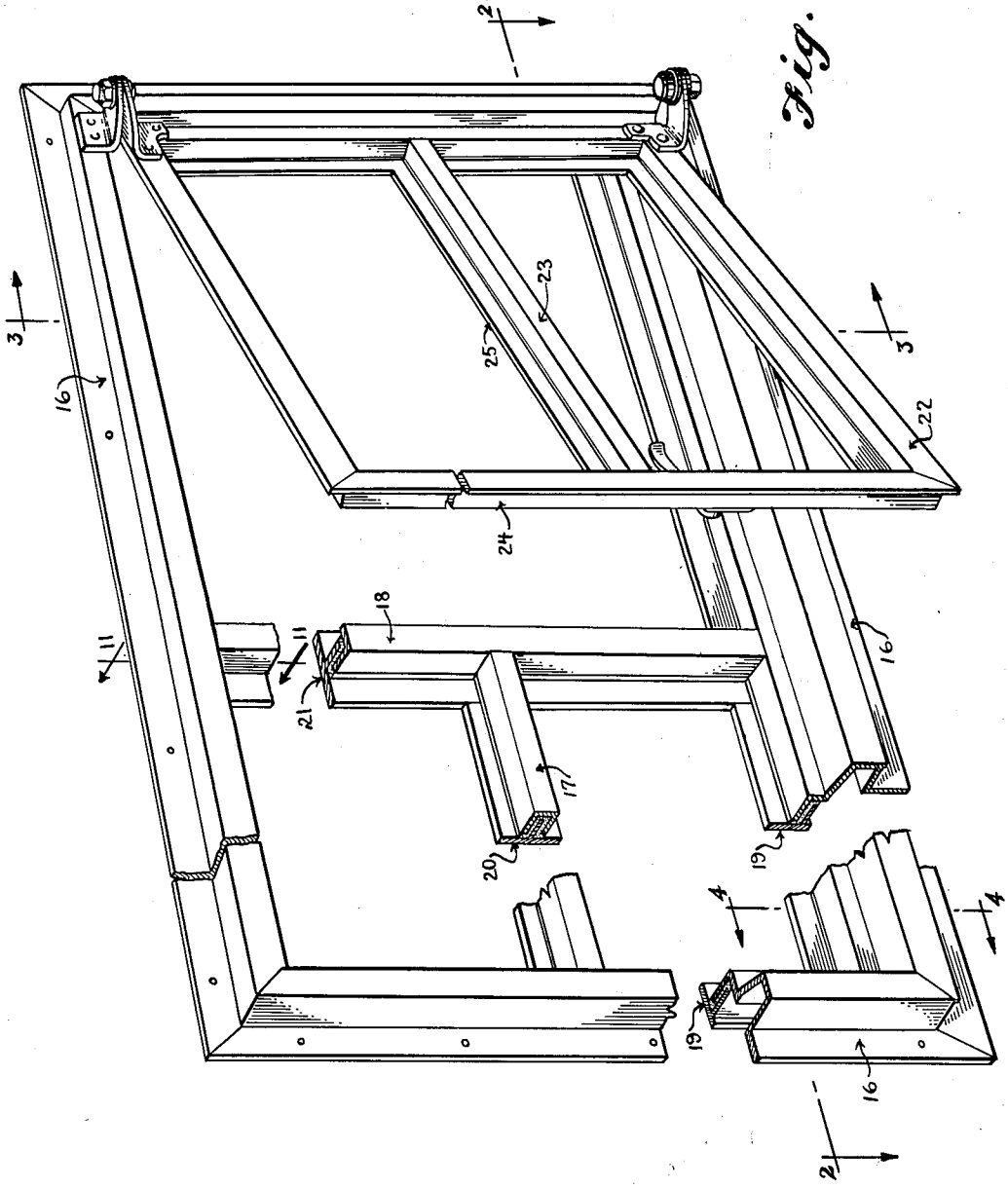
Feb. 14, 1956 E. L. ANDERSON 2,734,601

INSULATED WINDOW

Filed April 3, 1950 5 Sheets-Sheet 1

Fig. 1




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INSULATED WINDOW

