

Sept. 4, 1951

W. R. MILLIER
STRUCTURAL MEMBER

2,566,622

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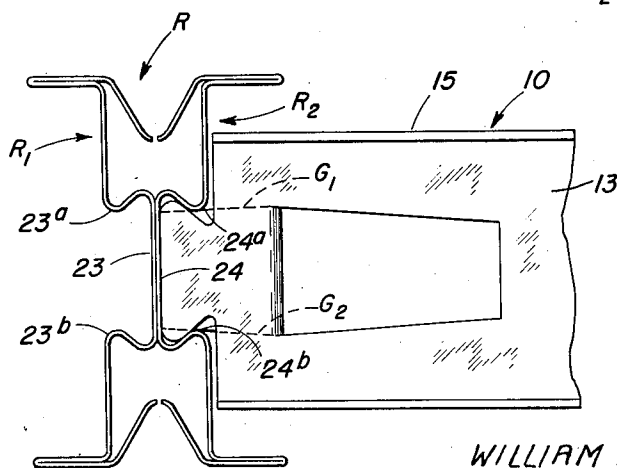
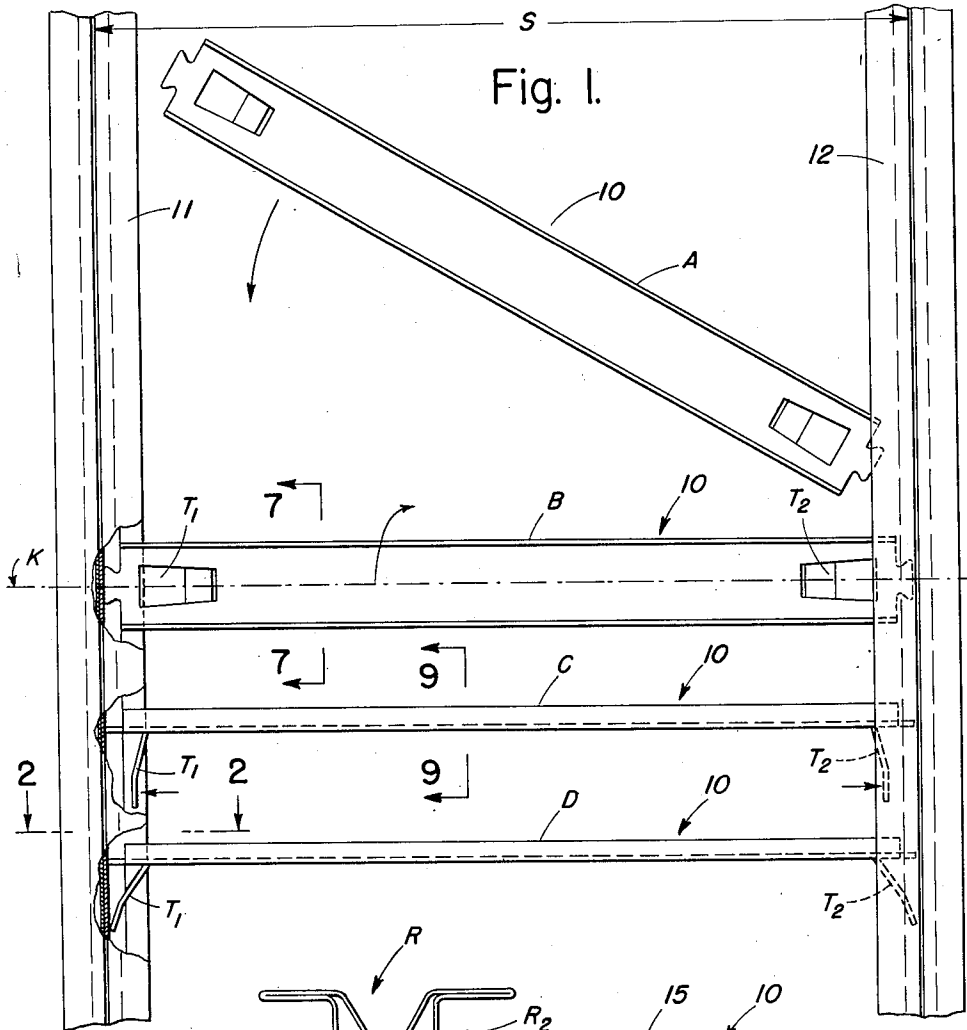


Fig. 2.

