METAL WALL FRAMING SYSTEM

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ABSTRACT

A metal wall framing system for residential and commercial building construction. Channel shaped metal studs are secured between top and bottom channel shaped metal tracks without the use of separate fasteners by an arrangement of lugs, tabs and punched slots that hold the studs tightly to the tracks in a predetermined position.

6 Claims, 4 Drawing Figures
METAL WALL FRAMING SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to building wall construction and more particularly to metal wall studs and related metal structural members. Many metal building systems have been proposed over the years for the construction of both residential and commercial buildings. Many of these systems used cold formed or rolled metal structural sections that were joined together either by welding or with special fasteners. A number of systems were quite complicated and required considerable time and skill to assemble. Several systems, while simple to assemble, did not provide the rigidity and strength required for a proper structural building frame.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide a metal building wall system that can be assembled without the use of welding or separate fasteners such as screws, nails or the like.

It is a further object of this invention to provide a metal building wall system that is versatile and can be quickly and easily assembled in the field.

It is a still further object of this invention to provide a metal building wall system that is strong, rigid and easily adapted for residential construction.

Other and further objects of this invention will become apparent from the following description and the accompanying drawings and claims.

It has been discovered that the foregoing objects can be attained by a metal wall framing system comprising a pair of spaced parallel channel shaped track members and a plurality of channel shaped studs the ends of which are adapted to fit between and be locked to the flanges of the tracks at predetermined positions without the use of separate fasteners by a series of lugs and tabs formed into the flanges of the tracks which engage cooperating slots formed in the ends of the studs.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a typical wall assembly of this invention.

FIG. 2 is an isometric view of the stud to track connection of this invention.

FIG. 3 is an isometric view of the connection between the top track and a roof truss or rafter.

FIG. 4 is a partial section along lines 4—4 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the Figures and particularly to FIG. 1, the wall system of this invention is constructed and assembled without the use of separate fasteners such as screws or nails, by using a number of specially designed channel shaped members made of light gauge metal such as steel or aluminum. The basic members used for this wall system are a horizontal track 1 and a vertical stud 2.

As best shown in FIG. 2, the track 1 is an open channel shaped metal member having a web portion 3 and a pair of opposed flanges 4. Preferably the web portion 3 is provided with a series staggered, elongated slots 5 to reduce heat conduction across the track as taught in U.S. Pat. No. 1,843,430 to Mayer. The slots 5 could be omitted if desired especially if the track is used for interior partitions. Sections of the track 1 can be made to any length with lengths of 8 and 12 feet being preferred.

As shown in FIG. 1, sections of track 1 may be joined together end-to-end by using a short track splice plate 6 which overlaps the abutting ends of the track sections 1. The base of the splice plate 6 is provided with a plurality of punched tabs 7 which are designed to engage rectangular openings 8 punched in ends of the track 1 when the ends of the track sections are butted together. The tabs 7 are then bent over thereby locking the ends of the track sections together.

A similarly constructed corner splice plate 9 is used to join sections of track together at the corners of the structure as shown in FIG. 1.

As best shown in FIG. 2, the track flanges 4 are each provided with a substantially continuous inwardly projecting rib 11 parallel to the top edges of the track flanges 4. A pair of openings 12 are punched at spaced intervals, preferably every 12 or 16 inches, along the rib 11 thereby leaving a narrow inwardly projecting protrusion or rib lug 13 in each flange 4. As shown in FIG. 2, directly below each rib lug 13, the flanges 4 are punched further to provide a pair of opposed inwardly and upwardly inclined tabs 14. I prefer to incline the tab 14 at an angle of approximately 25° inwardly from the flange 4. The rib lugs 13 and tabs 14 combine in a manner described later to tightly secure the studs 2 to the track 1.

As shown in FIGS. 1 and 2, stud 2 is an open channel shaped metal member having a web portion 15, a pair of opposed side walls 16 and a pair of inwardly directed narrow flanges 17. The stud web 15 can also be provided with a series of staggered elongated slots 18 to reduce heat conduction across the stud if desired. The studs are preferably 8 feet in length but could be made to any length desired. The width of stud 2 is designed so that it will fit snugly between flanges 4 of track 1.

Each side wall 16 of stud 2 is punched as shown in FIG. 2 to provide a pair of rectangular slots 19 and a pair of notches 20 at both the top and bottom of the stud 2. The slots 19 and notches 20 are sized and positioned to cooperate with the rib lugs 13 and tabs 14 of the track 1 and thereby tightly secure the stud 2 to the track 1.

