

May 4, 1948.

A. TODHUNTER
BUILDING CONSTRUCTION

2,440,763

Filed Feb. 19, 1945

4 Sheets-Sheet 1

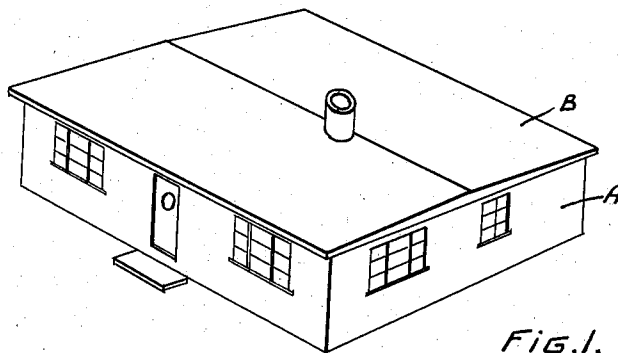


FIG. 1.

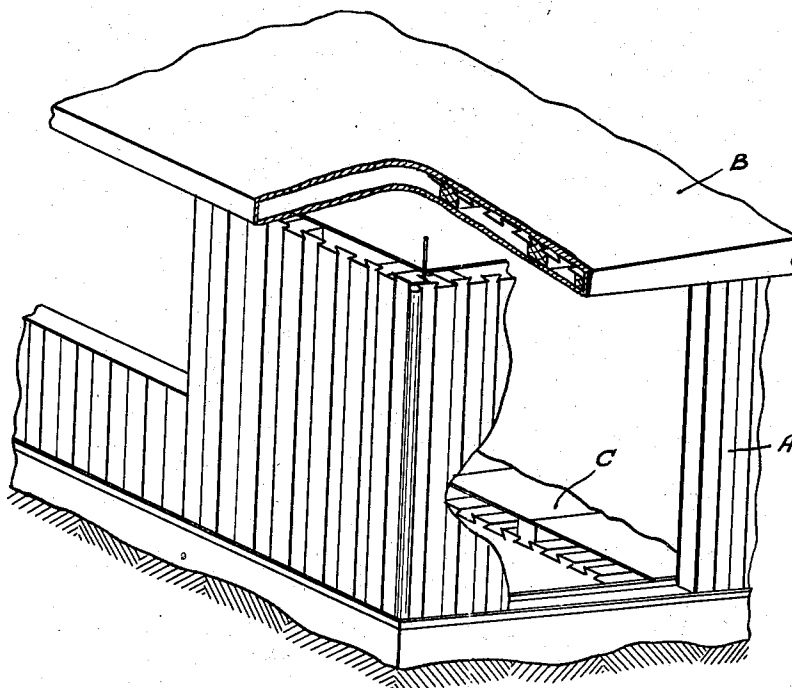


FIG. 2.

