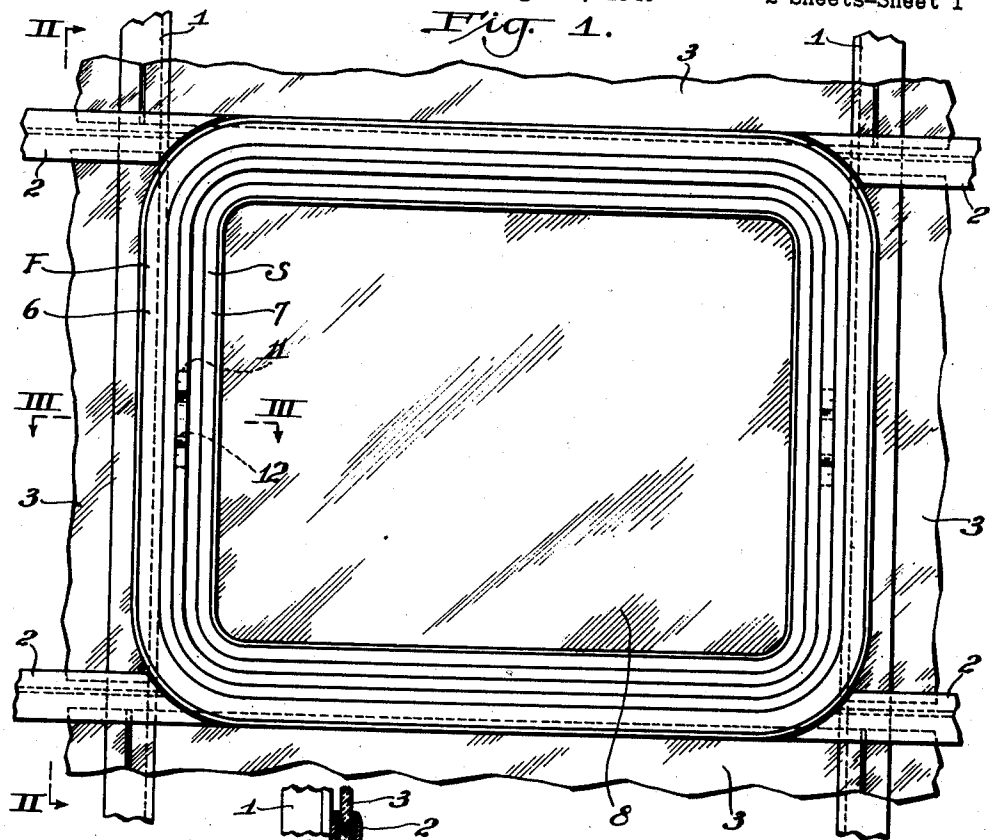
Nov. 10, 1942. E. K. GEYSER 2,301,694

METHOD OF MAKING WINDOW STRUCTURES

Filed Aug. 30, 1940 2 Sheets-Sheet 1

Fig. 1.



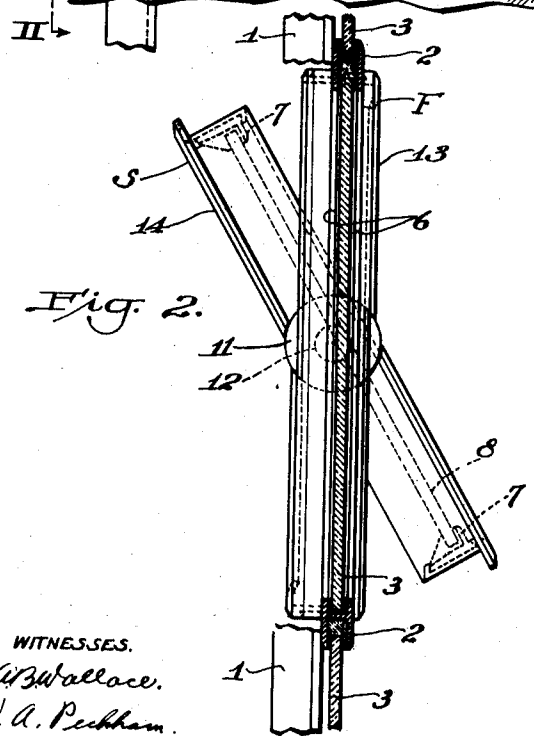


Fig. 2.

