May 19, 1931. O. A. MUNSON 1,806,263

METAL WINDOW SASH AND FRAME

Filed Oct. 8, 1928 2 Sheets-Sheet 1

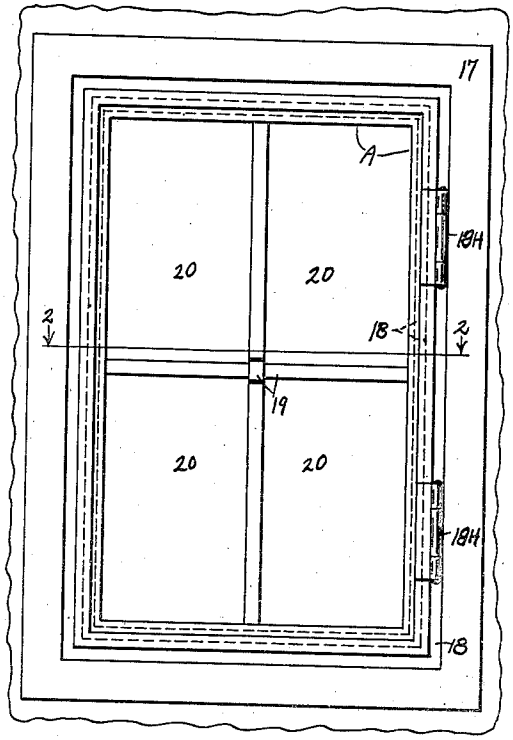


FIG. 1

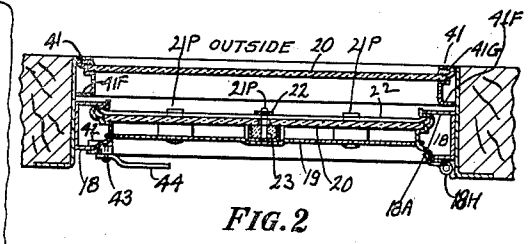


FIG. 2

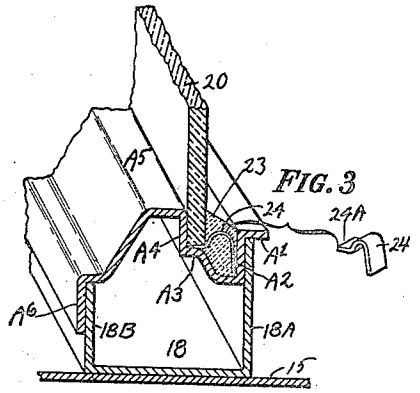


FIG. 3

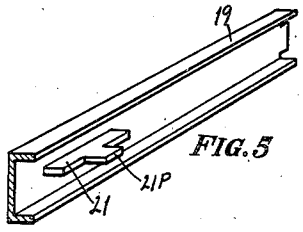


FIG. 5

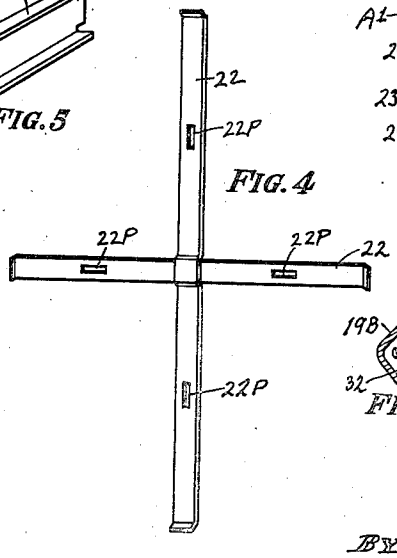


FIG. 4

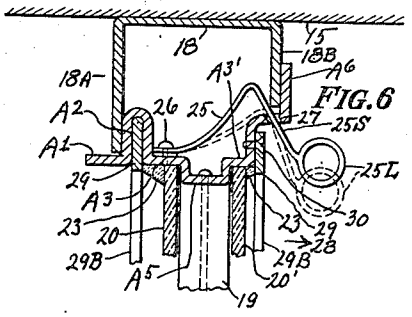


FIG. 6



FIG. 7

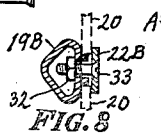


FIG. 8

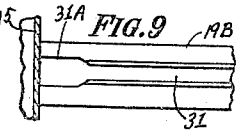


FIG. 9

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METAL WINDOW SASH AND FRAME

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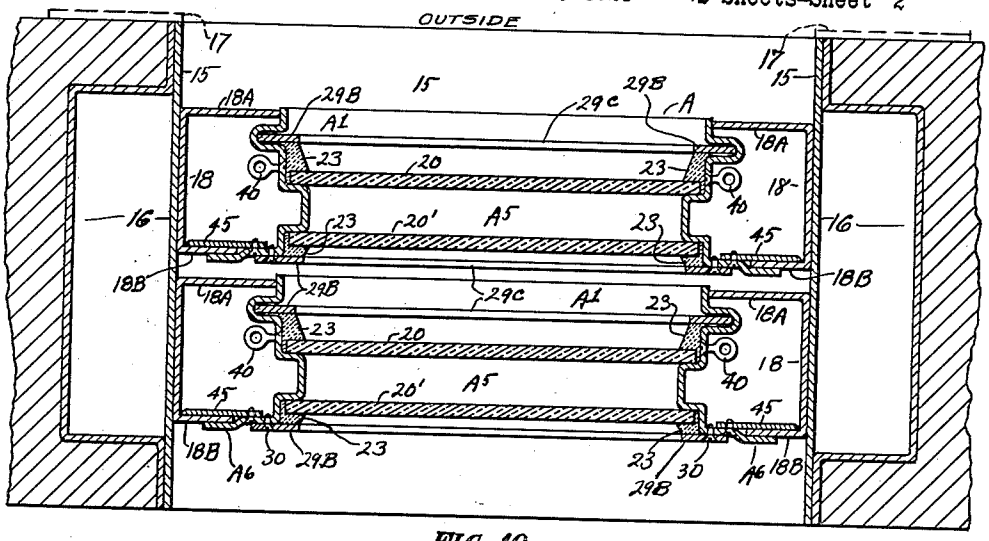


FIG. 10

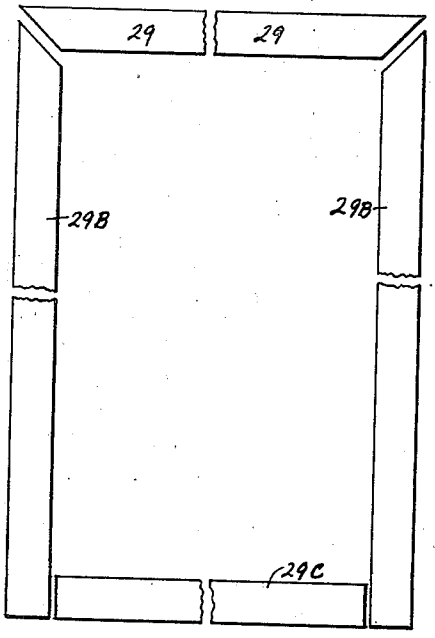


FIG. 12

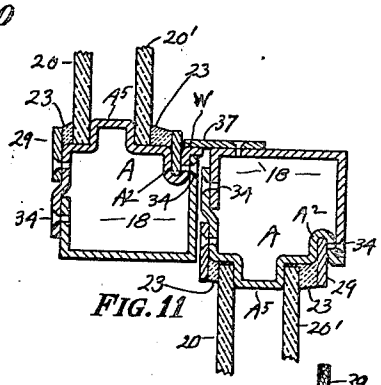


FIG. 11

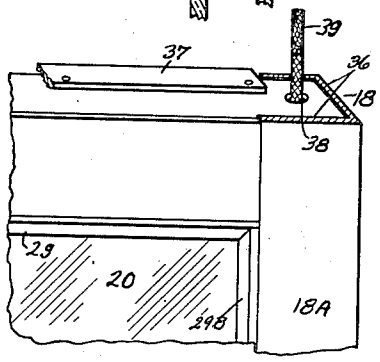


FIG. 13

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UNITED STATES PATENT OFFICE

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METAL WINDOW SASH AND FRAME

Application filed October 8, 1928. Serial No. 311,053.

My invention relates to improvements in window construction and the main object is to provide an efficient, durable, and non-rattling metal window sash and frame having also a number of other features as hereinafter fully set forth, reference being had to the accompanying drawings, in which,—

Fig. 1 is an inside elevation of my improved window, in a four-pane type and hinged at one side a so-called casement window.

Fig. 2 is a horizontal cross sectional view about as on line 2—2 in Fig. 1.

Fig. 3 is an enlarged sectional perspective of a single glaze type of sash and window channel of my improved type and including a certain metal clip for retaining the edge of the glass.

Fig. 4 is an elevation of preferred window pane retaining bars for a four-pane type of window as illustrated in Fig. 1.

Fig. 5 is a perspective, enlarged detail of a channel type muntin bar used with the retaining bars shown in Figs. 2 and 4.

Fig. 6 is a cross sectional detail of the upper bar of my window sash, in a modified form adapted to be hinged at the lower frame bar and including a manually released spring operated latch device.

Fig. 7 is a cross section of an I-beam shaped muntin bar for double-glaze windows and Fig. 8 is a cross section of a preferred type of hollow muntin bar used in single glaze windows of my improved type.

