Jan. 2, 1968 C. ROSSO 3,360,892

WALL CONSTRUCTION FOR BUILDINGS

Filed Sept. 30, 1965 3 Sheets-Sheet 1

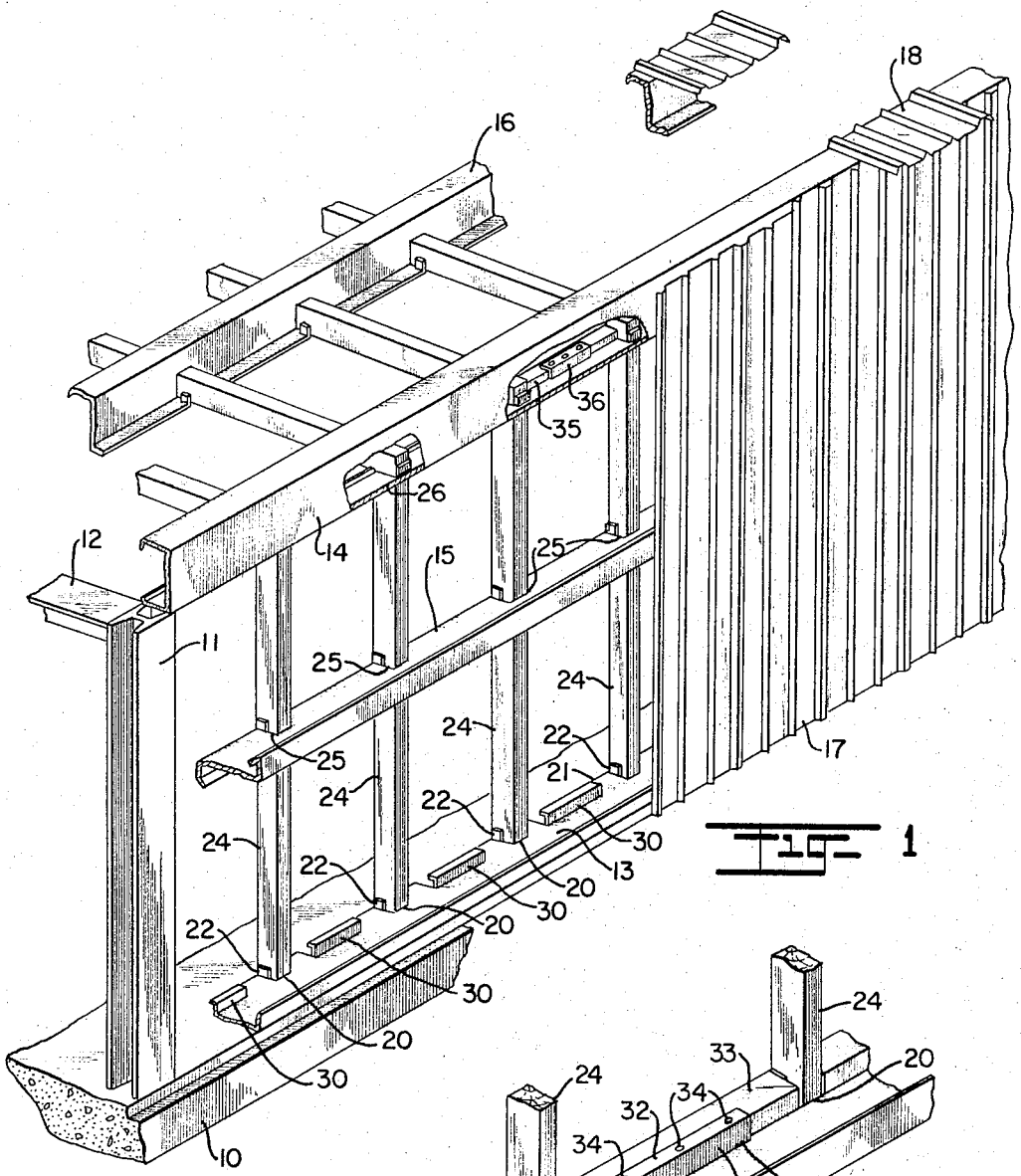


