

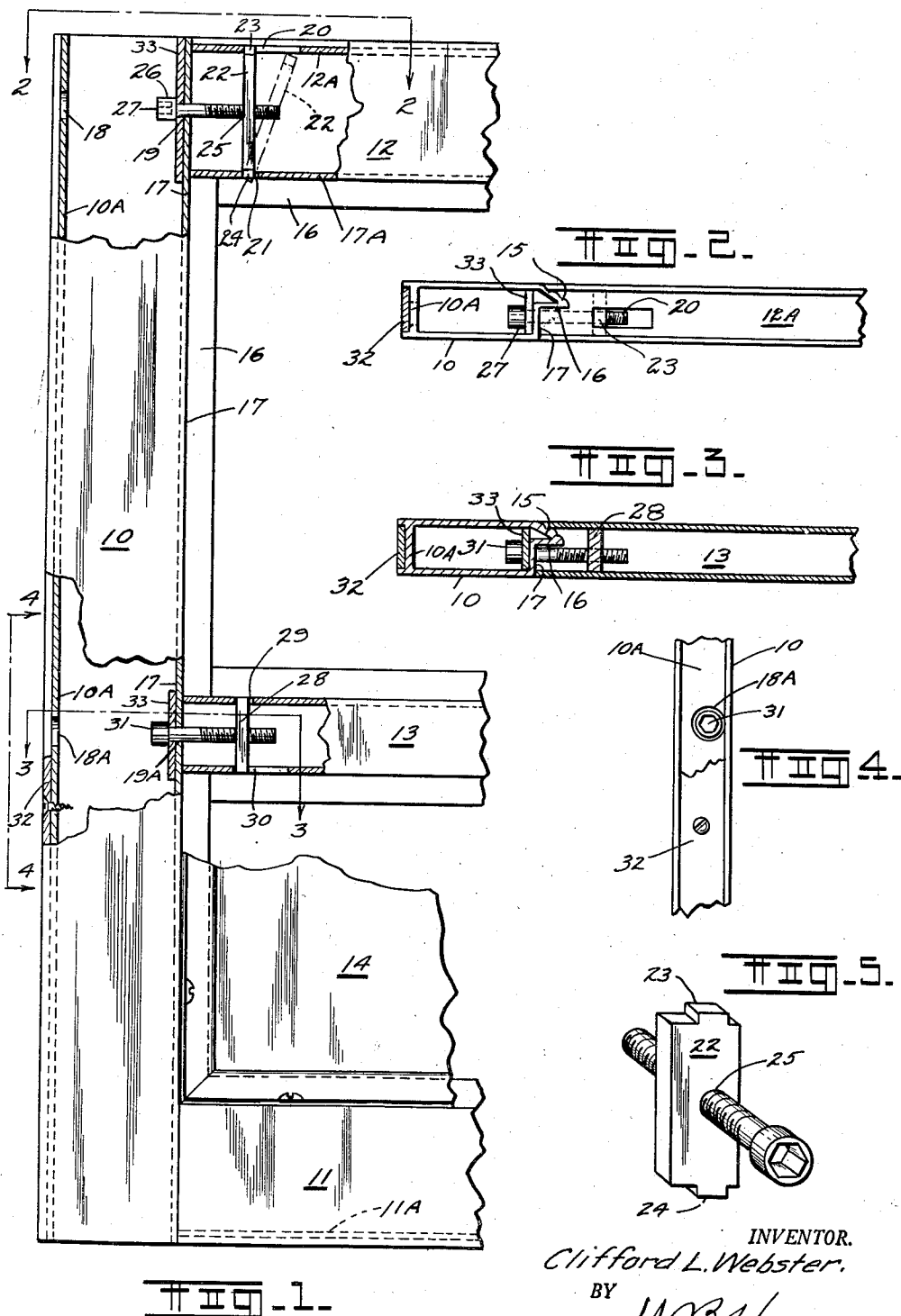
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CORNER CONSTRUCTION FOR METAL DOORS AND THE LIKE

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CORNER CONSTRUCTION FOR METAL
DOORS AND THE LIKE

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This invention relates to a corner construction and more particularly to a corner construction adaptable for use in metal storm doors and the like.

The principal object of the invention is the provision of a simple and inexpensive corner construction for a metal door.

A further object of the invention is the provision of a corner construction for joining two hollow extrusions to one another.

A still further object of the invention is the provision of a corner construction for forming a right angle corner on metal doors without the necessity of mitering the sections being joined.

A still further object of the invention is the provision of a corner construction suitable for joining right angle corners and mullion bars of metal door constructions.

A still further object of the invention is the provision of a corner construction wherein a structurally strong joint is formed with the construction members being hidden in the framing members joined.

