

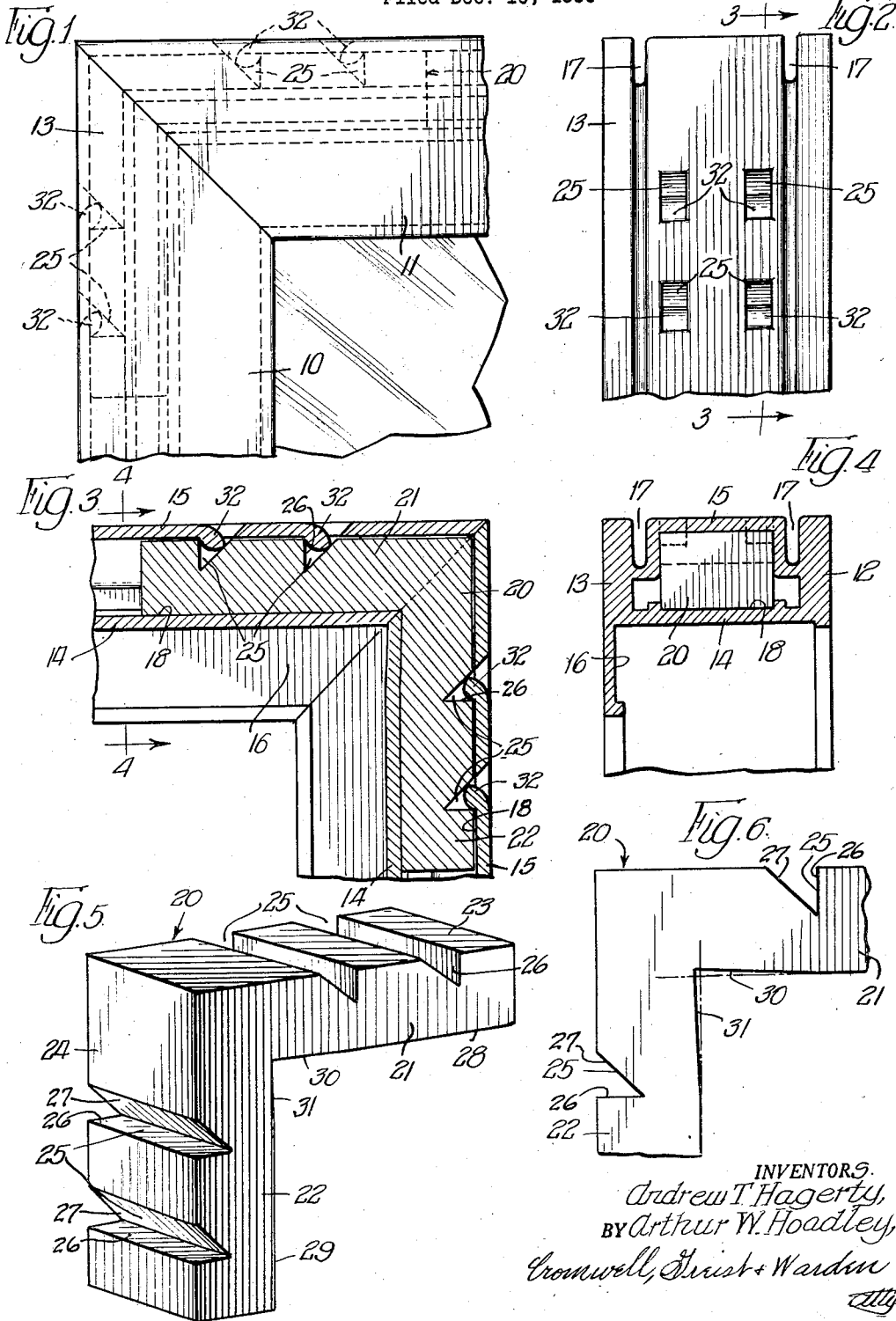
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CORNER JOINT

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CORNER JOINT

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This invention relates to metal frames of the type used in window sash, doors, and panels of a similar nature and is particularly concerned with improvements in the joint construction by means of which the ends of the frame members are connected together.

It is a general object of the invention to provide a corner connection for a window sash or similar metal frame structure which permits the frame members to be easily put together with a minimum of operations, which results in the mitered edges between the members being drawn snugly together, and which produces a strong, rigid, and tight joint between the abutting ends of the frame members.

It is another object of the invention to provide an improved connecting means for obtaining a rigid corner joint between the frame members of a metal window sash or similar panel construction without the use of screws, rivets, bolts or like fastening elements.

It is a further object of the invention to provide a corner joint construction for a metal frame which is particularly adapted to be formed by machine operations and which provides a strong, rigid, mitered connection between the frame members at all the corners of the frame.

It is a still further object of the invention to provide a metal frame construction wherein hollow frame members are held together at the corner by inserting in the abutting ends of the frame members an angular connecting block having recesses in an edge face thereof and securing the same in rigid relation therein by fastening tongues struck in from the walls of the frame members.

These and other objects and advantages will be apparent from a consideration of the joint construction which is shown by way of illustration in the accompanying drawings wherein:

Figure 1 is a front view of a corner of a window sash frame having incorporated therein the improved joint construction of the invention;

Figure 2 is an edge elevation of a corner portion of the sash frame;

Figure 3 is a section, taken on the line 3—3 of Figure 2;

Figure 4 is a cross section, taken on the line 4—4 of Figure 3;

Figure 5 is a perspective of the connecting angle member which forms part of the joint construction; and

Figure 6 is a partial plan view of the corner connecting member, to an enlarged scale.

