

Oct. 18, 1927.

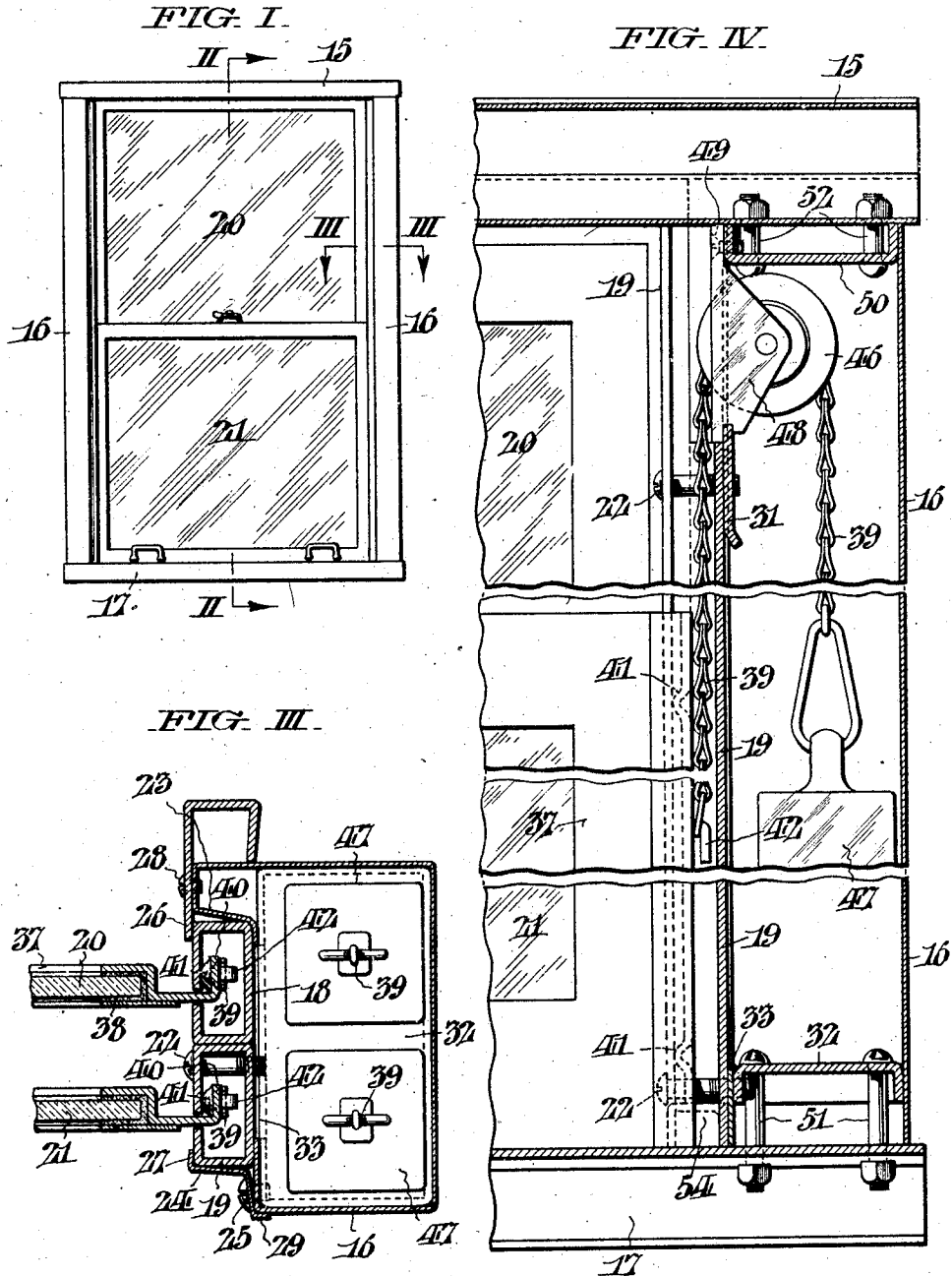
J. BROGDEN

1,646,006

METALLIC WINDOW

Filed Dec. 3, 1925

3 Sheets-Sheet 1



WITNESSES