The corner construction disclosed herein comprises an improvement in the art of joining metal members to one another and particularly in that extruded metal members such as those used in framing metal storm doors and the like may be simply and efficiently and inexpensively joined to one another with a minimum of time and effort. It has heretofore been necessary to cut and miter the corners of such metal doors and utilize complicated corner keys and/or clamping members for holding the cut and mitered metal sections in end to end engagement.

In the present disclosure the metal framing members are not cut and mitered but are joined in an end to side relationship in the same manner as a wooden door and the appearance of the door is thereby considerably improved as the diagonal miter joints are eliminated. Additionally, the construction utilizes the surface characteristics or pattern of the metal framing sections in holding the same to one another and can be used in joining the side of any member of tubular or extruded framing section to the end of a similar section.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

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The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a front plan view of a portion of a metal storm door with parts broken away and parts in cross section.

Figure 2 is a top plan view taken on line 2—2 of Figure 1.

Figure 3 is a cross section taken on line 3—3 of Figure 1.

Figure 4 is a side view taken on line 4—4 of Figure 1.

Figure 5 is an enlarged perspective view of one of the clamping brackets disclosed in Figure 1 of the drawings.

By referring to the drawings and Figure 1 and particular it will be seen that a vertical side rail of a storm door is indicated by the numeral 10, the bottom transverse rail by the numeral 11, a top transverse rail by the numeral 12 and an intermediately positioned mullion bar by the numeral 13. The area between the bottom rail 11 and the mullion bar 13 is normally closed with a metal panel 14 and the area between the mullion bar 13 and the top rail 12 is normally occupied by a glazed sash or alternately by a screened sash. The glazed and screened sash are not illustrated as they are known in the art and they are removably positioned in the frame formed of the rails 10 and 12 and the mullion bar 13.

The side rail 10, the bottom rail 11 and top rail 12 are formed of a tubular extruded member such as shown in end elevation in Figures 2 and 3 of the drawings, it being observed that the section forming the rails 10, 11 and 12 has a recessed end wall 10a as illustrated in Figures 1 and 2 of the drawings, the comparable portion forming a recessed bottom wall 11a in the bottom rail 11 and a recessed top wall 12a in the top rail 12. The opposite wall of the extruded metal member forming the rail 10 has a longitudinal extension 15, a surface 16 of which is formed at right angles to an end wall surface 17 so that an L-shaped channel running longitudinally of the extruded metal member is formed which is adapted to receive the glazed or screened sash heretofore referred to. The L-shaped channel is thereby formed on the vertical side rails 10 and the bottom and top rails 11 and 12 as they are formed of the same extruded metal member.

In order that the square cut ends of the bottom and top rails 11 and 12 may be joined to the side of the side rails 10 but without mitering the same or without utilizing L-shaped corner pieces as heretofore customary in the art, a pair of openings are formed in the side rail 10 and indicated by the numerals 18 and 19, the opening

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18 being formed in the recessed end wall 10a and the opening 19 being formed in the opposite end wall 17 and off-center with respect to the extruded metal member by reason of the projection 15 heretofore referred to. The openings 18 and 19 are formed along a line parallel to the center line of the extruded metal section to be joined to the end wall 17 as best illustrated in Figure 1 of the drawings.

In Figure 1 of the drawings the top rail 12 is joined to the end wall 17 of the side rail 10. The top rail 12 has a pair of slots 20 and 21 in its recessed upper wall 12a and its bottom wall 17a. The slot 20 runs longitudinally of the extruded metal section as best shown in Figure 2 of the drawings and the slot 21 is centered therebeneath in the bottom wall 17a of the extruded metal member forming the top rail 12. A clamping bracket 22, as shown in detail in Figure 5 of the drawings, is provided with upward and downward projections 23 and 24, respectively, and a drilled and tapped opening 25 midway therebetween is then positioned in the top rail 12 either by lowering the same through the slot 20 or by inserting the same through the open end of the top rail 12. If inserted through the slot 20 it is then turned one-quarter turn to the position shown in dotted lines in Figure 1 of the drawings and then moved to vertical position where the length of the body section of the clamping bracket 22 will conform with the vertical inner height of the top rail 12 and where the extensions 23 and 24 will engage the slots 20 and 21, respectively. It will thus be seen that the longitudinal positioning of the slot 20 permits the clamping bracket 22 to be positioned in vertical position as shown in solid lines in Figures 1 and 2 of the drawings and in which position it occupies the full cross sectional interior area of the top rail 12. A bolt 26 having a recessed socket 27 is then positioned through the openings 18 and 19 and threadably engaged in the opening 25. Upon being tightened the top rail 12 is drawn into tight engagement with the end wall 17 of the side rail 10 and a tight perfectly formed joint is thus made.

