

Feb. 7, 1956

P. J. MORRA  
WINDOW FRAMING

2,733,787

Filed Nov. 19, 1951

3 Sheets-Sheet 1

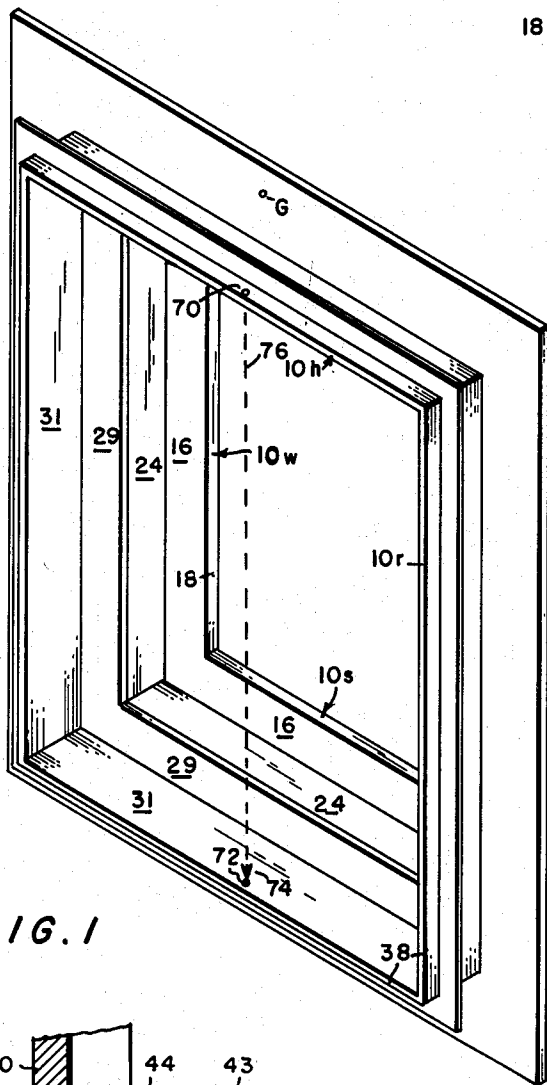


FIG. 1

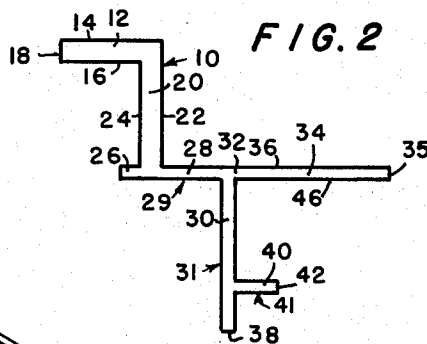


FIG. 2

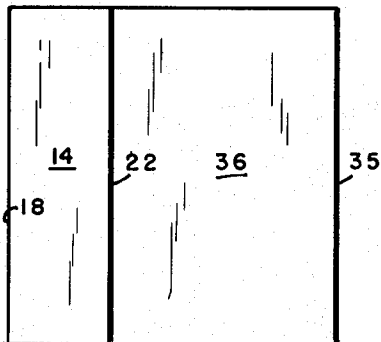


FIG. 3

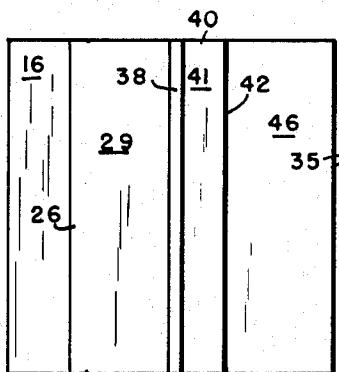


FIG. 4

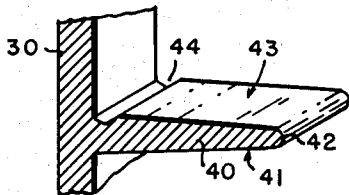


