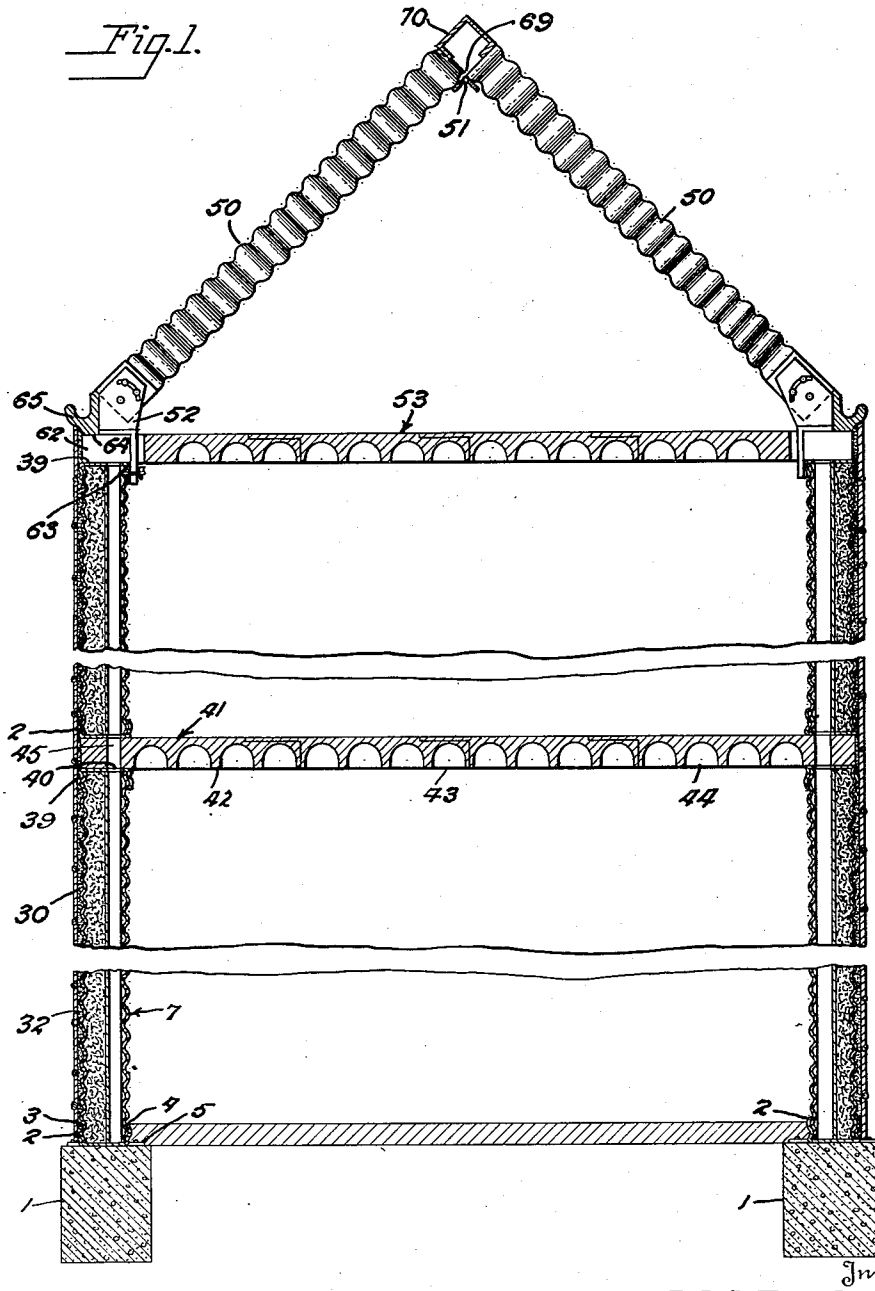
Sept. 8, 1942. J. M. BRINKER 2,294,890

STRUCTURAL CORRUGATED BUILDING UNIT AND WALL FABRICATED THEREFROM

Filed Dec. 21, 1938 4 Sheets-Sheet 1

Fig. 1.



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STRUCTURAL CORRUGATED BUILDING UNIT AND WALL FABRICATED THEREFROM

Filed Dec. 21, 1938 4 Sheets-Sheet 2

Fig. 2.

