Feb. 4, 1941. C. HENNING 2,230,247

COLUMN FOR METAL BUILDINGS

Filed Jan. 28, 1939 2 Sheets-Sheet 1

Fig. 1

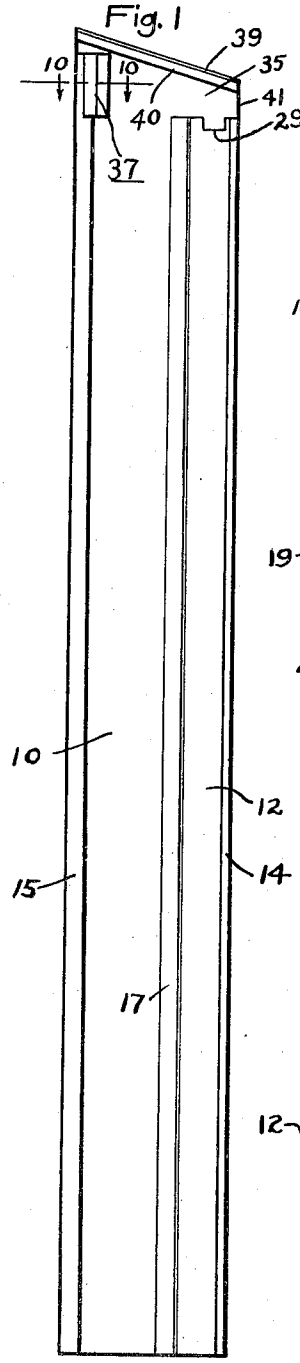


Fig. 2

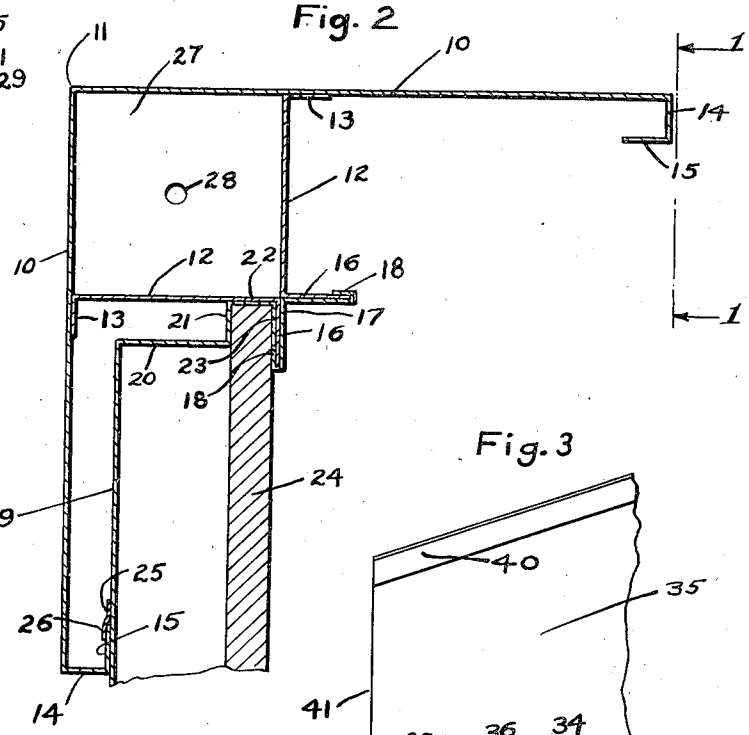
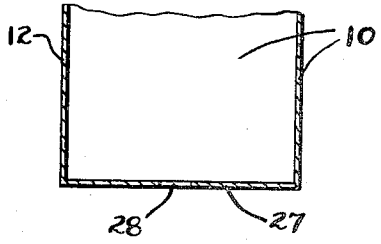


Fig. 3

Fig. 4



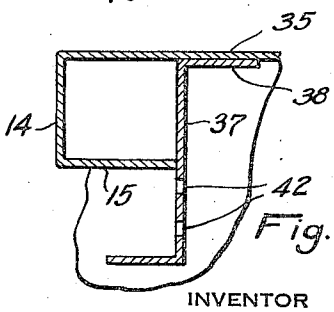


Fig. 10.