FIG. 2a

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3 Sheets-Sheet 2

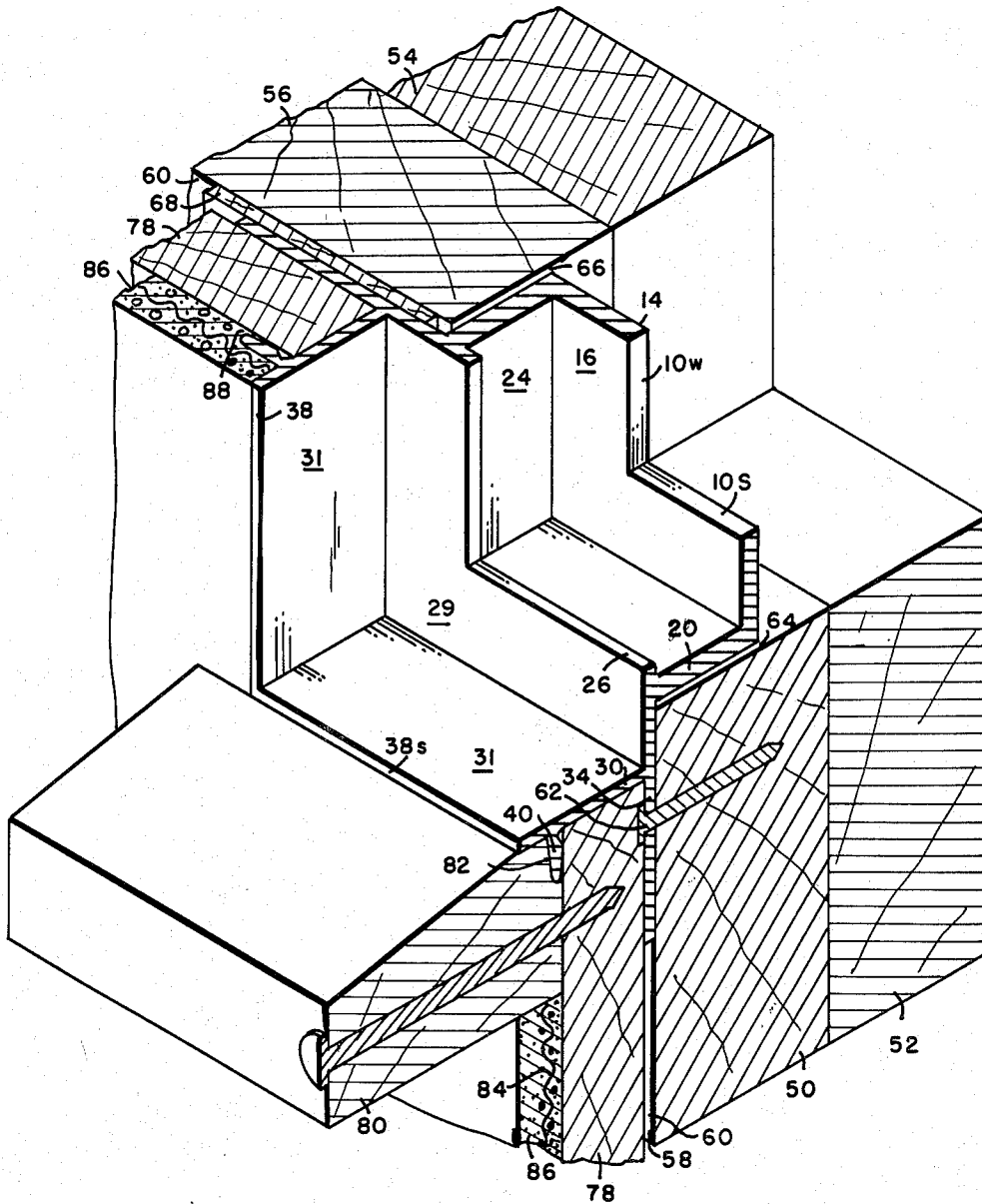


FIG. 5

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3 Sheets-Sheet 3

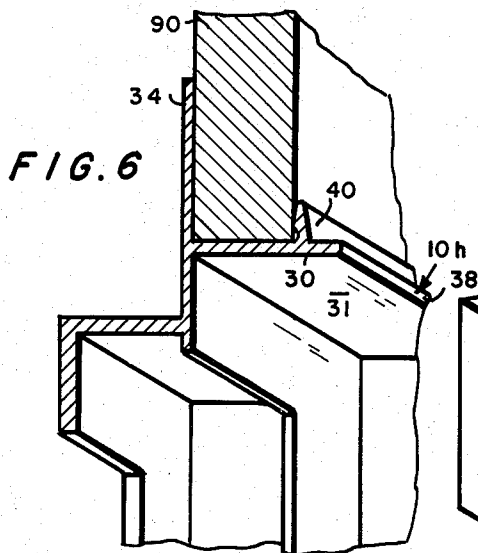


FIG. 6

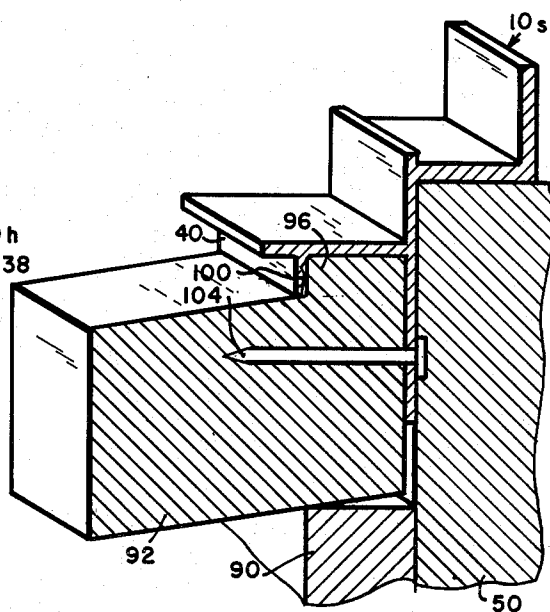


FIG. 7