Fig. 1

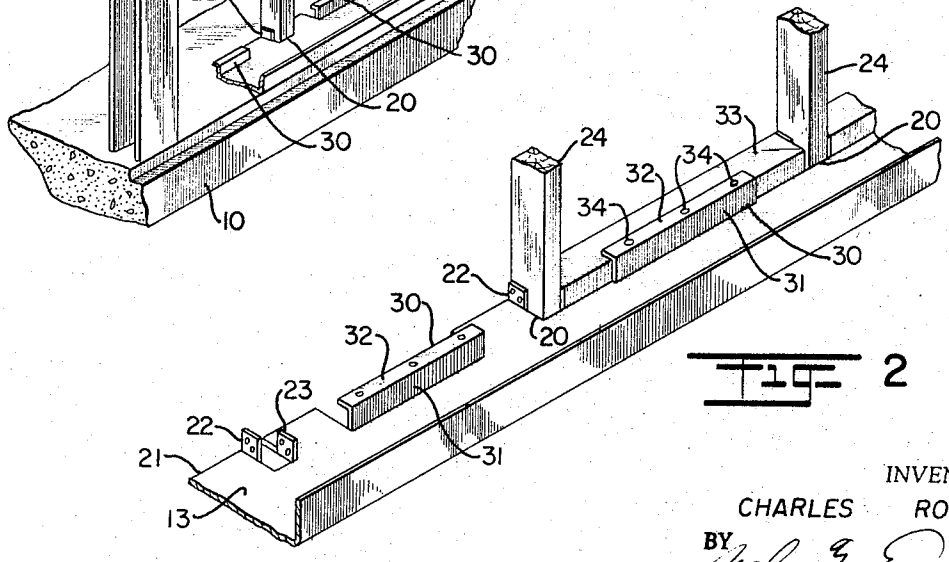


Fig. 2

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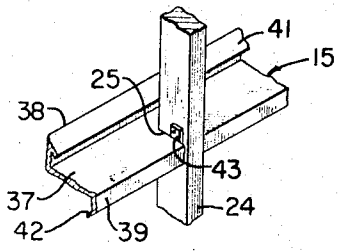