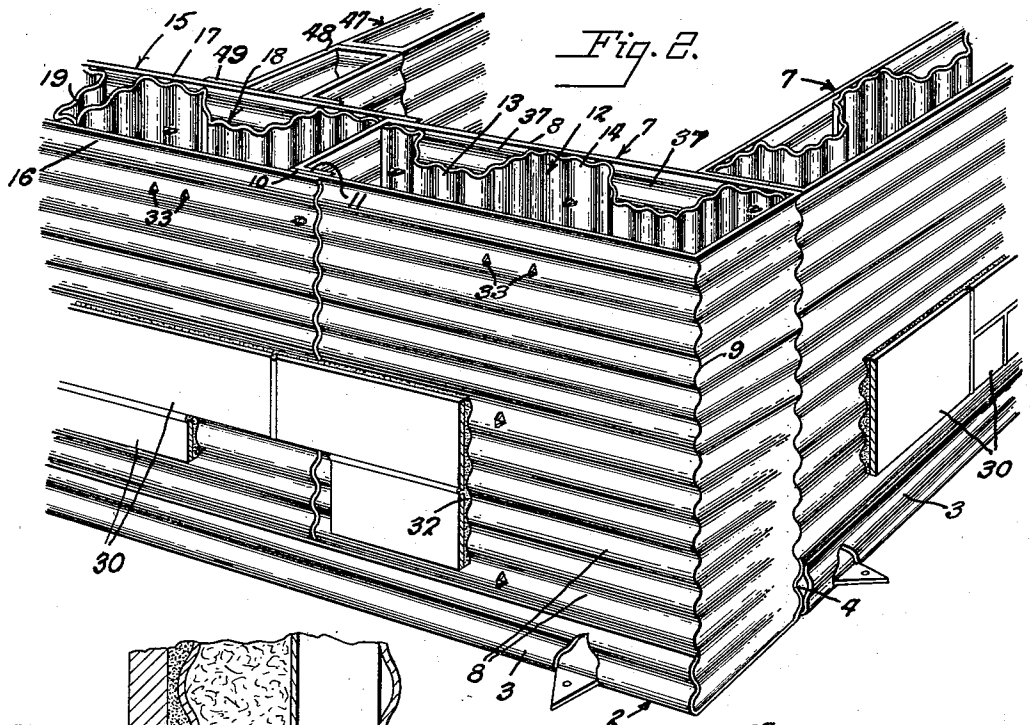

Fig. 3.

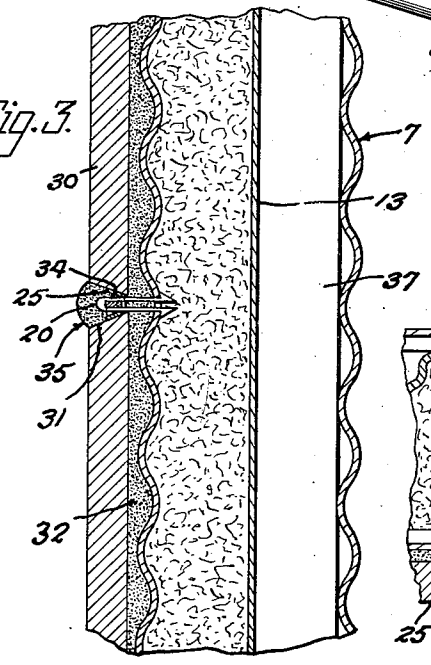

Fig. 4.

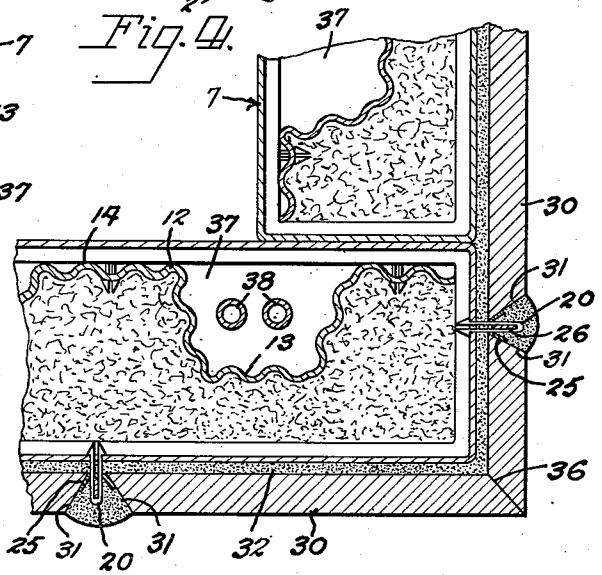

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Fig. 5.

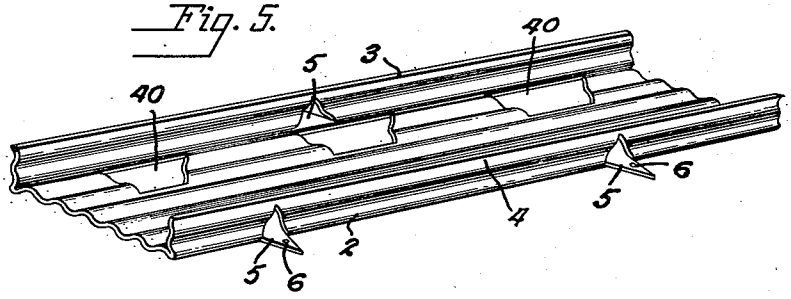

Fig. 6.

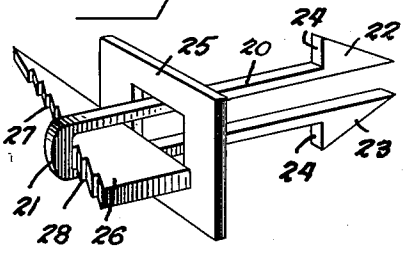

Fig. 7.

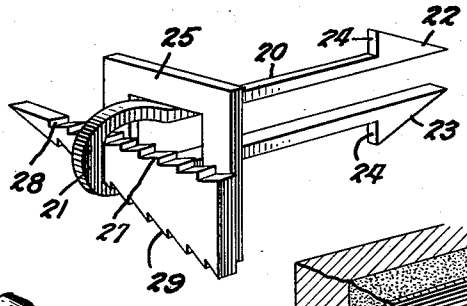

Fig. 8.