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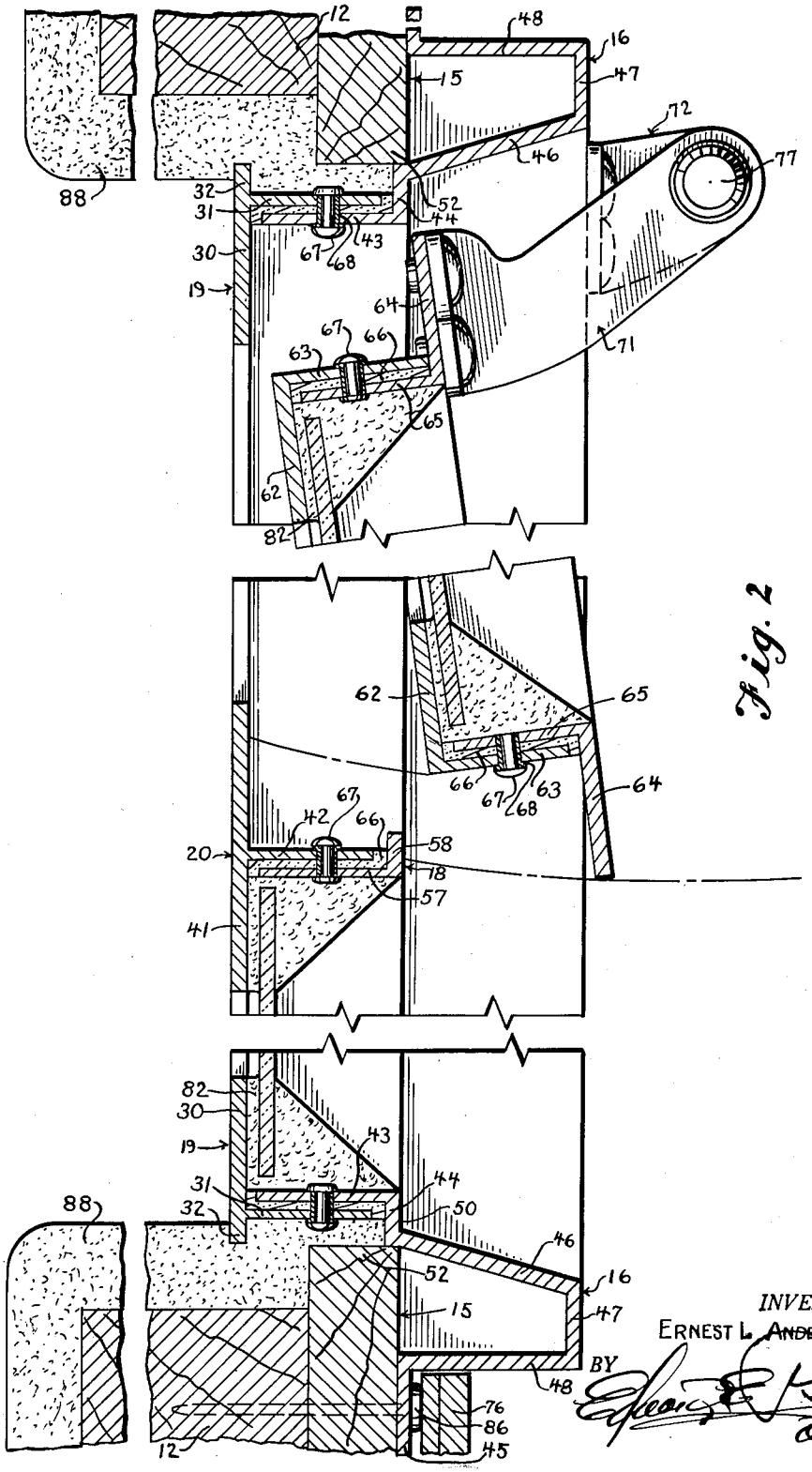



Fig. 2

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INSULATED WINDOW

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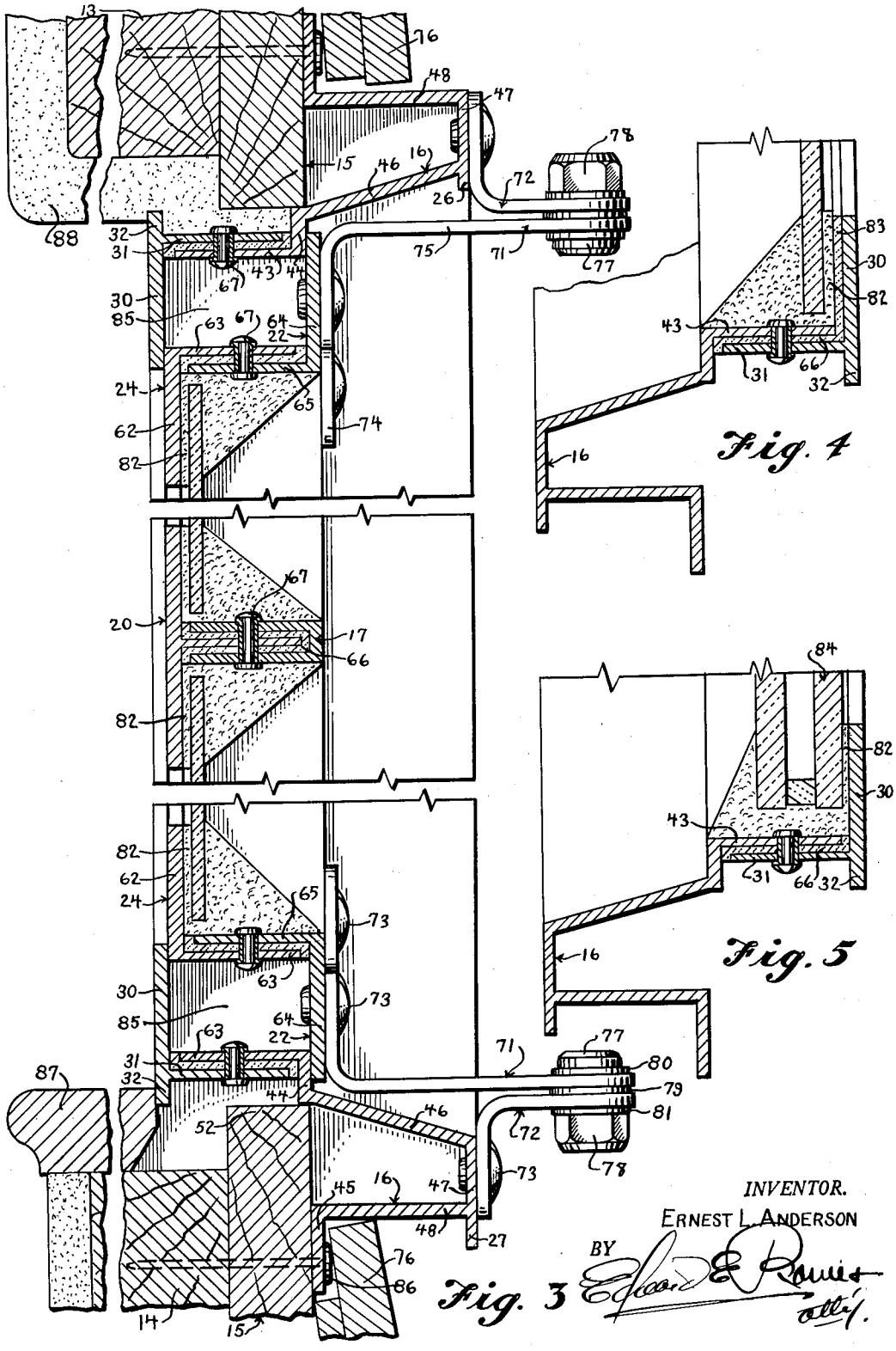