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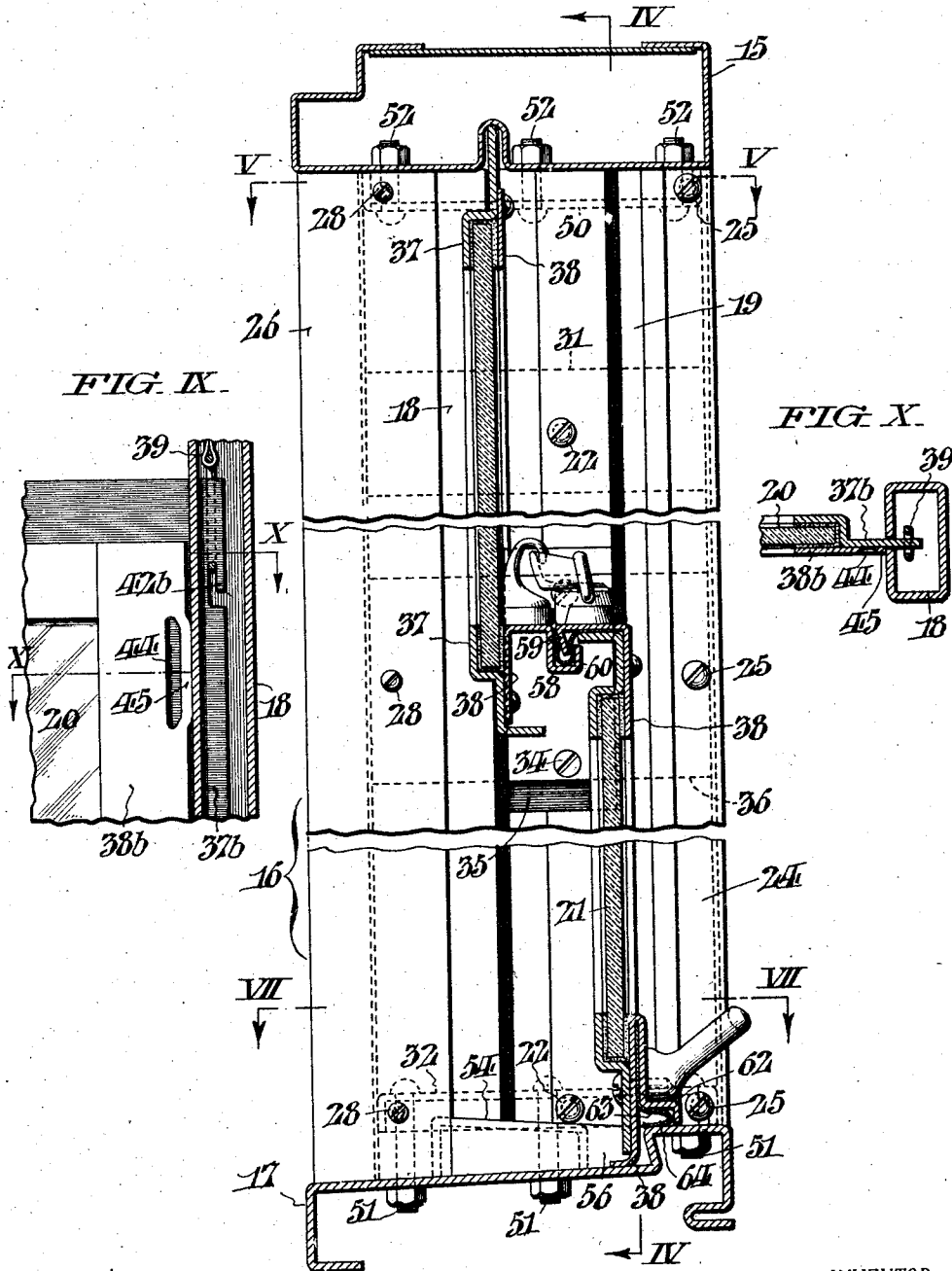
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3 Sheets-Sheet 2

FIG. II.