INVENTOR.
WILLIAM R. MILLIER
BY
Arthur Middleton
Att'y.

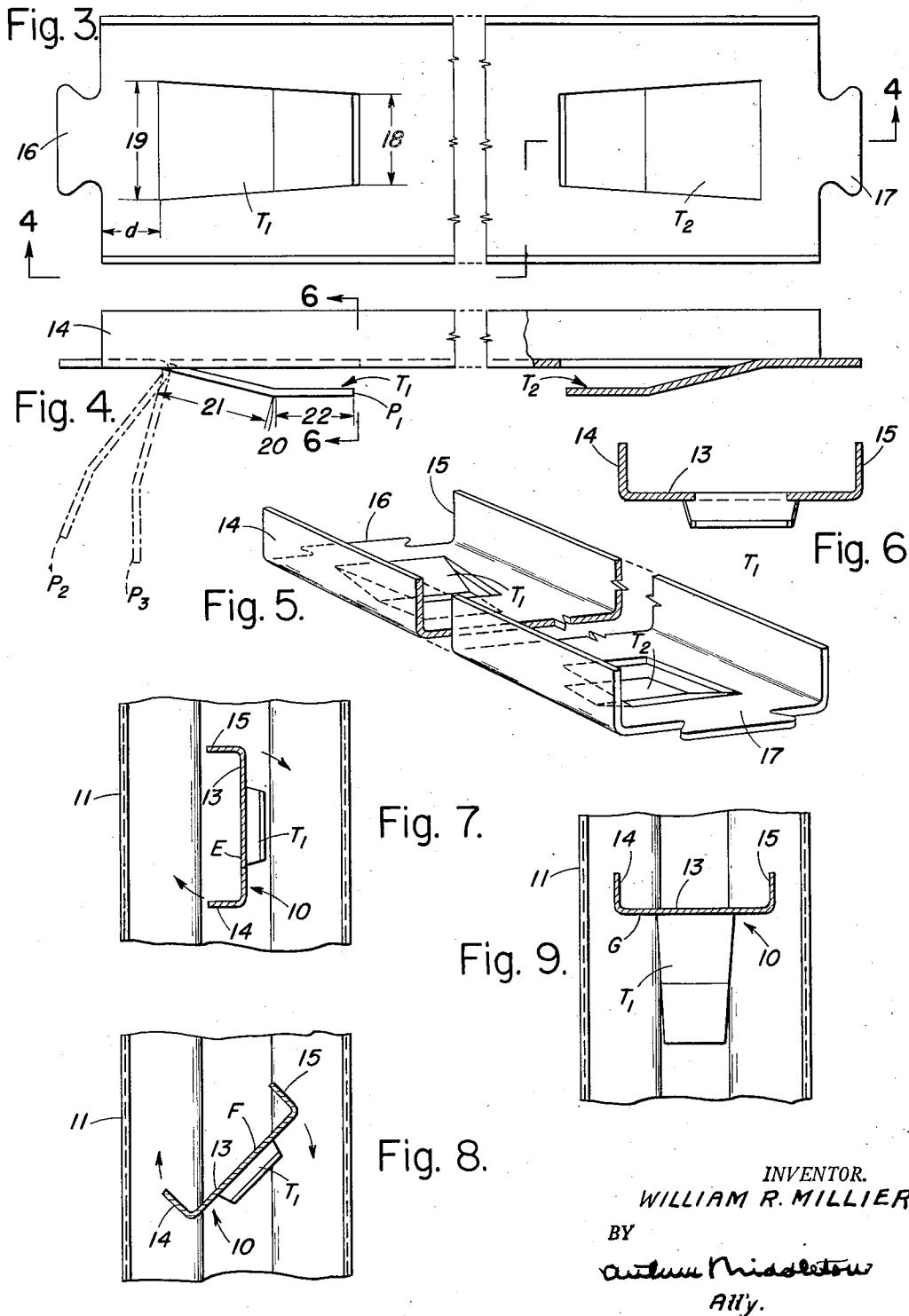
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UNITED STATES PATENT OFFICE

