

Aug. 23, 1960

W. A. BECKER ET AL

2,949,985

METAL WINDOW AND FRAME STRUCTURE

Filed April 18, 1957

2 Sheets-Sheet 1

FIG. 1.

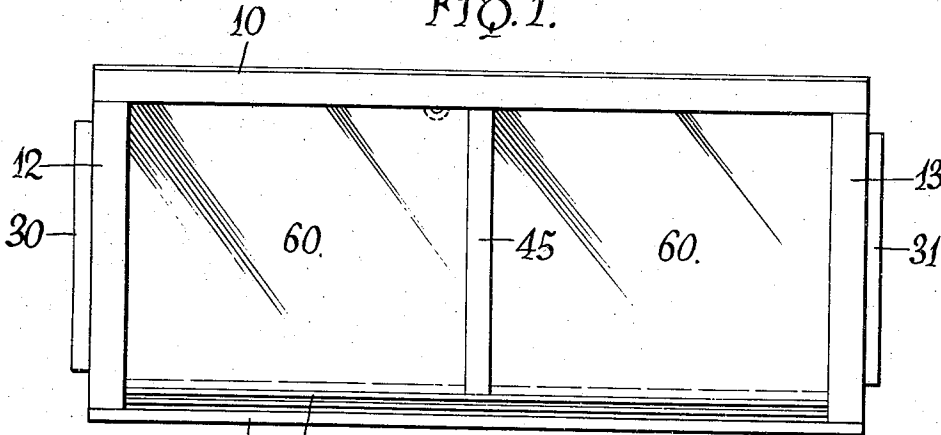
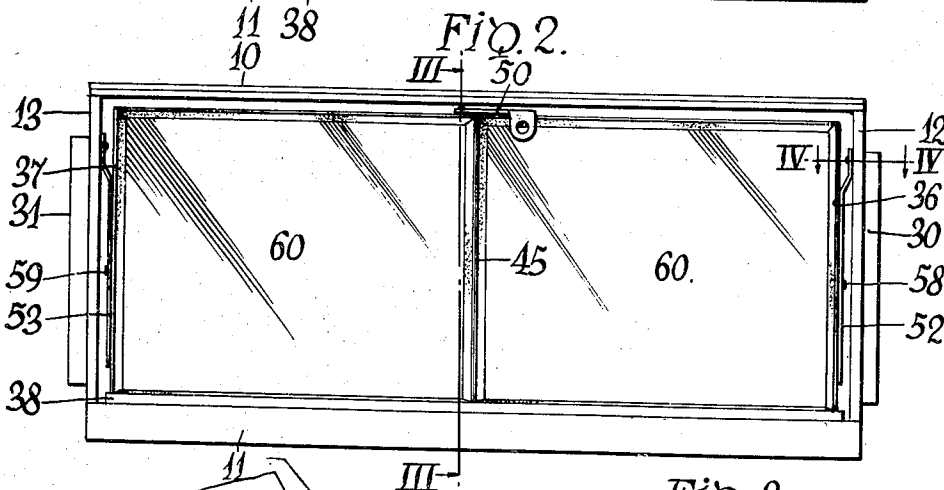


FIG. 2.



III-

FIG. 8.

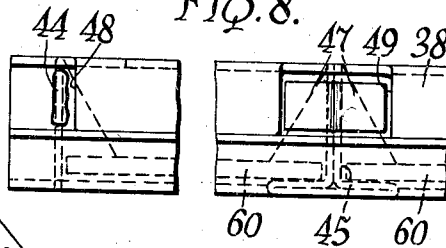
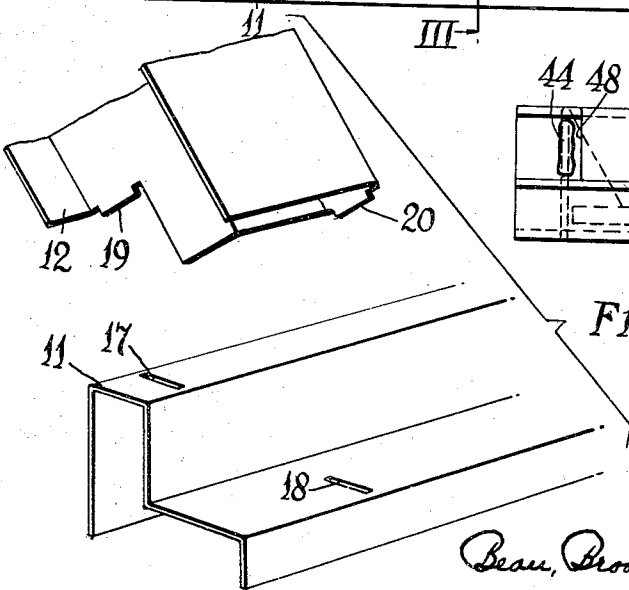


FIG. 6.