WITNESSES.
A. B. Wallace.
V. A. Peckham.

BY

INVENTOR.
Emil K. Geyser
Brown, Critchlow & Flick
his ATTORNEYS.

Nov. 10, 1942. E. K. GEYSER 2,301,694

METHOD OF MAKING WINDOW STRUCTURES

Filed Aug. 30, 1940 2 Sheets-Sheet 2

Fig. 5.

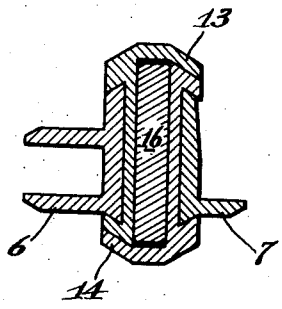


Fig. 3.

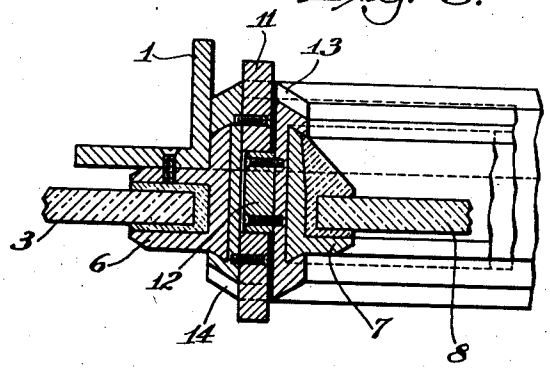
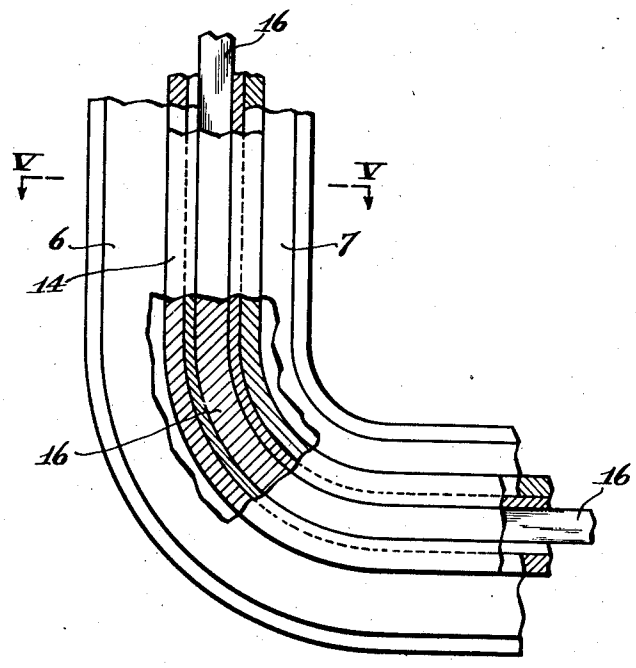


Fig. 4.



WITNESSES.
A. H. Wallace.
V. A. Peckham

BY

INVENTOR.
Emil K. Geyser
Brown, Critchlow & Flick
his ATTORNEYS.

Patented Nov. 10, 1942

2,301,694

UNITED STATES PATENT OFFICE

2,301,694

METHOD OF MAKING WINDOW STRUCTURES

Emil K. Geyser, Pittsburgh, Pa.

Application August 30, 1940, Serial No. 354,820

2 Claims. (Cl. 153—11)

This invention relates to a method of making metal frames, more particularly window frames and sashes, and to the frames made by this method.

In making metal frames it is the general practice to cut metal strips or bars to the lengths of the sides and ends of the desired frame and then connect them together at the corners in some suitable manner. This requires considerable labor and it is difficult to make strong and neat connections. When the frame, or metal strip from which it is made, is quite thin the strip is some times bent to form arcuate frame corners. In such a case the frame is continuous except at the ends of the strip which may be joined together at a point other than at a corner. This practice is all right with thin strips, but when the thickness of the frame becomes greater the difficulty in bending the strip to form satisfactory arcuate corners increases. That is, the inner portion of the frame is likely to buckle and the outer portion to stretch out of shape.

