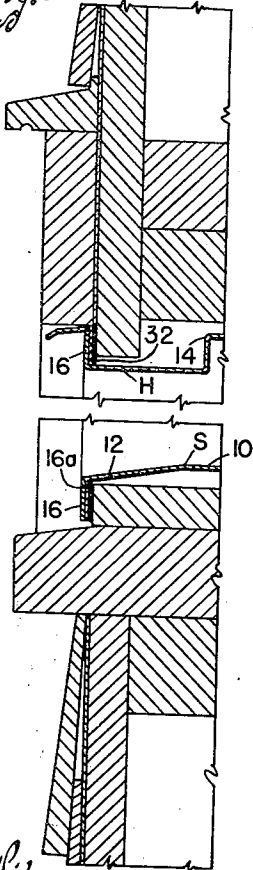


Fig. 2.

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4 Sheets-Sheet 2

Fig. 3.

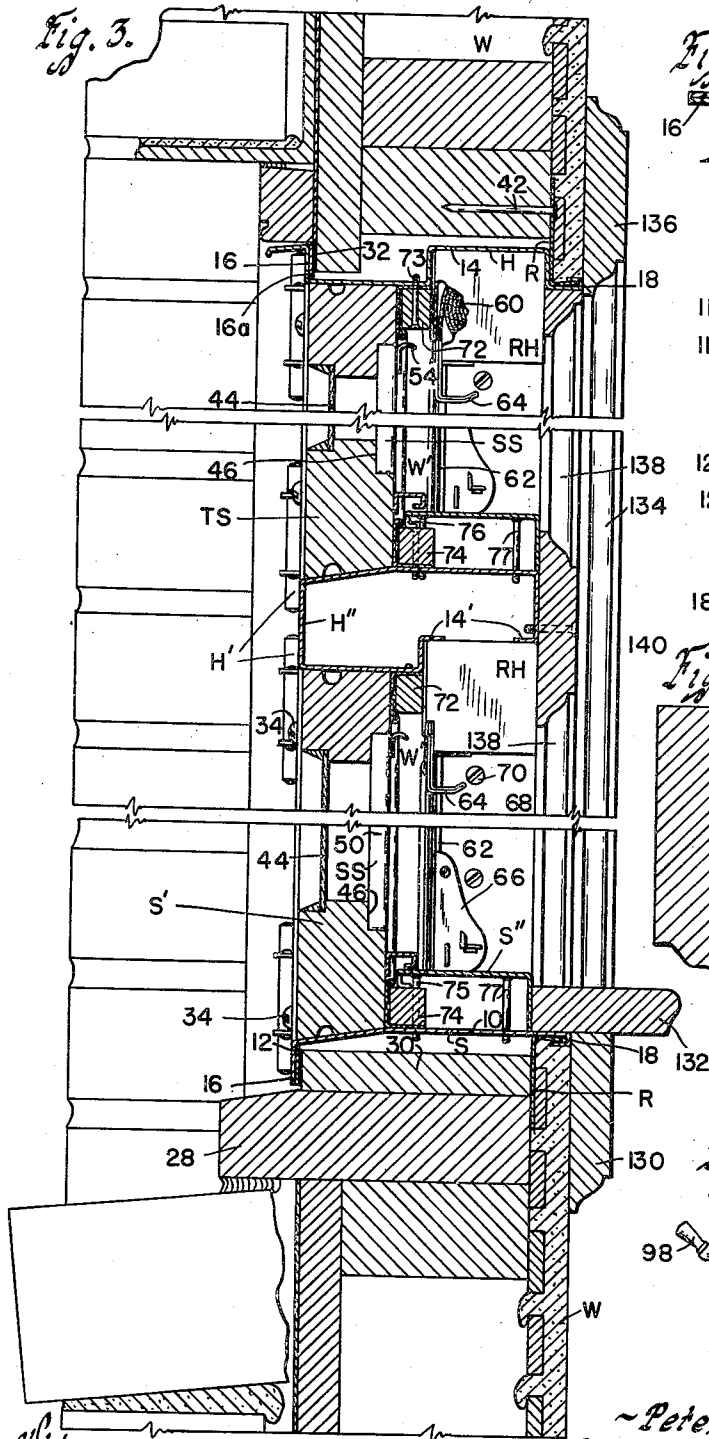


Fig. 4.