Fig. 9 is a front or face view of an end portion of the muntin bar shown in Fig. 8, looking toward the latter as from the right.

Fig. 10 is an enlarged cross sectional view taken on a horizontal line, through a two-sash window of my improved device and embodying certain modified pane retaining means.

Fig. 11 is a transverse sectional view through the adjoining sash bars of a two sash window as in Fig. 10, and Fig. 13 is a perspective view of a corner of one of the window-sash shown in Fig. 11.

Fig. 12 is an elevation of the quadrangularly arranged pane retaining frame members as used in the types of windows shown in Figs. 10, 11 and 13.

Referring to the drawings by reference numerals it will first be understood that I aim to provide an all-metal window frame, usually of course quadrangular and embodying suitably joined plates 15 to the vertical ones of which may be fixed elongated metal sash-weight pockets 16. 17 in Fig. 1 illustrates face boards or plates of suitable size and extending from the outer edges of the main frame 15.

18 are metal channel members suitably fixed by welding, or otherwise, to the vertical frame members 16, in pairs as in Fig. 10 for two-sash windows or in single continuous quadrangular formation as in Figs. 1 and 2 for hinged sash. In all types of windows embodying my improvements these channels have an outer wide flange 18A and an inner narrow, flange 18B. In the sliding sash type of windows these channels are the runways for the sash and in the casement type they are in quadrangular formation and the sash swung into position within the quadrangular channel frame as will presently be described. The swinging type will be first described.

In combination with the stationary means just described my improved window comprises further, a metal sash, single or double, and a certain type of storm sash, the latter embodying certain pane retaining features common to all types of sash herein described.

In Fig. 1 I have illustrated a horizontally swingable four pane single sash A hinged at 184 to the main frame 15. In this sash frame and the modification thereof in other views the general designation A will be used and variations in details designated likewise with numerical suffixes, for a more ready understanding of its construction.

The sash A is of course quadrangular being formed of 4 quadrangularly arranged suitably joined (as by welding) sash bars, each of formation, in cross section, comprising an outwardly directed flange A1, an inwardly adjacent continuous groove A2, in the inner part of the latter is a continuous ledge A3 and continuing inwardly from this ledge a shoulder A4 in vertical plane and inwardly of the inner part of this ledge is formed a continuous central, hollow ridge or rib A5 (see Fig. 3) from which the metal is shaped to extend inwardly in certain, modified ways and terminates in an inner outwardly directed flange A6 in vertical plane, said latter flange adapted to bear against the inner flange of flange 18B of the fixed channel frame 18 simultaneously as the sash flange A1 engages lightly the edge of channel flange 18A (as in Fig. 3) when the swinging sash (of Fig. 1) is closed, said flange A1 overlapping as shown best in Fig. 3.

19 are fixed, crossed muntin bars in the sash, for a four pane sash frame (see Fig. 1) each with its ends suitably fixed in opposite ridges A5 of a sash. These bars are illustrated as shallow channel irons, in Fig. 2 and Fig. 5 the opening of the channel being toward the glass and to receive putty or other glazing flush or little outwardly of the channel for the glass 20 to bear against. The adjacent edges of the panes at said muntin bars are kept apart by fixed parting lugs 21 in said channels each having a projection 21P to register with openings 22P of crossed pane retaining metal bars 22 bearing toward the face of the glass by having their ends slidably inserted and sprung into grooves A2 of the sash bars A (see Figs. 1, 2, 4 and 5).

In a single pane type of sash (as in Fig. 2) the glass 20 is cut in a size permitting it to be passed inwardly between flanges A1 of the sash bars and against shoulder A4 after which putty as 23 is filled in the groove A2 to retain the glass. 24 is a flat spring metal clip formed with a ledge 24A adapted to rest on shoulder A3 thence curved up in a semi-circular hump and extended down thence to engage in the front, lower part of groove A2. The humped part is frictionally engaged by the edge of the glass (see Fig. 3) and it will be understood that each clip is retained slightly compressed in the groove and ledge parts as shown, the clips being inserted in predetermined spaced relation before putty or the like is applied, the clips being of course entirely imbedded.

In Fig. 6 is shown, in cross section, an upper bar of a sash hinged at its lower edge, such as a transom sash. This is a double glaze sash with modified bar section and includes a spring metal latch bar 25 fixed at 26 on the inner part of ledge A3 extending upward angularly (normally) thence down, at 25S, angularly and outwardly through an aperture 27 in the bar, outwardly of which it is formed with a loop 25L or other suitable engaging means. The part 25S normally is pressed upward against and pinches the flange 18B of channel 18 thus holding the sash rigid when closed. The sash is released by simply pulling down loop 25L so the spring can pass under flange 18B and permit the sash to be swung open as in direction of arrow 28. In this double glazed sash the groove A2 is narrow and deep and ledge A3 comparatively wide. The muntin bar is an I-beam in cross section (see also Fig. 7) and inwardly of the ridge A5 an inner ledge A3′ is formed for the inner pane 20′.

