

April 18, 1939.

H. W. HOLMSTROM
BUILDING CONSTRUCTION

2,154,570

Filed Feb. 23, 1938

2 Sheets-Sheet 1

Fig. 1. Fig. 2.

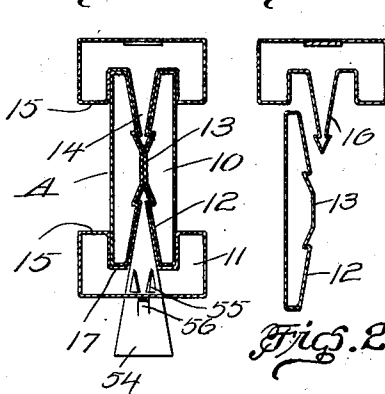


Fig. 3.

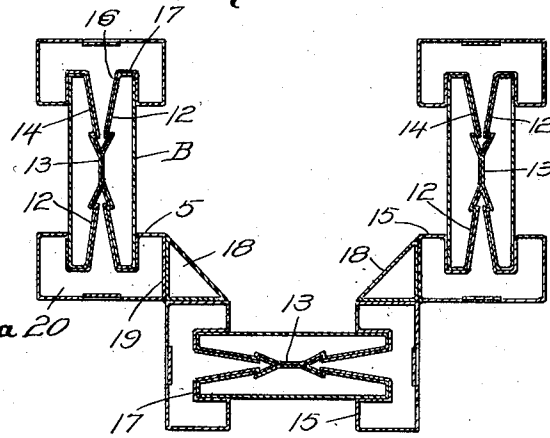


Fig. 4.

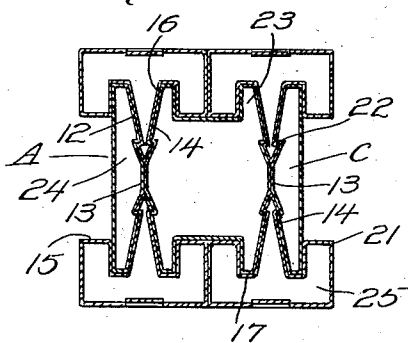


Fig. 5.

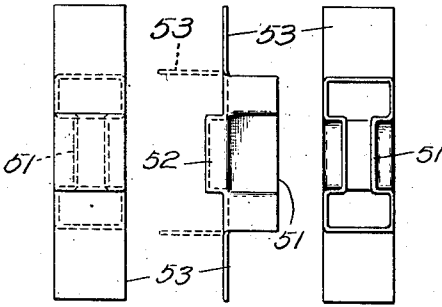
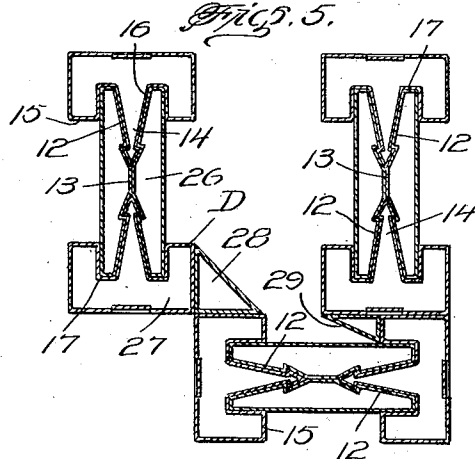


Fig. 10 Fig. 10a Fig. 10b

Fig. 11

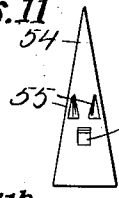


Fig. 11a

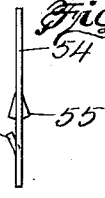


Fig. 11b



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FIG. 6.

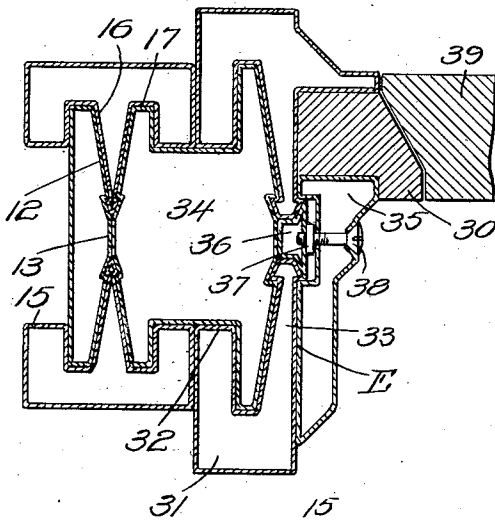


FIG. 7.