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3 Sheets-Sheet 3

FIG. V.

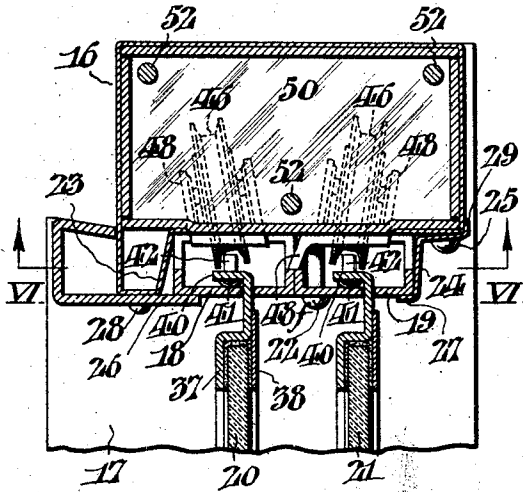


FIG. VII.

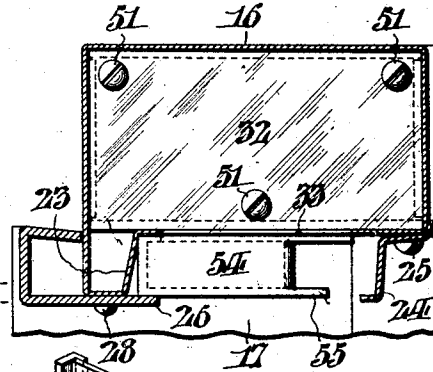


FIG. VIII.

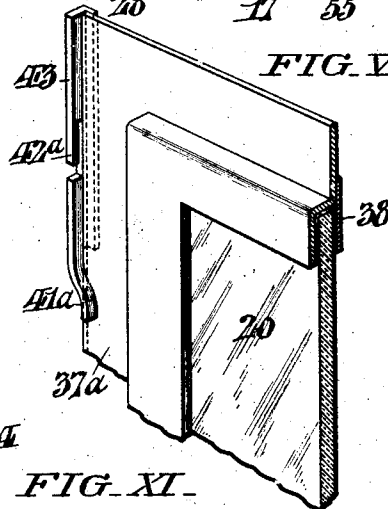


FIG. VI.

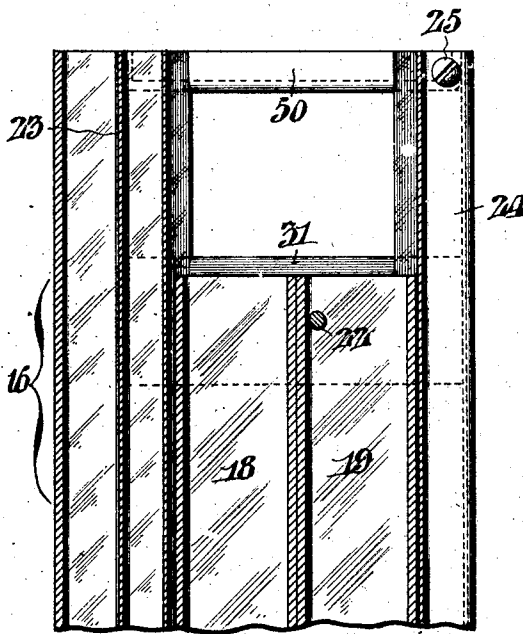
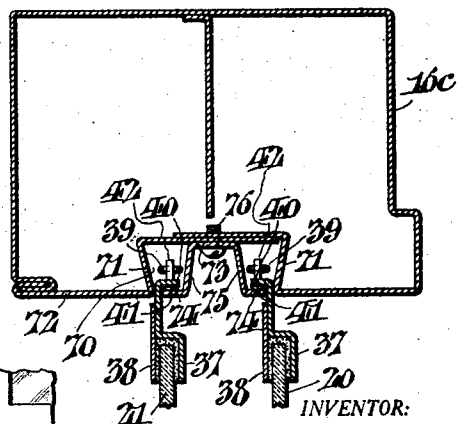
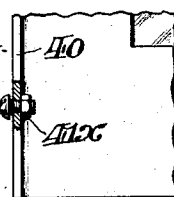


FIG. XI.