Fig. 4




Fig. 5

Fig. 3

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Feb. 14, 1956 E. L. ANDERSON 2,734,601

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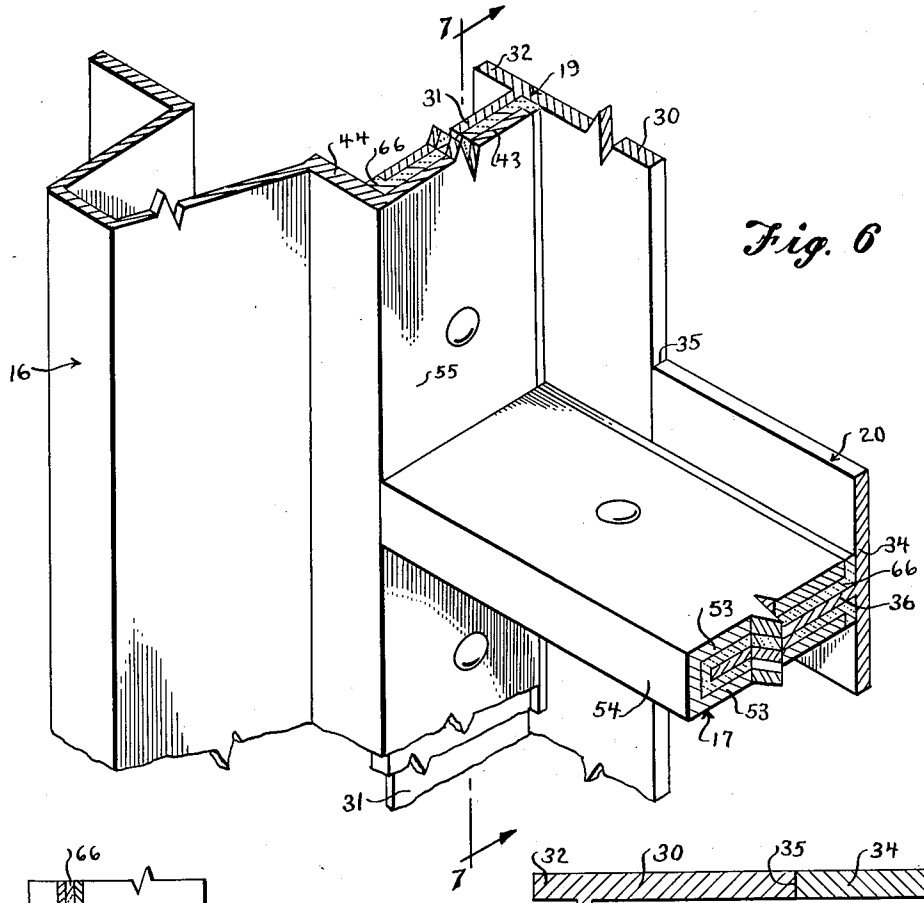