INVENTORS
William A. Becker,
BY Herbert M. Wendling,

Beau, Brooks, Buckley & Beau,
ATTORNEYS.

Aug. 23, 1960

W. A. BECKER ET AL

2,949,985

METAL WINDOW AND FRAME STRUCTURE

Filed April 18, 1957

2 Sheets-Sheet 2

FIG. 3.

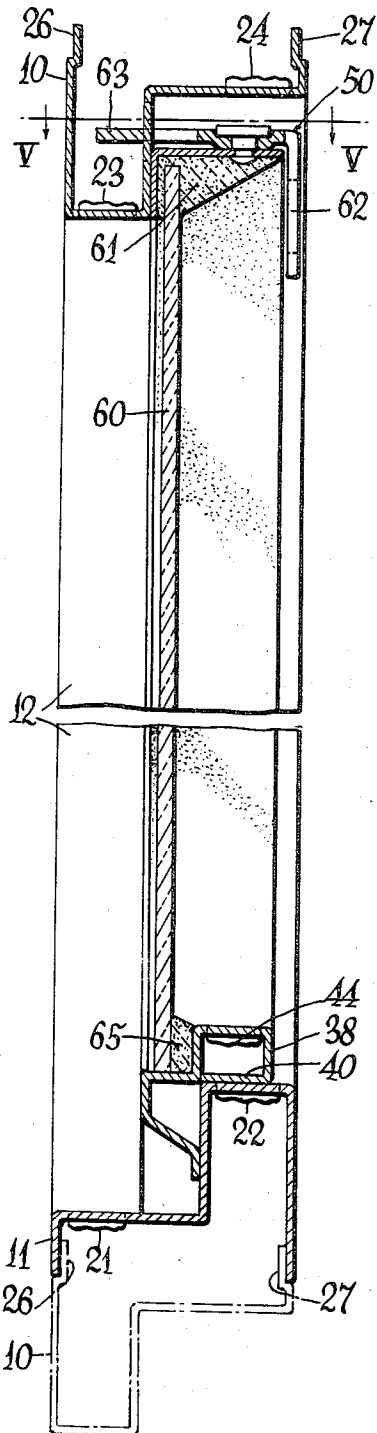


FIG. 7.

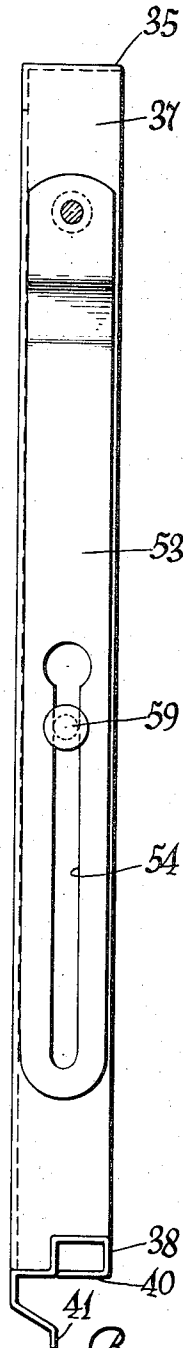


FIG. 4.

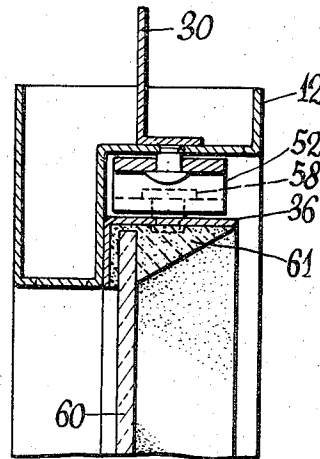
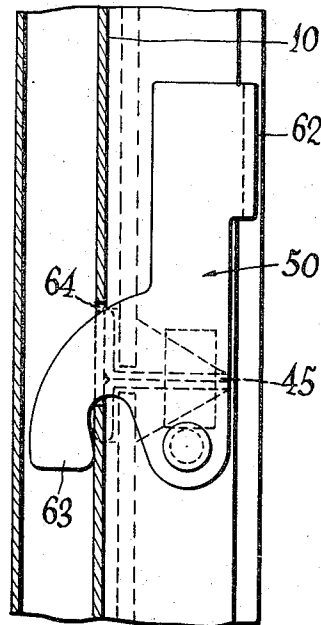


FIG. 5.