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STRUCTURAL MEMBER

William R. Millier, Montreal, Quebec, Canada, assignor to Cresswell Roll Forming Company Limited, Granby, Quebec, Canada, a corporation of Quebec

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1 Claim. (Cl. 189—34)

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This invention relates to structural framework such as for houses, and more in particular it relates to prefabricated structural elements that can be readily joined with other prefabricated elements in the assembly of such framework.

Further particularized, this relates to transverse connections or members for horizontally interconnecting vertical studs or posts in such structures.

It is among the objects to devise such a transverse connecting member whereby the transverse interconnection between a pair of posts can be established rapidly and optionally at any desired point of the free vertical length of the posts, that is without the use of additional fastening elements, such as bolts, screws, nails or rivets; and to devise such a transverse member that is simple, light and inexpensive to manufacture as from sheet metal as by stamping, rolling, and bending.

According to one aspect although in no limiting sense, it is one of the objects to devise such a transverse connecting element or member that will lend itself by a simple manner of assembly to readily interconnect such posts as are described in the copending patent application Ser. No. 71,615. For the purpose of illustration the horizontal connecting member according to this invention is herein shown as interconnecting or as adapted to interconnect a pair of posts of the particular kind and profile shown in the aforementioned copending patent application.

The post according to the copending application presents a composite profile of sheet metal having longitudinal hollow end portions. That is, the profile has the general appearance of an I-shape in which a web or body portion forms a solid although composite or double layer median wall portion and hollow end portions from which latter extend flange portions representing the transverse portions or flanges of the I-shape. As part of these transverse portions a pair of converging shanks extend into each hollow end portion and by their convergence towards each other inwardly these shanks form a vortex or V-shape providing a mere crack-like opening at the bottom of the V-shape where the converging shanks adjoin each other. A snap-fastening element for holding clapboards or other wall-covering elements to the post may be forced into the crack at any selected point along the length or height of the post in a non-retractable or one-way fashion since the converging shanks have sufficient resilient yieldability to be slightly forced apart or spread by such penetration.

More specifically, the profile of the post which enters into structural association with the horizontal or transverse connector of this invention, is embodied in a composite profile of roll-shaped

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elements, which profile comprises a pair of identical component profiles firmly interconnected in a symmetrical or complementary fashion along a longitudinal plane of juncture which coincides with the longitudinal axis of the profile of the I-shape.

Each component profile of the post, that is each half of the composite profile, is formed from a longitudinal metal strip by roll-shaping. Thus roll-formed the strip or component profile comprises a web- or body portion having a longitudinal plane medial portion which substantially coincides with the longitudinal median plane of the post which in turn coincides with what is termed the longitudinal axis of the I-shaped profile. The web portion of the component profile through an S-shaped or double-bend is formed with outwardly offset end portions extending substantially parallel to the medial portion, which offset portions form with the medial portion a groove of dove-tailed profile. From the end of each thus shaped web portion extends outwardly and at right angles a flange which has double wall thickness in that it is bent back upon itself and terminates in an inwardly inclined portion or shank overhanging the inside of the adjacent offset portion of the adjacent offset web portion.