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FIG. VIIa.



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UNITED STATES PATENT OFFICE.

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METALLIC WINDOW.

Application filed December 3, 1925. Serial No. 72,946.

My invention relates to windows, and is more especially concerned with sliding metallic windows such as are widely used in modern fire-proof buildings. Various objects and advantages of the invention are, in general, promoted and enhanced by sheet metal construction. Among the advantages that can be realized through the invention are simplicity and ruggedness of construction; ease, convenience and low cost in manufacture and installation; tightness against the weather, etc.; and easy, free operation of the sash. In suitable forms of embodiment, such as hereinafter described, the invention affords the advantage of rugged sash guides, not readily distorted, as well as the capacity for easy adjustment to take care of minor variations in window-frames and sash.

In the drawings, Fig. I is a front elevation (i. e., a view from the inside) of a window conveniently embodying my invention.

Fig. II shows a vertical section through the window-frame and sashes, taken as indicated by the line II—II in Fig. I.

Fig. III shows horizontal sections through one of the jambs and portions of the sashes, taken as typified by the line III—III in Fig. I.

Fig. IV shows a vertical section through one of the jambs, taken as indicated by the line IV—IV in Fig. II,—at right angles to the section shown in Fig. II.

Fig. V shows a horizontal section through one of the jambs taken as indicated by the line V—V in Fig. II, portions of the sashes being also shown in section.

Fig. VI is a fragmentary view of one of the jambs in vertical section as indicated by the line VI—VI in Fig. V, with the pulleys removed.

Fig. VII shows a horizontal section through one of the jambs as indicated by the line VII—VII in Fig. II, the sashes and their guides being omitted.

Fig. VII^a is a fragmentary front view of the side rail of a sash, illustrating an adjustable guide device therefor.

Fig. VIII is a fragmentary perspective view of a sash, illustrating a modification.

Fig. IX is a fragmentary view of a sash and its guide, similar to Fig. IV, but showing a modification.

Fig. X shows a horizontal section through the sash and guide, taken as indicated by the line X—X in Fig. IX.

Fig. XI shows horizontal sections through a jamb and portions of its sashes, illustrating yet another modification.

The window shown in Figs. I—VII has a frame consisting of a lintel or head 15, opposed jambs 16, 16 and sill 17, all of hollow sheet metal construction. The jambs 16 are provided with removable tubular guideways 18, 19 for the sashes, shown of squared tubular form. The tubes 18 and 19 for the upper and lower sashes 20 and 21 are separate, but side by side in contact with one another. These tubular guides 18, 19 are detachably secured at the inner jamb face: when detached, they can be moved sidewise across the jamb face with the sashes, for purposes of installation or removal. In the present instance, the jambs 16 are open at their inner faces practically from top to bottom, and the tubular guides 18, 19 are secured over and close the jamb openings. As shown in Figs. II and III, the tubular guides 18, 19 are secured and held in place partly by screws 22 through them and partly by stops 23, 24 at their remote (outer and inner) edges.