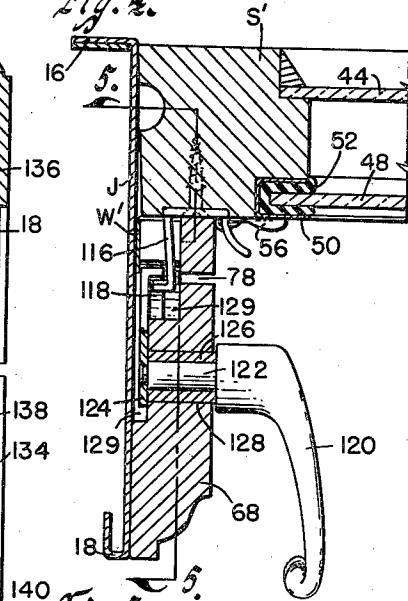


Fig. 5.

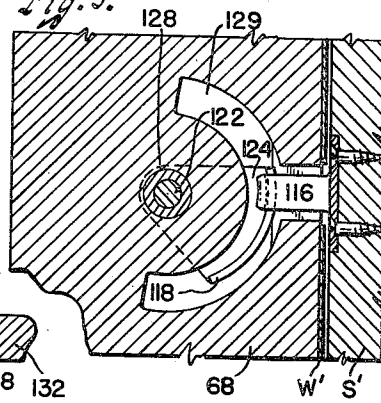
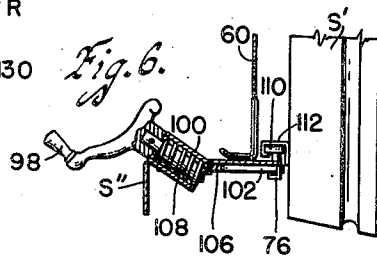


Fig. 6.



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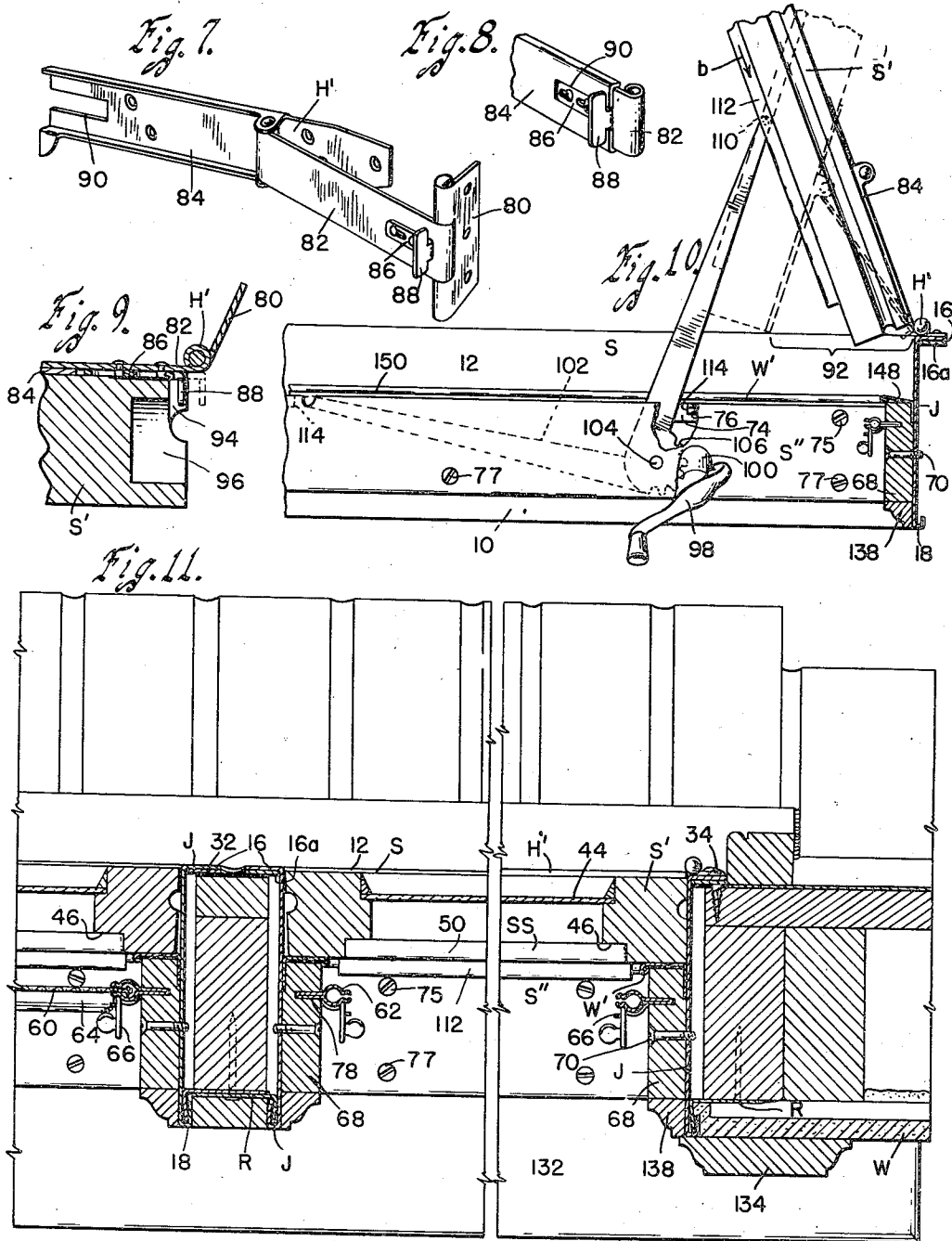
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WINDOW STRUCTURE