Fig. 6

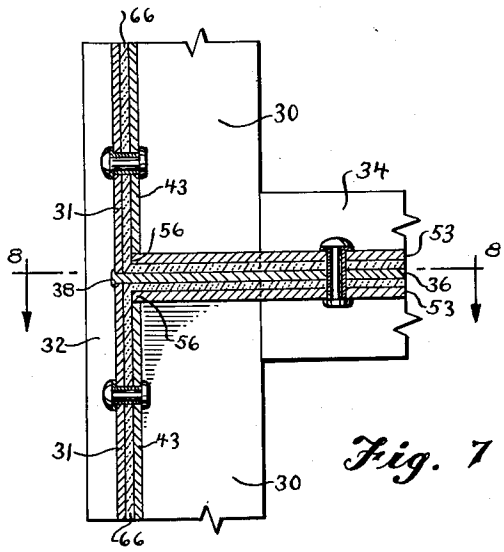



Fig. 7

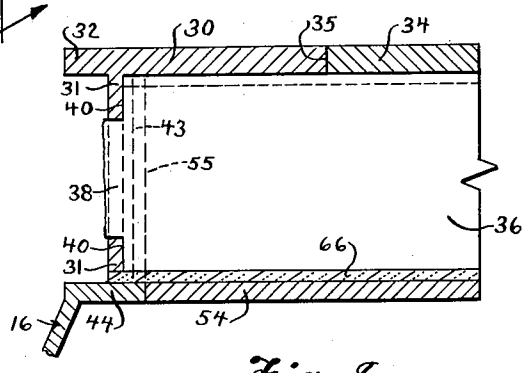



Fig. 8

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INSULATED WINDOW

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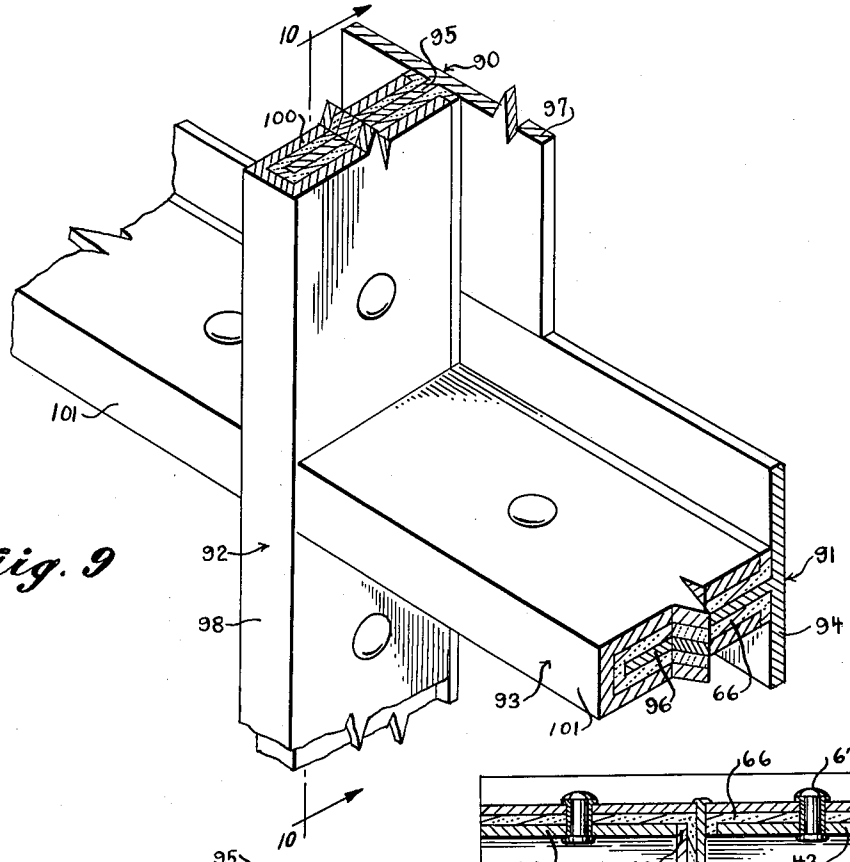



Fig. 9

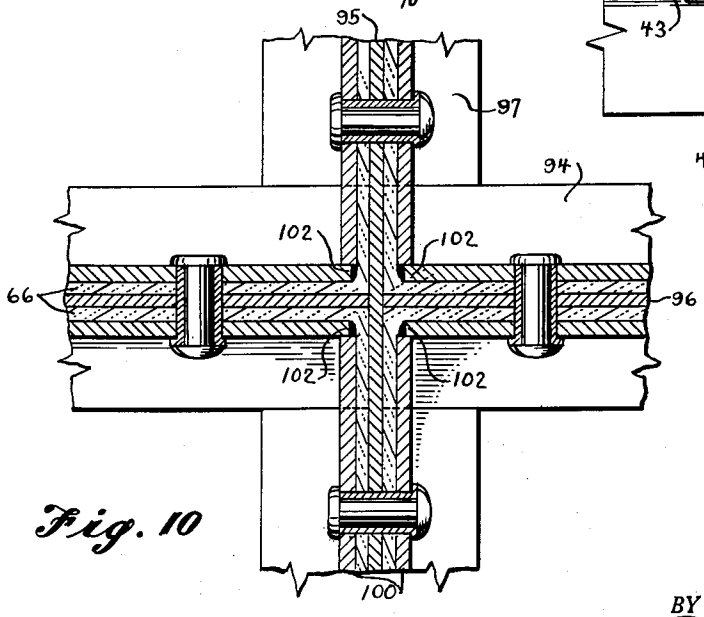



Fig. 10

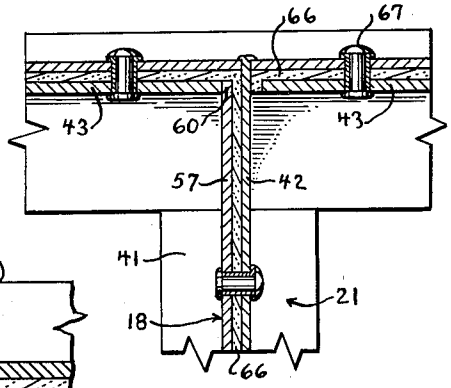



Fig. 11

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United States Patent Office 2,734,601 Patented Feb. 14, 1956



