

Oct. 7, 1958

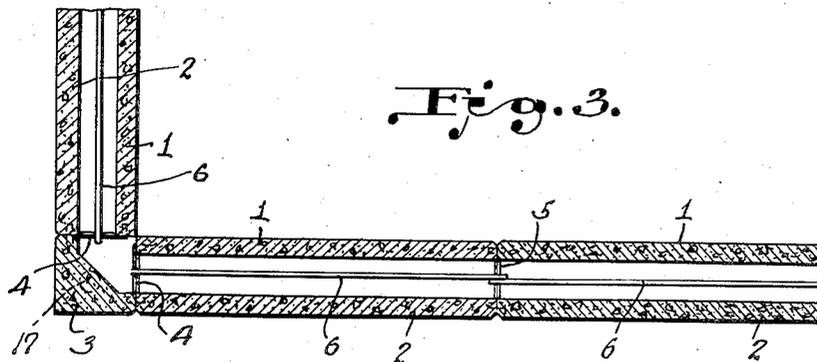
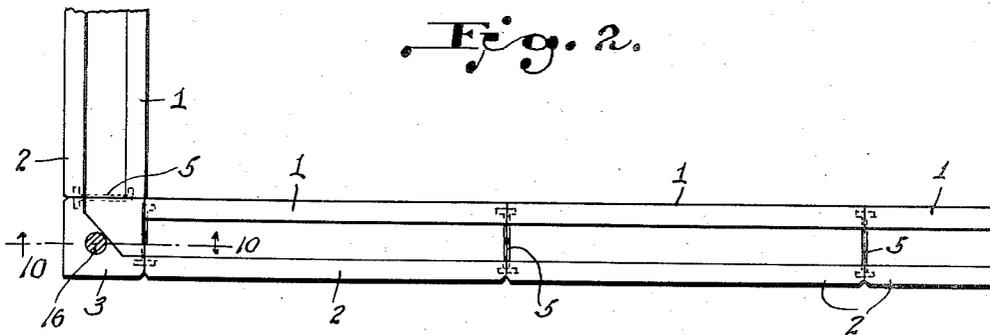
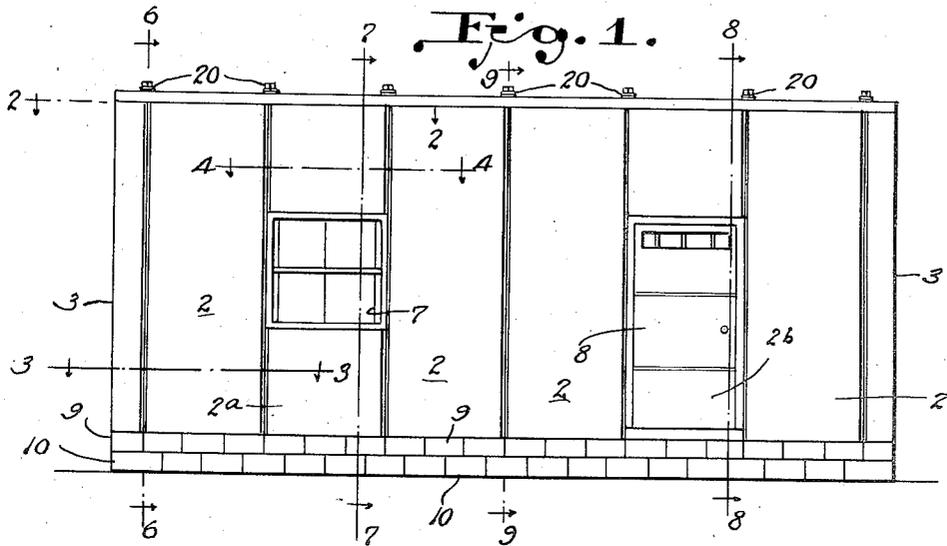
F. E. SIMMONS

2,854,841

PREFABRICATED BUILDING STRUCTURE

Filed March 20, 1953

4 Sheets-Sheet 1



Frank E. Simmons

INVENTOR

BY *Chenoweth*

ATTORNEYS.