In the present instance, the outer stop 23 (see Fig. III) consists of a shoulder along the outer corner of the jamb face, formed by appropriately bending the sheet-metal of the jamb wall, while the inner stop 24 is removable, consisting of an angle bar secured to the jamb face by screws 25. Besides being held in lateral position between the stops 23, 24, the guides 18, 19 may be held in place transversely, against the jamb face, by retaining means carried by the stops. As shown, these retaining means consist of shoulders or flanges 26, 27 on the stops 23, 24 that overhang in front of the jamb face, so as to project over the edges of the guides 18, 19. Thus each of the stops 23, 24 and its flange or shoulder 26, 27 in effect forms a socket facing across the jamb face, to take the corresponding guide tube edge. The flange 26 of the outer stop 23 consists of a heavy strip of sheet metal secured by screws 28 to the inner face of this stop, (and also forming an ornamental molding outside of the jamb 16) while the flange 27 of the inner stop 24 is formed by its own bent over edge.

As shown, the inner stop 24 is similarly flanged around the inner corner of the jamb box, at 29. In cross-section, this inner stop is a more obtuse angle than the angle between the jamb face and the tube edge, so as to clamp the tube 19 firmly when the screws 25 are tightened up.

As shown in Figs. II-VI, securing screws 22 for each inner guide tube 19 extend through the latter at its upper and lower ends. The screw 22 at the upper end of each tube 19 takes into a stout sheet metal bar 31 secured to the edges of the jamb wall across the opening in its inner face, and joggled "inward" flush with the "outer" surfaces of this wall, against which the tubes 18 and 19 seat. The screw 22 at the lower end of the tube 19 takes into the wall of a stout sheet metal "pan" 32 (hereinafter further described) in the lower end of the jamb 16, a liner 33 being interposed to seat the tube ends properly. At their adjacent edges, the guide tubes 18 and 19 are additionally secured by the screws 34 which extend through the meeting rail wedge block 35 (Fig. II) and the tube 19 and take into a joggled bar 36 like the bar 31.

As shown in Figs. II-V, the sashes 20, 21 are composed of overlapping front and rear (outdoor and indoor) strips of sheet metal 37 and 38, the former constituting the principal structural elements of the sashes, while the latter serve as removable glazing strips. The front strips 37 which form the side rails of the sash are engaged in the vertical guide slots of the tubes 18, 19 and the sash cables (chains) 39 are attached to the side rails 37 in the tubes. In the present instance, there is space for edgewise play of the sash outside the side rails 37, between the latter and the rear walls or backs of the tubes 18, 19, and the edgewise position of the sash is controlled by engagement with the inner sides or walls of the tubes 18, 19. As shown in Figs. III-V, the side rails 37 of the sash have lateral flanges 40 extending their whole height, with isolated guide projections 41 near their upper and lower ends for engaging the inner tube walls from the rear at inside, and hooks 42 for the attachment of the sash cables 39. These guide projections 41 may consist of pimple-like embossments of the sheet metal of the side rails 37; or they may consist of round-headed screws (of bronze, for example) tapped through the side rail flanges 40 and provided with lock-nuts 41*, as shown in Fig. VII^a.

In installing or replacing the sashes 20, 21, the guide tubes 18, 19 are slipped on their side rails 37 endwise. The inner stops 24 being removed (or not yet attached), the outer guides 18 are introduced sidewise between the jambs 16 and seated against them and in the above described sockets of the

outer stops 23, with the corresponding (upper) sash 20 engaged in them as described. Next the inner guides 19 (with their corresponding sash 21) are similarly put in place, and the inner stops 24 put on. The screws 22 and 34 and the meeting rail wedge-block 35 are then put in place, and all the screws finally tightened up. To remove the sashes 20, 21, these operations are simply reversed.

In Fig. VIII is shown a modification of the sashes in which the side rail flanges 40 are dispensed with, and the guide projections 41^a and sash cable attachment hooks 42^a formed or mounted on angle lugs 43 welded to the side rails 37^a near their upper and lower ends. In Figs. IX and X, the sash cable hooks 42^b are formed in the edges of the flangeless side rails 37^b and the edgewise position of the sash is controlled by external engagement with the inner tube walls. As shown in Fig. IX, the sash members 38^b are slotted near their edges, at 44, and the portions 45 outside the slots 44 are bent outward to form guide projections for engaging the tube walls externally.