2,734,601

# INSULATED WINDOW

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Application April 3, 1950, Serial No. 153,697

4 Claims. (Cl. 189—75)

This invention relates to metal windows, and has for its general object the provision of a metal window so insulated as to be sweat-proof.

Metal windows have met with increasing popularity in recent years, especially with the advent of aluminum windows. However, in some localities such have had one distinct disadvantage as compared with wooden sashes, and namely in colder climes wherein the differential between the temperature on the outside and that which obtains within the room is so great that the inside surface of the window frame becomes sufficiently cold, due to conduction from the outside, as to cause inside air adjacent the frame to cool below its dew point and create condensation on the inside surface of the frame. Such sweating is, of course, extremely undesirable because the collecting condensation drips off the window frame and not infrequently defaces adjacent plaster and trim. While sweating of the actual window glass can be prevented by using the well known "Thermopane" which comprises two spaced sheets of glass sealing an intervening air space, there has been, prior to my invention, no solution toward correcting a tendency of the window frame proper to sweat.

As a further and particular object, this invention aims to provide a sweat-proof window which admits of having a movable panel for ventilation purposes.

Still a further object of my invention is to provide a metal window which lends itself to use in buildings having a variety of frame and mortar constructions and having variously designed inside casings and trim.

This invention has as a still further object the providing of a perfected metal window which is of simple and economical construction.

With the foregoing and other still more particular objects and advantages in view, the invention consists in the novel construction and in the adaptation and combinations of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a perspective view of an unglazed window constructed in accordance with the teachings of my invention and showing the vent partially opened and certain of the frame members broken away.

Fig. 2 is a fragmentary horizontal section on the line 2—2 of Fig. 1 showing a glazed window installed in a building structure.

Fig. 3 is a fragmentary vertical section on the line 3—3 of Fig. 1 excepting that the window is glazed and the vent is shown closed, the window being installed as in Fig. 2.

Fig. 4 is a sectional view of Fig. 1 showing the window glazed and modified to the extent that the outside surface of the inturned flange of the border frame is completely covered with insulation.

Fig. 5 is a sectional view taken on the same section line as that of Fig. 4 and illustrating the window glazed with "Thermopane."

Fig. 6 is a fragmentary perspective view portraying the juncture of the mullion and border frame.



Fig. 7 is a vertical section on line 7—7 of Fig. 6.

Fig. 8 is a horizontal section on line 8—8 of Fig. 7.

Fig. 9 is a fragmentary perspective view showing the juncture of two mullion bars not otherwise illustrated.

Fig. 10 is a vertical section on line 10—10 of Fig. 9; and

Fig. 11 is a fragmentary vertical section on line 11—11 of Fig. 1 and illustrating the juncture of the single meeting rail and the border frame.

The present window is of that type wherein the frame and sashes are integral and is designed especially for building structures having framed walls providing window openings which, where the openings are rectangular, are defined by vertical jambs 12—12 (Fig. 2), a header 13, and a bottom plate 14 (Fig. 3). As the great majority of windows are rectangular, I have selected this shape for purposes of illustration, but it is self-evident that the invention is applicable as well to other shapes of windows. The wall studding is generally sheathed on the outside with shiplap 15 and such is preferably extended a slight distance beyond the member 12, 13 and 14 toward the center of the window, as illustrated in Figs. 2 and 3. The shiplap is covered with shingles 76, or any other suitable facing material such as wood sidings, bricks, or stucco.

As an example of my invention, I have illustrated in the drawings a ventilating window having a two-light hingedly mounted vent frame and a two-light stationary sash. There are a multitude of possible combination vent-and-stationary sash arrangements for windows and the one disclosed herein is intended solely as an example and not as a limitation.

Before commencing a detailed description of the invention, and disregarding for a moment the vent frame, it may be helpful to note that my window is designed particularly to be assembled from two individual frame units, hereinafter termed "inside" and "outside" to reflect the relative positions of the frames with respect to the interior of the building to which the window is to be applied. Also, these frames will be hereinafter distinguished from corresponding vent frames by the term "primary." In Fig. 1 the window is viewed from the outside and it will be seen that the unit comprises an outside border frame 16, a mullion U-bar 17, and a single meeting rail L-bar 18. On the other hand, the inside primary unit comprises an inside border frame 19, a mullion T-bar 20, and a single meeting rail T-bar 21. Likewise, the vent frame is formed from outside and inside frame units, the outside vent frame unit comprising an outside border frame 22 and a mullion U-bar 23, and the inside vent frame unit comprising an inside border frame 24 and a mullion T-bar 25.

