Feb. 3, 1931. J. L. McGLOTHLEN 1,791,219

METAL WINDOW CONSTRUCTION

Filed May 9, 1929 2 Sheets-Sheet 1

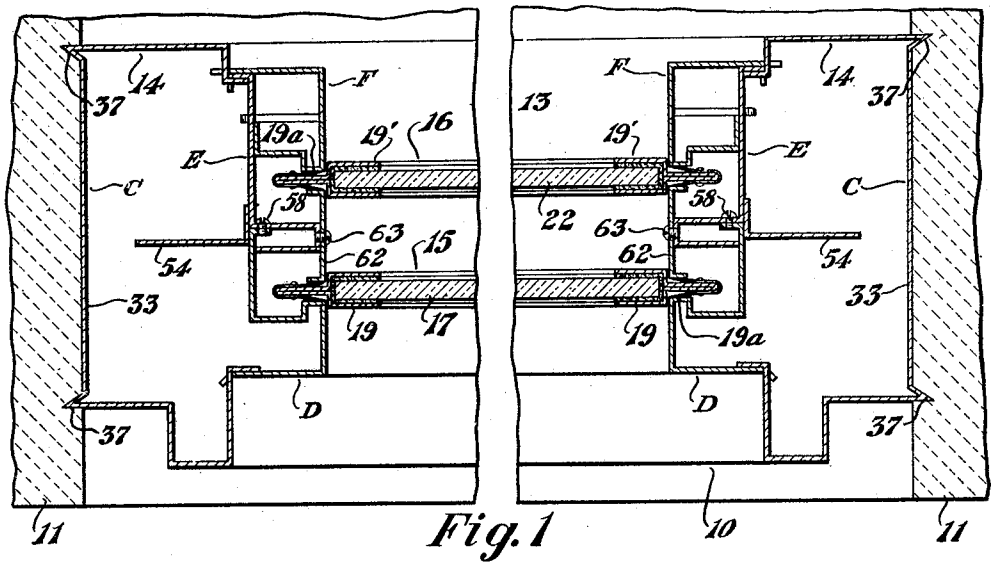


Fig. 1

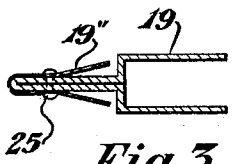
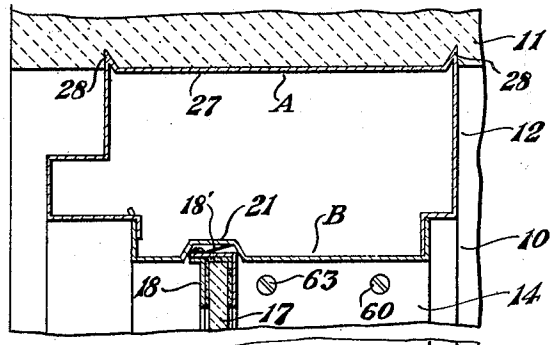