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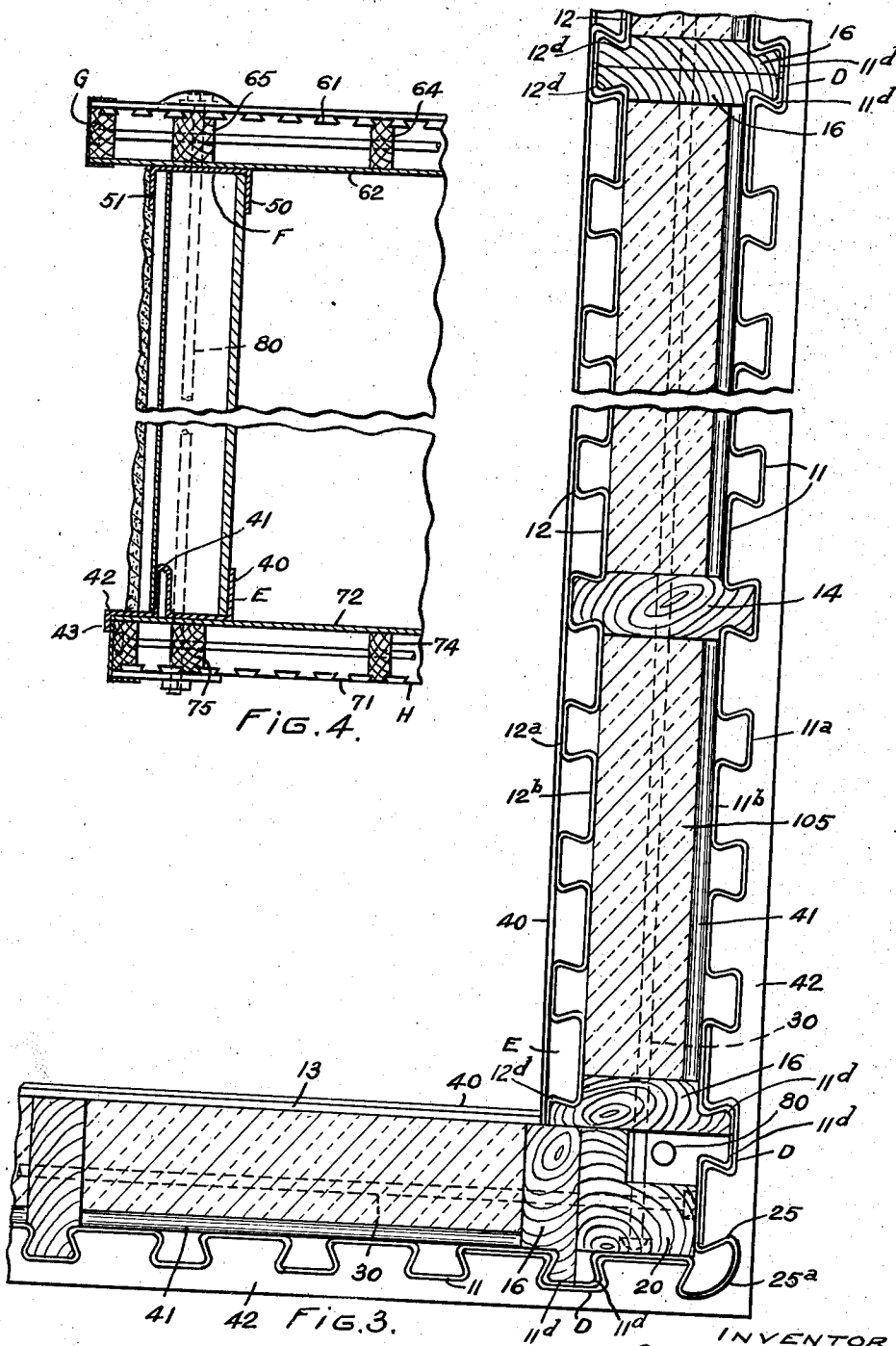
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