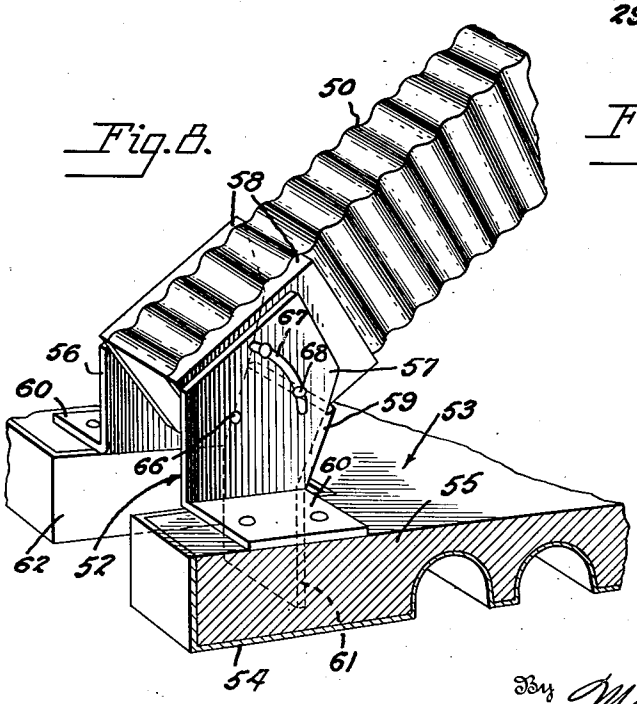

Fig. 12.

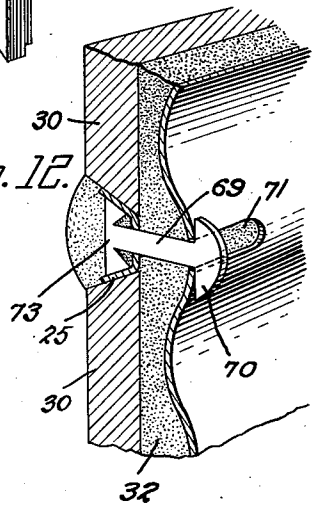

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Fig. 9.

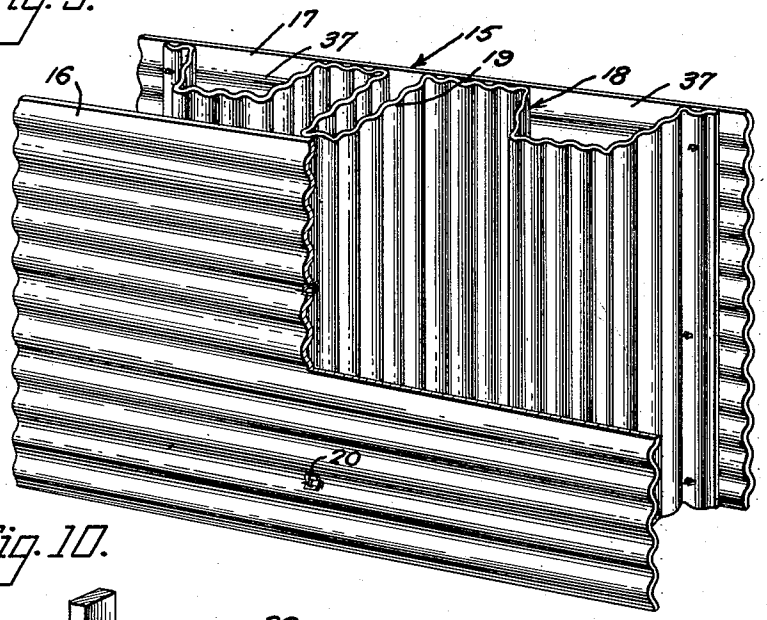


Fig. 10.

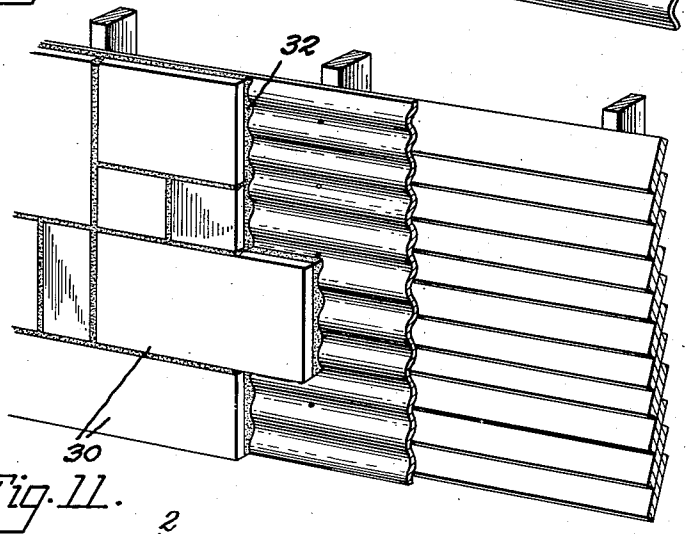
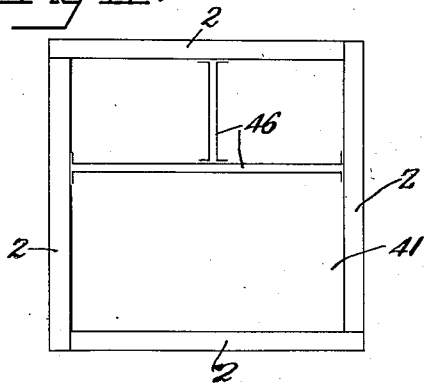


Fig. 11.