Fig. 3



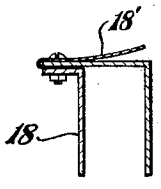


Fig. 4

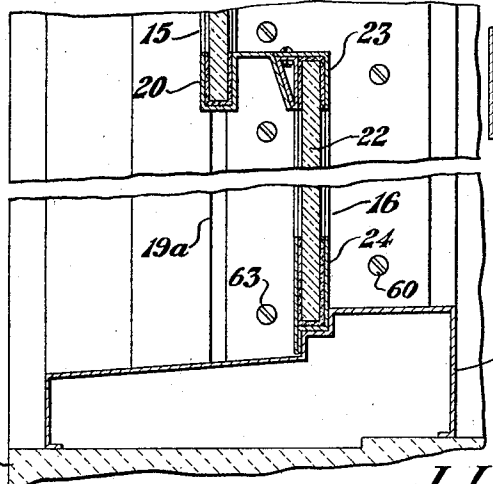


Fig. 2

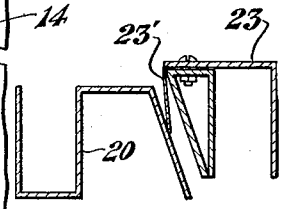


Fig. 5

Inventor

J. L. McGlothlen

By Harry Grease Attorney

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METAL WINDOW CONSTRUCTION

Filed May 9, 1929 2 Sheets-Sheet 2

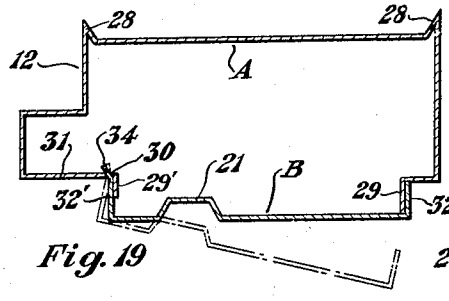


Fig. 19

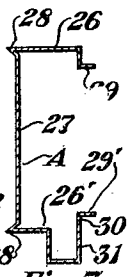


Fig. 7

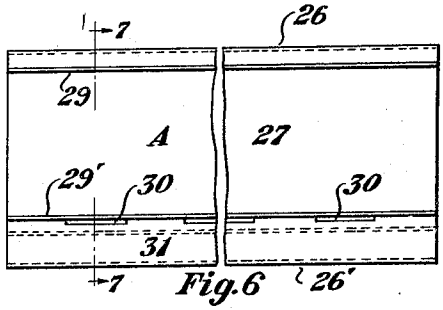


Fig. 6

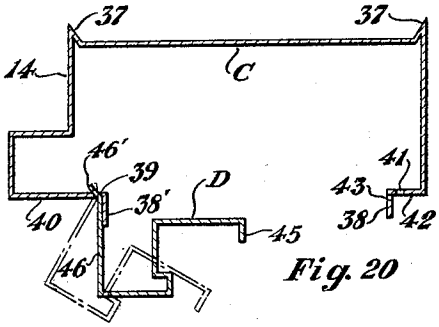


Fig. 20

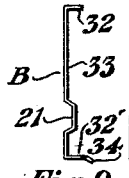


Fig. 9

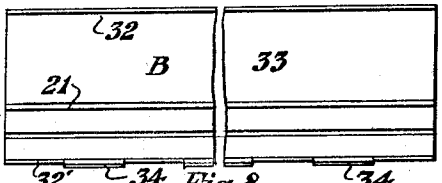


Fig. 8

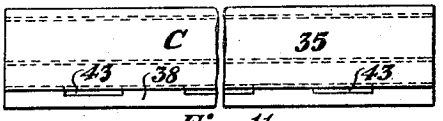


Fig. 11

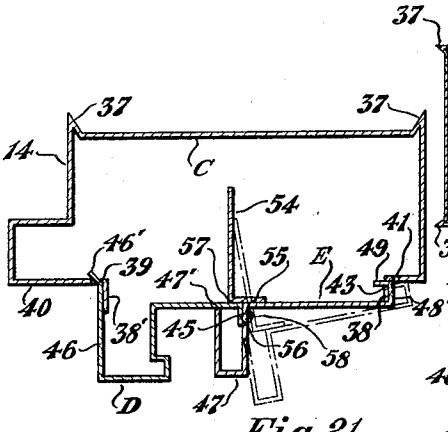


Fig. 21

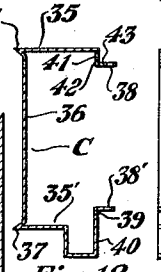


Fig. 12

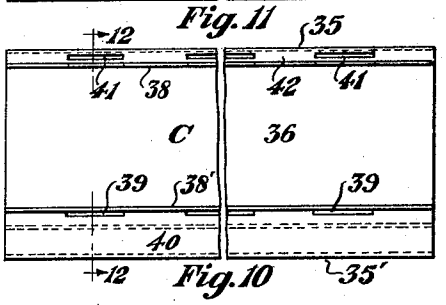


Fig. 10



Fig. 14

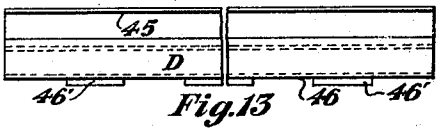


Fig. 13

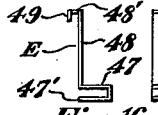


Fig. 16

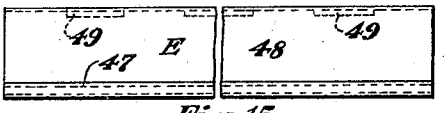


Fig. 15

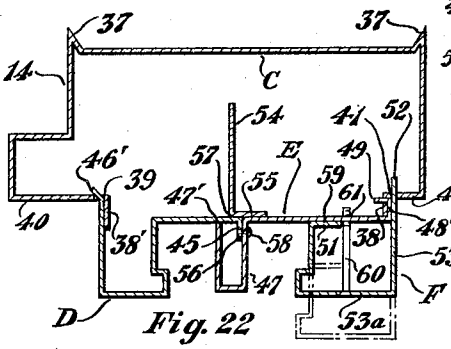


Fig. 22

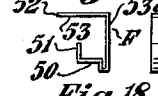


Fig. 18

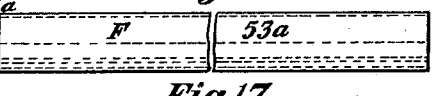


Fig. 17

Inventor

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Attorney

Patented Feb. 3, 1931 1,791,219

UNITED STATES PATENT OFFICE

JOHN L. McGLOTHLEN, OF HUNTINGTON, WEST VIRGINIA, ASSIGNOR TO FULTON TOOL WORKS, OF HUNTINGTON, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA

METAL WINDOW CONSTRUCTION

Application filed May 9, 1929. Serial No. 361,617.

The invention relates to metal windows to be used in connection with dwelling houses, business buildings and structures of any sort where ingress of light and air is desired.

The construction of ordinary metal windows in use at the present time, necessitates many exposed screw heads and a considerable number of these, being on the outside of the windows, are exposed to the weather, causing them to become corroded.

In addition, the construction in ordinary usage produces a window lacking in rigidity, tending in time to produce a partial separation of the various members.