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Feb. 4, 1941. C. HENNING 2,230,247

COLUMN FOR METAL BUILDINGS

Filed Jan. 28, 1939 2 Sheets-Sheet 2

Fig. 5

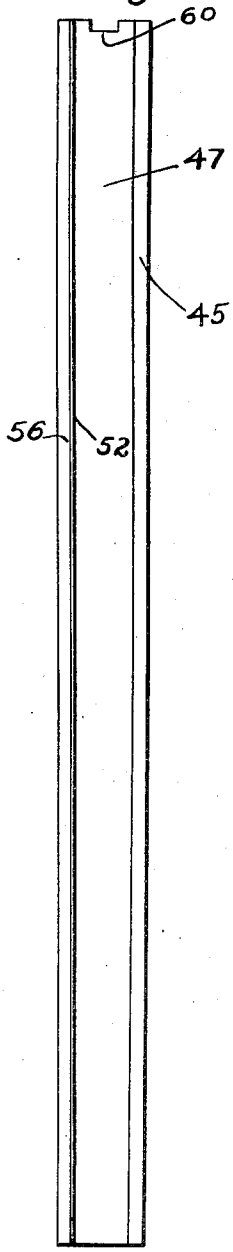


Fig. 6

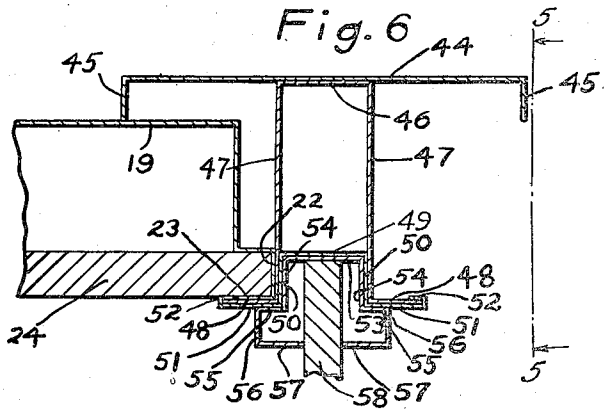


Fig. 8

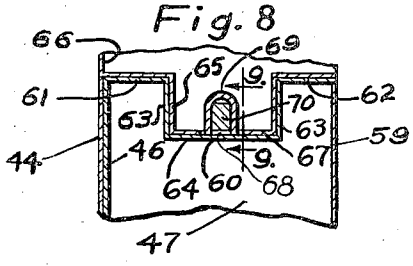


Fig. 7

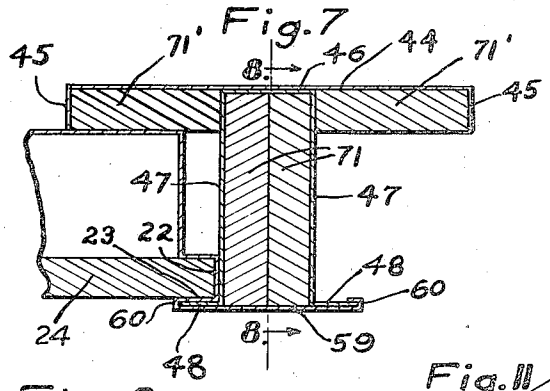


Fig. 9

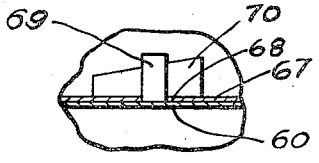
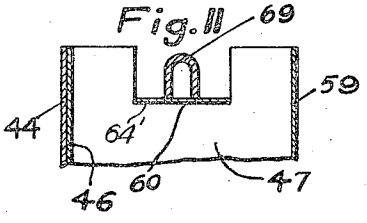


Fig. 11



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Patented Feb. 4, 1941 2,230,247

UNITED STATES PATENT OFFICE

2,230,247

COLUMN FOR METAL BUILDINGS

Carl Henning, Kansas City, Mo., assignor to Andrew A. Kramer, Kansas City, Mo.

Application January 28, 1939, Serial No. 253,371

20 Claims. (Cl. 189—38)

My invention relates to metallic building structures, and more particularly to a wall construction for metal houses, comprising box-like columns such as described in my co-pending application Serial No. 237,249, filed October 27, 1938, on Wall construction for metal houses, of which this application is a continuation in part.

