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2,771,971

METAL WINDOW ASSEMBLY

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3 Sheets-Sheet 2

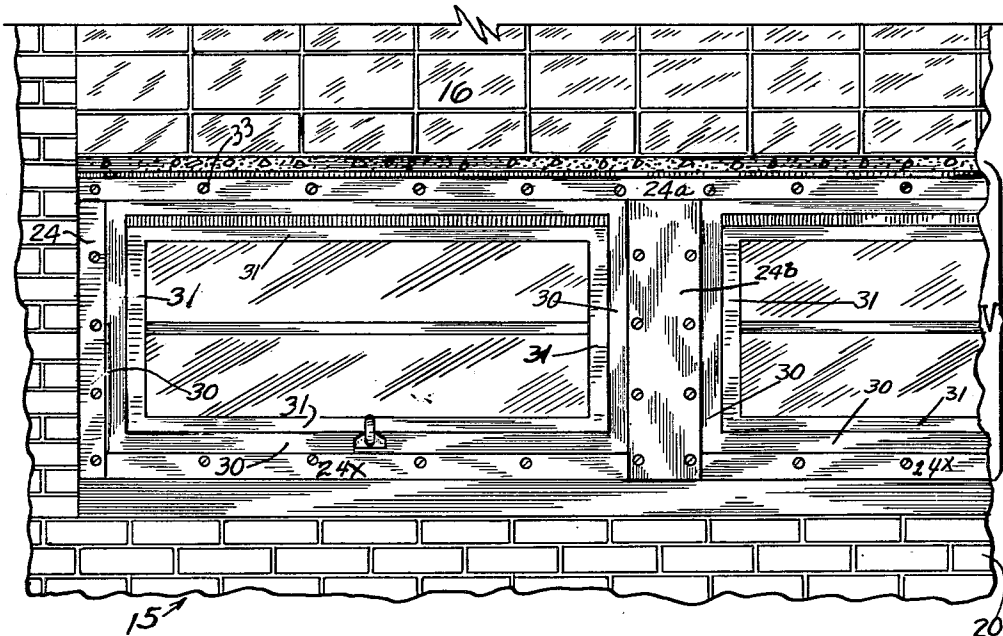
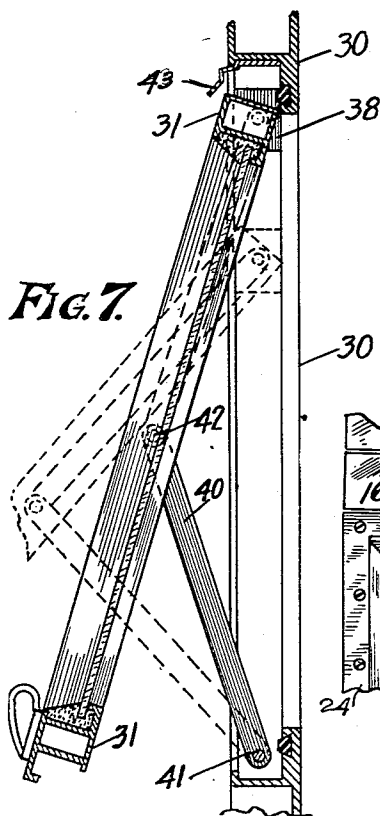
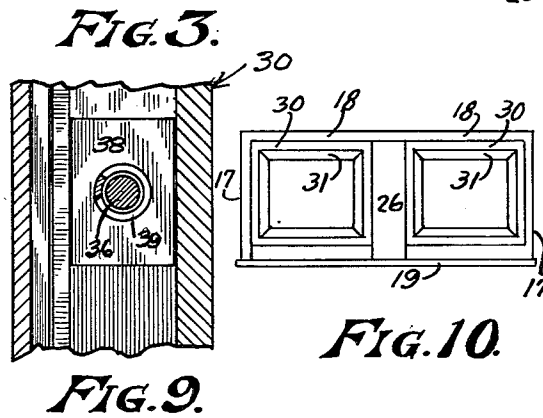
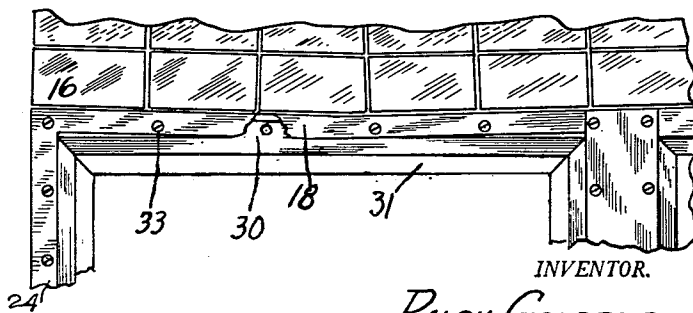