Further, in the installation of the ordinary metal window, it is necessary to use a plastic caulking material between the wall and the window frame in order to provide a weather-tight structure.

The objects of the present improvement are to provide for reducing the number of screws necessary to the construction of the metal window; to provide for eliminating practically all screws exposed to the weather; to provide for a more secure joining of the various sections, and a more rigid construction; to provide for more effective weather-stripping of the various members; to provide for producing a weather-tight joint between the walls and the window frame without the use of caulking material; and to generally improve and simplify the construction of metal windows.

These and ancillary objects are attained in the present improvement by means of the particular design of the various members of the window, together with the method of interjoining and interlocking them.

An embodiment of the invention thus set forth in general terms is illustrated in the accompanying drawings, in which

Figure 1 is a fragmentary, plan sectional view of the improved window and frame;

Fig. 2, a vertical sectional view of the same;

Fig. 3, an enlarged section through one of the stiles, showing the method of attaching the weather strip thereto;

Fig. 4, a similar section through the top sash, showing the method of attaching the weather strip thereto;

Fig. 5, an enlarged section through the lower portion of the upper sash of the window, and the sash meeting rail, showing the method of attaching the weather strip thereto;

Fig. 6, a fragmentary side elevation of one member of the head frame of the improved window;

Fig. 7, a sectional view as on lines 7—7, Fig. 6;

Fig. 8, a fragmentary side elevation of the other member of the head frame;

Fig. 9, an end elevation thereof;

Fig. 10, a fragmentary side elevation of one of the members of a side frame;

Fig. 11, a fragmentary plan elevation thereof;

Fig. 12, a sectional view as on lines 12—12, Fig. 10;