It is among the objects of this invention to provide a method of making metal frames which permits relatively thick frames to be provided with arcuately bent corners of proper contour. Another object is to provide a method of making a window structure in which the inner and outer frames are spaced uniformly from each other. A further object is to provide a frame or window structure having relatively sharply bent arcuate corners.

In accordance with this invention a plurality of metal strips are placed face to face in longitudinal sliding relation. These strips are then bent simultaneously to form arcuate frame corners which are sharper than could be bent satisfactorily from a single metal strip as thick as the frame. This is because the strips slide upon each other while being bent and therefore do not buckle or stretch appreciably at the corners. In making a window structure in which it is desired that the sash be spaced a uniform distance from the surrounding frame, a pair of metal strips which are disposed in sliding relation as mentioned above are placed against each side of a spacing bar. The strips and bar are then all bent simultaneously to form arcuate corners, the strips sliding longitudinally on each other and on the bar. The spacing bar is then removed. Preferably, one edge of the frame and sash is provided with a flange that overlaps the corresponding edge of the other member and is provided along its inner surface with a channel for receiving that corresponding edge.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a fragmentary front view of a window construction including my frame and sash in the form of a ventilator; Fig. 2 is an end view of the ventilator taken on the line II—II of Fig. 1 but showing the sash swung to an open position; Fig. 3 is an enlarged horizontal section taken on the line III—III of Fig. 1; Fig. 4 is an enlarged front view of a corner portion of the frame and sash at the time of bending the corner; and Fig. 5 is a horizontal section taken on the line V—V of Fig. 4.

Referring to Figs. 1, 2 and 3 of the drawings, my window frame F and sash S are shown, for the purpose of illustration only, in the form of a ventilator in which the sash is tiltable on a horizontal axis (Fig. 2). This ventilator is adapted to be mounted in a window such as shown in my Patent No. 2,201,577. In such a window a plurality of vertical muntins 1 are disposed at horizontally spaced intervals across the width of the window opening. These muntins may be in the form of angle irons each having the outside of one of its flanges facing outwardly. A plurality of horizontal muntins 2 are individually connected to the outer faces of the vertical muntins at vertically spaced intervals, whereby rectangular glass-receiving openings are formed. To facilitate simple and rapid installation of the panes of glass 3 without the use of separate fastening members, each of the horizontal muntins is H-shape in cross section to form upper and lower channels, as shown in Fig. 2. The lower channel is deeper than the upper one so that the upper edge of a pane of glass can be inserted in the lower channel of a muntin, raised therein until the lower edge of the glass clears the muntin below it, and then lowered into the shallow upper channel of the latter muntin with the upper edge of the glass still retained in the deeper bottom channel of the upper muntin. The panes of glass in each row are of sufficient length to partially overlap the vertical muntins, and the space between them is filled with putty which may be covered over with a facing member if desired. The space between the horizontal edges of each pane of glass and the flanges of the supporting muntins is likewise filled with putty for sealing purposes. This putty can be placed in the channels before the glass panes are inserted and retouched after the glass has been set.

In Fig. 1 the ventilator frame is shown mounted in one of the rectangular openings that otherwise would be occupied solely by a pane of glass,

but it will be understood that, depending on its size, the ventilator might occupy more than one of such openings. The frame F overlaps two vertical muntins 1 and is rigidly connected thereto by any suitable fastening means. The horizontal muntins do not extend across the space between these two vertical muntins, but are provided with ends that substantially meet and conform to the adjacent corner portions of the ventilator frame. The outside of the frame is surrounded by a pair of parallel flanges 6 that are spaced apart the same distance as the flanges of the horizontal muntins and that form a frame-surrounding channel of the same depth as the lower channel in the muntins. The channel thus formed along the bottom of the frame is aligned with the lower channels of the horizontal muntins at each end of the bottom of the frame whereby a continuous channel is formed across the window. The tops of the flanges across the top of the frame are aligned with the tops of the horizontal muntins at each end thereof. Although this top channel may be deeper than the upper channels of the adjacent muntins, it can be made substantially the same depth by filling it in with putty. The glass panes above and below the frame can thus be set in place in the same way as in the other rectangular openings in the window structure. The panes at the sides of the ventilator frame are likewise set in place in this same manner, but must then be moved horizontally into the vertical channels in the sides of the frame. The sash has an inwardly projecting flange 7 to aid in retaining a pane of glass 8 therein.