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Patented Sept. 8, 1942

2,294,890

UNITED STATES PATENT OFFICE

2,294,890

STRUCTURAL CORRUGATED BUILDING UNIT AND WALL FABRICATED THEREFROM

Joseph M. Brinker, Pittsburgh, Pa., assignor to Josephine S. Brinker, Baltimore, Md., as trustee for Elizabeth M. Brinker

Application December 21, 1938, Serial No. 247,116

12 Claims. (Cl. 189—1)

This invention relates to building construction of that type in which the wall and partition units are integrated at the building location, in horizontal position on the ground, for example, from prefabricated metal skeletal elements and preformed or cut masonry veneer, said wall and partition units being placed in final position by a boom or other suitable hoisting machine.

One of the objects of the invention is the provision in building construction of the type described, of a load sustaining unit comprising a hollow pillar of rectilinearly folded sheet metal corrugated substantially in a direction perpendicular to its folded edges, adjacent pillars being spaced apart in the wall and joined by connecting members comprising front and back sheets lapping the marginal portions of the inner and outer faces of adjacent pillars, and being secured thereto, said sheets being made unitary by an internal connecting web, and being formed with corrugations which form continuations of the corrugated inner and outer faces of the adjacent pillars.

The invention contemplates the application of a thin stone veneer to the outer corrugated surfaces of the pillars and the connecting members by means of a suitable mastic, the horizontal corrugations not only forming a key for the mastic, but supporting it until dry, against the gravitational tendency to settle, and uniformly distributing the shrinkage of the mastic in drying, over the entire wall, making it negligible at any one spot instead of permitting an aggregate shrinkage to concentrate at one spot, causing cracking or loss of adhesion with respect to the masonry veneer.

Another object of the invention is to provide a sheet metal pillar unit as described, with corrugations running perpendicular to the corner folds, having internal stiffening or load bearing webs of sheet material with the corrugations extending parallel to the corner folds of the pillar.

A further object of the invention is to provide, in combination with corrugated skeletal structure, as described, bevel-edged thin stoned veneer sheets or blocks cementitiously united to the corrugated structure, but having mechanical auxiliary positive fastening devices which hold the veneer blocks in place, at least until the mastic has become permanently and completely hardened.

Still another object of the invention is the provision of a system of metallic base channels for receiving the vertical walls and partitions, said channels consisting of corrugated sheet metal members laid on a horizontal floor or platform about the periphery of the space to be encompassed by the walls or partitions, in such a way as each to present an outward open end, the flanges of said channel members forming guides whose corrugations interdigitate with the corrugations on the front and rear sides of the pillars near their base, permitting the fabricated walls and partitions to be slidably inserted, and moved into place longitudinally with respect to said channels.

Another object of the invention relates to novel anchors or securing means for holding the metal parts together, and for holding the masonry veneer blocks to the metal-superstructure.

Still another object of the invention relates to the provision of channeled metallic cap members, fundamentally similar to the base channels, but inverted, which are slidably positioned upon the upper ends of the walls and partitions, and afford a base or seat for the superposed floor or ceiling.

Still another object of the invention is to provide roof trusses of corrugated sheet metal construction similar to that of the pillars, said roof trusses being provided in hinged pairs with means for making minor adjustments at the base ends of said trusses to compensate for varying tolerances in the width of the area spanned by said trusses.

Other objects of the invention relate to the floor construction and to the construction and arrangement of the various parts for purpose of heat and sound insulation, the disposition of pipe systems and other details, as will presently appear.

In the drawings which accompany and form a part of the following specification, and throughout the several figures, of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a vertical section, partly in elevation, and with intermediate parts broken away, showing a building construction embodying the principles of the present invention;

Figure 2 is a perspective view also showing sections in different planes illustrating details of construction;

Figure 3 is a vertical section through a wall, taken in the line of the joint between one of the masonry veneer units;

Figure 4 is a cross-section taken through a corner of the wall;

Figure 5 is a perspective view of one of the base channels;

Figures 6 and 7 are perspective views of the anchoring means illustrating alternative ways of inserting the locking wedge;

Figure 8 is a perspective view illustrating the adjustable connection at the base of the roof truss;

Figure 9 is a perspective view, partly in section, illustrating the construction of one of the connecting members;

Figure 10 is a perspective view, partly in section, illustrating a modification of the invention adapted to be applied to old buildings; and

Figure 11 is a plan view illustrating diagrammatically the mode of placing the base channels.

Figure 12 is a perspective view showing an alternative form of anchor.

Referring now in detail to the several figures, the numeral 1 in Figure 1 represents a foundation wall which may be of any desired construction, and as disclosed, does not enter into the invention, excepting that its top surface lies in a horizontal plane and affords a support or platform for the superstructure. Sheet metal channel members 2 are secured on top of the foundation or platform, said members being longitudinally corrugated, preferably as to both their bases and flanges, but essentially as to their flanges 3 and 4.