FIG. 3

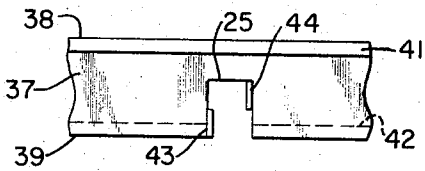


FIG. 4

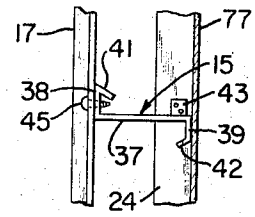


FIG. 5

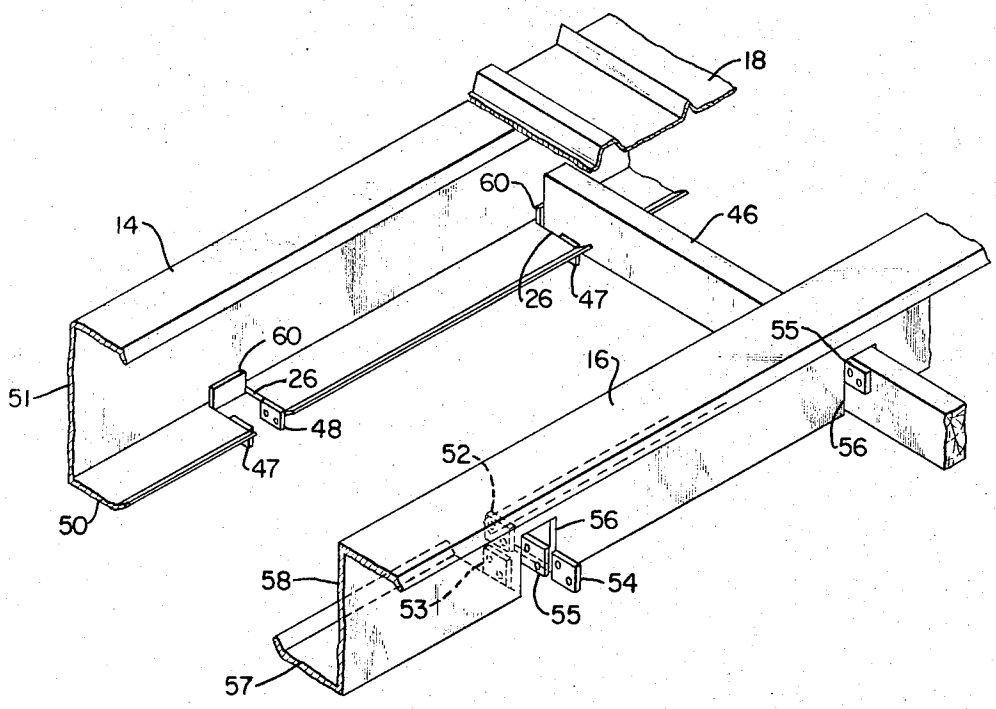


FIG. 6

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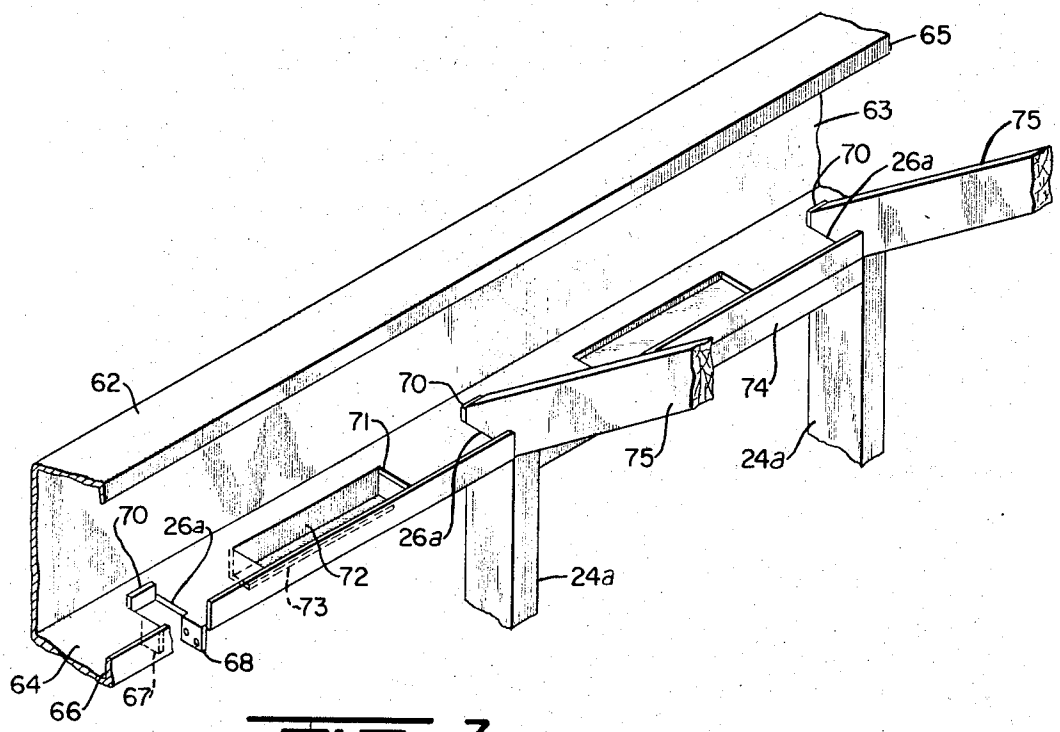