Filed Oct. 15, 1936

4 Sheets-Sheet 3



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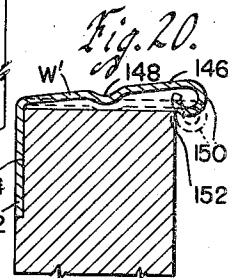
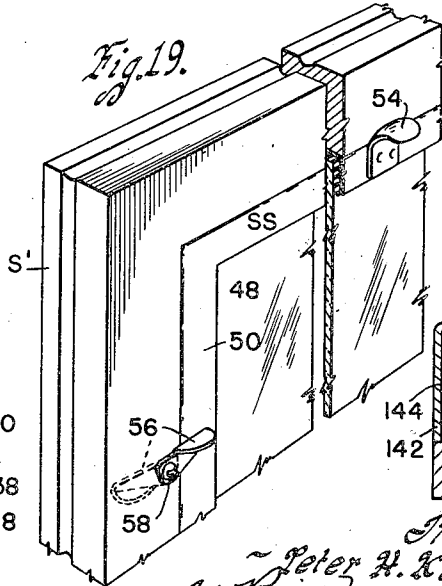
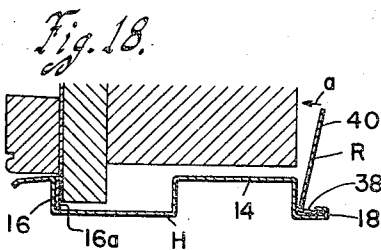
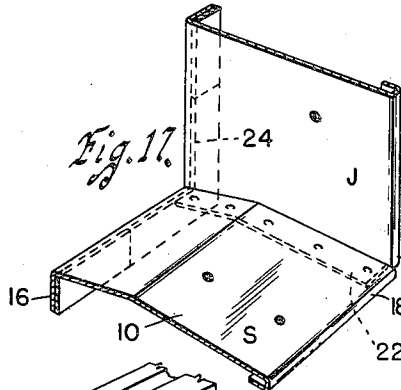
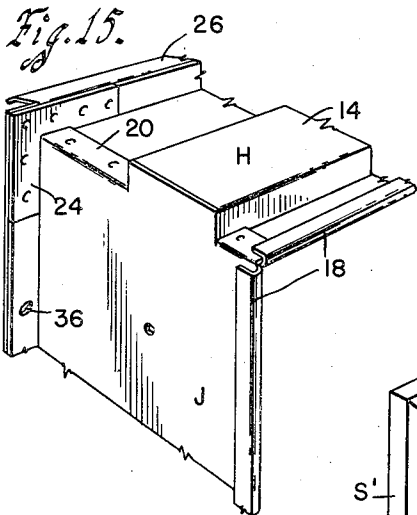
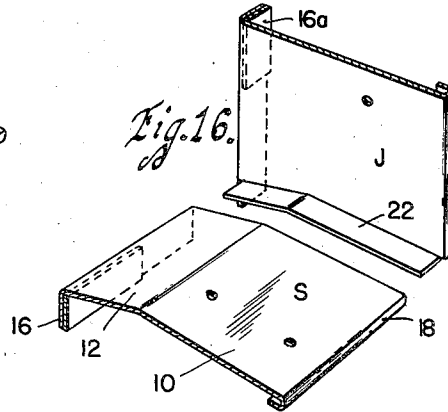
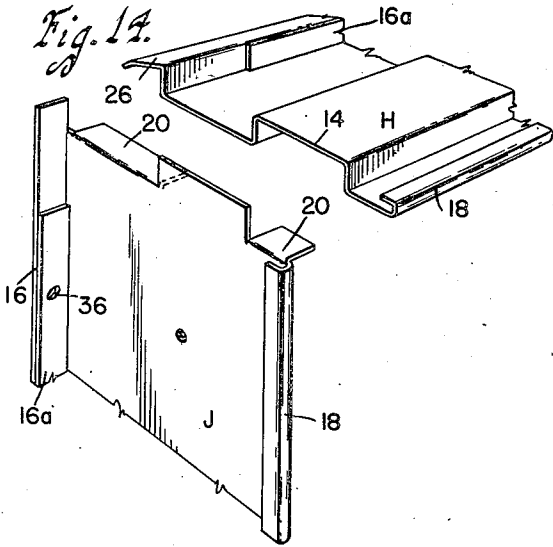
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2,188,050