Referring to Figure 5, it will be observed that the channels 2 have integral punched-out lugs 5 perforated as at 6, to permit the passage of bolts which are imbedded in a protruding manner in the foundation.

The channels 2 are arranged about the periphery of the space to be enclosed by the walls, in such a manner that each channel presents an open end outwardly of the enclosure. It is the purpose of the invention to prefabricate the walls at the point where the building is being erected, in horizontal position, to raise them to erect position, and to slide them into the channels, introducing them at the open ends of the channels.

Now proceeding to the wall construction, which is best shown in the group of Figures 2, 3 and 4, it consists primarily of sheet metal pillars which as a whole are designated by the reference character 7. These pillars each consist of a piece of corrugated sheet metal folded into a parallelepipedal form, with the corrugations 8 running perpendicularly to the lines of fold 9, and with the free edges 10 and 11 lapped and secured in any suitable manner as by welding. It will be noted that when the pillars are in the erect position, the surface corrugations 8 run horizontally. This is, of course, contrary to the direction in which corrugations might be expected to run to impart load bearing stiffness to the pillar, but it is done for a purpose, as will appear, and load bearing stiffness is imparted by an internal partition 12 which is corrugated in a direction parallel to the lines of fold 9, and therefore vertical in the erected wall.

For the purpose of increasing the effective thickness dimension of the partition 12, it is bent so as to form alternating ridges 13, and troughs 14. The bases of the troughs thus formed, lie against the inner side of the pillar and are secured thereto. The depth of the ridges is such that the partition 12 may be said to terminate in a vertical plane intersecting the interior of the pillar approximately at the middle, as shown in Figure 4.

The pillars are arranged in the wall at distances apart approximately equal to their own width, and are connected by an intermediate member which as a whole is designated by the reference character 15. Said member is constituted by front and rear sheets 16 and 17 transversely corrugated, and with their edges overlapping the margins of the adjacent pillars, and being secured thereto with the corrugations of the connecting member matching the corrugations of the pillars forming continuous corrugations transversely of the wall. The front and rear sheets of the connecting members are unitarily joined by a web member 18, which is fundamentally similar to the partition 12, but is bent to form a middle rib 19 which extends the full width between the front and rear sheets of the connecting member, and being secured to both of said sheets, spacing them apart the correct distance to receive the ends of the adjacent pillars, and enabling the connecting member to be handled as a unit.

The continuous corrugations running transversely along the base margin of the wall, both inside and out, constitute slides which fit into the corrugations of the flanges 3 and 4 of the channels 2, being guided thereby as the fabricated wall is slid into place, the wall being thus retained in said channels.

At this point in the description, it may be well to refer to the securing device, by means of which the various elements of this metal skeletal structure and the masonry units presently to be described, are held together. These devices are shown in Figures 6 and 7, and consist each of a resilient U-shaped member 20 having a bight 21, and spear heads 22 and 23 at the ends. Said U-shaped member can be pressed together until the spear heads coincide, or while being pressed together the U-shaped member may also be laterally deflected so that one spear head can be slipped behind the other, to a greater or less extent. This enables the spear heads to pass through relatively small holes which are punched or drilled in the metal parts at the desired points of fixation. After the spear heads have been inserted in the hole and the U-shaped member is released, the spear heads expand or separate so that their shoulders 24 abut the metal adjacent the hole and prevent the withdrawal of the U-shaped members. It will be assumed, for example, that two plies of the corrugated sheet metal are lapped with holes registering, and that the U-shaped member has been inserted through the holes and permitted to expand. A washer 25 which may be of any desired shape, is then slipped over the bight portion of the U-shaped member and the wedge 26 inserted in a loop of the bight. Said wedge is provided on at least one of its convergent edges with teeth 27, having abrupt shoulders 28 facing in a direction to prevent withdrawal of the wedge. The wedge is forced into place until the washer has been securely tightened against the lapping metal plates. It is preferred to make the entire anchoring device of stainless steel or other noncorrosive material. The washer may, however, be made of lead, so that it will take the form of the grooves of the corrugations.

In Figure 6 the wedge has been inserted in such a position as to create the tightening function solely by drawing the U-shaped member 20 longitudinally through the washer. In Figure 7 the wedge has been inserted at right angles to the direction of pull, so that it not only tightens

by drawing the U-shaped member longitudinally, but also bulges out the sides of the U-shaped member in the loop of the bight, which in effect shortens the limbs of the U-shaped member and assists in the tightening operation. In order to provided a finer adjustment for the wedge **26**, than a single row of teeth on one edge affords, it may be preferred to form an additional row of teeth **29** on the opposite convergent edge of the wedge with their abrupt shoulders in staggered relation to the shoulders of the opposite row of teeth, thus halving the intervals of adjustment.