FIG 7

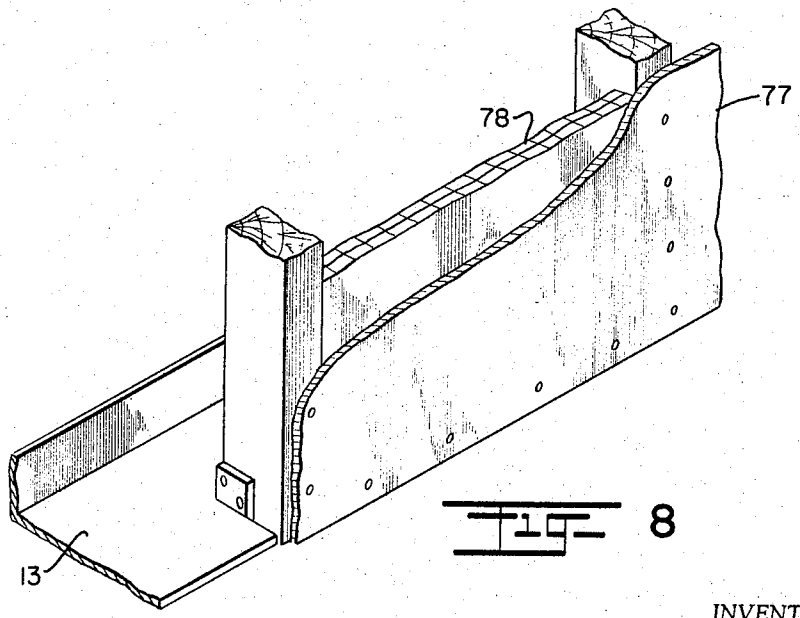


FIG 8

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3,360,892

WALL CONSTRUCTION FOR BUILDINGS

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9 Claims. (Cl. 52—93)

This invention relates to building wall construction and more particularly to an improved prefabricated wall structure for facilitating the securing of inside wall panels to metal frame structures.

Prefabricated metal building structures are in wide use today and find application in many fields. Many of these structures are intended both for industrial and residential use but do not provide arrangements for the easy and secure attaching of finished inside wall panels and insulation batts to the wall structure. Other constructions of prefabricated walls require special equipment or attaching devices for securing inner wall panels on the metal frame members. It is desirable that when inner wall panels are to be installed provision be made for speedy and secure attachment of the inside wall panels to the metal framework. Accordingly, it is an object of this invention to provide a prefabricated wall construction including an improved arrangement for securing inside wall panels to the metal framing members.

It is another object of this invention to provide an improved longitudinal framing member for prefabricated wall structures.

Briefly, in carrying out the objects of this invention in one embodiment thereof, a prefabricated metal building structure is provided which includes base, ceiling and intermediate longitudinal members having sheet metal outer walls secured thereto. The longitudinal members are constructed of formed steel or other structural metal and generally comprise web sections having reinforcing flanges or angles extending the length thereof. In order to provide for readily securing an interior finish wall such as wooden paneling, dry wall or the like, an arrangement is provided for securing studs and plate members to the longitudinal members and thereby provide attaching surfaces flush with the inner wall and to which the inner wall panels may readily be nailed or otherwise secured.

The longitudinal members are provided with vertical aligned recesses or slots for receiving the studs, these slots being spaced at predetermined intervals along the members. Longitudinal plates may be secured between adjacent studs and the web members of the longitudinals are provided with attaching means for such plates.

The features of novelty which characterize this invention are pointed out with particularity in the claims annexed to and forming a part of this specification. The invention itself, however, both as to its organization and manner of use, together with further objects and advantages thereof, will be best understood upon reference to the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view partly in section and partly broken away illustrating a prefabricated building construction embodying the invention;

FIG. 2 is an enlarged detail view of the base portion of the structure of FIG. 1;

FIG. 3 is an enlarged detail of the grit and stud structure of the building;

FIG. 4 is a plan view of the girt shown in FIG. 3;

FIG. 5 is an end view of a portion of FIGURE 3;

FIG. 6 is an enlarged detail view of a portion of the ceiling purlin structure of FIG. 1;

FIG. 7 is a perspective view of a portion of the eave structure of a building illustrating another embodiment of the structure; and

FIG. 8 is an enlarged detail view taken from the inside

of the structure of FIG. 1 showing an inner wall secured to the structure.

Referring now to the drawing, the prefabricated building structure illustrated in FIG. 1 is mounted on a suitable concrete foundation or footing **10** and comprises suitable rigid frame bents spaced at desired intervals along the building, one of the bents being indicated as comprising an upright column **11** and a horizontal beam **12**. Between adjacent columns a longitudinal metal foot plate **13** is mounted on the footing **10** and at the top an inwardly facing eave strut **14** having a channel-shaped cross section extends between the tops of adjacent columns; one or more girts **15** are mounted between the plate **13** and the strut **14** in accordance with the requirement of the building structure, one girt **15** being employed in the structure illustrated in FIG. 1. A plurality of roof supports or purlins are supported on the beams **12**, one purlin being indicated at **16**.