WINDOW STRUCTURE

Filed Oct. 15, 1936

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,188,050

WINDOW STRUCTURE

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screen Company, Pella, Iowa, a corporation of
Iowa

Application October 15, 1936, Serial No. 105,687

5 Claims. (Cl. 189—75)

An object of my present invention is to provide a window structure having a number of improved features, the window being durable and inexpensive from a manufacturing and installation standpoint.

A further object is to provide a window including a sheet metal window frame and wood sashes, whereby trouble experienced because of the shrinkage and swelling of the ordinary wood frames combined with wood sashes is reduced, and yet a substantially weather-tight window is produced in the form of a unit which can be readily made in its entirety and assembled at the factory.

Still a further object is to provide a sheet metal window frame having an outer flange for contact with the outer surface of a wall surrounding a window opening in the wall, and having an inner flange between which and the inner surface of the wall, retainer elements are interposed, thereby rigidly assembling the window frame relative to the wall.

Still a further object is to provide in combination with a sheet metal unitary window frame, wood sashes which are provided with storm sashes supported on and carried by the wood sashes, whereby the wood sashes may be opened when desired without the necessity of additionally opening the storm sashes.

Still another object is to provide a window structure particularly adapted for roll screens, the sashes of the window structure being hinged, and means being provided for opening and closing the sashes and retaining them in the desired position, such means being operable inside the roll screen so that the roll screen does not have to be rolled up in order to operate the window.

Still another object is to provide a latching means for the sash which is operable inside the roll screen.

Still another object is to provide hinging means for the window sashes which is operable to permit easy cleaning thereof.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is an outside elevation of a window structure embodying my invention and showing it mounted in a brick wall.

Figure 2 is a side elevation of the same.

Figure 3 is an enlarged vertical sectional view on the line 3—3 of Figure 1, parts being broken away and removed to conserve space on the drawings.

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 2 illustrating the sash latch.

Figure 5 is a sectional view on the line 5—5 of Figure 4 showing further details of the sash latch.

Figure 6 is an enlarged sectional view on the line 6—6 of Figure 1, showing a sash operator.

Figure 7 is a perspective view of an articulated hinge designed for easy cleaning of the sash showing it in the open position.

Figure 8 is a similar perspective view of a portion of Figure 7 showing the hinge in the closed position.

Figure 9 is an enlarged sectional view on the line 9—9 of Figure 2 showing the connection of the hinge to the window sash.

Figure 10 is an enlarged sectional view on the line 10—10 of Figure 2 showing details of the sash operator, the sash being shown in plan view.

Figure 11 is an enlarged sectional view on the line 11—11 of Figure 2 showing a horizontal sectional view through the window structure.

Figure 12 is a perspective view of a storm sash used in connection with my window structure.