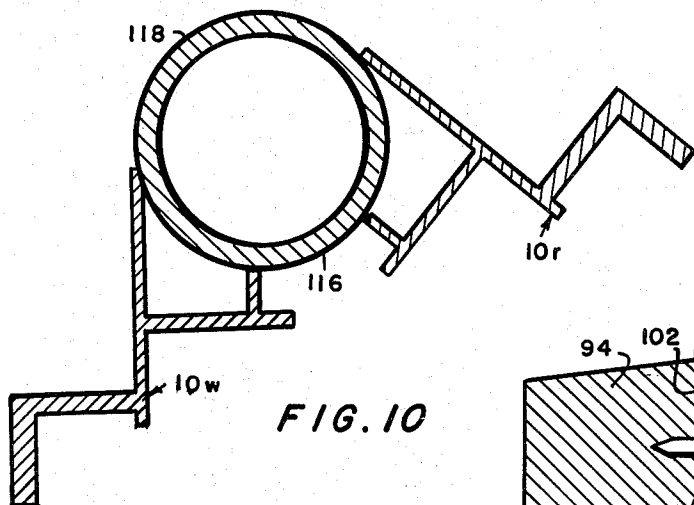


FIG. 10

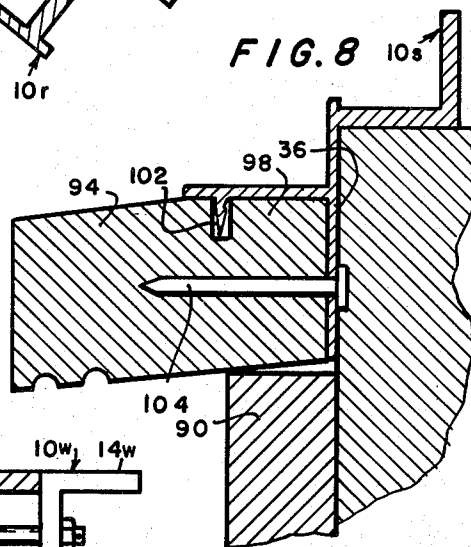


FIG. 8

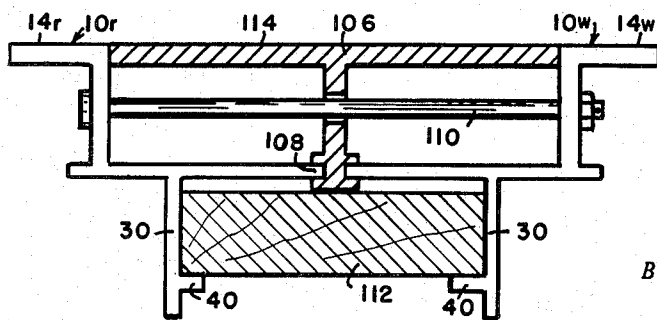


FIG. 9

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2,733,787

WINDOW FRAMING

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2 Claims. (Cl. 189—75)

This invention is in window construction.