Oct. 7, 1958

F. E. SIMMONS

2,854,841

PREFABRICATED BUILDING STRUCTURE

Filed March 20, 1953

4 Sheets-Sheet 2

Fig. 4.

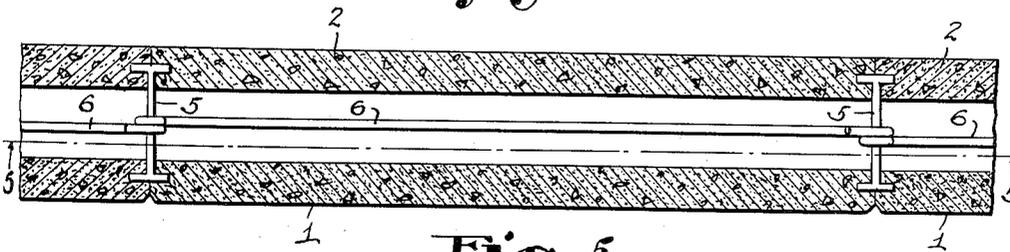


Fig. 5.

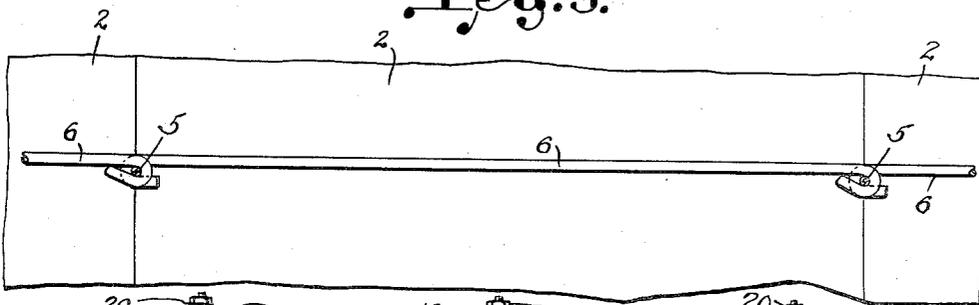


Fig. 6.

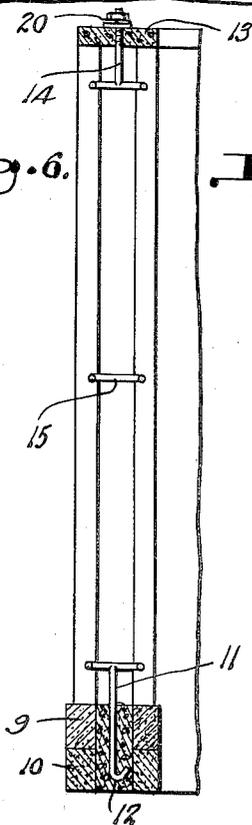


Fig. 7.

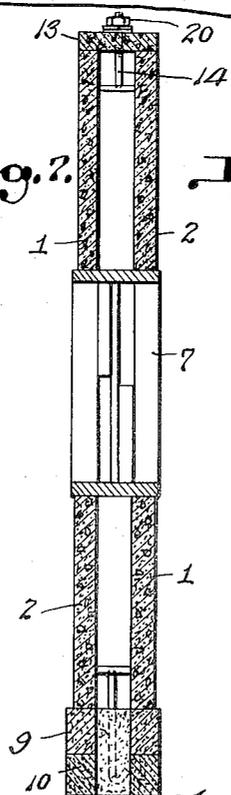
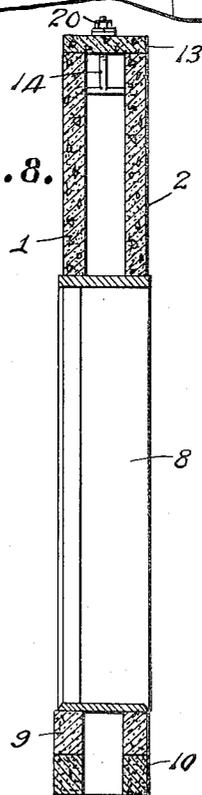


Fig. 8.



Frank E. Simmons INVENTOR

BY *Carroll*
ATTORNEYS.

