

March 9, 1948.

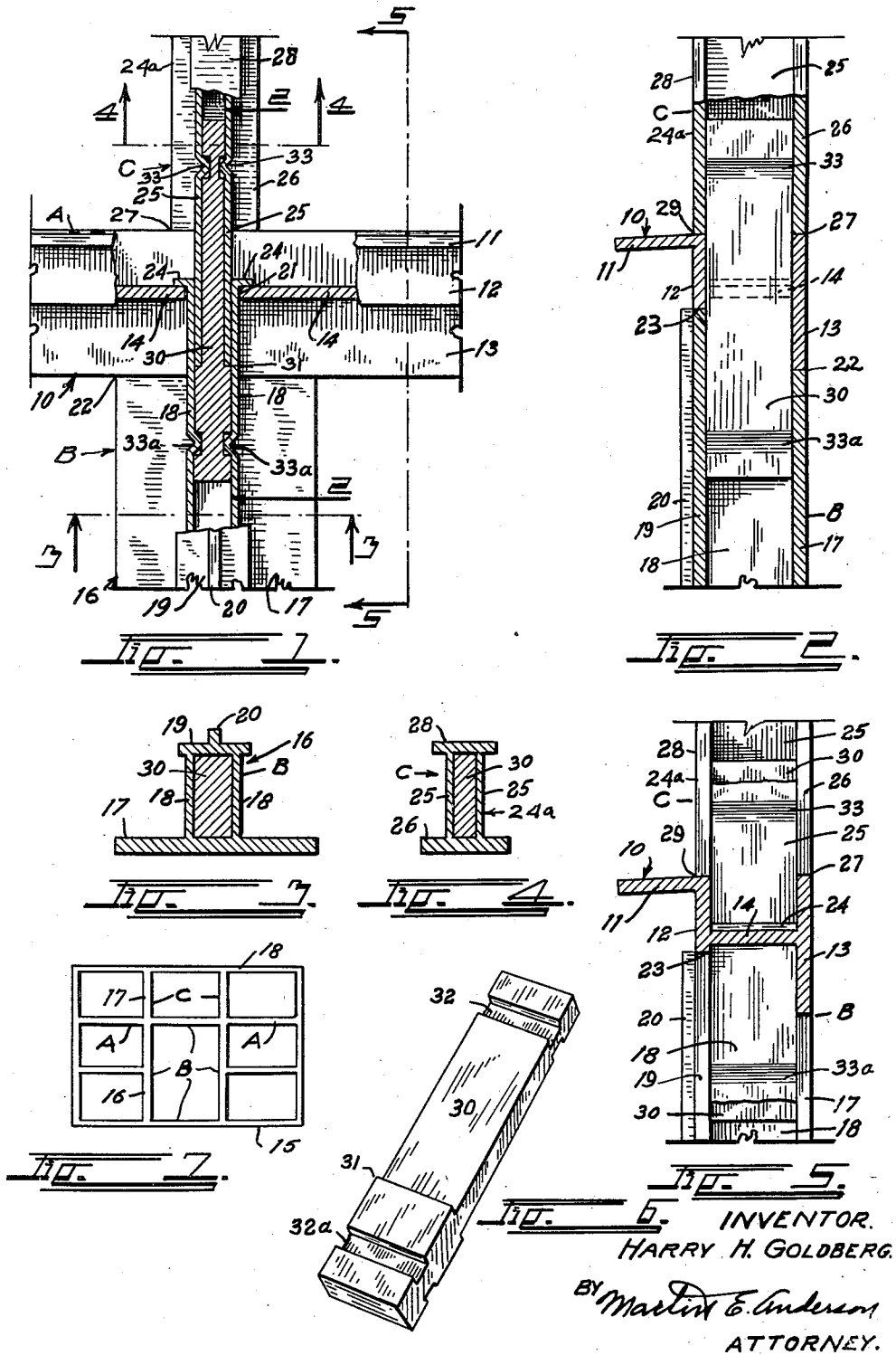
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JOINT FOR METAL WINDOW FRAMES