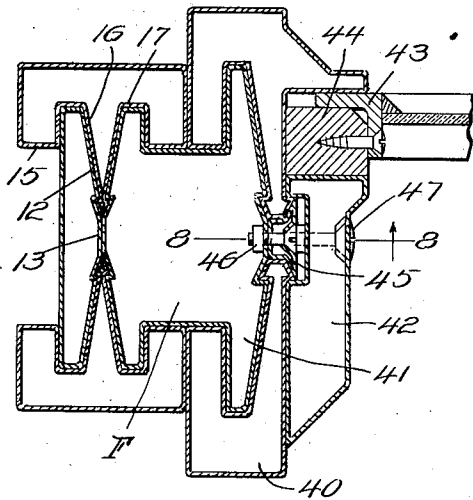


FIG. 8.

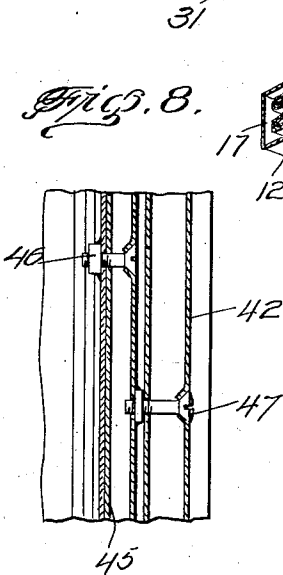
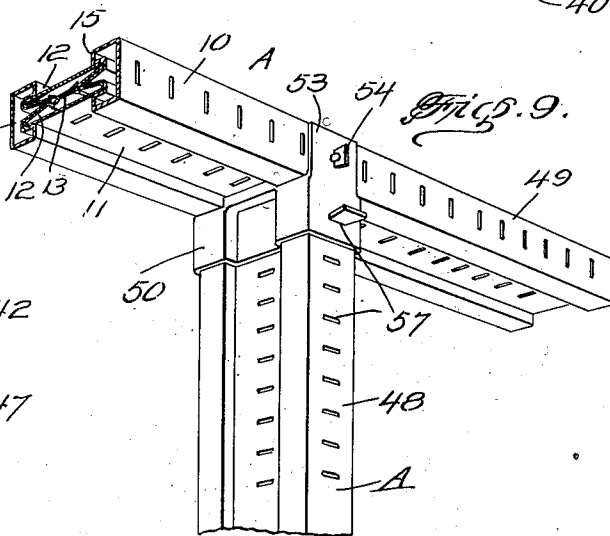


FIG. 9.



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BUILDING CONSTRUCTION

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Application February 23, 1938, Serial No. 192,152

10 Claims. (Cl. 189—34)

The invention relates to building constructions and more especially to pressed steel structural framing and method of joining the same.

The primary object of the invention is the provision of a construction of this character, wherein the said metal framing members are of hollow formation and are precut at the factory so that the same may be assembled at the place of erection of the building or the like without requiring labor in the cutting of said members for proper assembly thereof, these members being interlocked at the point of use thereof in a novel manner and are composed of a plurality of units adapted for interfitting with each other.

Another object of the invention is the provision of a construction of this character, wherein the units of the framing members are assembled and locked together in a novel manner without the use of nails or the like and create a rigid unitary formation, being precut as per plans of a structure so that the work or the labor required in the field would merely be assembly.

A further object of the invention is the provision of a construction of this character, wherein lathing, wall facings, sheathing material may be readily and easily fastened to the framing without the use of nails or other like fasteners and the framing being devoid of wood thus being of fireproof characteristic.

A still further object of the invention is the provision of a construction of this character, wherein the framing is of hollow sheet metal formation and in the assembly thereof for the erection of an edifice will be possessed of maximum strength and durability, being susceptible of reinforcement through the use of cementitious or homogeneous material.

A still further object of the invention is the provision of a construction of this character, wherein evolves a novel method of the joining of the units in their assembly to expedite erection of an edifice possessed of maximum strength and longevity.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, which disclose the preferred embodiment of the invention and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1 is a transverse sectional view of a framing constructed in accordance with the invention.

Figure 2 is a transverse sectional view show-

ing one part in the assembly of several of the units of the frame.

Figure 2a is a view similar to Figure 2 of another part.

Figure 3 is a view similar to Figure 1 showing a different arrangement of the framing in the assembly thereof.