Fig. 13, a fragmentary side elevation of a second member of the side frame;

Fig. 14, an end elevation thereof;

Fig. 15, a fragmentary side elevation of a third member of the side frame;

Fig. 16, an end elevation thereof;

Fig. 17, a fragmentary side elevation of a fourth member of the side frame;

Fig. 18, an end elevation thereof;

Fig. 19, a sectional view through the members shown in Figs. 6 and 8 of the head frame, showing the method of assembly;

Fig. 20, a sectional view through the members shown in Figs. 10 and 13 of the side frame, showing the method of assembly;

Fig. 21, a sectional view through the members shown in Figs. 10, 13 and 15, showing the method of assembly; and

Fig. 22, a sectional view through the members shown in Figs. 10, 13, 15 and 17, showing the method of assembly.

Similar numerals refer to similar parts throughout the drawings.

The improved window, indicated generally at 10 in Figs. 1 and 2, is set in a window opening in the wall 11, of a building or other structure. The window includes the head frame indicated generally at 12, sill frame 13, and side frames indicated generally at 14, the construction of each of which will hereinafter be set forth in detail; and upper and

lower window sashes indicated generally at 15 and 16 respectively.

The upper section 15 includes a window pane 17 cemented by means of a plastic material, within a top sash member 18, stiles 19 and bottom sash member 20, all preferably formed of sheet metal in usual and well known manner.

The method of attaching weather-stripping to the top sash is best shown in Fig. 4. It will be seen that when the upper sash is fully raised, as in Fig. 2, the top thereof will enter the concavely formed portion 21 of the head frame 12, forming, by means of the weather strip 18′ contacting with the portion 21, a weather-tight connection therewith.

The lower window section 16 includes a window pane 22, cemented, by means of a plastic material, within the top sash meeting rail 23, stiles 19′ and bottom sash member 24, all preferably formed of sheet metal in the usual manner.

As best shown in Fig. 5, the lower sash member 20 and sash meeting rail 23 are so constructed that when brought together by the closing of the window, they wedge against each other, any irregularity being compensated for by the flexible weather strip 23′ attached in the manner shown, whereby locking the window will only serve to wedge the sash more tightly together.

The bottom sash member 24, of the lower window sash 16, may also be formed of sheet metal, and is arranged to engage the sill 13, preferably formed of sheet metal, as shown in Fig. 2. Said sill may be of any usual and suitable design.

The stiles 19 and 19′, of the upper and lower window sections 15 and 16, respectively, are preferably formed of sheet metal, and slide vertically in slots 19*a* provided in the side frames 14. As shown in Fig. 3, the weather strip 19″ is attached to the stiles by means of rivets 25, and travels with the sash. The weather strip may have spring tension on both sides of the stile as shown, or on only one side, if desired.

It will be seen that when the sash is placed in the slots 19*a*, provided in the side frames, the spring tension of the weather strip causes frictional contact with the side or sides of the slot in the side frame, producing a weather-tight fit.

The head frame member A, as shown in Figs. 6 and 7, is substantially U-shaped, having side portions 26 and 26′ and the intermediate portion 27, which has formed integral therewith, nibs or pointed flanges 28, the function of which will be hereinafter described.

The portion 26 terminates in an offset flange 29, and the portion 26′ terminates in the offset flange 29′. Slots 30 are spaced at intervals in the length of the channel portion 31 of the side portion 26′, and adjacent to the flange 29′.

The head frame member B, shown in Figs. 8 and 9, is substantially U-shaped, having flanges 32 and 32′ and the intermediate portion 33. Tangs 34 are formed at regular intervals along the edge of the flange 32′ and at a slight angle therewith. The portion 33 has formed therein the concave portion 21, the function of which has been previously described.

The side frame member C, shown in Figs. 10, 11 and 12, is substantially U-shaped, having side portions 35 and 35′ and the intermediate portion 36. The portion 36 has formed integral therewith, nibs or pointed flanges 37, similar to the nibs 28 on member A, the function of which will be hereinafter described.