Filed May 5, 1947

2 Sheets-Sheet 1



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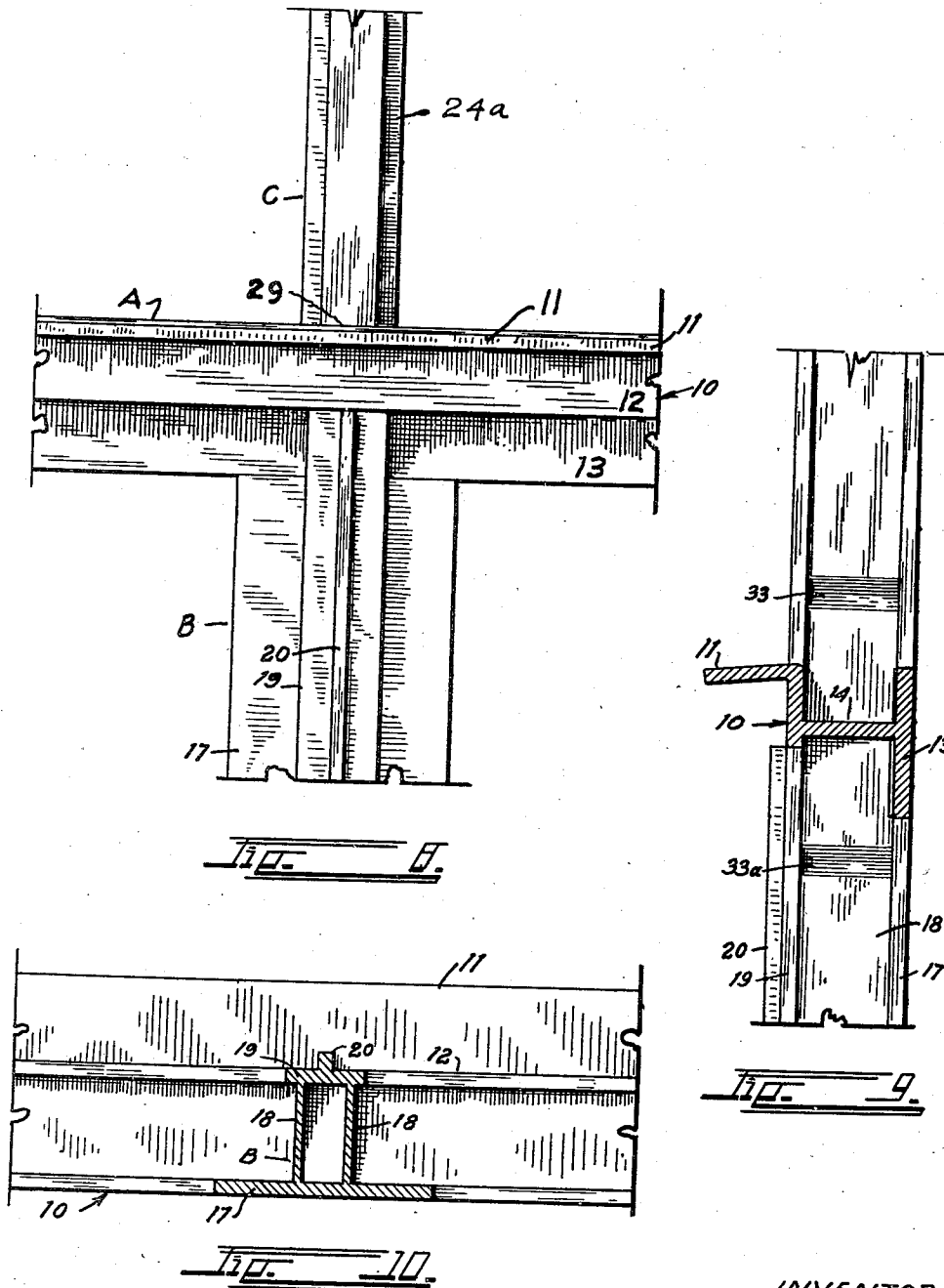
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JOINT FOR METAL WINDOW FRAMES

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Due to many causes, the use of metal window frames and sash is increasing and such window frames and sash can be and are manufactured for use with any type of building, including wood, concrete and brick.

The window sashes are constructed from preformed members which may be of any suitable metal, but which are preferably extruded from aluminum. Aluminum lends itself very readily to use in connection with metal window sash and frames because it can be extruded through dies so as to be absolutely uniform in shape and size. Such extruded aluminum frames also have a fine finish and produce an ornamental effect.

In the construction of window frames and sashes, it is necessary to interconnect various pieces that form the same and which are arranged in right angular relation. Such joints have heretofore been effected by welding. Aluminum does not lend itself very well to welding operations and such a method of interconnecting the members has been found to be unsatisfactory and quite expensive.

It is an object of this invention to produce a joint that can be quickly made without the use of welding apparatus and which is very substantial and rigid.

Another object of the invention is to produce a joint for the purpose indicated that can be produced more quickly than a welded joint and which has many advantages over the latter.