It is within the contemplation of the invention that the prefabricated wall which is made on the location where the building is being erected, shall include not only the skeletal supporting structure, but also the outside finishing veneer. With this end in view, I have devised a natural stone veneer block **30**, which has the characteristics of slate with respect to its hardness, moisture impervious nature and the thinness of the layers in which it may be quarried. The stone block **30** is preferably of a thickness of between three-sixteenths to one-fourth inch and is beveled on all four edges, as is indicated at **31**, in Figures 3 and 4. While the steel fabricated structure of the wall is in horizontal position on the ground, the front corrugated face is coated with a layer of suitable mastic **32**, such for example as asphalt, or a composition including asphalt, to such a depth that the corrugations are filled and a smooth plane surface provided. The front faces of the pillars **7** and the connecting members **15** have been punched while in the flat, with preferably triangular holes **33**, the ragged edges of which project outwardly. Said holes and said ragged edges form keys with the mastic, assisting in holding it tightly against the metallic surface of the wall. The stone blocks **30** are then placed against the soft mastic and suitable holes are drilled through the metal outer surface of the wall along the mortar lines of the stone blocks and the blocks are mechanically secured to the metallic substructure by devices such as those shown in Figures 6 and 7. In so securing them, it may be preferred to insert the wedges in the position shown in Figure 7, so that no part of the securing device will project beyond the outer surface of the masonry veneer. Figure 3 shows an anchoring device **34** between the vertical mortar line of two of the stone blocks with the lead washer **25** deformed so as to coincide with the angle of bevel of the masonry blocks, the entire securing means being concealed by the mortar or cement **35**.

While the anchoring devices **34** are of small size, they are thoroughly adequate to perform their function, which is to hold the stone blocks in place until the mastic has become thoroughly hardened and set. As a matter of fact, the anchoring devices will still perform their mechanical holding function, perhaps for years after the wall has been erected, but this is entirely immaterial for after the mastic has become thoroughly hardened, it is amply strong to hold the stone and the steel in monolithic unity throughout an undetermined number of years.

It probably takes weeks, or even months, for any mastic or cementitious substance to attain its final degree of hardness or strength, and the provision of the mechanical securing means for the masonry blocks enables the wall to be erected at once without waiting for the mastic to set. The transverse corrugations on the outer face of the wall perform the indispensable function of supporting the mastic uniformly throughout its entire vertical area, preventing the aggregate weight of the mastic from causing it to settle vertically. All mastic when setting or drying out, has a tendency to shrink and the horizontal corrugations distribute the shrinkage uniformly and evenly, so that the shrinkage at any one spot is negligible, and aggregate shrinkage is prevented from being referred to any one spot which might cause cracking of the mastic and separation or weakness of the masonry veneer.

It will be understood that the nature of the method of erecting this wall requires that the laying of certain of the stone blocks must be deferred until after the wall is in place. Thus, Figure 2 shows those stone blocks omitted, which would lap the flanges **3** of the channels **2**, and this would be also true of the stones which meet at the corner.

In order that the masonry veneer shall have the appearance of thick stones, those blocks of veneer which come together at the corners are mitered at an angle of 45°, forming an imperceptible joint, this being shown at **36** in Figure 4, and these same stone blocks at one side or the other of the corner, terminate in a vertical joint at a distance six or eight inches from the corner, according to the thickness of stone which it is desired to simulate.

While the dimensions of the pillars **7** and the connecting members **15** may be varied according to circumstances attending the nature of the building construction, they may for example, be twenty inches wide, eight inches thick and from eight feet to ten feet high, depending upon the distance between the floors of the building. Figure 4 shows that the outer walls outwardly of the partition **12** in the pillars and the web **18** of the connecting members may be filled with suitable insulation material which may be of rock wool, diatomaceous earth, or any other suitable insulating substance. The interior of the rib **19** may also be filled with this substance. The undulating nature of said partition and said web varies the thickness of the insulating layer, which fact tends to break up sound vibrations, making the insulation pack a sound insulator, as well as a heat insulator. The vacant spaces **37** within the ridges **13** serve as air flues, and also make room for the reception of the various pipes or conduits **38**, which customarily serve a building.

Just before the walls are erected to vertical position, they are capped by inverted channel members **39** (see Figure 1), which are similar to the base channel **2**, shown in Figure 5, excepting that the lugs **5** are not present, or if punched, they are not diverted outwardly from the normal corrugated flanges **3** and **4**. The cap channels are slid into place, the transverse corrugations along the front and back faces of the wall adjacent the top matching with the corrugations of the flanges **3** and **4** and sliding with respect thereto. The cap channels are provided with openings **40**, which are also present in the base channels, said openings registering with the spaces **13** which extend vertically through the walls. These openings, of course, do not function in those base channels which are against the foundation, but they make the spaces **37** continuous throughout the vertical height of the walls above the foundation.

The floor structure per se which is in general represented by the reference character **41** in Figure 1, is not a part of the present invention, except insofar as marginal portions thereof are

involved in the wall structure. As shown, the floor comprises a plurality of interfitting pressed steel sections 42, 43 and 44, extending the full length of the building, and having their marginal portions resting upon the cap channels 39. Said marginal portions of the floor are provided with openings 45, which register with the openings 40 in the underlying cap channels 39 and the overlying base channels 40.

The floor 41 constitutes a horizontal platform for supporting the base channels 2 of the outer walls as well as similar but narrower channel members 46 which receive the inner room partitions 47.