It is a main object of the invention to provide a window construction in buildings which requires a minimum of fabrication effort, particularly at the building side. One of the features of this invention is that a maximum part of the window frame is preferably a factory accurately made unit there fabricated of rigid metal bar. The invention further includes a bar which is first formed in an extrusion mill where the metal is distributed in the bar in the exact thickness and shape needed. This bar is subsequently cut into parts of required lengths and shapes to fit the design of a window, and the parts are integrated to form the rigid metal window frame of this invention, the integration being effected under factory conditions such that precision of the fitting may be subjected to efficient control.

The construction of the bar and resultant window frame are such that the frame itself, as completed in the factory, may be used for accurately placing the window true for level and alignment with respect to the main house studding and the like independently of inaccuracies in the wood surrounds. It is particularly to be noted that the house framing itself is regarded as a relatively rough job of carpentry, partially because appearance is unimportant in the framework, and it results accordingly that the portions of the studding forming the base for window frames are at least partially out of true as respects level, alignments with other windows, and doors and the like.

It is one of the advantages of this invention that the rigid metal window frame itself may be oriented on and with respect to the house wood frame independently of the accuracy of construction of the house frame portions to be associated with the metal window frame. This orientation usually may be effected by the use of but two or three nails and shims, serving to fix the metal window frame in rigid relation to the house wood frame. Once oriented, adequate additional securement to carry the window load is provided with a minimum of nails or screws.

It is a further feature of this invention that the frame as formed may be used in externally stuccoed buildings with the advantage, among others, that the metal frame forms a molding rail having a uniform projected distance from the sheathing surrounding the window against which rail the stucco is finished using the rail as a terminal gauge for the stucco finish plane. The rail also forms a neat window trim. These features reduce the skills required of the installers and save their time.

In stucco construction the house frame supports sheathing which in turn forms the base to which wire mesh is fastened in uniformly spaced relation by the use of furring nails. The terminal window abutting edges of the sheathing and of the stucco reinforce wire mesh adjoining window openings are, by the application of features of this invention, covered from view and from access by water and air by window frame constructions of this invention.

Another advantage is that a window provided with the frame of this invention may be satisfactorily entirely trimmed by the metal frame in either of two ways, either where rustic wooded exterior walls constitute the exterior

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finish of the building or where the exterior finish is stucco supported by furred metal lath and rustic sheathing. Either rustic or stucco is relatively low cost construction which is further lowered in cost by the employment of a metal frame which is itself both a weather proofing and a window trimming unit. In addition, the metal frame forms a window header with a pronounced drip concentrating edge which prevents cascading water from running onto the outside of the window glass.

Another feature of the invention is that the frame itself serves as a window sill for greatest economy of construction; or it supplements and adds to the economy in use of materials which include wood in the form of stub sills, these being fastened to the metal frame preferably at the factory, and indirectly joined to the wooden house frame through the metal window frame.

The present metal window framing is such, moreover, that two metal frames may be placed side by side in multiple window arrangements and themselves form a satisfactory interior finish between them, and that supplementary devices may be added in such situations to enhance the finish between window frames so placed.

The metal framing is also so adapted that, by the employment of simple corner shapes, such as cylindrical pipes, two window frames may be rigidly and neatly joined at any angle of a wide range of angles between their plane surfaces.