In this case groove A2 forms a continuous quadrangular pocket for retaining respectively an upper flat metal retaining bar 29, opposite vertical bars, 29B and a bottom bar 29C, (see also Fig. 12) all of a width to project inwardly toward the center of the sash from their grooves, and between which projecting parts and the pane, putty is inserted (best shown in Fig. 6). For retaining the inner pane, like bars 29, 29B and 29C are used but may be secured as with screws 30 to the sash bar.

19B in Figs. 8 and 9 illustrates a hollow, rolled metal muntin bar, as an alternative for 19, and for single pane sash only, said bar being approximately triangular in cross section and having a vertical face for adjacent pane sections to bear against. In said vertical face is a longitudinal slit 31 widened at its ends at 31A for insertion of a nut 32 and screw 33 provided in suitable numbers and adapted to engage in apertures of a glass retaining bar 22B which thus covers the adjacent edges of the panes and may be clamped against the glass by said screws.

In the forms of window sash above described I have disclosed single sash construction only, I will now describe double sliding sash as in ordinary house construction, where there is an upper and a lower sash slidable in parallel planes, this being done in my improved window device by providing in each frame 2 fixed channels 18 on opposite vertical members 16 of the main frame. The adjoining bars of the two sash must of course come to parallel, horizontally registering positions when the window is closed, as in Fig. 11, where double glazed sash are shown but single glazed equally adaptable.

In these horizontal bars I provide a hollow bar construction for weather proof construction, embodying the bar A as described but to each of which is fixed as at 34 a horizontal channel corresponding to the fixed channels 18 of the main frame. The upper cross bar of the upper sash and lower cross bar of the lower sash may be likewise constructed (not shown) but in all cross bars

their front and rear flanges are cut away at the ends and the webs continued to fit slidably and transversely in the main frame channels 18, as at 36 in Fig. 13. 37 is a metal plate secured on either or both bars 35, as on the right hand bar in Fig. 11, said plate overlapping a portion of the adjacent sash cross bar to provide a weather proof joint at W. 38 are apertures in the guided end web parts of the bar through each of which a sash cord 39 extends upwardly from any suitable cord attaching means such as the fixed eye-bolts 40 (Fig. 10) in the vertical sash members A.

It will now be readily understood that my invention embodies a metal main frame with integral elongated inwardly opening channel members between which is the space occupied by either sliding or swinging sash, the latter kind involving, selectively, sash hinged at either side, top or bottom. Further, means are provided in the making of the sash bars for either single or double glass and in Fig. 2 is illustrated a storm sash mounted within the main frame, whether fixed or hinged.

In said storm sash, Fig. 2, the glass 20 is retained in sash bars 41 of approximately but distorted S-shape in cross section having an outer, inwardly opening glass receiving groove 41G corresponding to groove A2 (Fig. 3). Inwardly of the glass retaining groove the frame is formed as a continuous vertical flange 41F movable inwardly to stop position against the outer flange 18A of the main frame channel. The thickness of sash bars of said storm sash is such that it may be inserted slidably within and between the parallel channels 18 to serve as a sliding sash therein.

In Fig. 2 I have also illustrated, on the left upright sash member a cam 42 on a pin 43 having a hand operated lever 44 accessible inwardly of the window to swing the cam into engaging position inside of the channel flange 18B and thus hold a casement window closed positively.

45 in Fig. 10 are upright interior bars in fixed parallel relation to each upright flange A6 of a sash to provide vertical guide means for the slidable sash.

I claim:

In combination, a window sash comprising a quadrangular frame of joined metal bars, a window frame comprising a main frame with inwardly opening channel members and said sash arranged to fit snugly between said channels, said channels comprising for each sash a continuous quadrangular frame with a wide outwardly exposed flange and narrower inwardly exposed flange in spaced relation to said wide flange, said sash frame bars having each an outer ledge and an adjacent glass retaining groove normally engaging the edge part of the wide channel, a ridge formed in each bar inwardly of said groove, muntin bars fixed with their opposite ends in said ridged parts of the sash bars and means for holding panes of glass in the sash with their adjacent edges at the muntin bars in spaced relation and removable auxiliary muntin bars arranged to lie over said adjacent edges of the panes, the outer ends of said auxiliary bars adapted to be removably engaged in the grooved parts of the sash bars.

In testimony whereof I affix my signature.

OTTO A. MUNSON.