Figure 13 is a vertical sectional view similar to a portion of Figure 3 showing the window structure associated with the wall of a frame building.

Figure 14 is a perspective view of an upper corner of a window frame showing the parts before assembly.

Figure 15 is a similar view showing them after assembly.

Figure 16 is a perspective view of a lower corner of the window frame showing the parts before assembly.

Figure 17 is a similar view showing them after assembly.

Figure 18 is a sectional view through the head of the window frame showing a retainer strip being positioned for retaining the window frame in position.

Figure 19 is a perspective view illustrating the coaction of a storm sash with a window sash of my invention; and

Figure 20 is an enlarged sectional view on the line 20—20 of Figure 2 showing details of a weather strip used in connection with my invention.

On the accompanying drawings my window

frame comprises in general a sill member S, side jamb members J and a head jamb member H. The sill S in cross section has a level portion 10 and a sloping portion 12. The head member H has a downwardly opening or upwardly depressed portion 14.

All four of the members S, J, J and H are provided with outer flanges 16 and inner hooked flanges 18. The flanges 16 are preferably reinforced by strips 18a spot welded or otherwise suitably secured to the flanges 16.

As illustrated in Figures 14 and 16, the upper and lower ends of the side jamb members J are provided with flanges 20 and 22. These are adapted to overlap the ends of the members H and S as shown in Figures 15 and 17, and to be spot welded thereto, whereby a unitary frame of stamped sheet metal is provided after the parts are thus assembled together.

The strips 18a are somewhat shorter than the flanges 16 and this is for the purpose of permitting the use of angle members 24 to connect the flanges 16 of the four frame members together. The member H is also provided with a drip flange 26 to prevent the entrance of water behind the upper flange 16 at the head of the window frame.

The window frame thus far described is adapted for mounting in the window opening in a wall W as illustrated in Figure 3. The window opening is made of the proper size and fitted with a wood sill 28 having a sill block 30 mounted on top thereof, the outer edge of which is coincident with the outer face of the wall W.

The window frame is inserted into the window opening with the flanges 16 against that portion of the wall immediately surrounding the window opening, mastic or other sealing agent 32 shown by black shading being used to provide a watertight joint. The flanges 16 are then secured in position by fastening elements such as screws 34 extending through openings 36 in the flanges and into the wall and the sill block 30.

After the window frame is thus mounted, retainer strips R are utilized to more rigidly retain the frame in position, and especially the inner edge in position relative to the inner surface of the wall W. The retainer strips R are angle shaped in cross section and have flanges 38 and 40. The flanges 38 are adapted to be received in the hooked flanges 18, as shown in Figure 18, and then the flanges 40 are swung in the direction of the arrow *a* to a position against the inner surface of the wall and secured thereto as by nails 42 (see Figure 3). One retainer strip R may be used for each flange 18 if desirable. The inner surfaces or backs of the flanges 18 serve as a plaster ground, this flange, of course, extending around the four sides of the window frame.

In association with my window frame I provide wood sashes S' comprising the usual rails, stiles and glass panes 44 puttied in position. In addition to this ordinary construction, however, I rabbet the rails and stiles as indicated at 46 to receive a storm sash SS.

The storm sash comprises preferably a single pane of glass 48 and a sheet metal frame 50. As shown in Figure 4 a liner of rubber or the like 52 is interposed between the peripheral edge of the pane 48 and the metal frame 50. The storm sash SS has a finger clip 54 at its upper edge for convenience in supporting it while placing it in position relative to the sash S' or removing it therefrom.

For retaining the storm sash SS in position, I

provide retainer buttons 56 which are pivoted to the sash S' as by screws 58 and may be swung to positions either overlapping or out of alignment with the storm sash frame 50, as shown by full and dotted lines respectively in Figure 19.

By the combination of a sheet metal frame and a wood sash I obtain all the advantages of a wood sash but eliminate the disadvantage of a wood frame combined therewith, and which disadvantage consists of binding of the parts due to swelling of both the frame and the sash. Metal, of course, does not swell and accordingly would retain the same dimensions whether the atmosphere is wet or dry, and therefore only the swelling of the sash has to be contended with. This materially reduces the trouble experienced by the swelling of wood.