The above and any other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail, and for this purpose reference will be had to the accompanying drawing in which the invention has been illustrated in its preferred form, and in which:

Figure 1 is a top plan view of a window sash joint at the intersection of frame members A, B and C, shown partly in side elevation and partly in section taken on line 1—1, Figure 2;

Figure 2 is a section taken on line 2—2, Figure 1;

Figure 3 is a transverse section of frame member B taken on lines 3—3, Figures 1 and 2;

Figure 4 is a transverse section of frame member C taken on lines 4—4, Figures 1 and 2;

Figure 5 is a view partially in section and partially in elevation looking through plane 5—5, Figure 1;

Figure 6 is a perspective view of the interconnecting member employed in making the joint;

Figure 7 is a diagram showing, in a general

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way, the relationship of the several frame members;

Figure 8 is a front elevational view of the joint shown in Figure 1;

Figure 9 is a side elevational view looking to the left in Figure 8; and

Figure 10 is an end elevation looking upwardly in Figure 8.

In the drawing reference numeral 10 designates a member which has also been indicated by the letter A and which is provided with a horizontal flange 11 that terminates in a vertical portion 12 that is connected with the base 13 by means of a web 14 shown most clearly in Figure 10. Extending upwardly from the bottom frame member 15 of the window frame is a preformed aluminum frame member 16 that has also been designated by the letter B. Frame member C extends downwardly from the top frame member 18 and is interconnected with frame member B in the manner shown in Figures 1 and 2 to which reference will presently be made.

A reference to Figure 3 will show that frame member 16 or B has a wide base 17 from one side of which webs 18 extend upwardly in spaced relation and are connected at their upper ends by the top portion 19 which, in the embodiment shown, has a rib 20 extending lengthwise thereof. Web 14 of member 10 is provided with a rectangular opening 21 of a width equal to the distance between the outer surfaces of webs 18. Flange 17 is cut back to the point indicated by reference numeral 22 and top portion 19 is cut back to the line designated by reference numeral 23. The distance to which the top 19 and flange 17 are cut back are such that webs 18 may project a short distance through opening 21 and have sufficient length to permit the ends to be bent outwardly in the manner shown in Figure 1, and designated by reference numeral 24. In bending the ends 24 outwardly the end surfaces 22 and 23 are held in close contact with the abutting edges of member 10 and in this manner members A and B become interconnected. Member C, which has also been designated by reference numeral 24a and which has spaced webs 25, has its base 26 cut back to line 27 and its top portion 28 cut back to line 29, leaving sufficient lengths of webs 25 to extend into the space between webs 18 in the manner and to the extent shown in Figure 1. Before the extending webs 25 are inserted between webs 18 a connecting member 30 is inserted in the opening between webs 25. The connecting member has been shown in somewhat greater detail in Figure 6, from which

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it will be seen that it has a rectangular cross section of different thicknesses but the same width. That part of the connector above line 31 in Figure 6 is of a size to fit the opening between webs 25 and is inserted into frame member 16 until the ends of webs 25 abut against the shoulder indicated by reference numeral 31 in Figures 1 and 6. The lower end or that part of the connector below line 31 in Figure 6 has a size and shape to fit the opening between webs 18 in the manner shown in Figure 3. Before the webs 25 of member 24a are inserted into the opening between webs 18 they are subjected to a pressure forcing a portion of each web inwardly into the transverse notch 32 of the connector. These inwardly pressed portions have been designated by reference numeral 33 in Figures 1 and 5. The connector is now securely attached to frame member 17 and cannot move longitudinally thereof. After the connection has been made by inserting an end of the connector into the opening between webs 18, the parts are urged together with sufficient force to effect a close contact between the abutting surfaces, after which webs 18 are subjected to pressure forcing them inwardly into the transverse grooves 32a. Such indented portions have been designated by reference numeral 33a in Figures 1 and 5. The parts are now rigidly and firmly interconnected and this interconnection has been effected without the use of welding apparatus.

Instead of having notches 32, 32a and indenting the webs 25 and 18 in the manner shown, the frame members may be connected with the connector 30 by means of rivets passing through suitable holes in the webs. Any mechanical equivalent means can be substituted for the one shown and described above.

A joint like the one described can be manufactured and assembled with less labor than if it were interconnected by welding, and in addition to this the joint has many points of superiority, being neater in appearance and as rigid as a welded joint. In welding aluminum, as has been mentioned above, difficulties are often experienced and unless utmost care is taken, a joint that appears to be perfect may be found to be defective with the result that window frames and sash that have been manufactured at a big expense are rejected by the buyers. A joint constructed in the manner herein described is always reliable and is free from the irregularities of the surface that frequently are found in welded joints.