The composite profile itself of the post is formed by back-to-back connection of the protruding medial web portions of the component profiles. In this way respective pairs of offset web end portions thus associated constitute a hollow portion at each end of the I-shape. By the same token, that is by interconnection of the component profiles in this manner, pairs of the inclined terminal shanks of the component profiles become associated so that the shanks of each pair converge towards each other and inwardly to constitute a V-shape or vortex within each respective end hollow of the I-shaped profile. The vortex of the V-shape forms a narrow slot or potential slot-like opening where the free terminal edges of a pair of converging shanks adjoin each other. A snap-fastening member for holding clapboards or other wall-covering to the posts can be forced in through the slot between converging shanks at any selected point along the length or height of the post, as the shanks allow themselves to be slightly forced apart by such penetration.

According to this invention a transverse connector for a pair of such posts as above defined by their profile comprises a flat sheet metal member formed with a dove-tail at each end as by stamping. The length of this connector corresponds to the distance between a pair of such posts, and each dove-tailed end of the connector is insertable into a corresponding dove-tailed groove of the profile of each associated post.

When these dove-tailed connections are established the plane of the flat connector is horizontal.

Each end portion of the flat connector also has a flat tongue extending at an angle from one of the faces of the flat connector although spaced somewhat inwardly from the dove-tailed end portion. This tongue is of slightly tapered shape, its end being slightly narrower than its base. With the transverse connector positioned, that is placed in dove-tail connection with and horizontally between a pair of posts, each of the tongues is adapted to be bent outwardly, that is towards the end of the connector thereby to be forced into the dove-tailed groove of the respective adjacent post so that frictional or wedging connection is established between the tapering edges of the wedge-shaped tongue and the entrance edges of the corresponding vertical dove-tailed groove of the adjacent post. In other words, each tapered tongue is forced outwardly into the adjacent vertical dove-tail shaped groove far enough to have the edges of the tongue intersect with and become jammed in between the entrance edges of the groove, thereby establishing structural connection between the transverse connector and the respective posts.

According to one feature the tongues are integral with the flat connector and are struck therefrom by way of stamping. Both tongues are struck from the same face of the connector and in a preferred embodiment they extend downwardly.

Other features and advantages will appear as this specification proceeds.

In the drawings:

Fig. 1 is a side view of a pair of posts with the transverse connector shown in various phases of its installation.

Fig. 2 is an enlarged cross-sectional detail view of the finished connection between one of the posts and the associated end of the transverse connector, taken on line 2—2 in Fig. 1.

Fig. 3 is a top view of the transverse connector showing the tongues as shaped prior to the installation of the connector.

Fig. 4 is a part-sectional side view of the transverse connector taken on line 4—4 of Fig. 3.

Fig. 5 is a perspective top view of the transverse connector shown in Figs. 3 and 4.

Fig. 6 is a cross-sectional view taken on the lines 6—6 of the connector member in Fig. 4.

Figs. 7, 8, and 9 illustrate sequential phases of the emplacement of a connector member upon the posts with the connector member shown in cross-section, some of the phases corresponding to those illustrated in Fig. 1.

Fig. 1 shows a transverse connector 10 in various sequential positions or phases of its emplacement upon and its connection with a pair of posts 11 and 12. These sequential phases are indicated at A, B, C, and D, showing the connector sideways or lengthwise. In Figs. 7, 8, and 9 similar positions of emplacement of this connector are shown by cross-sectional views thereof designated as E, F, and G respectively.