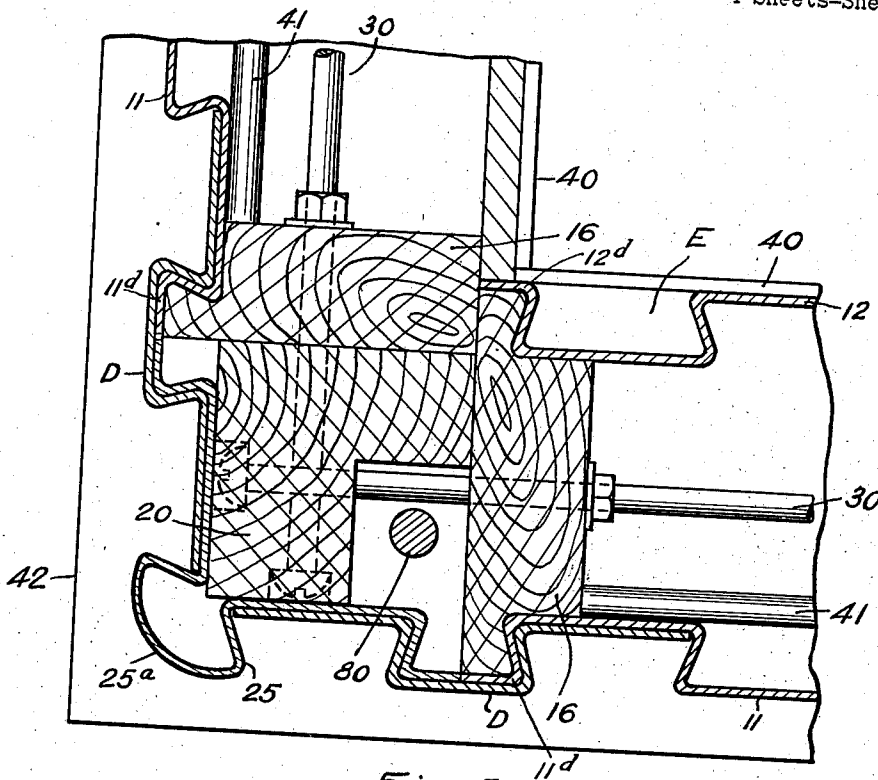


FIG. 5.

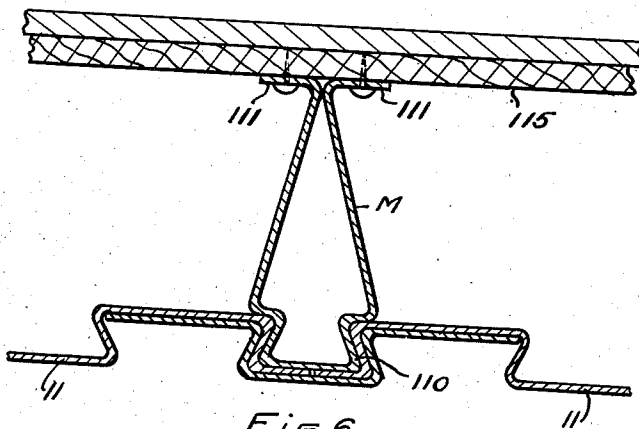


FIG. 6.

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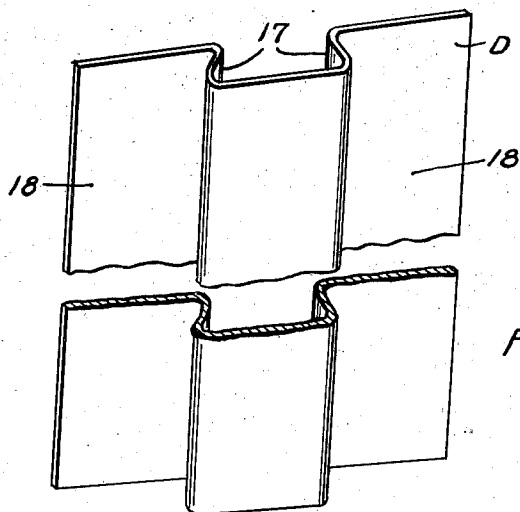


FIG. 7.

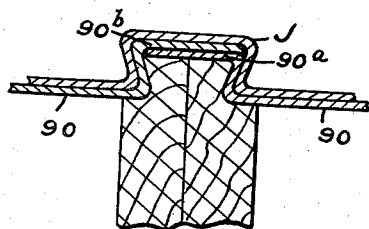


FIG. 8.

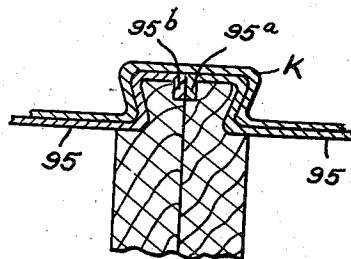


FIG. 9.