INVENTORS
William A. Becker,
BY Herbert M. Wendling,

Bean, Brooks, Buckley & Bean
ATTORNEYS.

1

2,949,985

METAL WINDOW AND FRAME STRUCTURE

William A. Becker, Jamestown, and Herbert M. Wendling, Depew, N.Y., assignors to Rolite Mfg., Inc., Lancaster, N.Y.

Filed Apr. 18, 1957, Ser. No. 653,696

2 Claims. (Cl. 189—75)

This invention relates to metallic window structures and particularly to novel window frame and window sash means.

Numerous prior art arrangements have been proposed wherein prefabricated metal window frame and sash combinations are adapted to be built into a building wall. A common type of window of this general class is one wherein the window sash member is pivotally mounted in the frame for opening and closing movements. The principles of the present invention are herein illustrated in conjunction with such a frame and sash arrangement, although certain novel structural features of the frame and sash may be embodied in window structures of other types.

Most of the commercially acceptable metal window frame and sash structures of the prior art involve welding of the parts to produce unitary frame and unitary sash structures. An object of the present invention is to provide a unitary, prefabricated metal window structure wherein all welding of the frame and sash members proper, which is a normally relatively expensive part of the manufacturing process, is eliminated. Furthermore, the window frame and sash arrangement of the present invention is such that the parts are virtually self-locating so that assembly of the structural components comprising the frame and sash members may be accomplished without jigs or special tools for holding or locating the parts during assembly thereof to form rigid, unitary frame and sash members.

A further novel feature of the present invention resides in the fact that the window frame is made up of top, bottom and side members of the same basic cross section, so that these members may be produced with the same fabricating dies or rolls, despite necessary differences in the final arrangement of the parts. This is accomplished, speaking generally by reversing the position of the bottom rail relative to the top and side rails, as will appear later more fully herein.

A still further feature of the invention consists in an arrangement wherein the several rails of the frame and sash are swaged, peened or riveted to form unitary frame and sash members, with the parts so arranged that the swaged or peened portions lie beneath or behind other portions so that, while they are freely accessible for swaging or peening, they are automatically shrouded or concealed in such a way that no grinding or other finishing is required and the swaged or peened parts do not detract from the finished appearance of the parts and do not interfere in any way with close and weather-tight fitting of the parts.

While window structures of the kind contemplated herein are very commonly used as basement windows in dwellings and the like, the windows may be employed wherever they are found useful. In particular, the window frame structures of the present invention are such that they may be readily used in multiple super position, so that a window assembly comprising two or more units

2

is made up by readily interfitting the bottom of one frame unit over the top of another to produce a rigid and weather-tight connection without separate securement or caulking or other fabricating or erecting steps.

Various other objects and advantages of the window frame and sash structure of the present invention will occur to those skilled in the art to which the invention pertains from a consideration of the embodiment of the invention illustrated in the accompanying drawings and described in detail in the following specification. However, it is to be understood that the details thus set forth are by way of example only and the invention is not limited thereto or otherwise than as defined in the appended claims.

In the drawings:

Fig. 1 is an elevational view of one form of the window frame and sash structure of the present invention viewed from what would ordinarily be the outside of a building;

Fig. 2 is an elevational view of the window frame and sash structure of Fig. 1 viewed from what would ordinarily be the inside of the building;

Fig. 3 is a vertical cross-sectional view on an enlarged scale taken approximately on the line III—III of Fig. 2;

Fig. 4 is a fragmentary horizontal cross-sectional view taken approximately on the line IV—IV of Fig. 2;

Fig. 5 is a fragmentary horizontal cross-sectional view taken approximately on the line V—V of Fig. 3;

Fig. 6 is a disassembled fragmentary perspective view of a lower corner of the frame member of Figs. 1 through 5;

Fig. 7 is an end elevational view of the window sash member of the present embodiment viewed from the right-hand side of Fig. 1 or the left-hand side of Fig. 2; and

Fig. 8 is a fragmentary bottom plan view of the sash member of Fig. 7.