I have also made provisions for the mounting of a roll screen housing RH by providing the recess 14 in the head jamb member H. The screen is illustrated at 60 and the guides for the edges thereof at 62. A binder bar 64 is secured to the lower edge of the screen 60 and is adapted to be pulled down to a position contacting with an auxiliary sill member S'', as shown in Figure 6. Latches 66 are provided for latching the binder bar in this position.

The roll screen housing RH is retained in position by side jamb liners 68 extending from the upper surface of the sill 10 to the under surface of the housing RH. The side jamb liners 68 are retained in position as by screws 70 and serve as side stops for the sash S' as shown in Figures 4 and 11. A head stop and a sill stop are provided at 72 and 74 which may be strips of wood retained in position by machine screws 73 and 75 as illustrated in Figure 3.

The auxiliary sill S'' is also formed of sheet metal and is of angle shape. It has a hooked flange 76 contacting with the sill stop 74 whereby to provide a hollow sill to receive the operating mechanism for the sash, as will hereinafter appear. The auxiliary sill S'' is retained in position by the machine screws 75 and additional screws 77. The auxiliary sill S'' extends from the inner face of one jamb liner 68 to the inner face of the other. The jamb liners 68 are provided with grooves 78 to receive the screen edge guides 62.

Each sash S' is hinged to one of the side jamb members J, as illustrated in Figure 10. The hinge is referred to generally by the reference character H'. The hinge H' is of special design to permit easy cleaning of the sash. It comprises a first leaf 80 to which is pivoted a second leaf 82. A third leaf 84 is pivoted to the second leaf 82. The leaves 80 and 84 are connected with the flange 16 of the side jamb member J and the upper or lower rail of the sash S' respectively. The leaves 82 and 84 are normally latched together by a sliding latch 86 having an enlarged head 88 normally assuming a position in front of the end of the leaf 84 having a slot 90 therein as shown in Figure 8. When the latch 86 is slid toward the right from the position of Figure 8 to the position of Figure 7, the enlarged head 88 clears the slotted end of the leaf 84, so that the leaves 82 and 84 can be swung apart as in Figure 7.

In Figure 10, the hinge (in its closed position of Figure 8) is illustrated by full lines, and in its open position for easy cleaning of the sash by dotted lines, the open position of Figure 7 being in excess of the one shown by dotted lines in Figure 10.

When the hinge is opened as in Figure 10 a space indicated at 92 is provided through which a person's arm can be thrust for cleaning the outer surfaces of the sash panes 44.

5 In Figure 9 the latched and unlatched positions of the latch 86 are illustrated, and it will be noted that when latched, the head 88 enters a pocket 94 in the sash so as not to interfere with the jamb member J when the sash is swung to closed position. A deeper recess 96 is provided for the convenience of the operator in engaging the head 86 with his finger when unlatching the latch. Incidentally if the latch is left in the dotted position when the sash is closed, it will engage the jamb and be thereby moved to its latched position.

For opening the sash S' without the necessity of raising the screen 60 I provide an operator comprising a crank 98 journaled in a hub 100 of the auxiliary sill S', and an actuating lever 102. The lever 102 is pivoted at 104 and is provided with worm gear teeth 106. The crank is connected to a worm gear 108 meshing with the teeth 106. The arm 102 is mounted in the hollow space between the sills S and S', as shown in Figure 6, and has on its outer end a roller 110.

The roller 110 is adapted to travel longitudinally in a formed channel guide 112 attached to the lower rail of the sash S'. As shown in Figure 10, when the lever 102 is swung from the dotted position to the full line position, the roller 110 will travel in the direction of the arrow b along the channel track 112 to the full line position where the window is opened. The hooked flange 76 of the auxiliary sill S' is cut away to accommodate the sweep of the arm 102, the terminal ends of this flange being illustrated at 114 in Figure 10.

In order to hold the sash in a tightly closed position, it is necessary to provide a sash latch in addition to the sash operator just described. The details of this latch are illustrated in Figures 4 and 5. The sash has a hook 116 secured thereto with which a cam flange 118 of a latch lever 120 is coactable. In Figure 4 the parts are shown in engaged but not tightened position. Counter-clockwise movement of the cam in Figure 5 will pull the hook 116, and in turn pull the sash S' tightly against the jamb stop 68.