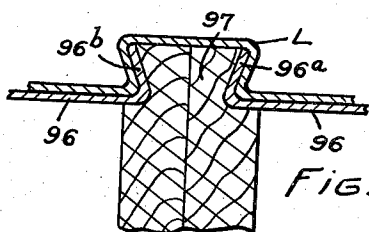


FIG. 10.

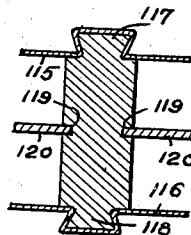


FIG. 12.

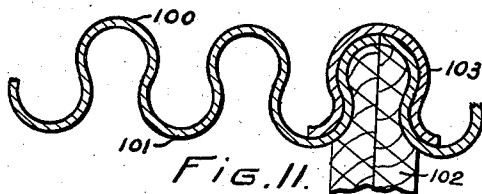


FIG. 11.

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BUILDING CONSTRUCTION

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5 Claims. (Cl. 189—1)

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Introduction

This invention relates to building construction. Generally speaking, buildings, particularly houses, are constructed at the building site, the various materials employed being cut to size and erected on the spot. However, it is of great advantage to employ standardized parts which can be made in a factory specially equipped and manned for their most economical manufacture "en masse" and subsequently shipped to distant sites for assembly.

Objects

It is, therefore, an object of the present invention to provide a form of construction which lends itself to the prefabrication in a manufacturing establishment of parts which can be eventually assembled together in a simple manner at the building site. It is a further object of the invention to provide structural parts, subassemblies and assemblies of unique and novel form.

With these and other objects in view, the invention is preferably embodied in a type of building construction employing a number of sections which can be assembled together to form wall, floor and roof units. All these units are preferably of a similar construction, each being made up of sections provided with a facing of a particular sheet material of a dovetailed conformation to be described in more detail, and a lining either of the same type of sheet or of conventional flat material. The linings and the facings are spaced apart and connected by special supporting members or studs which are provided with tenons adapted to fit into the dovetailed depressions in the sheets. At the junction between adjacent sections, special cover joints are provided to fit over the dovetailed projections at the joints, to key them together and to render them impervious. At the corners of the building, special sheeting and cover joints are also provided.

Preferably, each wall unit is supported in a special channel adapted to receive its lower edge and another channel covers the top edge of each wall unit. The roof, wall and floor units are held together at the corners of the building and immediately by vertically extending tie-rods.

This particular form of construction lends itself to a method of assembly which can be performed by unskilled labour and therefore facilitates the erection of the building at the building site. According to this preferred method, the sections are assembled by first placing the corrugated sheets edge to edge, then slipping the cover joints in place to hold them together, then slid-

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ing the supporting members or studs into the dove-tailed corrugations at the joint and at desirable intervals to space the facing and lining apart. Insulation is then inserted between the facing and lining. Windows and doors are set into the sheeting at intervals. The units thus formed are set into channels at top and bottom, which align the units. The floor, wall and roof are then brought into their respective positions and the tie-rods inserted to hold the units together. Tie-rods also extend longitudinally of the wall units giving further strength and stiffness in that direction.

Detailed description

Details of this preferred construction and others are given in the following description by which the invention will be better understood. This description has reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a one-storey building constructed according to the invention.

Figure 2 is a fragmentary sectioned view of the building shown in Figure 1 in which portions have been cut away to illustrate the structure of the wall, floor and roof units.

Figure 3 is a plan view partially in section of a portion of the wall of the building shown in Figures 1 and 2 with the roof and top flanges of the wall removed.

Figure 4 is a fragmentary vertical cross section through the building shown in Figure 1 adjacent a corner thereof, particularly illustrating the manner in which the roof, walls and floor are secured together.

Figure 5 is an enlarged plan view, partly in section, of a corner of the building shown in the previous figures.

Figure 6 is an enlarged fragmentary horizontal cross sectional view illustrating an alternative form of stud.

Figure 7 is a fragmentary perspective view of one of the cover joints.

Figures 8, 9 and 10 are fragmentary cross sectional views of alternate types of joints between respective sections.