The side portion 35 terminates in an offset flange 38, and the side 35′ terminates in the offset flange 38′. Slots 39 are spaced at intervals in the length of the channel portion 40 of the side 35′, and adjacent to the flange 38′. Slots 41 are spaced at intervals in the length of a leg 42 of the side 35, and slots 43 are spaced at intervals in the length of the flange 38, and ajacent to the leg 42.

The side frame molding member D, shown in Fig. 13, is of irregular cross-section as shown in Fig. 14. One side terminates in the narrow flange 45 and the other side terminates in the oppositely disposed flange 46. Tangs 46′ are formed at intervals along the edge of the flange 46 and at an angle therewith.

The side frame member E, shown in Fig. 15, is of irregular cross-section as shown in Fig. 16, having a U-shaped portion 47 terminating in an edge 47′ at one side, and having a wide flange 48 at the other side terminating in the narrow angular flange 48′.

Tangs 49 are formed at intervals along the edge of the flange 48′ at right angles therewith.

The side frame molding member F, shown in Fig. 17, is of irregular cross-section, as shown in Fig. 18, having side portions 50 and 53, and the intermediate portion 53*a*. The side portion 50 terminates in the inwardly disposed flange 51, at right angles therewith, and the side portion 53 is preferably straight and terminates in the edge 52.

In assembling the head frame 12, the member B is placed in the position shown in dotted lines in Fig. 19, with the tangs 34 inserted in the slots 30 of the channel portion 31 of the member A. The member B is then swung into the position indicated in full lines, the flange 32′ of B engaging the flange 29′ of A, and the flange 32 of B engaging the flange 29 of A.

By reason of the tangs 34 being angularly disposed with relation to the flange 32′ of B and channel 31 of A, the member B will become securely interlocked with member A.

In assembling the side frames 14, the member D is placed in the position shown in dotted lines in Fig. 20, with the tangs 46′ inserted in the slots 39 of the channel portion 40 of member C. The member D is then swung into the position indicated in full lines, the flange 46 of D engaging the flange 38′ of C, and the angularly disposed tang 46′ interlocking the members C and D at the slots 39.

The member E, which may have an angular member 54 welded thereto, as at 55, is then placed in the position shown in dotted lines in Fig. 21. After inserting the tangs 49 of member E in the slots 43 of member C, member E is swung into the position indicated in full lines, the flange 48 of E engaging flange 38 of C, flange 45 of D engaging the inside of the U-shaped portion 47 as at 56, and the flange of the angular member 54 engaging the member D as at 57. At the same time the edge 47′ of the member E engages the member D, and the members C and E become interlocked at the slots 43.

Screws 58 may be used to hold the various members in position until the member F is attached. The member F is then placed in the position shown in dotted lines in Fig. 22, and then moved into the position indicated in full lines with the edge 52 of the flange 53 inserted in the slot 41 of member C, the flange 51 engaging member E as at 59, and the flange 53 engaging the flange 48′ of member E.

Screws 60 are then inserted through countersunk holes in the intermediate portion 53*a* of member F, and screwed into member E as at 61, thus rigidly securing member F to member E and finally rigidly interlocking the members C, D, E and F.

A strip or channel member 62 may be secured to the U-shaped portion 47 of member E, by means of screws 63, in a manner illustrated in Fig. 1, and the legs of this channel form, with members D and F, the slots 19*a* in which the stiles 19 and 19′ of the window sections 15 and 16, respectively, slide vertically upward and downward.

When the window frame is built into the wall 11 as shown in Figs. 1 and 2, the nibs or pointed flanges 28 and 37 of the head frame and side frames, respectively, are inserted into the wall as shown, bringing the portions 27 of the head frame and 33 of the side frame into contact, throughout their length, with the surface of the wall opening. This provides a substantially weather-tight joint between the window frame and the wall without the use of a caulking material.