My invention relates to walls for metal buildings, comprising wall panels and columns alternating with said wall panels, said wall panels and columns being made of sheet metal, and interlocking so as to hold the wall panels and columns in properly aligned position relative to each other.

It is a particular purpose of my invention to provide, in a wall construction for metal buildings of the above mentioned character, new and improved sheet metal hollow column members that are so constructed as to provide a good appearance for both the inner and outer sides of the wall and prevent any structure of undesirable appearance on the wall panels from being visible, and which interlock with said wall panels in such a manner as to provide a wall that is held in proper alignment and is of fixed length between the corner columns at the corners of the building.

It is a further purpose of my invention to provide, in a metallic building wall structure of the above mentioned character, columns that cooperate with locking members in the form of top members, which also serve as eaves members, to hold said columns and the wall panels between the columns in interlocking relationship, said columns being provided with means for clamping said top locking members to said columns, to hold the same firmly interlocked therewith.

It is a further purpose of my invention to provide new and improved corner columns for sheet metal buildings of the above mentioned character, which are provided with means for receiving wall panel members in interlocking engagement therewith, to fix said wall panel members from any movement longitudinally of the wall relative to said corner columns, and which are provided with means interlocking with longitudinal top locking members to hold said columns from any vertical movement relative to the wall panel members, and to further provide such new and improved corner columns with means for securing a gable member thereto in such a manner as to provide a good appearance to the building.

It is still a further purpose of my invention to provide a new and improved intermediate column for a sheet metal building of the above mentioned character, which is provided with means for receiving a wall panel member and a top locking member, so as to properly align said intermediate columns and said wall panel members and prevent any relative movement thereof, said intermediate columns being so constructed that the same are adapted to either mount a partition member therein, so as to support the same at its junction with the wall of which the intermediate column is a part, or which may be so constructed that the partition mounting may be omitted without causing any unsightliness to exist in the finish of the inner face of the wall at said intermediate column.

It is still a further purpose of my invention to provide hollow sheet metal columns that are so constructed that the same can be filled with insulating material, if this is desired, being so constructed and arranged that insulating board members can be inserted in said columns, so as to insulate the same throughout, if this is desired, or so that the insulating members can be omitted, if this is preferred, a dead air space being provided in each of said columns for insulating purposes, if insulating board or similar insulating material is not desired.

Other objects and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described, except as defined in the claims.

In the drawings:

Fig. 1 is a view in side elevation of one of my improved corner columns, as viewed from the plane indicated by the line 1—1 of Fig. 2.

Fig. 2 is a horizontal section through the column shown in Fig. 1, on a somewhat larger scale than Fig. 1, showing a fragment of a wall panel associated therewith in section.

Fig. 3 is a vertical sectional view, through a corner column at the opposite end of the gable portion of the house from that at which the column shown in Fig. 2 is utilized, on an enlarged scale.

Fig. 4 is a vertical sectional view through the bottom end portion of the column shown in Fig. 1, on an enlarged scale.

Fig. 5 is a view in side elevation of an improved intermediate column made in accordance with my invention, as viewed from a plane indicated by the line 5—5 of Fig. 6.

Fig. 6 is a horizontal section through the column shown in Fig. 5 on an enlarged scale, show-

ing a fragment of a wall panel associated therewith in section.

Fig. 7 is a view similar to Fig. 6, of a modified form of intermediate column and wall panel associated therewith.

Fig. 8 is a fragmentary section taken on the line 8—8 of Fig. 7, the insulating board being omitted.

Fig. 9 is a fragmentary sectional view taken on the line 9—9 of Fig. 8.

Fig. 10 is a fragmentary section, on a somewhat enlarged scale, taken on the line 10—10 of Fig. 1, and

Fig. 11 is a fragmentary vertical section of the upper end portion of a modified form of intermediate column.

Referring in detail to the drawings, in Figs. 1 to 4, inclusive, is shown one of my improved corner columns, which comprises an outer wall made, preferably, of a single sheet of material, and made up of two wall portions 10, which extend at right angles to each other, said outer wall being bent at right angles at 11, so as to form two portions that extend perpendicularly to each other. Said corner columns further comprise two inner wall portions 12 that extend at right angles to the outer wall portions 10, having flanges 13 that are, preferably, welded to the inner faces of the outer wall portions 10 to form a box-like hollow metal column that is substantially rectangular in cross section. The wall portions 10 extend a considerable distance beyond the junction of the wall portions 12 therewith, thus forming wide lateral flanges, or wings, on the corner columns that extend laterally from the box-like body portion thereof in the directions in which the walls extend from said corner column.