Figure 11 is a fragmentary cross sectional view through an alternative form of sheeting.

Figure 12 is a fragmentary cross-sectional view through an alternative form of wall adjacent a spacer between facing and lining.

Referring more particularly to the drawings, Figure 1 shows a building having wall units A, a roof unit B and a floor unit C. Each of these units is of similar integral and partially prefabri-

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cated impervious structure to be described. The units are connected at their adjacent margins to form a strong and easily erected structure.

So that the structure of the units will be understood, I shall first describe a wall unit A. This unit is made up of a facing 11 of corrugated sheeting having alternate projections 11a and indentations 11b preferably of the dovetail conformation shown, and a lining 12 of similar sheeting. Alternatively, the lining may be flat. These alternative structures are best shown in Figures 3 and 5. Each unit is made up of several sections. Each section has, intermediate its ends, an elongated vertical stud 14 having a flaring tenon at front and back fitting in the respective recesses formed at the reverse side of the projections 11a and 12a and engaging the shoulders formed at the necks of the projections. In the case of the flat lining 13 it is screwed or nailed to the studs 14.

At the end of each section, the facing 11 and the lining 12 terminates in semi-dovetail projections 11d and 12d respectively. Studs are provided which have semi-dovetail front and back faces 16d fitting into the respective semi-dovetail projections 11d and 12d. The ends of adjacent sections are butted together so that the semi-dovetail projections 11d and 12d and the semi-dovetail studs 16d are juxtaposed. A cover joint D having a dovetail depression or mortise 17, best shown in Figure 7, adapted to form a snug fit with the outside of the dovetail projection formed by the juxtaposed semi-dovetail projections and flanges 18 adapted to lie along the outside of the depressions 11b, is then put into place by sliding it on endwise. This completes the joint locking the sections together. Where twin corrugated sheets are employed, there is a cover joint both at the facing and at the lining, as shown in Figure 3.

At the corner of the wall there is provided a square corner post 20, the outer faces of which are covered with a corner piece 25 of similar sheeting to the facing and lining, but having a corner portion 25a of rounded or other suitable conformation. The ends of adjacent sections are butted against the corner post, the edge of the facing 11 abutting the edge of the corner piece 25. Cover joints D complete the joint as in the case of the junction of adjacent sections.

Tie-rods 30 extend through the corner posts 20 and studs 14 and 16 from one end of the wall to the other, thus bracing it in the longitudinal direction. Bolts secure the ends of the tie-rods.

The wall is set at the bottom into a special channel member E (see Figure 4) having an inner flange 40 engaging the inside of the wall lining and an outer flange 41 engaging the inside of the facing and a horizontal portion or ledge 42 on which the facing is adapted to rest, extending outwards from the flange. The member E also has a flange 43 extending downwardly from the ledge 42. Covering the top of the wall is a channel member F having flanges 50 and 51 engaging respectively the inner side of the lining and the outer side of the facing.

The roof and floor structure is similar to that of the wall. The roof comprises corrugated facings 61, lining 62, rafters 64 and at the edges a flashing G.

The floor comprises a facing 71, lining 72, studs 74 and a flashing H. At the corners of the building, the roof rests on the channels F, its weight being supported by studs or rafters 64. The lower channel member E of the wall rests on the floor, its weight being supported on a joist 75. A tie-rod 80 extends through the roof, the wall flanges

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and floor and by suitable bolts secures these parts together. The tie-rods 80 are preferably accommodated in a recess formed in the corner posts 20 as best indicated in Figure 5.

In the case of additional storeys to the building, the channels F may be replaced by H-sections, the top channel of which carries the wall of the additional storey.

Advantages of construction

It is evident that the structure as above described provides a strong, durable, impervious roof, floor and wall construction. The corrugated sheeting, braced by the studs in the direction of its corrugations gives extreme strength. The joints between sections are impervious. The connection of the roof, wall and floor units is such as to afford stability in all directions. The sections of each unit, being capable of separate assembly, render prefabrication possible. The simplicity with which the respective sections and units are assembled makes the construction of the building at a point of assembly remote from the factory very simple and enables relatively unskilled labour to be employed.