Cross-sections through the outside and inside vent border frames and the inside primary border frame are different, but each said frame has identical cross-sections at all points along its periphery. The same is true of the outside primary border frame 16 excepting that it is preferably provided at top and bottom with drip strips 26 and 27 to be later detailed. Accordingly, in rectangular ventilating windows disregarding the said drip strips, border frames are each fabricated from four lengths of a corresponding frame bar each having its ends beveled on a forty-five degree angle to form mitered corners when the lengths are assembled and secured together as by welding. In fabricating an outside primary border frame which is provided with drip strips, such as the border frame 16, this procedure is slightly modified in that the ends of the drip strips are cut at ninety degrees. The border frame bars and the other above noted bars are preferably extrusions having the desired cross-section so that normally only cutting and welding operations are necessary to construct the frames.

The extrusions for the inside border frame 19 are sub-

stantially L-shaped in cross-section with one flange 30 being by preference slightly thicker than the other flange 31 to provide a finishing strip 32. When the frame 19 is constructed the lengths of corresponding frame bar are arranged with the flange 30 inturned to form a continuous coplanar flange. With such an arrangement the other flange 31 perforce is directed toward the outside of the window and is continuously at right angles to said inturned flange.

The juncture of the mullion T-bar 20 and the inside primary border frame is best disclosed in Figs. 6 to 8. The end of the arm 34 of the T-bar is given a rabbet cutback approximating the width of the inturned flange 30 of the inside border frame to provide a shoulder 35 abutting the inturned edge of the flange 30 and permitting the back edge of the leg 36 of the T-bar to engage the outside face of the said flange. The end of the leg 36 is necked to form a tongue 38 lying between two shoulders 40 (Fig. 8) and this tongue is received in a mating slot in the flange 31 of the inside border frame. The end of the tongue is peened to hold the T-bar in position. The juncture of the ends of the single meeting rail T-bar 21 and the inside border frame is identical to the above described juncture of said inside border frame with the mullion T-bar. The juncture of the two T-bars 20 and 21 is also identical, the arm 41 and leg 42 of the T-bar 21 corresponding respectively to the flanges 30 and 31 of the inside border frame.

The outside border frame is fabricated from three slightly different extrusions, one for the side jambs, one for the head, and one for the sill, all three having in common an L-section presenting a relatively wide flange 43 and a thicker and narrower flange 44, a moulding commencing at the foot of the narrow flange and extending oppositely from the wide flange, and a terminal nailing strip 45 parallel to the narrow flange. The moulding is so formed as to provide a sloping inner wall 46 contiguous with the narrow flange, a front wall 47, and an outer wall 48 joining the nailing strip. The latter is preferably outset slightly with respect to the flange 44 so that the front face of the said flange and the back face of the nailing strip are coplanar. Such offset is provided so that the foot of the flange 44 will rest against the projected edges 52 of the shiplap when the window is installed as shown in Figs. 2 and 3. The frame bar extrusions for the head and sill of the outside border frame are each provided with a respective drip strip, aforementioned, and formed as a prolongation of the front wall 47 of the moulding. As best seen in Fig. 3, the head drip 26 extends in a direction opposite to that of the nailing strip, while the sill drip 27 extends in the same direction as the nailing strip. The outside border frame is assembled so that the flange 43 lies innermost and the nailing strip lies outermost.

The mullion U-bar 17 has its parallel legs 53 spaced a distance appreciably exceeding the thickness of the leg 36 of the mullion T-bar to provide space for insulation when the U-bar is placed in surrounding relation to the T-bar leg, as will later be described. Proceeding to the juncture of the U-bar and the outside primary border frame, the front flange 54 connecting the parallel legs of the U-bar is rabbeted an amount equal to the thickness of the flange 43 to form an abutment shoulder 54 (Fig. 8) for engaging the outer edge of the inturned face 55, and forming two spaced and parallel tongues 56 at the ends of the parallel legs 53 of the U-bar. The flange 43 is notched throughout its entire width, the width of the notch corresponding to the distance between the outside faces of the tongues 56. Into this notch the tongues are placed as best shown in Fig. 7. Since the length of the tongues does not exceed the depth of the flange 43 they do not extend past such flange. The juncture of the other end of the mullion U-bar and the single meeting rail L-bar are identical to that just described, the legs 57 and 58 of the L-bar corresponding to the flanges 43 and 44, respectively, of the outside primary border frame.

The junctures of the ends of the single meeting rail L-bar 18 and the outside primary border frame 16 is similar to that of the U-bar 17, especially in that the short leg 58 of the L-bar is rabbeted identical to the front flange 54 of the U-bar to form a tongue 60 at each end of the long leg 57. As can best be seen in Fig. 11, the flange 43 of the outside border frame is notched to a width equal to the sum of the thickness of the long leg 57 of the U-bar, and the leg 42 of the T-bar 21 plus twice the thickness of the insulation to be used and later described. The tongue 60 extends into the notch opening a distance closely approximating the thickness of the flange 43.