Other objects and advantages of the invention will become evident from a consideration of the following specifications wherein reference is made to the accompanying drawings for illustrations of the construction and use of the invention, and in which drawings:

Fig. 1 is an isometric view of a metal window frame illustrating a step in the mounting thereof;

Fig. 2 is an end view of the straight bar stock as cut in a plane perpendicular to the straight planes and edges of the bar as shown in Figs. 3 and 4, entirely from which the frame of Fig. 1 is fabricated;

Fig. 2a is an enlarged detail view of a portion of Fig. 2;

Fig. 3 is a view from above Fig. 2 showing a fragment of the bar in plan;

Fig. 4 is a view from beneath Fig. 2 showing the corresponding flat parallel surfaces of the bar;

Fig. 5 illustrates by isometric view my metal window frame construction applying the bar stock of Fig. 2 to form a window frame in a stuccoed exterior and wood frame building;

Fig. 6 illustrates fragmentarily a section through the head of a metal window frame forming the window frame and illustrating window trim, weather seal, and drip edge of a building using only rustic wood finish and also illustrating the base for stucco whereto the furring nails, mesh, membrane, and stucco have not been applied;

Figs. 7 and 8 illustrate fragmentary sill sections of metal frames directly supporting wooden sills, applicable to rustic and stucco building construction;

Fig. 9 illustrates by horizontal fragmentary section, methods of placing metal window frames side by side and methods for providing a flat or continuous interior surface between inwardly forward faces of two adjacent windows; and

Fig. 10 illustrates short radius rigid round corner support for window frames coming together at external corners of buildings having angles less than 180 geometric degrees.

The frame of Fig. 1 is illustrative of that employed in all figures of the drawing and is formed as a rectangularly rigid metal frame of head and sill portions 10h and 10s of equal length and of identical shape preferably mitered at 45 degrees at the ends, and by right and left identical side portions 10r and 10w mitered in like manner, the mitered ends being rigidly integrated as by butt

welding, riveting, or other well understood methods. The frame parts are preferably assembled and united in a suitable jig to insure perfection in registration of corresponding planes of the various bars intended to be coplanar, parallelism of side and horizontal bar elements, and perpendicularity of horizontal and vertical portions. Slight but uniform and advantageous variations may be introduced by such jigs as will be referred to hereinafter.

The bar portions  $10h$ ,  $10s$ ,  $10r$ , and  $10w$  are all completely formed of rigid straight bar stock  $10$  having the section perpendicular to its length shown very closely to scale in Figs. 2 and  $2a$ . The bar  $10$  is a forging, forged of aluminum, aluminum alloy, or other metal or substance having like working properties and having corrosion resistance, luster, and particularly rigidity with considerable elastic resistance to fracture due to impact and normal bending moments. The bar  $10$  is formed by extrusion through a die having the section shown, the metal being as shown, of various thicknesses as required for the purposes served by each portion of the section, the extrusion process being economically practical for the manufacture of such intricate sections as are here described.

The section of bar  $10$ , as shown in Fig. 2, includes a portion of generally inverted L shape comprising the straight foot  $12$  having straight parallel sides  $14$  and  $16$  and straight toe end  $18$  perpendicular thereto, and the straight vertical L part  $20$  perpendicular to the foot having straight parallel sides  $22$  and  $24$ . The thicknesses of portion  $12$  and portion  $20$  are substantial and of the order of one-eighth inch. Joined to the end of part  $20$ , opposite portion  $12$ , and extending in the same direction from part  $20$  as part  $12$ , is a short lip  $26$  extending therefrom a distance about equal to the thickness of part  $20$ .

Integral with the first L portion is a second L portion. This second L portion comprises integral perpendicularly related foot and vertical parts  $28$  and  $30$  having about half the thickness of parts  $12$  and  $20$  with the toe of part  $28$  joined to the part  $20$  at the end thereof and extending opposite from part  $26$  and with part  $28$  having its surfaces  $29$  and  $36$  perpendicular to sides  $22$  and  $24$  of part  $20$ , and part  $30$  being perpendicular to part  $28$ . To the heel  $32$  of the second L a plate section  $34$  of uniform thickness and flat parallel surfaces  $36$  and  $46$  is integrally formed, with its upper surface  $36$  in extension of that of part  $28$  and its lower surface  $46$  in the same plane as the lower surface  $29$  of part  $28$ , the part  $34$  being of about the same length ( $1\frac{1}{8}$  in.) as part  $30$ , and perpendicular thereto oppositely to part  $28$  so as to provide a continuous uniplanar top surface  $36$  extending from the free edge  $35$  of part  $34$  to the side of part  $20$  adjacent thereto. To the part  $30$  adjacent the free edge  $38$  thereof is integrally attached a part  $40$  at about  $\frac{5}{16}$  inch perpendicularly from free edge  $38$  and having a length of about the same value perpendicularly from  $30$  to its free edge  $42$  disposed on the same side of  $30$  as part  $34$ . The section of part  $40$ , as shown in detail in Fig.  $2a$ , is preferably wedge shaped and near its base is preferably provided with a shallow V channel  $44$  disposed toward surface  $46$  of part  $34$  which channel tends to prevent water creeping in some dispositions of the bar and the part  $40$  so modified forms a more efficient key for stucco.