Each of the wall portions 10 is provided with an inwardly directed flange 14, extending perpendicularly to the main body portion of the wall portion 10, and which terminates in a flange 15, extending inwardly toward the box-like body portion of the corner column and parallel to the wall portion 10, on which said flange is formed. A flange, projecting inwardly from the wall portion, angular in cross section is thus formed on each of the lateral flanges, or wing portions, formed by the portions of the walls 10 extending beyond the walls 12. The wall portions 12 have flanges 16 extending therefrom at the edges thereof that are opposite those having the flanges 13, said flanges 16 extending in the same direction as the flanges 13 and being perpendicular to the wall portions 12 to thus provide two inwardly projecting flanges 16 that are perpendicular to each other. A securing member 17, in the form of a clip, angular in cross section, and having hook-like end portions 18 thereon, formed by bending back portions of the member on itself, engages the flanges 16 on the wall portions 12 of the corner column to firmly secure the same together. The angular clip member 17 not only serves as a connecting member, but also as a finishing, or trim, strip, being of a length equal to the height of the wall panel, and thus providing a corner finish at the junction of the wall panels with the corner column, as well as securing the walls 12 of the corner column together. The engagement of the clip-like member 17 with the flanges 16 is accomplished by a longitudinal sliding movement of the member 17 relative to the corner column in a vertical direction.

The wall panels shown are hollow members and are the same as shown in my application Serial No. 237,249, of which this is a continuation in part. The same have an outer sheet metal wall 19, which is provided with a marginal flange 20, which is outwardly offset at 21, and has a portion 22 extending parallel to the portion 20 and terminates in an inwardly directed flange 23 providing a groove in which the inner wall of insulating board 24 is mounted. A clip 25, outwardly offset at 26 to receive the edge of the flange 15, is also provided on each wall panel member. The clip 25 is in the form of a strip of sheet metal running substantially the full height of the wall 37. The flanges 15 on the corner column are received between the outwardly offset portions 26 of the clips 25 and the outer metallic walls 19 of the wall panel members, and the portions 22 of the flanges 20 on said wall panels engage, on their outer faces, flatly against the walls 12 of the corner columns. Thus the wall panels and the corner columns are firmly secured to each other so that there can be no relative movement thereof lengthwise of the wall panel members.

It will be noted that all of the securing elements for fastening the corner columns and wall panel members together are hidden by the structure described, due to the wing portions on the outer walls 10 that overlap the portions of the wall panel members having the securing means thereon. Also it will be noted that the corner columns have the outer walls 10 thereof offset outwardly, a distance dependent upon the width of the flange 14, from the outer walls 19 of the wall panel members. By providing the extending portions on the walls 10 that form said wing portions, a massive appearance is given to the corner columns. Also any offsets and other parts of objectionable appearance on the wall panels are hidden thereby and a joint of good appearance is provided on the exterior of the wall between the corner column and the wall panel member.

The corner column is provided with a bottom wall 27 extending between the walls 12 and the walls 10 and secured thereto by welding, or in a similar manner, to provide a closed bottom for the box-like hollow body portion of the corner column except for an opening 28 therein, through which a securing element may be extended for mounting the corner column on the foundation provided for the building.

The upper end of the corner column is shown in Figs. 1, 3 and 10. Said corner columns must be made in the form of rights and lefts, because of the formation of the top part of each corner column. In Fig. 1 the column that would be located at the corner illustrated in Fig. 2 is shown, while in Fig. 3 the corner column that is made of reverse construction, which is on the same end, but on the opposite side of the building, is shown. Each of said corner columns has a notch, or cut out portion, 29 in one of the walls 12 thereof and has a transversely extending wall provided at the top thereof for closing the upper end of the hollow box-like body portion of said corner column, forming a dead air chamber within said corner column, if this is desired. Said transverse top wall extends from the top of the wall 10, extending perpendicularly to the wall 12 provided with the cut out portion 29, and has a portion 30 extending substantially horizontally inwardly from the top of said wall 10, a downwardly extending vertical wall portion 31 depending from the horizontally extending portion 30, a transversely extending portion 32