The same construction is used at the bottom of the door, as shown in Figure 1 of the drawings, the only change being that the slots comprising the equivalents of the slots 20 and 21 in the top rail are reversed with respect to one another so that the longitudinally extending slot is in the recessed bottom wall of the bottom rail 11. The clamping bracket 22 will be seen by referring to Figure 5 of the drawings to have the upward and downward extensions 23 and 24 squared and formed off-center with respect to the main body of the clamping bracket and the opening 25 is also formed off-center so that when the device is under tension as in holding a completed corner joint together, the tension is equally carried through these extensions where they engage the end walls of the extruded metal section being clamped.

The same construction is utilized in joining the mullion bar 13 to the side rail 10 and, as shown in Figures 1, 3 and 4 of the drawings, the openings 18a and 19a are formed in the end walls 10a and 17 of the side rail 10. A clamping bracket 28 of shorter length than the bracket 22 heretofore referred to is positioned in the mullion bar 13 by way of slots 29 and 30 positioned vertically and a bolt 31 moved into engagement therewith through the openings 18a and 19a.

It will also occur to those skilled in the art

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that if desired a finishing trim strip may be applied to the recessed end walls 10a and 12a to cover the opening 18 and the slot 20 if desired, the trim strip being affixed by metal screws or other suitable fasteners. A section of such trim strips is shown in Figures 1 and 4 of the drawings and indicated by the numeral 32.

Under some conditions it may be desirable to utilize a rectangular metal washer such as shown in Figures 1, 2 and 3 of the drawings and indicated by the numeral 33, the said rectangular metal washer being located within the side rail 10 and provided with a central opening through which the bolt 26 is positioned. The rectangular metal washer 33 strengthens the construction and is preferably, although not necessarily, employed in producing satisfactory corner constructions as herein disclosed.

It will thus be seen that a simple, inexpensive and unusually efficient corner construction has been disclosed which enables extruded metal members to be joined to one another efficiently and rapidly and thereby meets the several objects of the invention.

Having thus described my invention, what I claim is:

1. A structural connection, said connection comprising one hollow metal member disposed in end position against the side of another hollow metal member, said first mentioned hollow metal member having an opening in one side wall and an elongated slot formed longitudinally of said first mentioned member in the side wall in oppositely disposed relation to said one side wall, a clamping piece having opposed parallel faces and having a peripheral form substantially conforming to the interior of said one member and having a thickness less than the width of said slot, said clamping piece having a length substantially equal to the inside distance between said pair of side walls, polygonal reduced end extensions on said clamping piece of a thickness equal to the thickness of the clamping piece, the length of said slot being greater than the width of said clamping piece so that after said clamping piece has been positioned through said slot to an inclined relationship within the first mentioned member and rotated through approximately a right angle, said clamping piece can be pivoted from its inclined position to a second position wherein said end extensions are engaged in said opening and slot at the ends thereof adjacent the other hollow member and held from rotation by the walls of the opening and slot, the other hollow metal member having an opening in the side wall thereof having the first mentioned member positioned thereagainst, said clamping piece having a threaded opening extending between said parallel faces adapted to be aligned with said opening in the side wall of said other hollow member when said clamping piece is in said second position, and a bolt adapted to be engaged through said opening in the other hollow member and engaged in said threaded opening for clamping said members together.

2. A structural connection, said connection comprising one hollow metal member disposed in end position against the side of another hollow metal member, said first mentioned hollow metal member having an opening in one side wall and an elongated slot formed longitudinally of said first mentioned member in the side wall in oppositely disposed relation to said one side wall, a clamping piece having opposed parallel faces and having a peripheral form substantially conform-

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ing to the interior of said one member and having a thickness less than the width of said slot, said clamping piece having a length substantially equal to the inside distance between said pair of side walls, polygonal reduced end extensions on said clamping piece of a thickness equal to the thickness of the clamping piece, the length of said slot being greater than the width of said clamping piece so that after said clamping piece has been positioned through said slot to an inclined relationship within the first mentioned member and rotated through approximately a right angle, said clamping piece can be pivoted from its inclined position to a second position wherein said end extensions are engaged in said opening and slot at the ends thereof adjacent the other hollow member and held from rotation by the walls of the opening and slot, the other hollow member having a pair of aligned openings in opposite side walls thereof and communicating with the interior of said first mentioned member, said clamping piece having a threaded opening extending between said parallel faces adapted to be aligned with the pair of aligned openings in the other hollow member when said clamping piece is in said second position, and a bolt having a threaded

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shank movable through said aligned openings with the head thereof engaging the edge of one of said aligned openings and the shank adapted to threadedly engage the threaded opening of said clamping piece for connecting the said members together.

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