It will be observed that by cutting the bar along two planes, perpendicular to each other and to the surfaces  $36$ , etc., and intersecting on the free edge  $35$ , and with both planes of cutting  $45$  degrees from edge  $35$ , and after cutting removing the resultant right triangular portion, that the two parts of the bar may be rotated to engage the resulting end edges thereof in the planes of cutting in complete registry for welding or otherwise integrating them.

It will be observed that the feet  $12$  of the four compo-

nents may be used as the jig attachment parts for setting up before welding to form the frame of Fig. 1.

The metal frame is illustrated installed in the wood frame of the stuccoed house in Fig. 5, the lower left hand corner of a window thereof being cut out to show the details. The metal frame being rigid, true, and of adequate strength, is supported by a minimum amount of fastening to the wooden frame. The wooden frame usually comprises two sub-frames made of two inch by four inch lumber nailed together, the members  $50$  and  $56$  thereof exposing generally uniplanar surfaces  $60$  toward the outside of the house. The metal frame is nailed to the outside of the house by driving nails directly through the parts  $34$  into the members  $50$ ,  $56$ , etc. It should be noted that the nails  $62$  are wholly unexposed to view in Fig. 5 and make no path to which water has access and that the exposed surfaces  $29$  remain flat against  $60$  and imperforate.

The drawing indicates in Fig. 5 the leaving of clearances about the parts  $20$  of the frame as at  $64$  and  $66$  sufficient to permit mounting the frame in the desired erect position inside the wooden frame with all parts true, irrespective of probable lack of trueness in the wooden frame. The drawing also indicates at  $68$  that a shim of wooden shingle may be used to space one or more edges of the frame from the plane  $60$  of the wooden frame when necessary to bring the metal window frame edge  $38$  into a common vertical plane, or some other plane designed for.

The orientation of the metal frame in the wooden frame is facilitated by first fastening the upper part  $10h$  by a single nail placed at a gravitationally pendular center  $G$  (see Fig. 1) leaving clearances all around parts  $20$  as pointed out above. At the factory there is preferably provided a marking for  $G$  and two small holes  $70$  and  $72$  to be gravitationally in vertical registry after installation. After suspending the frame at  $G$  by the single nail, a plumb-bob  $74$  with its string  $76$  is suspended from hole  $70$  and thereafter the metal window frame is adjusted and fastened into position so that the point of the plumb-bob registers with hole  $72$ , as illustrated in Fig. 1. Holes  $70$  and  $72$  are preferably so small that after-applied paint fills the holes.

After the metal frame of Fig. 5 has been installed, sheathing boards are inserted between parts  $34$  and  $40$  thus providing a first barrier against entry of moisture and protection to the ends of the boards inserted in the groove formed by parts  $34$ ,  $40$ , and  $30$ . The sheathing may be thinner than shown and the plaster may be finished either to rim  $38$  as shown, or only to part  $40$ , in a manner not illustrated in the drawing.

After the sheathing has been installed a wooden stub sill part  $80$  having a corner notch  $82$  milled therein to accommodate part  $40$  may be nailed to the sheathing as shown in Fig. 5, or the sill part  $80$  may be omitted. Suitable metal lath or chicken wire mesh  $84$  is then secured in uniplanar spaced relation to the sheathing  $78$ , with suitable water sealing membranes or tar paper not shown, and the stucco  $86$  is applied to a plane flush with edges  $38$  as shown, or to the part  $40$  as described in the preceding paragraph but not illustrated. This leaves an adequate edge  $38$  for surface trim and the wedge of part  $40$  keys into the stucco as at  $88$ .