The outside wall of the building is formed by ribbed sheet metal panels **17** mounted vertically between the plate **13** and the eave struts **14**, these panels being secured to the plate **13**, girt **15** and strut **14** by any suitable connectors such as screw fasteners, and in some installations being welded in place. Similar ribbed panels **18** are connected to the eave struts and purlins to provide the roof of the building. The framework thus constructed comprises a rigid all-metal structure.

For many buildings it is desirable to install finished inside wall panels of drywall or various forms of panel board. It is difficult to secure such panels to conventional metal structural members and, in order to provide a structure for attaching such panels, the various structural members of the building are provided with notches, slots or recesses positioned and aligned so that studs and plates suitable for receiving the wall panels may readily be secured to the completed structure from the inside. These panel attaching members provide a flush inside surface to which wallboard and other panels may easily be secured in a conventional manner.

In the illustrated embodiment the plate **13** is provided with a plurality of spaced slots **20** opening toward the inside edge of the plate, indicated at **21**, and having upstanding tabs **22** and **23** as shown in FIG. 2. The size and configuration of the slots **20** is that of the cross section of suitable studs **24** which are to be connected to the structure and which have been illustrated as conventional wooden studs. These studs may be moved into position bodily directly into the slots **20** and into similar aligned slots **25** and **26** in the girt **15** and eave strut **14**, respectively. When the studs are in position they are secured in place by nails or the like passing through holes provided in the tabs **22** and **23** and similar tabs on the slots in the girt and eave strut. All of these slots **20**, **25** and **26** are of the same configuration and positioned in the same manner in their respective structural members so that they are open to the inside of the building.

In order to provide horizontal attaching surfaces for the inside wall panels, a plurality of upstanding stop flanges **30** are formed in the plate **13** intermediate the recesses **20**. Each of these flanges comprises an upright portion **31** and a horizontal portion **32** extending parallel to the web of the plate **13** to provide a recess opening toward the inside. This recess is arranged to accommodate a plate of wood or other suitable material having its ends abutting the adjacent studs **24** and one edge extending flush with the inner edge of the plate as indicated at **33** in FIG. 2. The plates **33** may be secured in position by nailing them to the plate **13**, the nails being passed through holes **34** in the portion **32** of the flange. The plate **33** is thus supported on the portions of the plate

13 adjacent the studs 24 and is held down by the flange portion 32 and secured in place by the nails.

A similar set of plate members comprising ceiling plates is secured in the eave strut 14 but on the underside thereof, as indicated at 35 in the broken away portion. A flange 36 of the same construction as the flange 30 is formed on the underside of the lower horizontal wall of the eave strut.

The construction of the girt 15 is shown in detail in FIGS. 3, 4 and 5. The girt comprises an elongated steel structural element of generally Z-shaped cross section comprising a main web or flange 37 and upwardly and downwardly turned flanges 38 and 39 on the outer and inner edges, respectively, of the flange 37. The flange 38 is provided with an inwardly and downwardly turned top rim or portion 41 for reinforcement and the flange 39 is provided with an inwardly and downwardly turned rim or flange portion 42. The slots 25 are cut into the web 37 from the inner edge of the girt and extend through the flanges 39 and 42.

Stud attaching tabs 43 and 44 are struck upwardly out of the material of the web 37 in staggered relationship, as shown in FIG. 4, these tabs being provided with holes for affording nailing of the studs 24 to the girts. In FIG. 5 the outer sheet metal wall panel 17 has been indicated as secured to the flange 38 by a self-tapping screw 45. The edges of the flange 42 adjacent the slot 25 engage the stud 24 and provide additional bracing.

The eave strut 14 as shown in FIG. 6 carries the ends of ceiling joists 46 which are nailed to downwardly turned tabs 47 and 48 formed in the lower or horizontal wall 50 of the eave strut, the main web or bottom of the channel section, indicated at 51, lying in a vertical plane and having the panel members 17 secured thereto. The joists 46 are also supported in the ceiling purlins 16 which have upwardly turned tabs 52 and 53 to afford nailing of the joists to the purlins. Additional tabs 54 and 55 are provided in the vertical web 51 so that the joists 46 may be nailed to the purlins on both sides of the web.