FIG. 8.

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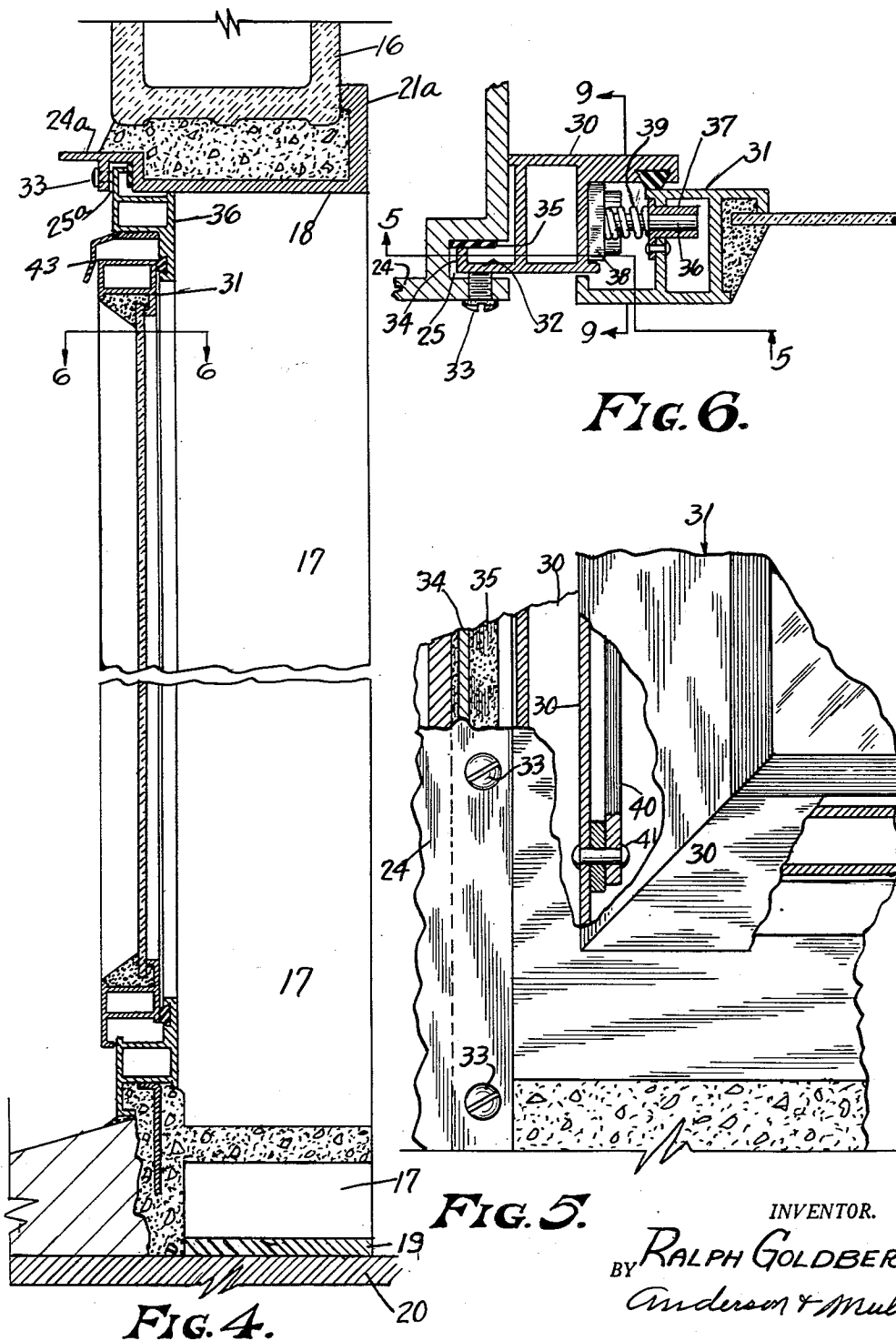