As shown in Figs. IV and V, the pulleys 46 over which the sash cables 39 extend from the counterweights 47 to the hooks 42 on the sashes are mounted in the jamb face just below the head 15, their housings 48 being secured by screws 49 to the bar 31 already mentioned and to the wall of a pan 50 itself secured in the upper end of the jamb 16, like the pan 32 at its lower end, and having its side joggled to seat the pulley housings, like the bar or plate 31. As the pulleys 46 project beyond the inner jamb face, the corresponding sides of the tubes 18, 19 are cut away (to the extent of about half their thickness) at their upper ends, to clear the pulleys and permit the tubes to be moved across the jamb face as above described. As shown in Fig. V, one of the pulley housings 48 may be provided with a flange 48' to fill the opening that would otherwise exist in the adjacent tube sides and prevent leakage of air from one tube to the other.

As shown in Figs. II and IV, the lower and upper ends of the jambs 16 abut against the sill 17 and the head 15 and are secured by bolts 51, 52 taking through the pans 32 and 50. The sill 17 is shown of stepped conformation. The jamb is provided with a seat 54 (Figs. II and VII) for the lower ends of the guides 18, 19, which seat is located in the lower end of the pocket in the outer stop, 23, and secured to the sill 17. This seat 54 is shown as of sheet metal pan-like construction, with its inner side wall 55 extending beyond its end to form a continuation of the outer guide edge of the inner tube 19. A small piece 56 (Fig. II) is secured to the overhanging sill step to form a

continuation of the inner guide edge of the same tube 19. Thus the side rail 37 of the sash 21 can extend down in the slot clear to the sloping sill surface, so that there shall be no influx of air at this point. As shown in Fig. II, the top of the seat 54 slopes upward and outward, permitting the guides 18, 19 to swing in and out about their own upper ends for insertion or removal.

As shown in Fig. II, the thinner inner member 38 of the meeting rail of the upper sash is bent inward and then downward, inward and upward to afford an upward-open channel 58, and that of the inner sash is bent outward and then downward, on a level, at 59 to enter the channel. The lower sash is shown provided with resilient sheet-metal weathering, comprising a thin strip of bronze 60 clamped and secured between the members 37, 38 of the lower sash meeting rail, and bent downward and then upward around the downward-extending flange 59 of said rail, so that the cross section of its free portion resembles the letter S. When the sashes 20, 21 are closed, the lower bend of the S engages against the bottom of the channel 58 of the upper sash meeting-rail.

The thinner inner member 38 of the bottom rail of the lower sash is bent outward to engage the lower step of the sill 17, and is doubled downward and then bent inward and downward to form a downward-facing channel 62 over the upper step of the sill. This channel 62 is provided with resilient sheet metal weathering in the form of a thin strip of bronze 63 clamped between the doubled plies of the inner sash member 38 and bent inward and then outward in a sort of bow 64, to engage the top step of the sill when the sash is lowered.

From the foregoing description, other practical advantages afforded by my invention will readily be apparent, besides those already mentioned. The tubular guides 18, 19 can be made of rolled sections, and their cross-section assures ample strength and rigidity without excessive thickness and weight of metal. Hence they can be made of non-corrosive metal such as bronze without excessive cost. They are little liable to accidental deformation from the straightness that is so desirable to assure easy operation of the sashes 20, 21. They are easily and quickly put in place or removed.

The sashes 20, 21, likewise, can be built of rolled sections; and when laterally flanged within the guides, as in Figs. III and V, they possess the most ample rigidity without undue thickness or weight. When turned outward toward the weather, as shown, the lateral sash flanges 40 tend to prevent high wind and rain, etc., from driving into the guideways 18, 19. The elastic weathering 60, 63 on the meeting rails and

on the bottom rail assures weather-tightness, and can be made of non-corrodible metal without undue cost.