depressed below the portion 30 and extending horizontally from the bottom edge of the vertical portion 31, a vertically extending portion 33 extending upwardly from the horizontally extending portion 32, which is the same height as the portion 31, and a horizontal wall portion 34 extending from the top edge of the portion 33 to the top of the wall 12 that lies opposite that wall 10 from the top of which the portion 30 extends. A channel-shaped portion between the side edges of the top wall of the box-like body portion of the corner post is thus provided, which forms a deep, wide groove in the top of said corner column, extending through the one wall 12 having the notch 29 therein and to the upward extension 35 of the wall 10 opposite the wall 12 that has said notch, or cut away portion, 29 therein.

A U-shaped retaining member 36 is provided, lying within the channel formed within said top wall member and extending upwardly from the bottom wall 32 of said channel. The U-shaped clip 36 is secured to the wall 32, by welding, and the top wall of the box-like body portion of the corner column is secured to the walls 10 and 12, by welding. The U-shaped clip 36 is utilized, in a manner which will be described more in detail in connection with Fig. 8 of the drawings, for securing a top connecting member, that also serves as an eaves-forming member, to the corner column, so as to fix the corner column and wall panel member against relative vertical movement.

The one wall 10 has a Z-bar 37 secured thereto by welding the one flange 38 thereof to the inner face of said extension 35. The web portion thereof may be welded to the flange 15 and is provided with openings 42 therein for securing a gable member thereto. The upwardly extending wall portion 35, comprising an upward extension of the one wall portion 10, is provided with an obliquely extending top edge portion 39, to which an angle member 40 is welded, to provide means for supporting the roof on the corner column. The outer edge 41 of the wall portion 35 aligns with that wall portion 10 that extends perpendicularly to the wall portion 10 provided with the extension 35.

The intermediate hollow columns are made up of an outer member having a flat vertical wall portion 44, which has the opposite vertical edges thereof turned inwardly to form flanges 45, which engage the outer walls 19 of the wall panel members referred to above. Said intermediate hollow columns further include an inner member having an outer vertical wall portion 46, which engages face to face with the inner surface of the outer wall portion 44, and is welded thereto. A pair of parallel vertical walls 47 extend inwardly from the wall 46 and terminate in oppositely directed, outwardly extending flanges 48, extending perpendicularly to the portions 47. Said intermediate columns are shown in Figs. 5 to 8, inclusive, and as far as described above, the said intermediate columns shown in Figs. 5, 6, 7 and 8 are exactly the same in construction. Each of said columns has a bottom wall, similar to the bottom wall 27 shown in Fig. 4, to close the bottom end of the box-like body portion of each column. Said box-like body portion is formed by means of the wall portions 46, 47, the bottom wall and a top wall, and a connecting member connecting the wall portions 47, which differs in the two forms of the invention shown in Figs. 5 and 6 and Figs. 7 and 8, respectively. In the case of both forms of intermediate columns, the wall portions 22 of the wall panels engage face to face with the walls 47 and the ends of the flanges 45 engage with the outer faces of the walls 19 of the wall panel members.

In the form of the invention shown in Figs. 5 and 6 the connecting member comprises a channel-shaped member having a transverse vertical wall portion 49, a pair of parallel wall portions 50 fitting closely within the wall portions 47 and terminating in oppositely directed outwardly extending flanges 51, which terminate in hook-like flanges 52 that slidably engage the flanges 48 at their outer edge portions. Welded to the transverse wall portion 49 of said channel-shaped connecting member is the transverse wall portion 53 of the partition mounting member, which has the wall portions 54 extending perpendicularly to the wall portion 53 and also has wall portions 55 outwardly offset in oposite directions, so as to extend away from each other, wall portions 56 extending perpendicularly to the wall portions 55 and thus offset from the wall portions 54 to provide a wider portion on the partition mounting member overlapping the flanges 51 partially and terminating in inwardly extending flanges 57, the free edges of which are spaced from each other sufficiently to provide a slot in the partition mounting member for slidably receiving the partition member 58 of insulating board, or similar material, the inner end edge of which is, preferably, in engagement with the transverse wall 53.