FIG. 6.

FIG. 5.

FIG. 4.

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METAL WINDOW ASSEMBLY

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2 Claims. (Cl. 189—75)

This invention relates to improvements in metal window frame assemblies and the structural members from which they are constructed.

At present metal window frames and sash are widely used in public and private buildings.

Public buildings such as school buildings and many private buildings have adopted a construction of window in which the light transmitting portion is formed from glass blocks built into the wall and which therefore is stationary. Beneath the light transmitting glass blocks, section, ventilators are provided which comprise a window frame in which are positioned assemblies consisting of frames with which are connected window sash, so constructed and associated therewith, that they may readily be opened and closed for ventilating purposes.

Windows of the type to which this invention more particularly relates are usually wide and comparatively narrow, in many instances the entire window assembly has a length of twenty four feet.

Since the light transmitting portion consists of heavy glass blocks it is obvious that much weight must be supported on the lintel and that the construction must be such that it will support this weight without excessive distortion. Windows of this type, as now designed and constructed, are difficult to install and are frequently made practically inoperative for ventilating purposes when the lintel bends under the weight of the glass blocks supported thereby.

It is an object of this invention to produce a metal window construction of such design that it may be assembled complete at the factory and then positioned in the wall opening, thereby greatly reducing the expense and labor connected with the installation.

Another object of this invention is to produce a window assembly of such construction that if the lintel or head of the outer frame on which the glass blocks are supported, does flex slightly between the mullions or jambs, this will not distort the lintel of the frame with which the window sash are connected.

A further object is to produce a structural shape for the lintel and jambs or mullions of the outer frame which will facilitate assembly and adjustment and which at the same time makes it possible to produce an air tight seal between such outer frame members and the window frame with which the window sash are directly connected.

The above and other objects that may become apparent as the description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail, for which purpose reference will now be had to the accompanying drawings in which the invention has been illustrated and in which:

Figure 1 is a horizontal section taken on line 1—1, Figure 2, and shows the construction of the jambs of the outer frame, and the mullions, showing also the structural shapes employed in connection with the window frame proper and the window sash;

Figure 2 is a front elevation of the window, the view being broken to indicate that the size of the window is reduced with respect to the sizes of the structural members, the latter having been shown to substantially half scale;

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Figure 3 is a front elevation of a portion of a window constructed in accordance with this invention;

Figure 4 is a vertical section taken on lines 4—4, Figures 1 and 2;

Figure 5 is a front elevational view of the lower left hand corner of the window, parts being broken away along a line corresponding to line 5—5, Figure 6 to better disclose the construction;

Figure 6 is a section taken on line 6—6, Figure 4;

Figure 7 is a diagrammatic vertical sectional view of one of the ventilating windows showing the sash in one partially open position by full lines and in another position by broken lines;

Figure 8 is a fragmentary front elevational view showing the lintel of the main frame bent downwardly by the weight of the glass blocks, the flexure being greatly exaggerated;

Figure 9 is a section taken on line 9—9, Figure 6, and

Figure 10 is a front elevational view of a two unit ventilating window showing the relationship of the parts that are assembled at the factory.