Like characters of reference denote like parts throughout the several figures of the drawings and, referring first to the window frame portion of the structure shown generally in Figs. 1 and 2 and in greater detail in Figs. 3 through 6, the numerals 10 and 11 designate horizontal top and bottom rail members, respectively, and the numerals 12 and 13 designate vertical side rail members.

Each of the rail members is of a channel-shaped cross section which is stepped to provide a relatively deep channel portion along one edge and a shallower channel portion along the opposite edge. To this extent the rail members are identical in cross section and may be formed in the same dies, rolls or other devices, although the top rail is formed with certain additional offsets, as will presently appear.

Top rail member 10 and side rail members 12 and 13 are disposed with their deep channel portions facing the same way, namely, toward the exterior of the window, while bottom rail member 11 is disposed with its deep channel portion at the inside of the window. The top and bottom rail members 10 and 11 have square ends extending the full width of the window frame, while the side rail members 12 and 13 are notched to interfit with the top and bottom rail members.

Referring particularly to Fig. 6, it will be noted that the end of bottom rail member 11 there shown has a pair of slots 17 and 18 and the lower end of side rail member 12, which is notched to fit the stepped channel formation of bottom rail 11, is provided with projections 19 and 20 which extend through the slots 17 and 18, respectively, when the parts are assembled. The rail members 11 and 12 are securely and permanently assembled in rigid right angular relationship by upsetting, peening, swaging or riveting the lower ends of the projections 19 and 20 which project through the slots 17 and 18, as shown at 21 and 22 in Fig. 3. The swaged ears of the upper end of rail member 12 which secure

the latter to top rail member 10 are shown at 23 and 24 in Fig. 3.

It is believed that no further description of the corner connections of the rail members which make up the window frame of the present disclosure is required. The corner connection between the bottom of the opposite side rail member 13 with bottom rail member 11 is the same as shown in Fig. 6 but of opposite hand and the upper corner connections are substantially the same as shown in detail in Fig. 6 excepting for the difference in notching of the upper ends of rail members 12 and 13 to fit the lower stepped surfaces of top rail member 10.

As indicated earlier herein, the stepped channel formation of top rail member 10 is the same as that of the bottom and side rail members excepting for certain additional offset formations. Referring to Fig. 3, it will be noted that the upper marginal edges of the side flanges of rail member 10 are offset inwardly as at 26 and 27, this offset being approximately equal to the metal thickness of the rail members.

By this means the lower rail member 11 of a window frame may be securely fitted over the upper rail member 10 of an underlying window frame as clearly shown at the bottom of Fig. 3, the result being continuous substantially flush inner and outer window frame surfaces. Since the individual window frames are securely built into the building wall construction in various ways no other attachment or securement of the interfitting rail members of vertically adjoining window frames is required.

In the illustrated instance the side rail members 12 and 13 are provided with angle bars 30 and 31, respectively, which have projecting flanges for embedding in masonry walls or for otherwise securing the frame with respect to a building wall. The angle bars 30 and 31 may be spotwelded or otherwise fixed to outwardly facing surfaces of the side rail members 12 and 13 as shown in Fig. 4.

Reference will now be had to the construction of the window sash member which fits within and cooperates with the foregoing window frame unit. The framing portion of the sash unit comprises top rail member 35, side rail members 36 and 37, and a bottom rail member 38. The top and side rail members 35, 36 and 37 are formed from a continuous strip of material of angular cross section, the strip being formed with a pair of V-notches in one flange thereof to permit bending the same into inverted U-shape to form the top and side rail members. The angular cross sections of these members are shown, respectively, in Figs. 3 and 4.

The lower sash rail member 38 is generally of inverted stepped channel formation as clearly shown in Figs. 3 and 7 with an additional inwardly bent flange 40 which cooperates with the stepped channel formation to form a sort of box section portion. Furthermore, the other lower marginal edge portion of the stepped channel formation is bent angularly to form an offset terminal flange 41.

The lower sash rail member 38 extends laterally beyond the side rail members 36 and 37 as shown in Figs. 2 and 8 and the uppermost surface thereof has a pair of slots substantially the same as the slots 17 of the lower rail member 11 of the frame with an additional central slot. The pair of slots receive projections extending from the lower ends of the side rail members 36 and 37 which are swaged or peened over at the underside of lower rail member 38 as indicated at 44 in Figs. 8 and also in Fig. 3.