Figure 4 is a view similar to Figure 3 showing a double stud framing.

Figure 5 is a view similar to Figure 4 showing a three-way stud assembly.

Figure 6 is a view similar to Figure 5 showing another frame assembly for a door jamb.

Figure 7 is a view similar to Figure 6 of still another frame assembly for a window sash.

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 7 looking in the direction of the arrow.

Figure 9 is a fragmentary perspective view showing the framing for vertical and horizontal supporting assembly of the framing.

Figure 10 is a plan view of a stud cap.

Figure 10a is a side view thereof.

Figure 10b is a view similar to Figure 10 looking toward the opposite side.

Figure 11 is a plan view of a lathing or wall fastener used with the assembly.

Figure 11a is an edge view thereof.

Figure 11b is an end view.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, particularly Figures 1 to 5 inclusive, each framing member constituting the present invention comprises pairs of web and flange units 10 and 11, respectively, each made of pressed steel and of hollow formation, being precut for mere assembly work in the field after shipment or distribution from the manufacturer. The units 10, each has the reversely beveled outer areas or portions 12 at one side thereof and an intermediate countersunk outwardly bulged area or portion 13, respectively, so that when these sides match with each other with the areas or portions 13 making medial contact with each other, there will be presented therebetween substantially arrowhead-like gaps or seats 14 opening outwardly transversely with respect to the units 10 and approach the intermediate areas or portions 13 of said units.

The flange units 11 at the inner sides 15 thereof, each has medially of its inner side 15 and longitudinally thereof a countersunk arrowhead shaped coupling rib 16 while created at opposite sides thereof are the channels or grooves 17,

these being adapted to accommodate the longer opposite edges of the units 10 with the ribs fitting the gaps or seats 14 between said units 10 in the assembly of the framing with the result that these units will be interlocked with each other to effect a substantial eye stud, joist, beam or other supporting member denoted generally at A.

To effect a three-way stud construction B, the assembly thereof is had by arranging a group of three eye studs, beams, joists or other supporting members A as shown in Figure 3 of the drawings and connecting these by hollow substantially triangular shaped connector strips or forms 18 which are welded or otherwise made fast to confronting sides 19 of the units 20 next thereto and at right angles to each other when a pair of the members A are arranged in spaced parallelism with each other and another of these members intermediate with respect to the latter and disposed crosswise in its lay thereto.

To effect a double eye beam, stud, joist or other supporting member C, a unit 21 of hollow formation having the contracted intermediate portion 22 and the outer portions 23, respectively, is created, these being in association with the units 24 and the units 25, respectively. The units 24 and 25 are similar to the units 10 and 11 and the assembly of these with the unit 21 being shown in Figure 4 of the drawings.

To effect the creation of a corner structure D, a series of members involving the units 26 and 27, respectively, are employed, these being similar to the units 10 and 11 and their assembly, and are connected together by the strips or forms 28 and 29, respectively, these being welded or otherwise made fast in the joinder thereof with the units 27 next thereto as is clearly shown in Figure 5 of the drawings.

In Figure 6 of the drawings there is shown a portion of a door jamb 30 fitted in a framing E involving a pair of sheet metal hollow units 31 formed with jaw extensions 32 and the arrow-head shaped locking ribs 33, respectively, the jaws being engageable with the unit 34 while the ribs 33 interlock with the latter and a hollow retaining strip 35, respectively, which conceals between it and the unit 34 a filler strip 36 having welded or otherwise made fast thereto bolt-receiving nuts 37 for fastening bolts 38 securing the strip 35 in place, a portion of the door being indicated at 39 fitting the jamb 30.

In Figures 7 and 8 of the drawings there is shown a window sash or frame assembly F involving the units 40 and 41, respectively, these being similar to the units 33 and 34, the retaining strip being indicated at 42 in the window frame at 43, respectively, this having a packing strip 44 associated therewith, the filler strip 45 being fastened at 46 and the strip 42 fastened at 47, respectively.