The handle 120 has a stub shaft 122 with which a sector portion 124 of the cam 118 is connected. The stub shaft 122 extends rotatably through a bushing 126 fitted in a bore 128 of the sash stop 68. The back of the sash stop is rabbeted as indicated at 129, the rabbet being of suitable shape to accommodate the hook 116, the cam 118 and the disk 124. Where the mounting flange of the screen edge guide 62 extends past the hook 116, it may be notched to avoid interference with the hook.

60 After the window frame is placed in position and the plastering finished, the window may be trimmed in the usual manner, as for instance by applying an apron 130, stool 132, side casings 134, head casing 136 and finishing mouldings 138 and 65 140.

Where a transom type window, as illustrated in Figure 3, is provided, an intermediate head jamb H' is provided, this being of somewhat different shape than the head jamb H and serving the purpose of both a head jamb for the sash S' and a sill for the transom sash TS. The recess for the roll screen housing RH is in the form of a pair of flanges 14' extending toward each other.

75 Where a mullion type window construction is

encountered, two of my window frames side by side are used as illustrated in Figure 11.

Due to the window frame being made of sheet metal, it is possible to use a very narrow trim on the window, which has been the modern trend.

My window structure is also readily adaptable to the use of weather stripping. I provide a weather strip W' preferably having the cross section illustrated in Figure 20. An attaching flange 142' is adapted to fit in a rabbet 144 of the side jamb liners 68, while another flange 146 of the weather strip W' is provided with a central bead 148 and an edge bead 150. The central bead 148 is adapted to contact with the outer face of the liner or stop 68 when the window is closed, as shown by dotted lines, while the bead 150 is slightly contracted after passing over the corner 152 of the stop 68. The weather strip W' similarly coacts with the stop strips 72 and 74 at the head and sill of the window.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a window structure, a sheet metal frame comprising a sill, side jambs and a head jamb each having an outwardly extending flange for engagement with that portion of the outer surface of a wall surrounding a window opening in the wall, the inner edge of said frame having hooked flanges located inward relative to the wall and opening toward the wall, angle shaped retainer strips each having one flange engaging the bottoms of said hooked flanges, said retainer strips each having its other flange overlapping the inner surface of that portion of the wall surrounding said window opening and means for securing said overlapping flanges thereof to said wall.

2. In a window structure, a window frame formed of sheet metal and having a peripheral outwardly extending flange for engagement with that portion of the outer surface of a wall surrounding a window opening in the wall, the inner edge of said frame having hooked flanges located inward of the wall and opening toward it and retainer strips each having one edge engaging the bottoms of said hooked flanges and being secured to the wall for retaining the peripheral flange of said frame in engagement with the outer surface of the wall.

3. In a window structure, a sheet metal frame comprising a sill, side jambs and a head jamb each having at one edge an outwardly extending flange for engagement with that portion of one surface of a wall surrounding a window opening in the wall, the other edge of said frame having flanges, retainer strips each constructed and arranged relative to said last flanges to permit adjusting movement of said sill, side jambs and head jamb to a level and square position with relation to the window opening, said retainer strips overlapping the other surface of that portion of the wall surrounding said window opening and means for securing the overlapping portions thereof to said wall to retain the retainer strips and thereby the sill, side jambs and head jamb in fixed position relative to the wall and the window opening therein.

4. In a window structure, a frame comprising a sill member, side jamb members and a head

jamb member, each of said members having at one edge thereof a stop shoulder for surface engagement with that portion of one surface of a wall surrounding a window opening in the wall, the other edge of each of said members having an integral hooked flange at substantially right angles to the plane of the wall of external diameter less than the window opening in the wall and retainer elements received in said hooked flanges and having portions in contact with the other surface of that portion of the wall surrounding said window opening, said portions of said retainers being shiftable relative to said other surface of said wall to effect proper leveling of the window structure relative to the wall, and means for securing said portions of said retainers to the wall to retain the window structure fixed relative thereto.

5. In a window frame, a sheet metal frame element for lining a window opening, one edge of said element having an outwardly extending flange for engaging one surface of a wall adjacent a window opening, the other edge of said frame element being of smaller diameter than the window opening and having a hooked flange at substantially right angles to the plane of the wall and a retainer element having one edge arranged to coact in said hooked flange to permit adjusting movement of the hooked flange and thereby the window frame in the plane of the wall, said retainer element having its other edge lying against the other surface of said wall adjacent said window opening, and means for securing it thereto.

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