It will be seen that with the above described system of interlocking only a limited number of screws are necessary to construction of the improved metal window, and the heads of only a small number of these will be exposed to the weather.

I claim:

1. A metal window including a frame having a head frame and side frames, the head frame including a main member formed of sheet metal of substantially U-shape, and having an offset flange at each side, and slots in said main member adjacent to one of said flanges, and a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the adjacent flange of the main member.

2. A metal window including a frame having a head frame and side frames, the head frame including a main member formed of sheet metal of substantially U-shape, and having an offset flange at each side, slots in said main member adjacent to one of said flanges, a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the adjacent flange of the main member, a window sash slidable in said frame and a concavely formed portion in said second member to receive the upper portion of said window sash.

3. A metal window including a frame having a head frame and side frames, the head frame including a main member formed of sheet metal of substantially U-shape, and having an off-set flange at each side, slots in said main member adjacent to one of said flanges, a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the adjacent flange of the main member, a window sash slidable in said frame, a flexible weather strip fixed at one edge to the upper edge of said window sash, and a concavely formed portion in said second member to receive the upper portion of said window sash and to contact with the free edge of said weather strip.

4. A metal window including a frame having a head frame and side frames, the head frame including a main member formed of sheet metal of substantially U-shape, and having a channel portion at one side terminating in an angular flange, and a second flange at its other side, and provided with slots in said channel portion, and a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the second flange of the main member.

5. A metal window including a frame having a head frame and side frames, the head

frame including a main member formed of sheet metal of substantially U-shape, and having a channel portion at one side terminating in an angular flange, and a second flange at its other side, and provided with slots in said channel portion, a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the second flange of the main member, a window sash slidable in said frame and a concavely formed portion in said second member to receive the upper portion of said window sash.

6. A metal window including a frame having a head frame and side frames, the head frame including a main member formed of sheet metal of substantially U-shape, and having a channel portion at one side terminating in an angular flange, and a second flange at its other side, and provided with slots in said channel portion, a second member formed of sheet metal and having a flange at each side, tangs upon one flange of the second member for engagement in said slots, the other flange of the second member being arranged to contact with the second flange of the main member, a window sash slidable in said frame, a flexible weather strip fixed at one edge to the upper edge of said window sash, and a concavely formed portion in said second member to receive the upper portion of said window sash and to contact with the free edge of said weather strip.

7. A metal window including a frame having a head frame and side frames, each side frame including a main member formed of sheet metal of substantially U-shape and having an offset flange at each side, and having slots adjacent to each of said flanges, molding members (D and F) having tangs for engagement with said slots, and a separating member (E) connected to said molding members.

8. A metal window including a frame having a head frame and side frames, each side frame including a main member formed of sheet metal of substantially U-shape and having an offset flange at each side, and having slots adjacent to each of said flanges, molding members (D and F) having tangs for engagement with said slots, and a separating member (E) connected to said molding members, and an angular strengthening member connected to said separating member.

9. A metal window including a frame having a head frame and side frames, each side frame including a main member formed of sheet metal of substantially U-shape and having an offset flange at each side, and having slots adjacent to each of said flanges, molding members (D and F) having tangs for engagement with said slots, and a separating member (E) connected to said molding members, each of said molding members having an inwardly disposed offset portion.

10. A metal window including a frame having a head frame and side frames, each side frame including a main member formed of sheet metal of substantially U-shape and having an offset flange at each side, and having slots adjacent to each of said flanges, molding members (D and F) having tangs for engagement with said slots, and a separating member (E) connected to said molding members, said separating member having tangs for engagement with certain of said slots.

11. A metal window including a frame having a head frame and side frames, each side frame including a main member formed of sheet metal of substantially U-shape and having an offset flange at each side, and having slots adjacent to each of said flanges, molding members (D and F) having tangs for engagement with said slots, and a separating member (E) connected to said molding members, and a strip connected to said separating member and having its side edges spaced from the molding members.

In testimony that I claim the above, I have hereunto subscribed my name.

JOHN L. McGLOTHLEN.