Oct. 7, 1958

F. E. SIMMONS

2,854,841

PREFABRICATED BUILDING STRUCTURE

Filed March 20, 1953

4 Sheets-Sheet 3

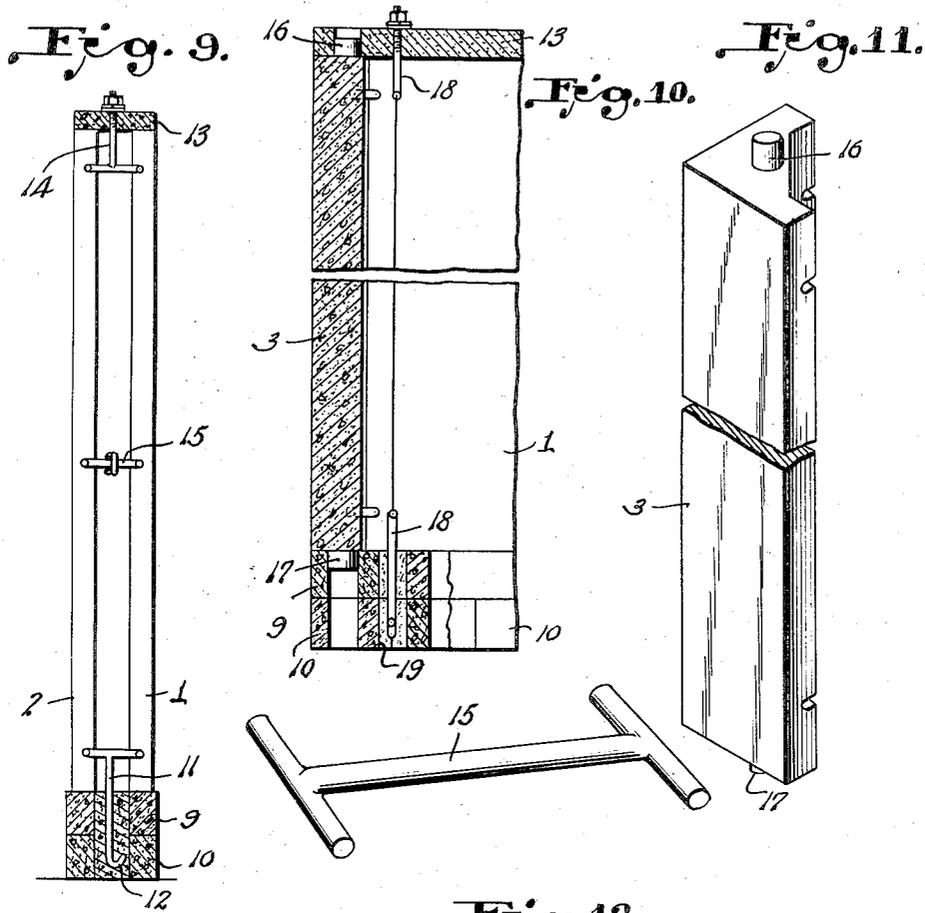
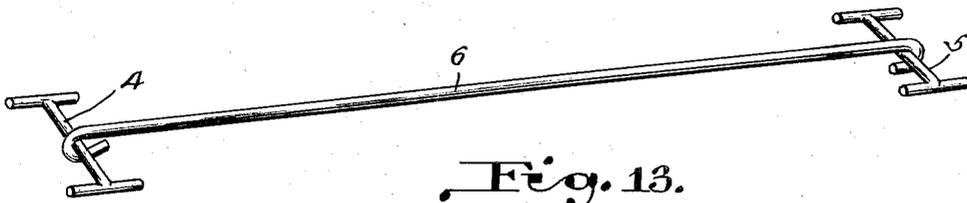


Fig. 12.



Frank E. Simmons

INVENTOR

BY

Chapman & Co.

ATTORNEYS.

Oct. 7, 1958

F. E. SIMMONS

2,854,841

PREFABRICATED BUILDING STRUCTURE

Filed March 20, 1953

4 Sheets-Sheet 4

Fig. 14.

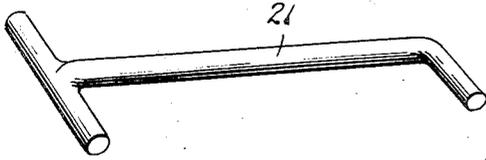


Fig. 15.