The sash assembly is braced and strengthened by means of a T-member 45 which in the present instance is formed from a single piece of sheet metal bent as shown in Fig. 8. The contiguous web portions of T-member 45 have projecting ears 47 at their lower ends which extend through the above-mentioned central slot in lower rail member 38 and are bent apart and flattened

as shown in Fig. 8 to secure the lower end of T-member 45 to lower rail member 38. The horizontal flange of upper rail member 35 is likewise provided with a central slot for receiving similar projecting ears at the upper ends of the web portions of T-member 45 which are likewise bent apart and flattened to attach the upper end of T-member 45 securely to the upper rail member 35.

It will be noted that the return bent flange 40 has end notches as at 48 in Fig. 8 and a central notch 49 to permit free entry of tools for upsetting the projections of the end rail members 36 and 37 as at 44 and for flattening the ears 47 of the T-member 45, whereby the upset formations 44 and the ears 47 are concealed and do not interfere in any way with the seating of the lower rail member 38 of the sash on the lower rail member 11 of the frame.

The offset flange 41 of lower sash rail member 28 is adapted to seat against the medial vertical surface portion of the bottom rail member 11 of the window frame as clearly shown in Fig. 3 and forms a sort of fulcrum or reaction support for the lower edge of the sash in the closed position thereof, cooperating with a latch 50 at the upper edge of the shaft to urge the inner surfaces of the top and side rail members of the sash outwardly against cooperating vertical surfaces of the stepped channels forming the top and side rail members of the frame as shown in Fig. 3 while the offset flange 41 is urged inwardly against the medial vertical surface of bottom rail member 11, thus forming a secure and weather-tight closure of the sash with respect to the frame.

A pair of link members 52 and 53 are pivoted at their upper ends to the side rail members 12 and 13, respectively, and are provided adjacent to their lower ends with elongated slots 54. The side rail members 36 and 37 of the sash have outwardly projecting headed members 58 and 59 fixed thereto, their head portions being adapted to pass through enlargements in the upper ends of slots 54 whereby the members are slidably engaged with the slots 54.

Latch 50 is pivoted to the upper side of top rail member 35 of the sash and has a handle portion 62 and a nose or hook portion 63 adapted to engage through an opening 64 in the medial vertical flange of the top rail member 11 of the frame as clearly shown in Fig. 5.

When latch 50 is released by manual pivotal movement thereof the upper part of the window sash opens by movement to the right as viewed in Fig. 3 (movement inwardly with respect to the building) with the lower right-hand corner of the bottom sash rail member 38 rocking on the upper surface of bottom frame rail member 11, the resultant generally pivotal movement of the sash member being limited by movement of the headed members 58 and 59 to the ends of the slots 54 of the link members 52 and 53. This portion of the window structure is not novel to the present applicants and it is described merely for the purpose of disclosing a fully operative window structure. The novel frame and sash units of the present invention may be related for desired opening and closing movements in other ways.

A window pane 60 is set into the sash unit and is embedded in and sealed by mastic, putty or other glazing compound. The embedding and sealing of the pane 60 is as indicated at 61 in Figs. 3 and 4 as far as the top and side edges are concerned and is as indicated at 65 in Fig. 3 as far as the bottom edge is concerned.

We claim:

1. A metal window frame having top side and bottom rail members of substantially identical cross-section, each rail member comprising a channel member with its flanges extending outwardly from the frame in the direction of the plane of the window and with its web portion offset to form a deep channel portion at one side and a relatively shallow channel portion at the other side, the shallow channel portion being of substantially greater width than

5

the deep channel portion, the deep channel portions of the top and side rail members being at one side and the deep channel portion of the bottom rail member being at the opposite side forming an intervening space between the oppositely disposed deep channel portions for receiving a window sash member.

2. A metal window frame having top side and bottom rail members of substantially identical cross-section, each rail member comprising a channel member with its flanges extending outwardly from the frame in the direction of the plane of the window and with its web portion offset to form a deep channel portion at one side and a relatively shallow channel portion at the other side, the shallow channel portion being of substantially greater width than the deep channel portion, the deep channel portions of the top and side rail members being at one side and the

6

deep channel portion of the bottom rail member being at the opposite side forming a medial space therebetween for receiving a window sash member with a lower rail portion thereof engaging in such medial space between the deep channel portions of the side and lower rail members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,086,043	Mercer	July 6, 1937
2,552,298	Stiles	May 8, 1951
2,601,164	Montgomery	June 17, 1952
2,643,744	Pickering et al.	June 30, 1953
2,775,325	Knebel	Dec. 25, 1956
2,788,098	Bianco	Apr. 9, 1957