Referring now to the drawings reference numeral 15 designates a wall, shown as brick, having a window comprising a lower ventilating section designated by V and an upper light transmitting section formed from glass blocks 16 which may be transparent or translucent.

The opening forming the window is divided into a lower ventilating portion having a plurality of windows, which section has been indicated by V in Figure 3. Section V is bounded by a metal frame consisting of two jambs 17 and a lintel or head frame member 18. Plate 19 rests on the lower wall of the window opening as shown most clearly in Figure 4 where reference numeral 20 designates the wall.

The jambs have a cross section like that shown in Figure 1 where one edge of the web terminates in a flange 21 to the edge of which is riveted or otherwise attached an angle iron 22 that is secured to the vertical wall of the window opening by some suitable means such as a pin 23. The other edge of the web terminates in a flange 24 whose outer edge has a groove 25. The jambs are of identical size and shape.

The head frame member or lintel 18 which is shown in section in Figure 4 is similar to the jambs but differs therefrom in this, that flange 21a is wider than flange 21 and further in this, that flange 24a extends parallel to the web instead of parallel with flange 21a, flange 24a has a groove 25a.

Lintel 18 extends the whole width or length of the window opening and the space enclosed by the lintel, the jambs and the plate 19 is divided into two or more rectangular spaces by mullions 26 which may be built up from lengths of jamb arranged in opposed relation but which have been shown as formed from an extruded section having webs 21b and 24b, the latter being common to the two sides, flanges 22b are joined by a plate 27. The several window spaces are usually four (4) feet in length and a four section window is therefore provided with three mullions. Grooves 25, 25a and 25b form a continuous groove when the lintel 18, the two jambs and plate 19 are assembled in the manner shown in Figure 10.

The window frame proper is formed from an extruded aluminum alloy and has been shown to substantially full scale in Figure 6 where the same has been designated as a whole by reference numeral 30. The four sides of the frame are all of the same size and shape. The window sash is formed from extruded aluminum bars 31 of the size and shape shown in Figure 6.

The window frame members 30 are provided with outwardly directed flanges 32 that project into grooves 25,

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25a and 25b, as shown most clearly in Figures 1 and 6, and are secured to the jamb, the lintel and the mullion by screws 33 that force edge 34 into engagement with the rubber seal strip 35, as shown in Figure 6. When the lintel 18, the jambs and the mullions are assembled the window frames may be slid into position occupying the positions shown in Figures 1 and 4. Instead of a metal plate 19 as shown, any other suitable means may be substituted for securing the free ends of the frame while the assembly is transported from the factory to the building where it is to be used.

The window sash may also be assembled in the frame before shipment if it is found desirable to do so.

Referring now more particularly to Figures 4, 5, 6 and 7 it will be observed that the sash whose frame is designated by reference numeral 31, is provided near the top of its end members with pins 36 that are mounted for longitudinal movement in sleeves 37 carried by said sash end members in the manner shown in Figure 6. Attached to the outer ends of pins 36 are plates 38 that are mounted for sliding movement in the channel provided therefore in frame member 30, as shown in Figure 6. Springs 39 urge plates 38 outwardly. Links 40 have their lower ends connected to the vertical frame members 30 by pivots 41 and have their upper ends connected with the vertical frame members 30 by pivots 41 and have their upper ends connected with the vertical end members of the sash by pivots 42. An inspection of Figure 7 will show that the sash may be moved outwardly at the bottom, pivots 42 moving in arcs whose centers are pivots 41. This causes the upper end of the window sash to move downwardly in a straight line. The friction between plates 38 and frame members 30 holds the window sash in adjusted position. Since the construction just described is old and well known it will not be described in any greater detail.