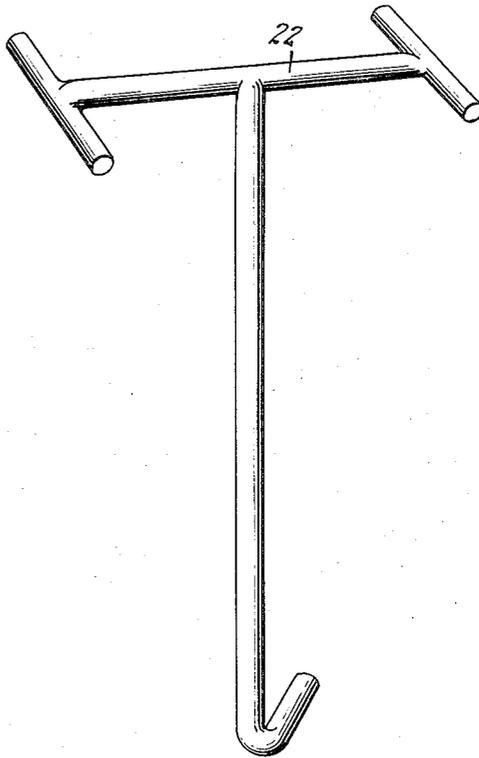


Fig. 16.

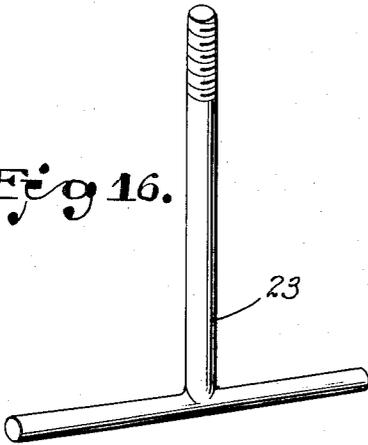


Fig. 17.

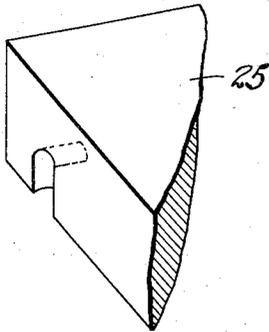
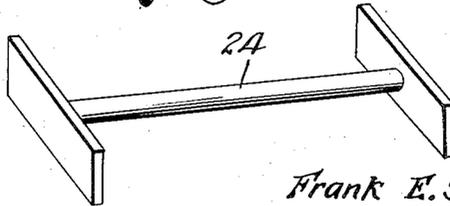


Fig. 18.



Frank E. Simmons
INVENTOR

BY *Calnow & Co.*
ATTORNEYS.

2,854,841

PREFABRICATED BUILDING STRUCTURE

Frank E. Simmons, Landover, Md., assignor to Lad-E, Inc., Washington, D. C., a corporation of Delaware

Application March 20, 1953, Serial No. 343,854

1 Claim. (Cl. 72-44)

This invention relates to an improved building construction and method of assembling the same which is particularly suitable for use in prefabricated buildings which may be made in sections according to the predetermined design and which may be quickly and readily assembled at the side of construction by unskilled or semi-unskilled labor thus enabling quantity and mass production of buildings at extremely low cost and with a minimum of expense for labor as well as materials and also effecting a great saving in the construction time and the employment of skilled artisans of the building trade.

One of the objects of the invention is to provide a building construction which is well adapted for use with prefabricated buildings which is made up of a plurality of inner and outer wall sections disposed in spaced relation so as to provide an insulating air space, all of such wall sections being adapted for quick assembly and construction so as to provide a sturdy and well constructed building which is substantially leak proof and which will not settle unduly as the result of vibration or heavy load.

The further object of my invention is to provide a prefabricated building construction having the above described features and characteristics which can be made and assembled with a minimum cost.

Another object of the invention is to provide a building construction and a method of constructing and assembling the same and in which the building is made up of a plurality of prefabricated reinforced concrete sections which may be produced rapidly and in quantity in a suitable factory or plant and then assembled at the site of construction thus effecting a great saving in time, labor and materials.