In erecting the metal structure on the floor 41 which is directly above the basement, and upon the other floors, in the event that the building is more than one story high, the channel members 46 are first put in place. The room partitions 47 are fundamentally similar in construction to the outer walls, being formed of similar pillars and connecting members, the difference being that the room partitions may be narrower in thickness, and that unless they are desired to bear the load of the superposed floor, the interior load carrying partitions 12 may be omitted. In the room partition 47, shown in Figure 2, there are no load bearing interpartitions or webs. The only other essential distinction between the room partitions and the outer walls is that the pillars 48 which constitute the abutting ends of the room partitions and are provided with outwardly extending corrugated vertical flanges 49, which abut against the corrugated inner side of the outer wall, the corrugations matching, and being secured thereto. The room partitions are slid into the channel members 46 before the base channels 2 of the outer walls are put into place, and the outer walls are erected subsequent to the erection of the room partitions.

The description now proceeds to the roof construction, which is illustrated in Figures 1 and 8, and in which the roof trusses 50 are constructed of corrugated sheet metal folded into a pillar or column in the same manner as the pillars 7, the corrugations extending perpendicularly to the direction of the lines of fold. For strength, the depth dimension is generally greater than the width dimension of the trusses. The trusses are hingedly united in pairs, the hinge connection being shown at 51 in Figure 1. The pairs of hinged trusses are arranged at suitable distances apart throughout the extent of the roof, for example, at intervals of six feet. The foot of each truss is secured to a bracket 52, which in turn is bolted or otherwise fixed to the horizontal platform constituted by the floor of the attic. This floor which as a whole is designated by the reference character 53 in Figure 8, comprises the pressed steel shell 54 filled in with a body 55 of concrete or other suitable monolithic filler.

The bracket 52 consists of the side plates 56 and 57, which receive between them the lower end of the truss 50, the side faces of which have been reinforced by filler pieces 58 which are flat on their outer sides and undulating on their inner faces to interfit with the corrugations. The side plates 56 and 57 are integrally connected by a bridge plate 59, said side plates being bent angularly to form the horizontal flanges 60 and said bridge plate being bent down to form the vertical flange 61. The horizontal flanges are secured to the floor, while the vertical flange extends through a recess 62 in the floor, and is anchored through the lapping interflange of the cap channel 39 and the inner side of the outer wall, as shown at 63 in Figure 1. The brackets 52 are preferably set back from the outer edge of the floor, leaving the space 64 which forms the seat for a gutter 65, illustrated in Figure 1.

The hinged connection at the head of a pair of roof trusses permits the lower ends of said trusses to be spread or contracted to suit slight variations or inaccuracies of the width dimensions of the building. The side plates 56 and 57 of the brackets 52 and the foot portions of the trusses, including the filler plates 58, are provided with an aligning aperture 66. In erecting a pair of roof trusses a bolt is thrust through the aperture 66 on one side, and then the truss on the opposite side is manipulated so as to bring the various parts of the aperture 66 on that side into alignment. A bolt is then thrust through this aperture. The bases of the trusses are provided with other bolt apertures which align with slots 67 in the side plates of sufficient width to register with said bolt holes, regardless of slight variations in the angularity of the trusses of a pair, the bolts 68 which pass through said holes and slot being then tightened against the walls of said slots to hold the trusses in final fixed position.

At the top the ends of the hinged trusses form an angle 69 which will vary according to the steepness of the pitch of the roof, and a ridge plate 70 especially made to suit the particular angle, is secured in place to the truss, the side faces of which are flush with the planes of the apices of the corrugations on the upper sides of said trusses.

Referring to Figure 12, this shows an alternative means for mechanically securing the stone facing. It comprises a flat bar 69 having a shouldered head 70 at one end adapted to pass through a slot 71 extending longitudinally of the corrugations, through the metal sub-structure 72. The opposite end 73 is bevelled to correspond to the bevelled edges of the masonry veneer blocks 30. After the anchor has been inserted in the slot 71, it is turned through a right angle, which secures the head behind the sides of the slot and at the same time causes the end 73 to ride out against the bevelled edges of the blocks 30, a lead washer 25 intervening, pressing the blocks 30 firmly inward against the mastic layer 32.

While I have in the above description disclosed what I believe to be a preferred and practical embodiment of my invention, it will be understood to those skilled in the art that the details of construction and the arrangement of parts as shown, are merely illustrative and are not to be construed as limiting the scope of the invention which is defined by the appended claims.

What I claim as my invention is:

1. Skeletal structural unit comprising a hollow parallelepipedal pillar having corrugated sides, the corrugations running perpendicular to the angular corners of said pillar, and a load bearing web secured within said pillar extending longitudinally thereof, said web being corrugated longitudinally and bent to form deep corrugated ridges and valleys giving girder depth and stiffness to said web.

2. Skeletal structural unit comprising a hollow parallelepipedal pillar having corrugated sides, the corrugations running perpendicular to the angular corners of the pillar, and a load bearing web secured within said pillar extending lon-

gitudinally thereof, said web being corrugated longitudinally and bent to form deep corrugated ridges and valleys, giving girder depth and stiffness to said web, said web being of less depth dimension than that of the pillar, and located toward the rear of said pillar, leaving the front portion of said pillar free from internal obstruction.

3. Fabricated wall unit comprising a plurality of hollow parallepipedal pillars with sides corrugated perpendicular to the angular corners of the pillar spaced apart and alternating with connecting columns comprising front and back metallic sheets, transversely corrugated, having their longitudinal edges overlapping the corresponding corners of adjacent pillars, and being secured thereto, and an internal web connecting said front and back sheets throughout a longitudinal region remote from said lapping edges.