It will be obvious from an inspection of Figure 1 that when the plug 30 is in place, the ends of the web whose sides have been designated by numerals 25 will be in effect a solid member as far as resisting transverse pressure is concerned. The web and the plug therein are in effect the same as a solid web of equal length will be.

Having described the invention, what is claimed as new is:

1. The method of interconnecting three sash frame members, each of which has two parallel flanges connected by a web and in which at least two of the members have tubular webs of different thicknesses, the openings in which are of substantially rectangular cross section, the shorter transverse inside dimension of the opening in the thicker web being the same as the shorter transverse outside dimension of the web of the other member, the distance between the outside surfaces of the flanges of all three members being the same; which consists in providing

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the web in the third member with an opening having a width equal to the outside shorter transverse dimension of the thicker tubular web, removing the flanges of the member having the thicker web to a point where the web walls may project through the opening in the web of the third member, with the ends of the cut back flanges in engagement with the edges of the flanges of the third member, bending the ends of the web walls that project through the opening, outwardly to overlap the sides of the opening, cutting back the flanges of the tubular web member with the thinner web to such a distance that its web walls may be telescoped into the opening in the web of the tubular web member with the thicker web, in which position the cut back flanges abut the edges of the flanges of said third member, positioning an elongated connecting member in the end of the smaller web, providing said connecting member with an end having the same shape and size as the opening in the larger web, inserting the smaller web and the connecting member into the opening in the larger web, and providing an interconnection between the ends of the connecting member and the webs with which they are in contact, whereby the interconnected frame members will be held against relative axial movement, and whereby a rigid joint is obtained.

2. A window sash having three frame members interconnected to form a cross, each of the members having two parallel flanges connected by webs, two of the members having their flanges connected by webs formed by two spaced web walls, forming substantially rectangular openings, the opening in the web of one of the last named members being of a width equal to the distance between the outer surfaces of the web walls of the other hollow web frame member, the web walls of the two last named members projecting beyond the ends of their flanges, the web of the third member having an opening of a size and shape to receive the ends of the web walls of the thicker web, the web walls of the thicker web extending through the web opening in the third member and terminating in end portions extending angularly into positions in which they overlap the web of the third member on two sides of the opening, the web walls of the other hollow web member extending into the opening in the end of the thicker web, an elongated connector member having two sections of different cross sectional area, positioned with the smaller section in the web having the smaller opening and having its larger end in engagement with the walls of the larger web opening, and means interconnecting the webs of the two aligned frame members with the ends of said connector member in contact with them.

3. A window sash having three frame members interconnected to form a cross, all of the members having two parallel equidistantly spaced flanges connected by webs, at least one of the members having a solid web provided with an elongated rectangular opening, one of the other members having a tubular web whose thickness is equal to the width of the opening in the solid web, the flanges thereof cut back, and having the side walls of said tubular web projecting through the opening in the solid web, the ends of the side walls of the tubular web being flared outwardly into a position overlapping the solid web, whereby the two members last named are interconnected in substantially right angular relation, the third member having a web whose thickness is

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equal to the width of the opening in the thicker tubular web, its flanges being cut back to such an extent that when the cut back flanges engage the edges of the flanges of the member with the solid web, the side walls of the smaller tubular web will extend through the solid web, and means for interconnecting the two telescopically connected webs, whereby the three members form a cross whose flanges are positioned in abutting relation and in the same planes.

4. A window sash joint at the intersection of two right angularly related muntin bars, each of which has equidistantly spaced parallel flanges, one of the bars being formed from two aligned sections, one bar having a solid web provided with an opening, one section of the two section bar having a tubular web of a size and shape to fit the opening in the solid web and fitting therein, the side walls of the tubular web projecting through the opening in the solid web, the other section having a web of the size and shape to fit and telescope into the opening in the tubular web and telescoped therein, the end of the web that projects into the tubular web extending across the solid web, and means for interlocking the telescopically interconnected webs, the two aligned sections having their flanges cut back to engage the edges of the flanges of the bar having the solid web when the joint is completed.

5. A window sash comprising three frame members arranged to form a cross, all of the members having webs provided along their edges with parallel flanges, the flanges being spaced the

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same distance apart in all of the members, one of the members having a solid web, provided with a transversely elongated opening, one of the other members having a tubular web of the size and shape to fit the opening in the solid web and fitting therein, the flanges of the member having the tubular web being cut back to such a point that the side walls of the web project through the opening in the solid web, the third member having a web of the size and shape to telescope in the tubular web and telescoped therein, the flanges of the third member being cut back to such a point that the web thereof extends to a point beyond the solid web, and means for interlocking the telescopically interconnected webs whereby a joint is produced.

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