It will be understood that the principle involved in this method of construction may be applied to various modifications of the particular structure shown. For instance, the structure of the joint may be modified. In Figure 8 there is shown an enlarged fragmentary cross section of a modified joint. Here the ends of the sheeting 90 of respective sections are brought together and instead of the ends of each sheet being butted together as previously described, the respective ends 90a and 90b are lapped as indicated and a cover joint J slipped over to complete the joint. In the case of the structure shown in Figure 9, the ends of the sheeting 95 of respective sections are interturned and the interturned ends butted together and a cover joint K placed over the joint in the usual manner. In the case of the structure shown in Figure 10, the ends 95 of the sheeting of adjacent sections do not meet at all but terminate as shoulders 96a and 96b which conform to the tapered sides of the tenon of a stud 97. A cover joint L completes the joint in the usual manner.

Another modification is in the nature of the sheeting employed. Illustrated in Figure 11 is a cross section of a type of sheeting in which projections 100 and indentations 101 are of circular dovetail cross section. In this case the studs 102 and cover joints 103 also of circular cross section are used to conform to the shape of the sheeting. Figure 12 illustrates an alternative form of spacing member or stud having dovetailed ends 117 and 118 adapted to fit into recesses in the facing 115 of the lining 116 respectively. The stud is also provided with slots 119 midway between the facing and lining adapted to receive dividing sheets 120.

The dimensions of the building are capable of infinite variation. In a particular house of dimensions approximately 30 feet by 24 feet, it was found convenient to have the wall sections about 18 inches in width. In this case the sheeting is preferably made of aluminium of .032 inch in thickness, and the distance between the inside of the facing and the outside of the lining is about 2 1/2 inches. It will be understood, however, that these dimensions are by no means critical.

Windows, doors and other openings may easily be provided in the walls, floor or roof sections as will be well understood by those skilled in the

art. Insulation 105 may be placed between the lining and facing of the units. It is preferable that this insulation does not fill the entire space but that a gap is left between the facing and the insulation as shown in Figure 3.

Another modification in structure is shown in Figure 6. In this case the wooden studs joining the facing and lining together are replaced by a metal stud M of the cross section shown, the stud having a tenon 110 engaging the recess of the facing in the manner above described. The stud M has flanges 111 which are connected, in this case, to a horizontally or vertically extending slat 115 to which the lining is attached.

The material from which the elements of the structure are made may, of course, be widely varied. The sheeting may be of metal, plastic, glass, paper or any other material lending itself to the structure as described.

The space between the facing and lining has been shown as filled with fibrous insulating material. This space may be filled with concrete or other material which gives both insulation and structural strength. Alternatively, the spacing studs may be employed to give structural strength and to leave space for insulating material such as cork, sawdust, rock wool, aluminium foil, fibre board, etc.

The outer faces of the corrugated sheets may receive stucco, plaster, etc., so as to provide normal outside and inside wall finishes. A stucco of weak mixture with large proportion of aggregate may be used which is not so liable to crack as a strong mixture but readily allows rain water to penetrate. Because of the impenetrable nature of the cover joints, the penetration of rainwater through the stucco is not of the same importance as in ordinary construction which does not have impenetrable joints behind the stucco.

The method of construction described is featured by the possibility of breaking up the materials for building a house, etc., into flat sheets which can be joined together at the site by sliding studs into sockets in the wall sheets.

Strength is obtained in thin sheet material by sliding a member or stud with dovetailed edge into a dove-tailed corrugation in the sheet, thus supporting the sheet through its entire height and making it possible because of its close connection with the stud to hold considerable downward thrust of a roof or similar weight placed on it.