4. Fabricated wall unit comprising a plurality of hollow parallelepipedal pillars with sides corrugated perpendicular to the angular corners of the pillar, a load bearing web secured within each pillar and corrugated lengthwise of the pillar, the pillars being spaced apart and alternating with connecting columns, each comprising front and back metallic sheets transversely corrugated, having their longitudinal edges overlapping the corresponding corners of adjacent pillars and being secured thereto, and an internal web connecting said front and back sheets throughout a longitudinal region remote from said lapped edges.

5. Method of constructing a building comprising providing a permanent horizontal platform, fixing open ended sheet metal channel members having upstanding flanges on said platform in position to delineate the periphery of the enclosure, fabricating in horizontal position, walls from laterally spaced hollow corrugated sheet metal pillars having their corrugations running perpendicularly to their longitudinal corners, alternating with sheet metal members comprising front and back transversely corrugated sheets the longitudinal edges of which lap the corresponding corners of adjacent pillars, and being secured thereto with the corrugations of said sheets matching the corrugations of said pillars, said sheets being unitarily connected, raising the walls to erect position, and sliding them to final positions in said channels.

6. Wall construction comprising a fixed base channel with upstanding longitudinally corrugated side flanges, and a wall seated therein comprising a plurality of spaced hollow parallelepipedal pillars with sides corrugated perpendicular to the angular corners of the pillar, a load bearing web secured within each pillar and corrugated lengthwise of the pillar, the pillar being alternated with connecting columns each comprising a front and back metallic sheet transversely corrugated, and having longitudinal edges of said sheet overlapping the corresponding corners of adjacent pillars with the corrugations of said sheets matching the corrugations of said pillars, and being secured thereto, and an internal web connecting said front and back sheets throughout a longitudinal region remote from said lapping edges, the base corrugations of said wall fitting within the longitudinal corrugations of said channel.

7. Wall construction as claimed in claim 6, including a cap channel with corrugated flanges fitted to the top margin of said wall with the matching corrugations of said pillars and connecting members fitting the longitudinal corrugations of said cap channel, the latter serving as a support for a superposed floor.

8. Method of building construction comprising providing a horizontal floor or platform, fixing on said platform open ended channels having longitudinally corrugated side flanges delineating the interior room partitions of the building, sliding into said channels by way of their open ends transversely corrugated hollow sheet metal wall units with the lower transverse corrugations slidably interfitting the corrugated side flanges of said channels, fixing on said platform open ended channels having longitudinally corrugated side flanges, in positions delineating the outer walls of said building, slidably inserting in the open ends of said last named channels transversely corrugated hollow sheet metal wall units having vertically corrugated interior load supporting webs, and securing said partition wall units to said outer wall units.

9. Method of constructing a building wall unit comprising arranging hollow parallelepipedal sheet metal pillars having transversely corrugated front and back faces in spaced relation in a substantially horizontal plane, interconnecting said pillars by means of connecting members comprising front and back transversely corrugated sheets having their longitudinal edges overlapping the corresponding corners of adjacent pillars and being themselves internally interconnected, coating the upper and uniformly corrugated face of said wall so fabricated, with mastic to a depth exceeding the height of the corrugations, placing bevel-edged thin stone veneer plates in adhesive contact with said mastic, mechanically securing said stone veneer plates, through said mastic, to said underlying metallic wall structure whereby said stone plates are held in position independently of said mastic at least during the period required for said mastic to attain its final hardness and set, and erecting said wall unit into a vertical plane.

10. Fabricated wall unit comprising a plurality of spaced pillars each consisting of a hollow parallelepipedal pillar or corrugated sheet metal, the corrugations of which run perpendicular to the angular corners of the pillar, said pillar having a longitudinally extending web secured therein corrugated longitudinally and bent to form deep corrugated ridges and valleys giving girder depth and stiffness to said web, the depth dimension of said web being less than that of said pillar and said web being located toward the rear of said pillar matching the front portion of said pillar free from obstruction, said pillars being spaced apart and alternating with connecting columns comprising front and back metallic sheets transversely corrugated, having their longitudinal edges overlapping the corresponding corners of adjacent pillars and being secured thereto, with the corrugations of said sheets matching the corrugations of said pillars, said connecting members each having an internal web longitudinally corrugated and bent to form deep corrugated ridges and valleys giving girder depth and stiffness to said web, at least one of which ridges extends throughout the depth of said connecting member and by means of which said front and back sheets are united, the remaining portion of said web being of less depth dimension than that of said connecting member and located toward the rear thereof, leaving the front portion of said connecting member free from internal

obstruction, and an insulating filling occupying the unobstructed front portion within said pillars and said connecting members.

11. Channel for supporting a hollow transversely corrugated sheet metal wall, comprising an open ended longitudinally corrugated sheet metal member having upstanding longitudinally corrugated side flanges and having laterally punched-out lugs in the plane of support of said channel.

12. Channel for supporting or capping a hollow sheet metal transversely corrugated wall unit having vertical flues formed therein, said channel comprising an open ended longitudinally corrugated sheet metal member having longitudinally corrugated side flanges adapted to slidably engage transverse flanges of said wall unit in positioning said wall unit and channel, said channel being formed with openings adapted to register with the flues in said wall unit.

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