The slot in the purlins as indicated at 56 is formed in the bottom wall of the purlin indicated at 57 and in the main web of the purlin indicated at 58. The slots 26 in the eave strut are provided with upturned tabs 60 at the end of the slot which are positioned to abut the ends of the joists 46 and hold the ends directly above the respective studs secured in the slots 26. However, if desired, the tabs 60 may be omitted and the joists allowed to extend nearer to the main web 51 of the eave struts.

For buildings provided with sloping roofs the construction of the eave strut is modified as illustrated in FIG. 7 to form the top wall of the channel in a plane having the same slope as the roof, as indicated at 62. The eave strut thus comprises a main web 63, a horizontal bottom wall 64 and the top wall 62. The top and bottom walls are provided with inwardly turned reinforcing flanges 65 and 66, respectively. The stud securing slots indicated at 26*a* are formed in the bottom wall 64 and its flange 66. Downwardly turned tabs 67 and 68 are struck from the material at the slot 26*a* in staggered relationship so that nails may be driven from either side through the respective tabs without interference. An upwardly turned tab 70 is provided at the rear of the slot 26*a*. Intermediate the adjacent slots 26*a* there is formed an elongated slot 71 the material of which is bent outwardly to provide a downwardly extending flange 72 having a horizontal portion 73 extending toward the inside wall and providing a recess into which a top plate 74 may be inserted and secured by nailing through suitable holes (not shown) formed in the portion 73.

Inclined ceiling joists 75 are positioned in the slots 26*a* above the studs indicated at 24*a* and the ends of the joists 75 abut the tabs 70 which carry the side thrust due to the inclined ceiling structure. All of the panel attaching members, including the studs 24*a*, plate 74 and

ceiling joists 75, may be moved bodily into position in the structure from the inside so that these members may be incorporated in the structure after the steel framing has been completed.

When all of the studs and plates are in place, the interior wall may be completed by securing suitable panels such as indicated at 77 in FIG. 1 and in FIG. 8 directly to the studs and plates. If insulation is required in the walls, suitable batts of insulation may be installed between the studs as indicated at 78 in FIG. 8. These batts are stapled or otherwise secured in position in the wall structure before the inner wall panels 77 are installed.

While the invention has been described in connection with a specific form of steel frame building structure, various modifications and other applications will occur to those skilled in the art. Therefore, it is not desired that the invention be limited to the details of construction illustrated and described and it is intended by the appended claims to cover all modifications which fall within the spirit and scope of this invention.

I claim:

1. In a prefabricated metal wall structure, a plurality of longitudinal members each having a flat web extending in a plane transverse to that of the wall, an outside metal wall secured to said members, and means providing recesses in said members opening toward the inner side of said structure for affording the positioning of studs by bodily movement directly into said structure and for securing such studs to said structure for affording attachment of finished interior walls thereto, said means including spaced recesses formed in each of said webs opening toward the inner side of said structure and said recesses in adjacent webs lying in vertical alignment, tabs formed on said webs and extending at right angles thereto adjacent the edges of said recesses for face engagement with studs placed in said recesses and having holes therein affording nailing of the studs thereto.

2. An elongated metal element for supporting the inner and outer wall panels of prefabricated building wall structures and the like, said element having a flat web extending transversely of the wall structure and along the inner edge of said element, a plurality of spaced slots in said web opening along said edge and shaped to fit closely about respective studs to be employed with said element for holding one face of each stud flush with said edge, tabs extending from said web normal thereto adjacent the edges of said slots for face engagement with respective studs positioned in said slots, an elongated stop flange formed on said web and having a first portion transverse to the plane of the web, said flange extending parallel to said edge and in a plane parallel to that of said web intermediate two respective ones of said slots and having a second portion extending from said first portion parallel to said web and toward said edge and spaced from said web to accommodate a plate member extending between said studs and along said edge, said tabs and said second portion of said flange having holes for affording their attachment to the studs and plate for preventing the displacement thereof.

3. An elongated metal element for supporting the inner and outer wall panels of prefabricated building wall structures and the like as set forth in claim 2 wherein said tabs and said flanges are struckout of the material of said web, said flanges being substantially shorter in length than the distance between said slots whereby a plate supported on said web and abutting studs in adjacent slots is held between said flange at its central section and the portions of said web adjacent said slots.