As can be easily seen by reference to FIGS. 1 and 2, a typical wall frame can be quickly and easily assembled without special tools or fasteners by merely inserting the top and bottom ends of the studs 2 between the flanges 4 of the top and bottom tracks 1 at the predetermined proper intervals. The bottom of the stud 2 is pushed down into track 1 until the rib lugs 13 in the flanges 4 of the bottom track 1 engage the slots 19 formed in the side walls 16 of the stud 2. Simultaneously the edges of notches 20 will engage the inclined upper surface and side edges of tabs 14 thereby aligning the stud and also forcing the sidewalls 16 of the stud 2 tightly against the inside surface of the flanges 4 of the track 1 and thereby locking the rib lugs 13 tightly in place within slots 19. The portions of the rib 11 that abut the web 15 and flanges 17 of the stud also assist in holding the stud 2 tightly in its proper position. This simple but unique arrangement insures not only that the stud will be in the proper position but also will remain tightly locked to the track 1 even if subjected to torsional forces. After the bottoms of the studs are
secured to the bottom track 1, the top track 1 may be secured to the tops of the studs in a similar fashion thereby forming the basic wall frame. The completed wall frame may then be secured to the floor and ceiling in any suitable fashion. The bottom track 1 may be secured to the subflooring and floor framing (not shown) by any suitable means such as by bolts or nails. Tests have shown that this fastening arrangement produces a wall as rigid as a conventional wooden wall frame system.

The completed wall frames are joined at the corners of the structure by an upper and lower corner splice plate 9. A specially shaped corner stud 21 is secured to upper and lower corner splice plates 9 by flanges 22 of the corner splice plate 9 and by lugs 23 formed in tabs 24 which engage slots 25 of the corner stud 21.

To accommodate door and window openings in the wall frame, I provide auxiliary jack studs 35 as shown in FIG. 1 which are also open channel shaped members of a width that will fit snugly between the flanges 4 of the tracks 1 but having narrow outwardly extending flanges 26 that permit them to be clipped onto the inwardly directed flanges 17 of the main studs 2.

FIG. 1 also illustrates a sheet metal box beam 27 lintel which is used over the door and window openings in the wall frame. The end of lintel 27 is slipped over a channel shaped end bracket 28 whose flanges 29 engage the inside surfaces of the stud 2 and is secured thereto when lintel 27 is slipped over the end of the bracket 28 as shown in FIG. 1.

FIG. 3 illustrates a sheet metal clip 30 designed to snap around the top track 1 and the top of a stud 2 to accommodate a roof truss or rafter 32 between upstanding flanges 31.

The studs 1, tracks 2 and other members may be provided with openings 33 or knock out panels to permit the passage of electrical wiring, pipes and the like. The wall system is adaptable for the use of conventional interior and exterior wall sheathing materials such as plywood and gypsum board which can be easily attached to the wall frame by sheet metal screws, adhesives or the like.

The studs 1 and tracks 2 with their related fastening tabs, lugs and slots are especially suitable for being manufactured at high production rates on conventional cold roll forming equipment and thereby can be produced at relatively low cost with a minimum of manufacturing operations.

I claim:

1. A metal wall framing system for buildings or the like comprising a substantially channel shaped track member having a web portion and a pair of opposed flanges, a substantially channel-shaped stud member having a web portion and a pair of opposed side walls which are adapted to fit between said flanges of said track member, each of said flanges of said track member having an inwardly projecting lug and an inwardly and upwardly projecting tab, each of said sidewalls of said stud member having a slot and a notch formed therein adjacent to one end of said stud and designed to cooperate with said lugs and said tabs whereby as the end of said stud member is inserted between said flanges of said track member, said projecting lugs will engage said slots and said tabs will engage said notches and thereby lock the end of said stud member to said track member.

2. The metal wall framing system of claim 1 in which the lugs and tabs are formed at regularly spaced intervals along the length of the track member.

3. The metal wall framing system of claim 1 in which a substantially continuous inwardly projecting rib is formed in each flange of said track member parallel to the edges of said track flanges.

4. The metal framing system of claim 3 in which said lugs are formed as portions of said rib.

5. The metal framing system of claim 1 in which said tabs are inclined approximately 25° inwardly from said flanges of said track.

6. A metal wall framing system for buildings or the like comprising a pair of spaced parallel substantially channel shaped track members each having a web portion and a pair of opposed flanges, a plurality of substantially channel shaped stud members extending between said track members and secured thereto without the use of separate fasteners by a plurality of inwardly projecting lugs and inwardly and upwardly projecting tabs formed in said flanges of said track member which engage a plurality of cooperating slots and notches formed in the side walls of the ends of said studs.

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