June 21, 1960 C. L. HARRIS 2,941,635

HOLLOW RECTANGULAR SECTIONAL METAL STRUCTURAL MEMBER

Filed Sept. 6, 1952

Fig. 1

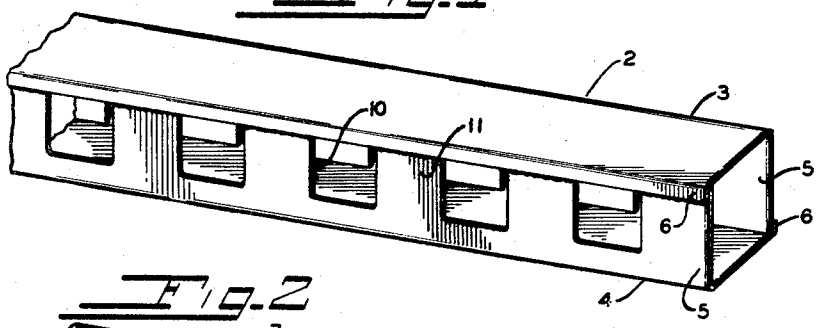


Fig. 2

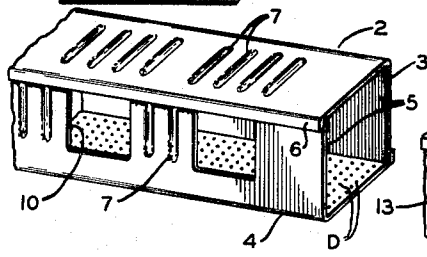


Fig. 3

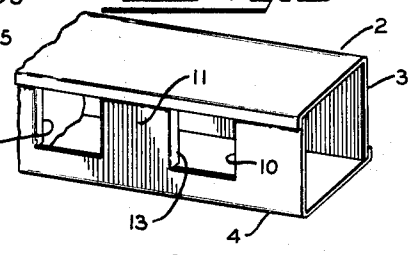


Fig. 4

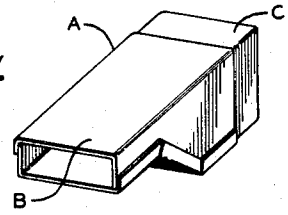


Fig. 5

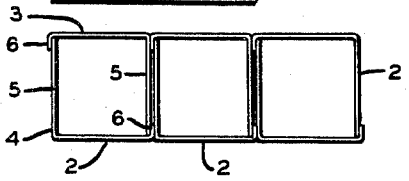


Fig. 6

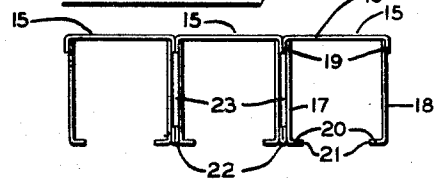
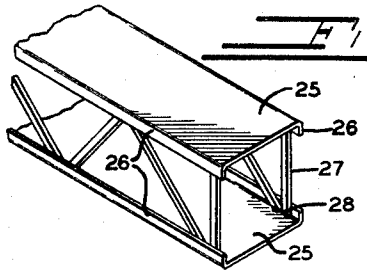


Fig. 7



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HOLLOW RECTANGULAR SECTIONAL METAL STRUCTURAL MEMBER

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2 Claims. (Cl. 189—34)

This invention relates to a hollow rectangular sectional metal structural member, and more particularly to a hollow metal structural member used in floors, roofs, decking, supports, columns, and the like, adapted to be used alone or laid lengthwise, side by side, in abutting relation with other hollow metal structural members of like construction for being fastened together, as by welding. The two opposite sides of the structural member have a truss formation between the top and bottom sides acting as trusses longitudinally of said member.

The hollow metal structural member is recessed throughout its length, in one or more of its sides or faces with one continuous aperture or a series of separate apertures, thereby permitting, if desired, electrical wires, pipes or other members being placed in the interior of the hollow member anywhere along its length through at least one side as well as through either open end.

One of the main objects of the invention is a hollow rectangular sectional metal structural member which is simple in construction and efficient in operation.

Another object of the invention is a hollow rectangular sectional metal structural member which is of double thickness at portions of two of its opposite corners and provided with an overhanging lap flange on its opposite sidewalls.

Another object of the invention is a hollow rectangular sectional metal structural member which is apertured lengthwise through at least one of its walls for access to the interior of said member transversely.