4. In a prefabricated metal wall structure, a plurality of longitudinal members each having a flat web extending in a plane transverse to that of the wall, and means for securing studs and plates to said member for facilitating the attaching of inner wall panels, said means including spaced rectangular slots in each of said webs opening toward the inner side of said structure, said

slots in adjacent webs being in vertical alignment, tabs formed on each of said webs and extending at right angles thereto adjacent the edges of said slots for engaging studs placed in said slots and having holes therein affording nailing of the studs thereto, elongated straight flanges one between each pair of slots and extending transversely to said webs, said flanges having portions lying in planes spaced from and parallel to the planes of the respective webs and extending toward the inner side of said wall for positioning and holding plates between said slots with their ends abutting studs therein and their inner edges flush with the inner face of the studs, said flange portions being positioned to engage the surface of plates positioned on said webs and having holes for nailing to such plates.

5. In a prefabricated metal wall structure, a plurality of longitudinal members as set forth in claim 4 wherein said slots and the recesses formed by said webs and said flanges open toward the inner face of said structure and afford free bodily straight-line movement of studs and plates into position on said structure whereby said studs and plates may readily be mounted and secured to said wall after the metal structure has been completed.

6. A longitudinal structural element for prefabricated wall structures and the like comprising an elongated straight body formed to provide a flat web and a reinforcing angle portion extending along the web and having a surface normal thereto for facilitating the attachment of an outer metal wall panel, said web having a plurality of equally spaced rectangular slots having open ends along the edge of said web remote from said angle portion and having their sides normal to said edge, and tabs extending from the face of said web normal thereto on opposite sides of said slots whereby said tabs will lie in face engagement with studs fitted in said slots at right angles to said web, a plurality of longitudinal stop flanges formed in said web one in each space intermediate adjacent slots and each extending at right angles thereto, each flange having a flat portion extending toward said edge and spaced from and parallel to said web to provide an open slot for the insertion of plate members between each pair of studs and each of said flat portions having holes for facilitating the nailing of the plates to secure them in position.

7. In a metal building wall assembly comprising an elongated metal base plate and an elongated eave strut spaced apart and connected by sheet metal siding, said metal base plate and eave strut constituting upper and lower longitudinal metal wall members, a plurality of upright studs extending between said members, each of said members having pairs of tabs turned outwardly therefrom and fitting against two opposite sides of each

respective stud, means for securing said studs to said tabs, longitudinal plate members extending between each pair of studs with their ends abutting said studs, and means including longitudinal flanges turned outwardly of said wall members and extending along one side of each respective one of said plate members and having face portions parallel to and engaging said plate members, and means for securing said face portions to said plate members.

8. In a metal building wall assembly including elongated structural members and a metal outside wall, an eave strut secured in the upper portion of said assembly, said strut comprising a channel member opening toward the inner face of said assembly and having an upturned flange along the inner edge of the lower wall of the channel, spaced slots formed in said lower wall and said flange and having downturned tabs on opposite sides extending normal to said wall and an upturned tab at the end of each slot, said slots being dimensioned to receive upright studs terminating flush with the upper side of said wall and said tabs having holes therein for affording nailing of the stud to the strut, said upturned tab and the edges of said flange affording positioning of a sloping ceiling rafter on the end of the stud whereby said upturned tab serves as a stop to receive the thrust of the rafter.

9. In a metal building assembly, a purlin for supporting ceiling rafters and the like comprising a light-gauge steel section having a main upright web and flanges extending from opposite sides of the web at the top and bottom thereof respectively, spaced slots formed in the lower one of said flanges and the lower portion of said web to receive ceiling rafters, a portion of said slot in said web being provided with staggered tabs extending from the edge of the slot normal to said web and said bottom flange having staggered tabs extending normal to the flange upwardly therefrom whereby a ceiling rafter placed in a slot lies in face engagement with said tabs, said tabs having holes for affording nailing of a rafter in said recess to said purlin and said bottom flange having an upturned portion along the outer edge thereof for strengthening said flange, said upturned portion terminating at the recess in said flange and its edges being positioned to engage a rafter positioned in said slots.

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