The sash and frame have a space between them to permit swinging of the sash and to trap moisture. The pivot means for the sash can be located in this space at the opposite sides of the ventilator. Each pivot preferably takes the form of a pair of concentric discs 11 and 12 (Fig. 3) one being connected to the frame and the other to the sash, and one being rotatable relative to the other.

The space between the sash and frame is closed, when the window is shut, by lateral flanges 13 and 14 (Figs. 2 and 3) that project from opposite edges of the frame and sash, respectively, and overlap the adjacent unflanged edges of each other. A more weather tight joint is formed by beveling the unflanged edge of each member and providing the cooperating flange with a rearwardly extending portion overlapping the beveled edge, as shown in Fig. 3. In other words, the flange has an inside channel that receives the edge of the other member.

It will be seen from Fig. 1 that there are no joints at the corners of the ventilator, but that they are arcuate and continuous. Such corners are formed by making the frame and sash from metal strips that are bent in a suitable bending machine to provide corners. It will also be observed that the corners are relatively sharp for the combined thickness of the frame and sash as measured in the plane of the glass. This is likewise true of the frame or sash even if considered alone. In spite of their sharpness the corners are satisfactory, by which is meant that the inner flanges of the frame and sash are not buckled and their outer flanges are not stretched out of shape. The feature of this invention that makes such corners possible is the formation of both the sash and frame from a plurality of, preferably two, straight metal strips of the proper contour disposed face to face in longitudinal sliding relation. The sliding connection can be produced conveniently by joining the strips together throughout their length by a dove-tail joint, as shown in Fig. 3. The connected strips are then bent simultaneously to form corners. As they can slide upon each other during bending, neither one is subjected to the distortion that otherwise would occur if a single strip as thick as both of them were used.

This method of forming the corners also makes it possible to make the frame and sash at the same time because, due to the sliding relation of the strips, the bending of the outermost strips has no effect on the bending of the innermost. Simultaneous bending of sash and frame is desirable in order to insure a good fit between them. That is, if there is an irregularity in the corner of one member there will be a corresponding irregularity in the other, so they will still fit. In order to provide the space between the sash and frame a straight spacing bar 16 is first placed between them at each point where a corner is to be formed, and the bar is bent with the other members and slides lengthwise thereon during the bending, as shown in Fig. 4. The bar fills the rectangular space between sash and frame, as shown in Fig. 5. After the bending has been completed the spacing bar is removed and either discarded or straightened and used again.

A window structure can be quickly and easily made by the method disclosed herein because both sash and frame are formed simultaneously by a single bending operation with only one or two joints. That is, they can be formed in separate upper and lower halves joined together at the pivots, or in one unit joined at its ends at one of the pivots. This does away with the difficulty of making satisfactory and weather tight corner joints.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. The method of making a window structure in which a sash is spaced uniformly from a surrounding frame, comprising placing metal strips against opposite faces of a spacing bar in longitudinal sliding engagement therewith, bending the bar and strips simultaneously to form sharply bent arcuate corners, and then removing said bar.

2. The method of making a window structure in which a sash is spaced uniformly from a surrounding frame, comprising placing a pair of metal strips face to face in longitudinal sliding relation, placing another pair of metal strips face to face in longitudinal sliding relation, placing a spacing bar between said two pairs of strips in longitudinal sliding relation relative thereto, bending the bar and strips simultaneously to form an arcuate corner whereby the strips and bar slide longitudinally on one another, and then removing the bar.

EMIL K. GEYSER.