After wall 20 is built up to the level of the lower surface of plate 19, in Figure 4, the window assembly comprising lintel 18, jambs 17, mullions 26 and the window frame formed from members 30 that has been slid into position in grooves 25, and the bottom plate 19 is positioned on wall 20 and the wall built up along the jambs as high as desired. The glass blocks are laid on top of lintel 18 to whatever height is desired. The window after the sash have been positioned in the frame will now have the appearance shown in Figure 3.

Before the glass blocks are put into position screws 33 at the top of the window frame are loosened so that if the lintel 18 sags slightly under their weight it can not transmit a corresponding curvature to the upper member of window frame 30. This has been shown in a greatly exaggerated manner in Figure 8. After lintel 18 has flexed, screws 33 may then be tightened. The feature that has just been described is of great importance because all beams will flex to some extent when loaded, and experience has shown that where the load supporting beam also serves as the top member of a window frame much trouble is experienced in opening and closing the sash due to the binding action this produced.

The window frame assembly that has been described above can be completely assembled in a shop, transported to the building and positioned on the wall in the desired position, the wall being built up and over same. No careful work is required by the masons as is necessary when the beam that supports the glass blocks also serves as the window frame and cooperates directly with the sash.

The three frame members 17 and 18, comprising the jambs and the lintel and the mullions where these are employed, have internal grooves 25 into which flanges 32 of frame members 30 are slideably engaged and in which they are held in position by screws 33.

Any window frame having flanges similar to flanges 32 may be used instead of those illustrated. There is, however, a cooperative combination between an outer frame with internal grooves and a window frame having flanges

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that fit into the grooves and are adjustably secured in place by screws or other clamping means, because this structural relationship makes it practical to assemble the entire window frame structure before it is positioned in the wall. Plate 19 is, of course, put into position after the window frame or frames have been positioned in the outer frame and serves to hold the jambs and the mullion or mullions in properly adjusted position while transported and positioned.

It will be observed from Figures 4 and 7 that a rain shield 43 is attached to the top member of the window frame and prevents water and/or snow from getting between the window frame and the sash. Shield 43 has been eliminated entirely in Figure 3 and shown partly broken away in Figure 2.

In Figure 3 a bottom frame member 24x has been shown which may be employed if desired; this member has a cross section similar to jambs 17.

What is claimed as new is:

1. A window assembly comprising, an outer metal frame having a lintel and two spaced jambs which form vertical supports for the ends of the lintel, the frame being adapted for positioning in a window opening the lintel and the jambs having channel shaped cross sections positioned with their flanges extending outwardly, the inside surfaces of the lintel and jambs having narrow grooves positioned in alignment adjacent one outer edge, a window frame positioned in the outer frame for lateral and vertical adjustment therein, the window frame having aligned flanges extending outwardly from its top and sides, positioned to enter the grooves in the lintel and jambs, the distance between the outer edges of the flanges on the sides of the window frame being less than the distance between the bottoms of the groove in the opposite jambs whereby the window frame can be adjusted laterally with respect to the jambs, the flange on the top of the window frame extending part way to the bottom of the groove in the lintel to permit the lintel to flex downwardly without placing a strain on the window frame.

2. A window assembly comprising an outer frame for positioning in the window opening in a building said frame comprising a lintel and two spaced jambs secured at their upper ends to the lintel forming supports for the ends thereof, the frame members being of wide channel shaped cross section, and arranged with the flanges extending outwardly, the lintels and jambs having their inwardly facing surfaces provided with grooves positioned in alignment, and a window frame of slightly less height than the height of the jambs and of slightly less width than the distance between the jambs so that the window frame may be adjusted vertically and laterally relative to the outer frame, the top and sides of the window frame having aligned flanges positioned to enter the groove in all relative positions of the two frames whereby the window frame may be inserted from the open side of the outer frame before the latter is positioned in the wall and whereby the lintel of the outer frame may flex downwardly without exerting a bending force on the top member of the window frame.

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