Referring to the drawings, the invention is illustrated as embodied in a window sash having two hollow frame members 10 and 11 which are mitered at their adjoining ends in order to fit together at right angles to each other. The frame members 10 and 11 are of metal, and may be, for example, sections of extruded aluminum or aluminum alloy. Each of the frame members 10 and 11 is formed with spaced inner and outer walls 12 and 13 which form the vertical faces of the sash and connect-

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ing web-like inner and outer edge forming wall portions 14 and 15, respectively, which are spaced apart and which are at right angles to the face forming walls 12 and 13. The outer wall or face 13 extends beyond the inner edge forming wall 14 in the direction of the center of the sash and forms therewith an inwardly facing glazing channel 16. The outwardly facing edge wall 15 may be provided with spaced parallel grooves 17 to receive a weatherstrip (not shown). The wall members 12, 13, 14 and 15 define an internal pocket or recess 18 of generally rectangular cross section.

The frame member 10 is fastened to the frame member 11 to form a corner by an L-shaped or angular connecting member 20 which is preferably of solid metal construction. The legs 21 and 22 of the connecting member or block 20 each have a rectangular cross section corresponding approximately to the cross section of the hollow interior recesses 18 in the frame members 10 and 11 so that the legs 21 and 22 may be inserted in the ends of the frame members 10 and 11 and fit snugly within the same when the connecting member 20 is assembled with the frame members 10 and 11.

The legs 21 and 22 of the connecting member or block 20 are provided on the outwardly facing edges or surfaces 23 and 24 thereof with pairs of identical grooves 25 which extend inwardly of and across the outer faces 23 and 24 of the legs and which are spaced in the lengthwise direction of the same. Each of the grooves 25 is defined by inwardly converging walls 26 and 27. The wall 26 is in a plane normal to the long axis of the leg and faces toward the corner of the member 20 while the wall 27 is in a plane extending diagonally in the same direction so that each groove has a generally V-shaped cross section and opens outwardly of the surface of the member. The legs 21 and 22 have adjoining portions of their inwardly facing edges or surfaces 28 and 29 cut away or tapered outwardly at 30 and 31 where they meet to form the inner corner of the member 20 as indicated in Figure 6.

After the legs 21 and 22 of the connecting member 20 have been inserted in the ends of the frame members 10 and 11, and the latter have been positioned in abutting mitered relation, pairs of fastening tongues or lips 32 are struck from the outer edge forming wall 15 of each frame member and turned inwardly into each of the grooves 25. Each pair of the fastening tongues 32 is located with the tongues in transverse alignment so that each tongue is wrapped around the edge of the wall 26 of a groove 25 as shown in Figure 3. The striking in or staking of the fastening tongues 32 causes the tongues 32 to engage the connecting member 20 and exert a force on the same in the direction away from the corner of the frame which pulls the ends of the frame members 10 and 11 toward each other. This results in the inside walls 14 of the frame members 10 and 11 being drawn with a spring-like action down into the cut away inner corner of the connecting member 20 and into tight fitting snug engagement with each other.

The joint construction illustrated is particularly adapted for machine operation. It is contemplated that the joints at the four corners of the frame will be formed simultaneously by a machine having a punching tool arranged to strike the outer wall 15 of each frame member diagonally relative to the exterior surface thereof and force the fastening tongues 32 into the grooves 25 in the manner described.

While specific details of construction and particular materials have been referred to in describing the form of the joint illustrated, it will be understood that other details of construction and other materials may be resorted to within the spirit of the invention. Also, the joint construction has been illustrated in connection with a window

sash frame, but it is not limited to use in this particular structure since the invention is susceptible of embodiment in other frame structures.

We claim:

1. In a frame construction, two hollow metal frame members arranged in right angular mitered abutment with each other at one corner of the frame, an angular connecting block positioned within the frame members at the abutting corner thereof, said connecting block having adjoining portions of the inner edges of the legs thereof cut inwardly so as to form an acute angle where the legs join at the inner corner of the block, said connecting block having spaced outwardly opening transverse grooves in its outer edges with one of the walls defining each groove facing in the direction of the corner of the frame, and staking tongues struck inwardly from the outer walls of the frame members and engaging in the transverse grooves in said connecting block, said tongues being wrapped inwardly around the outer edges of the walls of the grooves which face in the direction of the corner of the frame thereby forcing the ends of the inner walls of the frame members into snug engagement in the inner corner of the block.

2. In a metal frame construction, two hollow frame members arranged with their ends in right angular mitered abutment with each other to form a corner of the frame, an angular connecting block having its legs positioned within the abutting ends of said frame members, said connecting block having portions of the inner edges of its legs at the inside corner thereof tapering toward the outside corner and having outwardly opening recesses in the outer edges of its legs, and a fastening tongue struck

inwardly from the outer wall of each of the frame members with the free end of each tongue extending in the direction toward the corner of the frame and engaging in an outwardly opening recess in the connecting block for holding the block in rigid connecting relation relative to the members and for forcing the abutting ends of the inner walls of the frame members forced into spring-tensioned engagement at the inner corner of the block.

3. In a metal frame construction, two tubular metal frame members which are mitered to form a corner of the frame, and means for rigidly connecting the frame members at the corner comprising an angular connecting member having its legs snugly fitting within the ends of the tubular frame members and provided with outwardly opening recesses in the outer face thereof, each presenting an abutment wall in a plane extending transversely of the long axis of the leg and facing in the direction of the corner of the frame, and fastening tongues struck inwardly from the outside walls of the frame members and engaging in the recesses, said tongues extending in the direction toward the corner of the frame and having their ends tightly wrapped around the outside edges of the walls of the recesses which face in the direction of the corner of the frame thereby drawing the frame members into tight fitting engagement at the corner of the frame.

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