The form of the invention shown in Figs. 5 and 6 is used when a partition member is to be supported by an intermediate column. If no partition member is to be supported by the intermediate column, the flat connecting member 59 is provided, which has hook-like flanges 60 provided along the opposite vertical side edges thereof, which slidably engage the outer edges of the flanges 48, just as do the hook-like flanges 52 on the connecting member of channel shape, as shown in Fig. 6. In either form of intermediate column described, the connecting member acts also as a finishing strip to finish off the intermediate column on its inner side and to cover the flange portion 23 on the wall panel member.

In both forms of intermediate columns shown, top transverse walls are provided, that are provided with grooves, or channels, therein, similar to that provided in the corner column, as above described. Such a top wall is shown in Fig. 8, and while in said figure the top wall is shown as extending between the walls 46 and 59, it will be obvious that in the form shown in Fig. 6 the top wall will extend between the walls 46 and 49. The wall portions 47 are provided with cut out portions, or notches, 60, similar to the cut out portion, or notch, 29 provided in the top edge of the wall portion 12 in the corner column, except that in the case of the intermediate columns, both wall portions 47 are cut out, or notched, at 60. The wall portions 61 and 62 extend inwardly horizontally from the tops of the wall portions 46 and 59, and from these depend the vertically extending wall portions 63, which are connected by the central or depressed horizontal wall portion 64, to thus provide a channel, or groove, in the top wall of the intermediate column running lengthwise of the wall. The wide groove, or channel, thus formed is adapted to receive the downwardly projecting hollow rib portion 65 of an eaves-forming, or top connect-

ing, member 66, which has a depressed transverse bottom wall 67 provided with an opening 68 therein, through which the U-shaped clip, or retaining member, 69 extending upwardly from the depressed central wall portion 64 of the intermediate column extends. The top connecting member, which also serves as an eaves-forming member, is clamped rigidly in position against the channeled top wall of the intermediate column, by means of a wedging member 70, and it is of course, to be understood that the U-shaped clip 36 is utilized in a similar manner with such a wedging member to secure the top connecting member to the corner column.

It will be obvious that dead air spaces are provided in the box-like, hollow body portions of the corner and intermediate columns by the construction described. However, if desired, the corner columns and intermediate columns can be provided with insulating board members within the box-like body portions thereof, such insulating board members being readily insertable in said box-like members before the clips 17, or connecting members 59, or the channel-shaped connecting member 56, are put in place. The manner in which said insulating board members are utilized is shown in Fig. 7, in which a pair of similar insulating board members 71 are shown, mounted within the hollow box-like body portion of said intermediate column between the walls 47, 46 and 59, and similar insulating board members 71' are mounted between the wall panel members and the wing portions, or wide flanges, formed on said intermediate columns by the extensions of the walls 44 beyond the walls 47. It will be noted that said insulating board members 71' are mounted between the flanges 45 and the walls 47, and it is obvious that insulating board members can be similarly mounted on the corner columns, if this is desired.

In Fig. 11 a modified form of intermediate column is shown, in which the walls 47 are cut out, or notched, at 60 as in the previously described forms of intermediate columns, but, instead of the entire top end of the box-like body portion of the column being closed, a cross piece 64', extending between the walls 47 and resting on and welded to the depressed top edges of the walls 47 forming the bottoms of the notches 60, is provided, which has a U-shaped clip, or retaining member, 69 extending upwardly therefrom. The top connecting member is mounted in the top of this intermediate column in a similar manner to that previously described. While the particular top connecting member described herein is described as also serving as an eaves-forming member, other members, such as gable members, having channel formations thereon, forming hollow depending rib portions, may be connected with the intermediate columns illustrated in a similar manner to that shown in Fig. 8. While any of the columns illustrated may be filled with heat insulating material, it is particularly desirable to fill the box-like body portion of a column that is not completely closed, such as that shown in Fig. 11, with such heat insulating material.

What I claim is:

1. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having a pair of laterally extending wings thereon having inwardly directed marginal flanges substantially the length of said column extending substantially perpendicularly to said wings, said column having a pair of flanges thereon extending substantially the length of said column and substantially parallel to said wings.

2. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having a pair of laterally extending wings thereon having marginal flanges extending substantially perpendicularly to said wings, each of said wings constituting a portion of the outside wall of said column and said flanges extending substantially the length of said column and projecting inwardly from said outside wall, and a pair of flanges on said body portion extending substantially the length of said column parallel to said wings and spaced therefrom substantially the thickness of said hollow body portion.