A still further object of the invention is to provide a building construction of the character described in which the separate sections are formed of re-enforced concrete or other suitable material all of which sections are secured firmly against relative displacement both vertically and horizontally and which are rigidly secured to the corner construction or corner post and to the foundation by means of tie rods which extend both vertically and horizontally and are disposed in different planes, the said tie rods having end portions which are firmly embedded in cooperating recesses or grooves in adjacent or abutting sections, and which serve both as means for spacing the inner and outer wall sections from each other as well as to provide a rigid dependable sturdy building having a minimum number of braces, joists, beams or other supplementary reinforcing or strengthening supports.

According to my improved construction and method of assembly of the various building sections, such sections may be formed of reinforced concrete made in suitable standard forms of limited variety and shape depending upon the shape, size and design of the building. The tie rods or bars are made of the desired size and shape and the number thereof is reduced to a minimum and the same may be made in quantity at relatively low cost. The separate sections also comprise only a relatively

few standard shapes and sizes and may have suitable openings formed therein to receive the doors and windows which may be similarly secured in place by tie rods in spaces which give the necessary rigidity and sturdiness to the building thus necessitating the use of only a few additional braces or supports or reinforcing members. The several sections may be quickly assembled and fitted together according to a prearranged plan which may be indicated on a chart or other plan. The several parts having a suitable indicia thereon to facilitate assembly of the various portions or parts of the building. It has been found that most contractors have enough equipment and tools to assemble the different panels or sections or units without having to secure much additional tools or equipment thus reducing to a minimum the number of carpenters, metal workers or other skilled persons and thereby greatly reducing the cost of labor which comprises a large proportion of building construction.

Further and more limited objects of the invention will occur as the description proceeds and by reference to the accompanying drawings in which corresponding parts are indicated by similar reference characters.

In the accompanying drawings:

Fig. 1 is a view in front elevation of the building construction embodying the features of my invention;

Fig. 2 is a horizontal sectional view on the line 2-2 of Fig. 1;

Fig. 3 is a horizontal sectional view on the line 3-3 of Fig. 1;

Fig. 4 is a horizontal sectional view on the line 4-4 of Fig. 1;

Fig. 5 is a fragmentary view in elevation showing the means for securing the adjacent sections of the outer wall sections together at the joints and the horizontally extending tie rods for securing adjacent sections against displacement;

Fig. 6 is a vertical sectional view on the line 6-6 of Fig. 1;

Fig. 7 is a vertical sectional view on the line 7-7 of Fig. 1;

Fig. 8 is a vertical sectional view on the line 8-8 of Fig. 1;

Fig. 9 is a vertical sectional view on the line 9-9 of Fig. 1;

Fig. 10 is a vertical sectional view taken on the line 10-10 of Fig. 1 and disclosing the corner post construction;

Fig. 11 is a perspective view of one of the corner posts;

Fig. 12 is a perspective view of one of the spacing and tying elements for securing the inner and outer walls in spaced relation and disposed intermediate the edges thereof;

Fig. 13 is a perspective view of one of the tie rods and a pair of the connecting rods for securing the parts in place;

Figs. 14 to 18 inclusive are perspective views showing different forms and modifications of tie rods and securing means for securing the parts against relative movement.

Referring now to the drawings my improved building construction comprises essentially front, rear and side walls which are made up of wall panels or sections principally of preformed re-inforced concrete slabs. The slabs are preferably made in steel molds having suitable projections thereon so arranged as to provide a series of opposed recesses or grooves on the adjacent faces of adjacent slabs and also on the edges thereof where adjacent slabs abut. These slabs are so designed that grooves or recesses may be provided at any desired points in the slabs. The specific manner of forming and securing the slabs forms no part of this invention except as indicated hereinafter. The several wall sections or panels are substantially alike and are so shaped and designed