The vent frame unit is also assembled from separate inside and outside frames, such frames each including a border frame fabricated from angle-bar stock. The inside border frame 24 of the vent has one of its flanges 62 inturned and the other 63 directed outside, such flanges corresponding, respectively, to the inturned flange 30 and the flange 31 of the primary inside border frame 19. The outside border frame 22 of the vent is, on the other hand, conversely placed, and this is to say that one flange 64 is out-turned and the other flange 65 is directed inside so that these flanges 64 and 65 bear the same relationship, one to another, as do the flanges 44 and 43, respectively, of the primary outside border frame. These similarities between the outside and inside border frames of the primary and vent frames are pointed out because if the decorative effect of the outside moulding were not desired the vent-type border frame could be employed in and of itself as the primary border frame with the flange 64 then serving as a nailing strip.

The size of the primary border frame is perforce governed by the size of the window opening in the wall structure to which the window is to be installed and in this regard it is necessary that the perimeter of the outside primary border frame 16 measured along the foot of the flange 44 thereof be not greater than the perimeter of the window opening defined by the projected ends 52 of the shiplap. It is also necessary that the perimeter of the inside border frame 19 measured along the flange 31 exceed that of the corresponding measurement of the flange 43 of the outside border frame so that when these flanges 31 and 43 are overlapped in a concentric relationship they will be spaced apart as an allowance for insulation.

Referring now to the dimensions of the vent frames it will be apparent that the free-edge perimeter of the outturned flange 64 of the outside vent frame must slightly exceed the perimeter of the opening circumscribed by the short leg 58 of the single meeting rail L-bar on one side and the flange 44 of the primary outside border frame on the other three sides so that the outside vent frame will overlap when it is installed and in a closed position. Likewise, the outermost perimeter of the inside vent frame must slightly exceed the vent opening defined by the arm 41 of the single meeting rail T-bar 20 on one side and the inturned flange 30 on the other three sides so that the inside vent frame will overlap when the vent is closed. The vent flanges 63 and 65 are so dimensioned that they can be placed in a concentric spaced relation when assembled together to permit insulation to be carried therebetween.

Before mating the outside and inside frames of the primary and vent frames a layer 66 of insulation is placed over the portions of one or the other of said frames which would otherwise directly engage the mating frame. It is usually easier to cover the inside frame members and accordingly the legs of the T-bars and the inner faces and free ends of the flanges 31 and 63 must be covered. In covering these legs and flanges the insulation should extend over a slight amount onto the outside faces of the arms of the T-bars and the inturned flanges 30 and 62 to protect such from the free ends of the U-bar arms and the

flanges 43 and 65, respectively, when the frames are later united.

A wide variety of insulating materials are applicable. Strips of asbestos are satisfactory and in such case it is expedient to cement the strips to the inside frame members. Suitable extrusions of a comparatively rigid insulation such as "Bakelite" can be utilized. A further alternative is the use of one of the insulating compounds which can be painted on the surfaces in liquid state and thereafter harden as an insulating coating.

After the insulation has been applied the outside and inside primary frames are set together with the flanges 31 and 43 in concentric relation, the mullion U-bar surrounding the mullion T-bar, and the single meeting rail L-bar overlying the free edge and one face of the leg of the corresponding T-bar. The frames are then secured together by rivets 67 spaced at regular intervals along the border, the mullion and single meeting rail of the window. The rivets are conventional but are each sheathed with a sleeve 68 formed from insulating material, "Micarda" for example, the sleeve having an annular flange on one end serving to insulate the head of the rivet from the adjacent frame member. These sleeves prevent the conduction of cold by the rivets from the outside frame to the inside frame. It might be here noted that these insulating sleeves are not necessary except where extreme cold is experienced because the amount of cold conducted from the outside frame solely through the rivets is normally not sufficient to lower the inside frame temperature to a point whereat sweating will occur. The inside and outside vent frames are placed together and riveted in like manner.

The vent is mounted for swinging movement and such is preferably accomplished by the use of a pair of hinge brackets 71 and 72 secured by rivets 73 to the out-turned flange 64 of the outside vent frame and to the front wall 47 of the primary outside frame, respectively. Each bracket 71 comprises a vertical arm 74 recessed at one corner so as to fit around the corner of the continuous outturned flange 64, and a horizontally extending arm 75 having its free end offset to the outside of the vertical flange as can best be seen in Fig. 2. The brackets 72 are angle brackets and the horizontal arms thereof are shorter than those of the other brackets 71 in an amount equaling the spacing of the front wall 47 from the flange 44 of the primary outside border frame. The free ends of the horizontal arms of both pairs of brackets are apertured and when assembled with intervening spacing washers 79 are fitted with threaded hinge bolts 77 carrying the lock nuts 78 on their free ends, the bolt heads and the said nuts being relieved against frictional contact with the brackets by washers 80 and 81.