The connector 10 itself as shown in Figs. 3 to 6 consists basically of a length or strip of sheet metal, for instance of aluminum, of roll-formed profile, namely of a shallow or squat U-shape. This U-shape comprises (see Fig. 6) a flat body portion 13 and a pair of vertical shank portions 14 and 15. Each end of the flat body portion 13 is formed with a co-planar dove-tail 16 and 17 respectively. Furthermore the end portions

of the flat body portion 13 are formed with symmetrically disposed tongues T₁ and T₂ respectively, the tongues being stamped out and struck from the outer or under face of the body portion 13. For example the tongue T₁, the same as the other tongue T₂, is of slightly tapered shape having a narrow inner end 18 and a wider base 19, the base 19 being spaced a suitable distance "d" from the end of body portion 13, so that the tongues point towards each other. Each of the tongues T₁ and T₂ has a shallow bend 20 intermediate its length demarking a body portion 21 of the tongue and an end portion 22. Each tongue is capable (see Fig. 4) of being bent downwardly and outwardly away from the outer or under face of the body portion 13, namely from its substantially horizontal position P₁ to a substantially vertical or past-vertical position P₂ (indicated in dot-and-dash lines).

Each of the posts 11 and 12 consists of a pair of symmetrically joined, that is welded together, identical roll-formed component profiles R₁ and R₂ constituting together the composite profile R of the post. The characteristics of this profile are substantially self-explanatory from Fig. 2 and are otherwise defined and dealt with in detail in the copending patent application Ser. No. 71,615. In connection with this invention such a profile of the posts presents at each side thereof a vertical groove 23 and 24 respectively of dove-tailed cross-section, that is of an outline or contour which is complementary to the dove-tails 16 and 17 respectively of the transverse connector 10. In connection with this invention it is furthermore important to note that the dove-tailed grooves have vertical entrance edges indicated at 23^a and 23^b for the groove 23 and indicated at 24^a and 24^b for the groove 24.

Now in describing the manner of emplacing the connector 10 to connect with the posts 11 and 12 it will be shown that a firm transverse interconnection of the posts can be established by this connector without the use of any additional fastening or connecting means, such as screws, bolts, rivets or the like.

Let it then be assumed that the posts 11 and 12 had been erected as part of the framework and were in place with a center-to-center distance S between them. In order to transversely interconnect and brace these posts a connector member 10 as proposed by this invention is first positioned between the posts in the tilted position A and with its main plane, that is the plane of its body portion 13 substantially vertical. Then the member 10 is brought to the horizontal position B of Fig. 1 (which is also E of Fig. 7) as the dove-tails 16 and 17 are allowed to enter the respective vertical complementary grooves 23 and 24 of the posts. Thus positioned horizontally at an elevation at which the interconnection of the posts is to be realized, the member 10 is then rotated about its then horizontally disposed longitudinal axis K (see also Fig. 8) until it assumes the position C of Fig. 1, that is position G of Fig. 9, in which the main plane of the member is horizontal and the dove-tails 16 and 17 substantially fill their respective complementary grooves in the posts.

While the member 10 is being held in the G- or C-position, the tongues T₁ and T₂ may be bent downwardly and outwardly towards the respective ends of the member 10 and indeed far enough to be forced or jammed into the dove-tailed grooves of their respective adjoining posts, as by a hammer blow or the like. Thus the

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tongues due to their slightly tapered shape are forced in between the entrance edges such as the edges 24^a and 24^b of the respective vertical groove so that these tongues will become jammed between the entrance edges and thereby establish a firm connection between the transverse member and the vertical posts.

Indeed the tapering edges G₁ and G₂ (see Fig. 2) will thus intersect with the associated entrance edges 24^a and 24^b of the groove and the tongues may be forced in sufficiently to even slightly indent or dig themselves into the entrance edges 24^a and 24^b in a manner to insure a firm and safe connection.

I claim:

In combination with a pair of posts having vertical grooves of dove-tail cross-section facing each other, a transverse connecting member having a dove-tail terminal portion at each end, said dove-tail terminal portions being complementary to and lodging in dove-tail connection each with one of said vertical grooves, said member having adjacent each end a tongue tapered

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to form a narrow end and a wider base and bent towards and forced into the adjacent vertical groove with the tapered edges of the tongue engaging intersectingly with the entrance edge portions of said groove establishing wedging connection therewith.

WILLIAM R. MILLIER.

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