3. In metallic building structure, a column having vertical walls providing a box-like rectangular hollow body portion, said body portion having top and bottom end walls, said top end wall being depressed below the top ends of said vertical walls to provide a groove in the top end of said column.

4. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having top and bottom end walls, said top end wall being downwardly offset to provide a groove therein spaced from an opposed pair of vertical walls of said box-like portion.

5. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having a top end wall and one of the vertical walls of said box-like portion extending beyond said top end wall and having an inclined top edge.

6. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having a pair of walls having flanges thereon extending perpendicularly to said walls and lying adjacent each other and a member angular in cross section having marginal hook-like formations thereon slidably engaging said flanges to secure said walls together.

7. In a metallic building structure, a column comprising an outer member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly perpendicularly from said outer member, each terminating in a flange at its inner end spaced substantially the thickness of the column from a portion of said outer member, and a connecting member slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

8. In a metallic building structure, a column comprising an outer member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation thereto and each terminating in a flange at its inner end, and a connecting member slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

9. In a metallic building structure, a corner column comprising an outer member having a right-angular bend substantially midway thereof and having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and each terminating in a projecting flange at its inner

end, and means securing said inwardly extending walls together at the inner ends thereof.

10. In a metallic building structure, an intermediate column comprising an outer flat member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and each terminating in an oppositely projecting flange at its inner end, and means securing said inwardly extending walls together at the inner ends thereof.

11. In a metallic building structure, a corner column comprising an outer member having a right-angular bend substantially midway thereof and having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and perpendicularly to each other in spaced relation to said inturned flanges and terminating in flanges at their inner ends directed away from each other and extending perpendicularly to each other, and a connecting member angular in cross section slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

12. In a metallic building structure, an intermediate column comprising an outer flat member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and in parallelism to each other, said walls terminating in flanges directed away from each other, and a connecting member slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

13. In a metallic building structure, an intermediate column comprising an outer flat member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and in parallelism to each other, said walls terminating in flanges directed away from each other, and a connecting member having a flat body portion extending between said parallel walls and having hook-like flanges slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

14. In a metallic building structure, an intermediate column comprising an outer flat member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and in parallelism to each other, said walls terminating in flanges directed away from each other, and a connecting member slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together, said connecting member having means thereon for mounting a partition on said column.

15. In metallic building structure, a column having a box-like rectangular hollow body portion, said body portion having a pair of laterally extending wings thereon having marginal flanges extending substantially perpendicularly to said wings, and means mounted on and nested in said body portion for receiving a partition member.

16. In a metallic building structure, an intermediate column comprising an outer flat member having an inturned flange at the opposite side edges thereof, a pair of walls extending inwardly from said outer member a substantial distance beyond said inturned flanges and in spaced relation to said inturned flanges and in parallelism to each other, said walls terminating in flanges directed away from each other, and a connecting member having a channeled body portion extending between said parallel walls, means mounted thereon for receiving a partition and said channeled body portion having hook-like flanges slidably interlocking with said flanges on said inwardly extending walls to secure said inwardly extending walls together.

17. In a metallic building structure, an intermediate column having an outer vertical wall, a pair of vertical walls extending perpendicularly to said outer wall and having rectangular notches in the top edges thereof between the ends thereof, and a top wall portion extending between said pair of walls at said notches depressed below the top ends of said vertical walls.

18. In a metallic building structure, an intermediate column having an outer vertical wall, a pair of vertical walls extending perpendicularly to said outer wall and having rectangular notches in the top edges thereof between the ends thereof, a top wall portion extending between said pair of walls at said notches depressed below the top ends of said vertical walls and a U-shaped keeper extending upwardly from said top wall between said pair of walls.

19. In a metallic building structure, a column having a box-like rectangular hollow body portion having a pair of wings extending laterally from a pair of adjacent walls at right angles to each other, said wings having inturned flanges on the ends thereof, and said body portion having a pair of flanges extending from the other pair of walls at their junction in substantial parallelism to said wings.

20. In a metallic building structure, a column having a box-like rectangular hollow body portion having a pair of wings extending laterally from the opposite edges of one wall thereof, said wings having inturned flanges on the ends thereof, and said body portion having a pair of flanges extending from the side thereof opposite said wall in substantial parallelism to said wings.

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