As illustrated in Figs. 2 and 3, the window may be glazed in the conventional manner. The inturned flanges 30 and the arms of the T-bars 20 and 21 serve to support the panes for the stationary openings against movement perpendicular thereto with the inturned vent flanges 62 and the arm of the T-bar 25 functioning in like manner. It is important to note that in the glazing operation a layer 82 of putty is placed between the pane and the above-said inturned flanges and arms and this layer performs the vital function of insulating them from the pane. In other words, this layer of putty insulates the panes from the inside border frames. If such layer is not deemed sufficient in some localities a coating 83 of insulation can be placed over the said flanges and arms before the puttying operation as illustrated in Fig. 4. To prevent sweating of the pane in cold climates it is desirable to use "Thermopane" 84, as shown in Fig. 5.

It is extremely important to note that when the vent is closed as in Fig. 3, a continuous channel 85 of air is trapped between the vent and the surrounding portion of the primary frame unit. This air channel functions to sufficiently insulate the primary and vent inside frames from the portions of the primary and vent frames which partially surround the air channel.



The completed window is held in position in the wall opening by nails 86 passing through the nailing flange 45 and the shiplap and into the header 13, side jambs 12, or base plate 14. The nails are aided in their function by the foot of the flange 44 which rests against the projected ends 52 of the shiplap. An attractive inside appearance is attained by resting the stool 87 against the finishing strip 32 and by dressing the plaster 88, at the sides and head of the window, against the said strip.

When more than a two-light window is desired it may be necessary to cross two mullion bars and such a juncture is illustrated in Figs. 9 and 10 wherein the T-bars 90 and 91 are parts of an inside frame and the U-bars 92 and 93 are parts of an outside frame. The arm 94 of the horizontal T-bar 91 and the leg 95 of the vertical T-bar are continuous whereas the leg 96 of the former is rabbeted throughout its width to receive the continuous leg 95 of the vertical T-bar, and the arm 97 of the vertical T-bar is rabbeted to receive the continuous arm 94 of the horizontal T-bar.

The connecting wall 98 of the vertical U-bar is uninterrupted but the parallel arms 100 thereof are each interrupted by a notch having a width corresponding to the thickness of the horizontal U-bar. The horizontal U-bar is completely severed at the joint and each severed end thereof is joined to an arm 100 of the vertical U-bar in the same manner that the U-bar 17 is joined to the flange 43 of the primary outside border frame as illustrated in Figs. 6 and 8 aforedescribed. In other words, the front wall 101 of each horizontal U-bar section is rabbeted back a distance approximating the thickness of the parallel arms 100 to form tongues 102 at the end of the parallel legs of the horizontal U-bar. These tongues extend into the notches in the arms of the vertical U-bar and are preferably welded thereto as shown. Insulation 66 is applied as before and the bars are then assembled with the U-bars surrounding the legs of the T-bars and being separated therefrom by the insulation.

The advantage of the invention will, it is thought, have been clearly understood from the foregoing detailed description of the embodiments which I have elected to illustrate. Minor changes in the details of construction will suggest themselves and may be resorted to without departing from the spirit of the invention, wherefore it is my intention that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language admits.

What I claim is:

1. An insulated window comprising two overlapping frames, one said frame presenting a continuous coplanar flange defining an opening, a continuous nonplanar flange circumscribing said opening, and a length of T-bar bridging the opening and having the ends of its leg flange secured to the said nonplanar flange and the ends of its arm flange rabbeted back and abutting the inner edges of the said planar flange, the other said frame providing a continuous flange concentric to and spaced inwardly from the said nonplanar flange and provided with notches receiving the leg of the said T-bar, and providing a length of U-bar surrounding the said leg and secured at its end to the notched flange, insulation separating said frames, and means holding said frames together.

2. An insulated window comprising two overlapping frames, one of which presents an inturned continuous flange defining a light opening, insulation separating the overlapping portions of the frames, a T-bar traversing said light opening and secured to the frame which presents the inturned continuous flange, insulation separating the T-bar from the other frame, a U-bar surrounding the leg of the T-bar, insulation separating the T-bar and the U-bar, and means holding the frames together and the U-bar and T-bar together.

3. In an insulated window providing a vent opening, two overlapping frames, one of which presents an in-

turned continuous flange defining a light opening, insulation separating the overlapping portions of the frames, a T-bar traversing said light opening and secured to the frame which presents the inturned continuous flange, insulation separating the T-bar from the other frame, an L-bar overlapping one face and the free end of the leg of the T-bar, insulation separating the T-bar and L-bar, and means holding the frames together and the T-bar and L-bar together.

4. An insulated window comprising an inside frame and an outside frame in overlapping relation, the inside frame presenting a continuous inturned flange occupying a common plane and defining a light opening and said inside frame also presenting a continuous flange directed outwardly and perpendicular to the said common plane, the outside frame presenting a continuous inwardly directed flange concentric to and spaced toward the center of the window from the last-said continuous flange and said outside frame also presenting a continuous out-turned marginal nailing strip occupying a common plane and extending laterally beyond the inside frame, insulation separating said frames, means holding said frames together, a pane covering said light opening, and putty insulating between said pane and the outside exposed face of said continuous inturned flange and arranged to hold said pane in position.




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