In Figure 9 of the drawings there is shown vertical and horizontal supports as employed in building construction and each support involves the member A including the units 10 and 11, these interlocked with each other for the eye beam, joist or the like formation, a portion of the vertical support being indicated at 48 while a portion of the horizontal support is indicated at 49. About the support 48 is a cap member 50 in the form of a sleeve having the inturned portions 51 so that the cap in its formation will snugly embrace the support 48. The inturned portions 51 carry lips 52 interfitting the horizontal support 49 while at opposite ends of the cap 50 are bend-

able wings 53 which are disposed by bending in overlapped relation to the horizontal support 49 and both the said ends of the cap 50 and the ears 53, respectively, each has a clearance for accommodating a wedge-shaped locking key or fastener 54, it having burrs or latching ribs 55 and 56, respectively, for the retention of the fastener 54 in place. The supports 48 and 49, each carries preformed slot formations 57 therein, these being initially partly cut into the units 10 and 11 so that they can subsequently be cleared for accommodating the keys or fasteners 54 for the joining of the supports 48 and 49 together.

The units 10 and 11, after assembly thereof with each other, can be reinforced by fillings of cementitious material, the hollow formations of such units being receptive of such material.

With reference to Figure 6 of the drawings, the jamb 30 is susceptible of reversal for the setting thereof with respect to the door 39 should it swing outwardly or inwardly in the hanging of such door.

It is preferable that the filler strip 36 be fastened in place similarly to the fastening of the filler strip 45 by the fasteners 46.

The units 21 and 34 in their formation function as fillers and are spot welded to give additional structural shape. The cap 50 is usable for the joining together of members disposed at right angles to each other. Normally the wings 53 of the cap 50 are extended laterally from opposite ends and in the use of such cap are bent from this position to overlapping relation to an adjoining part.

The keys or fasteners 54 can be used for attaching to the framing metal lathing, wall or ceiling facings and sheathing or the like, these keys or fasteners 54 being bendable into clinching or gripping engagement with the latter at their ends exposed and projected beyond the frame.

In the use of the invention in its novel sectional construction, it is customary to apply a mastic of low heat conductivity in the nature of a thin film between its sections and in this fashion lessen the concentration of moisture and thus add to the usefulness of the invention. This mastic of low heat conductivity is located between the contacting surfaces of the web and flange section wherever necessary.

It is further understood that the web and flange section when set up for use as an I-beam will function as such at any required locality in structural framing and thus offer a solution for insulation and to feed direct transmission of heat as occurs in the use of steel framing of modern trend in building construction. This sectional hollow assembly hereinbefore set forth eliminates or prevents warping particularly where there is great differences in the temperatures particularly with regard to opposing flanges and a silent movement characteristic is allowed with respect to component parts through the elasticity of the mastic film when employed at contacting points of the structure. It is, of course, recognized that cold and heat effects expansion and contraction of composite parts of steel or metal resulting in perceptible noises and groans where the movement of one part over another takes place, this being produced through mechanical friction and by the presence of the mastic film between adjacent or at contacting points of the parts the mechanical friction or movement of these parts is silenced.

What is claimed is:

having reversely beveled portions and countersunk intermediate outwardly arched portions therebetween, a pair of preformed hollow sheet metal flange units, countersunk locking ribs formed on said flange units and engageable between the reversely beveled portions of the web units for locking action with the intermediate arched portions of said web units, the said flange units being formed with seats at opposite sides of the ribs and accommodating the web units therein for the interfitting of the said web and flange units with each other and effecting an I-beam formation, a coupling capping for an I-beam formation and the connecting of another I-beam formation therewith when at substantially right angles thereto, locking keys engageable with the coupling cap and with the beam formations for the fastening thereof together, means for the joining of I-beam formations with each other when in side relation to each other, hollow sheet metal formations hooked and interlocked with a beam formation, filler strips fitted with the last-mentioned formations, and sheet metal stripping fastened with said filler strips.

10. In construction of the kind described, a pair of preformed hollow sheet metal web units having reversely beveled portions and countersunk intermediate outwardly arched portions therebetween, a pair of preformed hollow sheet metal flange units, countersunk locking ribs formed on said flange units and engageable between the reversely beveled portions of the web units for locking action with the intermediate arched portions of said web units, the said flange units being formed with seats at opposite sides of the ribs and accommodating the web units therein for the interfitting of the said web and flange units with each other and effecting an I-beam formation, a coupling capping for an I-beam formation and the connecting of another I-beam formation therewith when at substantially right angles thereto, locking keys engageable with the coupling cap and with the beam formations for the fastening thereof together, means for the joining of I-beam formations with each other when in side relation to each other, hollow sheet metal formations hooked and interlocked with a beam formation, filler strips fitted with the last-mentioned formations, and sheet metal stripping fastened with said filler strips and effecting a seating for a door jamb or a window frame therein.

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