Another object of the invention is a hollow rectangular sectional structural member of a reenforced corner construction adapted to be laid lengthwise, side by side, with like members with the reenforced corners of said members, vertically disposed, in abutting relation for fastening the members together.

Another object of the invention is a hollow rectangular sectional metal structural member having its two opposite sides of truss-like formation acting as trusses longitudinally of said member.

Other objects, and objects relating to details of construction and economies of operation, will readily appear from the detailed description to follow. In one instance, I have accomplished the objects of my invention by the device and means set forth in the following specification. My invention is clearly defined and pointed out in the appended claims. A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawings, forming a part of this specification, in which:

Fig. 1 is a perspective view of a length of a hollow sectional metal structural member showing one embodiment of the invention.

Figs. 2 and 3 are perspective views of lengths of modified forms of the invention.

Fig. 4 is a perspective view of a reduced end of a structural member telescoping with the end of another length.

Fig. 5 is a cross sectional view of flooring or decking

formed by a plurality of structural members laid lengthwise, side by side, and fastened together, as by welding, at their abutting corners.

Fig. 6 is a cross sectional view of a flooring or decking formed from another modified form of structural member.

Fig. 7 is a perspective view of still another embodiment.

Generally described, the invention comprises a plurality of sections, one or more of which sections is provided with an angularly disposed flange along the edge to overlap another mating section at the corners of the structural member formed from the assembled sections so that angularly disposed lapped flanges are provided at two of the side corners on the opposite sides of said structural member. These lapped side flanges may be at horizontally or diagonally disposed corners, and will be in position to abut with the side corners of a similarly constructed structural member laid lengthwise, in side by side relation, for the abutting portions to be welded. The hollow sectional structural members may be made with a lapped flange at diagonal side corners so that when two hollow structural members are laid adjacent lengthwise, side by side, there will be a lapped side corner of one member abutting a non-lapped side corner of the other member, and providing abutting relation of said adjacent members both at the top and bottom corners. There may be an overlap at each of the four corners of the structural member.

Or, the lapped flanged corners may be provided only at the top or bottom corners so that the lapped corners on the opposite sides of the structural member will be adjacent a lapped corner of a similarly constructed structural member laid lengthwise in side by side relation. If desired, a filler or shim strip, of twice the thickness of the lapped flange, can be inserted in the space formed between adjacently laid members to be in vertical alignment with the lapped flange and fill said space if there is not a lapped flange at both the top and bottom corners on opposite sides of said member.

In these constructions, one or more of the sides of the structural member may be recessed to permit electrical wiring or pipes being inserted into the interior of the structural member anywhere along its length as well as through either of its opposite open ends. The structural members are made of sheet metal, or the like, and, where made of sheet metal, they can be reenforced by pressed out crimps or beads or flanges formed by cutouts in the metal formed wherever desired. Or the top and bottom sides can be made from sheet metal sections, each with lapped flanges on its opposite side edges with serpentine bars forming the opposite side walls and secured to the top and bottom sides by fastening means such as welding.

Referring specifically to the drawings, in which like numerals are used to designate like parts, numeral **2** (Figs. 1 to 5) designates generally a hollow structural member composed of the two duplicate or similar sections **3** and **4**, each provided with a larger lateral flange portion **5** at one end to form a side of the structural member formed by the mating sections, the main body of said section forming another side of the structural member. The opposite end of each of the duplicate or similar sections is provided with a smaller lateral flange **6** which provides the overlap parallel to the side. The sections **3** and **4** are fitted together with the lateral portions **5** and **6** of one section oppositely disposed and directed toward the respective lateral portions of the other section with the smaller lateral portion **6** of one section extending over and lapping the outside of the adjacent main portion **5** of the other section. Thus assembled, the two sections can be secured together by any suitable fastening means, such as welding, forming the

hollow structural member 2. The lapped portions are at the diagonally opposite corners, the other two diagonal corners being non-lapped.

The sections are preferably made of sheet metal, and they can be reenforced or rigidified by transverse crimps or beads 7 and/or flanges resulting from the cut-outs as hereinafter described.

The lateral sides 5 of the sections may also be scalloped to provide alternating recesses 10 and projections 11 as this not only permits the two sections to be cut from a single blank, with a corresponding saving of material by reason of the projections on one section being formed from the cut-outs from the other section, but the resultant recesses 10 will be formed along the length of the structural member in each of the opposite sidewalls, thereby permitting electrical wires, pipes or the like to be inserted lengthwise and transversely therethrough into the hollow interior of the structural member when used for joists, beams or columns in a building construction. The opposite side edges of the projections 11 may be bent laterally, if desired, into reenforcing flanges 13.