The cover joints not only hold ends of sections together but form a cover to the joint which is impervious to water. They are not observable as in the case of strips of wood or metal which are normally used to cover joints between sections. By their use the exterior of a building is made to look like a continuous corrugation without joints.

While the description has been in terms of a building, the sheeting and attendant structure may be employed in the manufacture of fencing or for similar purposes.

It will be understood that, without departing from the spirit of the invention or the scope of the claims, various other modifications may be made in the specific expedients described. The latter are illustrative only and not offered in a restrictive sense, it being desired that only such limitations shall be placed thereon as may be required by the state of the prior art.

The sub-titles used throughout the specification are merely to simplify reference thereto and should otherwise be disregarded.

I claim:

1. In a building structure a plurality of sections forming a wall of the structure, each section having a facing of corrugated sheeting, the corrugations being in the form of dovetail projections or cells, an end of each section being provided with a pair of studs having tenons of semi-dovetail conformation extending into a semi-dovetail end projection of the facing, the studs of adjacent section being juxtaposed, and a cover member having a depression of dovetail conformation conforming to the dovetail projection formed at the joint by the juxtaposed semi-dovetail projections of adjacent sections, the cover sheet serving to lock the adjacent sections together and to shield the joint.

2. In a building structure a plurality of sections forming a wall of the structure, each section having a facing of corrugated sheeting, the corrugations being in the form of dovetail projections or cells, an end of each section being provided with a pair of studs having tenons of semi-dovetail conformation extending into a semi-dovetail end projection of the facing, the studs of adjacent sections being juxtaposed, and a cover member having a depression of dovetail conformation conforming to the dovetail projection formed at the joint by the juxtaposed semi-dovetail projections of adjacent sections, the cover sheet serving to lock the adjacent sections together and to shield the joint, a corner post, a corner sheeting piece covering the corner post, its edges being formed by a semi-dovetail projection, cover joints covering the dovetail formed by the semi-dovetail of the respective wall sections and the corner sheeting section, the walls being set into channels at the top and bottom thereof, the channels serving to align the walls, the roof, walls and floor being connected at intervals by tie-rods extending through the top and bottom wall channels, the floor and roof units, and holding the units firmly together, the studs and cover members spacing and holding together the facing and lining sheeting throughout their length thus forming an integral structure.

3. A building construction, comprising, a roof, a floor and wall units all of similar construction, each unit being made up of a number of sections, each section comprising a facing of dovetail corrugated sheeting and a lining of dovetail corrugated sheeting, a number of studs joining the facing and the lining, each stud having a tenon engaging in a depression of the facing and lining respectively, the sections being joined together by adjacent half dovetail studs, studs of the respective sections inserted in half-dovetail projections in the ends of the respective sections, dovetail cover joints engaging the outside of the dovetail projection formed by the juxtaposed half-dovetail projections and studs of the adjacent section ends.

4. A method of building, comprising, forming a structural section by placing in spaced apart parallel relationship two sections of dovetail corrugated sheeting having terminal projections of semi-dovetail conformation, inserting a stud having ends of dovetail conformation in opposite projections of the facing and lining respectively so as to hold the facing and lining together, inserting a semi-dovetail stud in each semi-dovetail projection, bringing the ends of respective sections together by juxtaposing the end studs of respective sections and sliding over the outside

of the dovetail projection formed by the respective semi-dovetail projections of the adjacent sections to cover joint adapted to engage the projections and hold them together.

5. In a building construction, a wall structure, comprising, a number of metal sections in which there are dovetail corrugations substantially equi-spaced the length of each section and each section has two parallel edges of semi-dovetail conformation, the sections being placed edge to edge thereby to form a substantially complete dovetail projection divided near the middle, a spacer separating the facing so formed from an inner lining of like conformation, tenons of the spacer fitting within the dovetail indentation formed inside said dovetail projection, a cover member covering said projection and holding the semi-dovetail edges together and to said spacer, the spacer being connected to the lining

thus holding the facing to the lining, the facing and the lining being adapted to form a cell adapted to receive insulation.

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