It is evident that if the stub wood sill  $80$  is omitted, the stucco is brought to edge  $38$ , or to part  $40$ , in the manner above described but not illustrated, thus causing the lower metal bar portion  $10s$  to serve as the entire window sill.

In Figs. 6, 7 and 8, rustic construction only is illustrated and no stucco is shown to have been applied. The rustic finishing boards  $90$  enter the weather grooves formed by parts  $30$ ,  $34$  and  $36$ , and at times these boards form the entire wooden support for the metal window frame as shown. Wooden sills  $92$  and  $94$  having keys  $96$  or  $98$  and provided with a shelf  $100$  or a groove  $102$ , when used,

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are assembled to the sill bars 10s by nails 104 driven from the inside surface of the nailing plate 34 before installation of the metal frame in the wooden frame, the exterior boards 90 being placed in sealing relation to the stub sills subsequently and as shown. The edge 38 of the head bar 10h in Fig. 6 serves as a drip edge. The drip capacity may be accentuated if the hole 72 is placed nearer to edge 38 than hole 70, and the frame installed as previously described using the plumb-bob, thus making surface 31 run upwardly slightly from the drip edge. However, the jig design at the factory may provide for a corresponding tilt of the bar 10h of a degree or two without substantially increasing difficulties of fabrication and without impairing other functions of the metal window frame. It will be observed that the part 40 still serves its weather proofing function, adds a width of trim, and serves to protect the edges of boards 90 from view and exposure to weather. The sill constructions of Figs. 7 and 8 may, of course, be used with stucco construction.

In Fig. 9 two adjoining frames such as of Fig. 1 are abutted at their side bars 10r and 10w in either or both of two ways. A mullion 106 of T section preferably having grooves at 108 is clamped to the bars by several bolts 110. A board 112 may be used between parts 30 for similar purposes; or in wider width than shown for the purpose of causing surfaces 14r and 14w to adjoin surface 114 at a corresponding obtuse angle.

In Fig. 10 two adjacent vertical frame bars 10r and 10w are abutted, and preferably suitably fastened to a pipe 116. A wide range of corner angles is thus easily finished toward the inside 118 as well as toward the outside of the house.

I claim:

1. A window frame comprised of four straight bar parts rigidly fastened together at the ends of the bar parts and the bar parts all being formed in geometrically identical rigid sections perpendicular to the bar part length and of continuously integral homogeneous material throughout the section; the said section in any bar being formed to provide integral section forming portions extending along the bar perpendicular to the section and comprising: a first section portion of L shape comprising a foot part and a straight L part; a second portion of L shape comprising a foot part joined perpendicularly to the straight L part and extending oppositely from the foot part of the first L portion; a plate portion secured to the heel of the second

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L portion extending coplanarly with the foot part thereof oppositely to the foot parts of both L portions; said second L portion comprising a part extending perpendicularly to its foot part and to the plate portion of lesser extent than the plate portion; and a key portion secured to the vertical part of the second L portion spaced from and extending in the direction of the plate portion; said various respective section portions and the four bar parts being integrated to the same portions and parts of the ends of adjoining bar parts with the corresponding surfaces of the foot part of the second L portion each lying in a single continuous plane surface surrounding the window opening at the inside of the frame and with the corresponding surfaces of the four plate portions disposed coplanarly in a single plane perpendicular to the planes of the surfaces of the straight leg parts and extending around the outside of the frame as a continuous rigid plate.

2. A bar formed to provide integral section forming portions extending along the bar perpendicular to the section and comprising: a section portion of L shape comprising a foot part and a straight L part; a second L section portion comprising a foot part joined perpendicularly to the straight L part and extending oppositely from the foot part of the first L portion; a rigid flat plate portion secured to the heel of the second L portion extending therefrom coplanarly with the foot part thereof in a direction oppositely to the foot parts of both L portions; said second L portion comprising a leg part extending perpendicularly to its foot part and to the plate portion of lesser extent than the plate portion; and a key portion secured to the leg part of the second L portion spaced from and extending in the direction of the plate portion.

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