Any number of these structural members may be laid lengthwise, side by side, to form floors, decking, sheathing or the like, and, when so laid, the lapped portions at one side corner of one member will be adjacent a non-lapped corner of an adjacent member, with the two lapped flanges in vertical alignment and parallel to the sides. Thus assembled, the adjacently laid structural members can be welded at the contacting points at the top and bottom corners. The sections of the structural members can be welded along the edge of the lapping portion back from its exposed face so as not to impair the finished surface on the exposed face.

The structural member may be formed with a reduced end, or a section A can be formed with a reduced end B (Fig. 4) and connected to one of the ends of member 2 by a joint spanning sleeve C, and it will be understood that the ends of the two sections 2 could be connected in end to end relation in the same manner, the spanning sleeve being welded to either or both ends.

The hollow structural member is suitable for wall, roof and flooring, and one of the side faces which is to be exposed can be provided with acoustical perforations D.

In the embodiment of Fig. 6, the structural member, designated generally by the numeral 15, is formed of the three sections 16, 17 and 18. Section 16 is bent laterally at its opposite ends into lapping portions 19, and the other sections 17 and 18 are fitted thereto by means of the lapping end portions, sections 17 and 18 being of duplicate construction. Each of the sections 17 and 18 is provided with an inwardly extending lateral flange 20, these flanges being spaced apart to form an opening 21 throughout the length of the structural member to function in the same manner as the recesses 10 in the side wall or walls of the embodiment in Figs. 1 to 3.

It will be understood that the body of the sections 17 and 18, adjacent the non-flanged edges, could be scalloped as are the larger lateral portions or flanges in the embodiments of Figs. 1 to 3 in order to provide openings in the opposite side walls of the structural member and also to permit these sections 17 and 18 being cut from a single blank with the projections on one member being formed from the material cut out to form the recesses in the other section.

Two or more of these structural members can be laid lengthwise, side by side, with the lapped portion or flange of one member adjacent the lapped portion or flange of the adjacent member, permitting the abutting portions or flanges to be welded. If it is desired to fasten the members together at their lower adjacent corners, a filler strip or shim 22, of twice the thickness of the flange 19, can be inserted in the space 23 between the members and welded to their adjacent sides. The shim can be readily

formed from a single strip retroverted to double the thickness of the resulting shim.

In the embodiment of Fig. 7, the top and bottom sections 25 are each of a construction like section 16 of Fig. 3 with flanges 26 at each of the opposite side edges with serpentine bars or rods 27 forming the opposite sides, the bars being secured to the sections 25 at their crown or bent portions 28. The bars will provide spaces in the opposite sides as well as a truss formation as do the recessed sides in the embodiments of Figs. 1 to 3.

I am aware that there may be various changes in details of construction without departing from the spirit of my invention, and therefore, I claim my invention broadly as indicated by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by United States Letters Patent, is:

1. A longitudinally hollowed rectangular metal sectional structural member comprising a duplicate pair of elongated angular sections, each of said sections having two sides angularly disposed to each other, said sections being disposed parallel to each other for forming opposite sides of said member, at least one of said angular sections having a series of spaced complementary openings extending inwardly from one edge thereof to form projections between said openings and thereby skeletonize said section an angular flange on an opposite edge of each section lapping over an abutting skeletonized edge of an adjacent section to form lapped corners, transversely disposed inturned flanges provided on at least one of said sections, said flanges extending into said lapped corners with their ends abutting against an adjacent side whereby the lapped corners are reenforced without need of additional reenforcing means.

2. A longitudinally hollowed rectangular metal sectional structural member comprising a duplicate pair of elongated angular sections, each of said sections having two sides angularly disposed to each other, said sections being disposed parallel to each other for forming opposite sides of said member, each of said angular sections having a series of spaced complementary openings extending inwardly from one edge thereof to form projections between said openings and thereby skeletonize said sections, said projections from one section being formed from the openings of said other section thereby permitting said duplicate sections to be cut from a single blank with a minimum of waste material, an angular flange on an opposite edge of each section lapping over the abutting skeletonized edges of the adjacent section to form lapped corners, transversely disposed and inturned flanges on said sections projecting into the interior of the hollowed structural member, said flanges having one end thereof extending into the lapped corners with said one end abutting against an adjacent side whereby said lapped corners are reenforced without need of additional reenforcing means.

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