The guide projections 41 or 45 are easily adjusted to take care of the usual minor variations of windows in manufacture and installation, by punching or screwing them out a little more if the sash has too much lateral play, and by filing off their tops or screwing them in somewhat if the sash binds or has insufficient play.

Fig. XI shows the sashes 20, 21 of Figs. III and V with a jamb 16 of different construction. In this case, the inner jamb wall is unbroken, but has a vertical recess or groove 70 with re-entrant, overhanging sides 71, 71. The rear (inside) portion 72 of the inner jamb face is a vertical strip separate from the rest of the jamb box, with one joint at the rear inner corner and the other at the bottom of the recess 70. In the recess 70 is a vertical channel 73 with guide flanges 74, 74 on its sides 75, 75. This channel 73 is secured to the bottom of the recess 70 by bolts 76, and the edges of its flanges 74, 74 are spaced from the corners of the recess to afford slots for the side rail members 37 to slide in. The spaces between the walls of the recess 70 and those of the channel 73 serve as pockets to accommodate the sash cables 39, which are secured to hooks 42 on the side rail flanges 40 as in Figs. III-V. Preferably, the edges of the side rail flanges 40 are separated from the channel sides 75, 75 by considerable clearances (e. g., $\frac{1}{8}$ - $\frac{1}{4}$ inch), as shown, rather than substantially in contact with them. The isolated guide projections 41 in the side rail flanges 40 engage the rear or inner faces of the guide flanges 74.

In Fig. XI, various parts and features are marked with the same reference characters as in Figs. I-VII, as a means of dispensing with further or merely repetitive description.

Having thus described my invention, I claim:

1. The combination of a metal window jamb with an open socket in front of and facing across its inner face, vertically sliding sash, stationary guide means for said sash removably engaged in said socket at one side, and means for detachably securing said guide means in place in said socket.

2. The combination of a metal window jamb with a retaining flange or shoulder in front of its inner face, vertically sliding sash, stationary guide means for said sash removably engaged behind said shoulder at one side, and a removable stop at the other side of said stationary guide means with a retaining flange or shoulder engaged in front of the guide means.

3. The combination of a metal window jamb with a stop shoulder along its inner

face, vertically slotted tubular guide means at the inner jamb face against said shoulder, vertically sliding sheet metal sash with side rail in the guide slot, and a stop detachably
5 secured to the jamb at the other side of said guide means.

4. The combination of a metal window frame including a jamb with a stop shoulder along its inner face toward the outside of
10 the window; vertically sliding sash; guide means for said sash normally seated against said shoulder, but swingable inward and outward across the jamb, about its own upper end, for removal and insertion; and a seat
15 for the lower end of said guide means with the upper surface sloping outward and upward to permit said guide means to swing freely as aforesaid.

5. The combination of a metal window
20 jamb with pulley projecting beyond its inner face; vertically slotted tubular guide means at the inner jamb face, and vertically sliding sheet metal sash with side rail in the guide slot, said guide means being laterally
25 cut away to clear the pulley and permit its being moved across the jamb face with the sash.

6. The combination of metal window jambs, a sliding metal sash with laterally

flanged side rails and space for edgewise
30 play outside them, and slotted guide tubes for said sash enclosing their said flanges and engaging them at their inner sides, and thus controlling the edgewise position of the sash.

7. The combination of a metal window jamb; vertically sliding sash; laterally abutting tubular guides for said sash; and means
35 for securing said guides to the jamb face, including a meeting rail block held by screws through the guide means.

8. The combination of a metal window jamb, vertically sliding sash, and laterally abutting tubular guides therefor, retaining
40 means on said jamb engaging the remote edges of said guides, and means for securing the guides to the jamb at their adjacent edges.

9. The combination of a hollow metal window jamb open at its inner face, verti-
50 cally sliding sash, and tubular guide means for said sash detachably secured over and closing the opening in the inner jamb face.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsyl-
55 vania, this 27th day of November, 1925.

JOAH BROGDEN.