as to conform to the architect's plans and the shape and design of the building. When a number of buildings of the same or generally same design are contemplated the number of panels or sections are more or less standard and may be reduced to a minimum. The tie rods, cross heads and other fastening, spacing and securing means are also more or less standard and are precision made so as to properly fit in the grooves or recesses adapted to receive the same. Where any particular slab is designed to receive a window or door frame the size, shape and design of the same is made to conform to the building plans. Each panel or wall section is of substantially the same size and shape and the location of the recesses and grooves are substantially similar. The several wall sections are secured together at their abutting edges by suitable spacer elements or tie rods which engage in corresponding grooves in the continuous faces so that the edges of adjacent sections abutt each other so as to provide a smooth-like surface at the joints. Disposed intermediate the joints are additional fastening and spacing elements which likewise engage in recesses or grooves in the adjacent faces of the inner and outer wall sections. The several spacer elements and fastening means are secured together by tie rods or connections which extend both vertically and horizontally so as to securely hold the inner and outer walls against relative displacement in any direction. The individual wall panels or sections are also secured to the corner posts by similar locking means which will now be described.

The corner posts are also prefabricated and are secured in interlocking relation with both the adjacent panels and with the foundation and roof structure as will appear from Figs. 3, 6 and 11. Each corner post is of the general shape shown in Fig. 7 and is provided with suitably arranged grooves or recesses and projections for securing the same to adjacent parts in interlocking relation so as to provide a sturdy strong and rigid construction.

The several panel sections are also interlocked with the foundation and with the corner posts by suitable fastening members which function also to maintain the inner and outer walls sections in spaced relation and to prevent relative displacement of adjacent parts.

Referring now to the drawings the building is made up of a plurality of panels or wall sections having inner wall 1 and spaced from the same are outer walls 2 which are secured to the corner posts 3 by fastening elements 4 the end portions of which engage in grooves provided in the adjacent edges of the wall sections 1 and 2 and in corresponding grooves provided in the side walls of the posts 3 as shown most clearly in Figs. 2 and 3. The adjacent edges of each of the panels 1 and 2 are secured together by the rods 5 which engage in grooves provided in the abutting faces thereof so as to provide a flush smooth surface at the joints. The fastening members 4 and 5 are rigidly connected by tie rods 6. Additional fastening and spacing members may be provided intermediate adjoining panels depending upon the size and shape of the individual panels so as to provide additional strength and rigidity where a great strain or stress may occur. Fig. 1 shows a front view of the front of the building made up of panels 2a and 2b. Secured within openings provided in the panel 2a is a window frame 7 preferably formed of steel and which is secured in place in any suitable manner. The panel 2b carries a door 8 formed of wood or steel and suitably secured in place. Fig. 9 shows a vertically disposed panel which is secured within an opening provided in the foundation blocks 9 and 10 which are preferably concrete blocks. This section is secured to the foundation by tie rods 11 embedded in a mass of concrete 12. The upper end of the tie rod 11 is embedded in grooves provided in the walls 1 and 2. Disposed over the upper end of the vertically disposed sections 1 and 2 is a roof section 13 which may be of wooden 2 x 4's secured in place by tie rods 14 which extend through the two by fours and which is exteriorly threaded to receive thereover two washers and a lock nut

14. A sufficient number of these connections are provided to insure rigidity of the construction. Additional locking and fastening elements 15 similarly locked in place may be provided. Fig. 10 is a sectional view showing the corner post 3 having projections 16 and 17 which engage in openings in the foundation and roof section. Additional tie rods 18 may be disposed between the inner and outer walls 1 and 2 which are secured in place in the foundation at the bottom by a mass of concrete 19 and which extends through the roofing section 13 and are secured in place by a nut 20. The means for securing the corner posts to the foundation are preferably secured in place before the side walls are put in place but any suitable means for providing a rigid sturdy construction may be used.

Figs. 14 through 18 inclusive are perspective views of different forms and shapes of rods and tie bars of suitable design and shape which are used at different parts to secure adjacent members in fixed relation and are indicated by the reference characters 21, 22, 23, 24 and 25. These parts consist of sections of rods welded together so as to obtain the desired shape. It is contemplated that when convenient all of the adjacent fastenings and spacing means are secured together by tie bars or other connecting means which are preferably welded together and which extend both vertically and horizontally to insure the necessary rigidity.

Suitable tools such as clamps are provided for securing several wall sections in fixed relation to the foundation and roof sections temporarily to permit the various securing and spacing elements to be put in place. The outer wall 1 is preferably set up first and secured with relation to the roof and foundation. The inner wall 1 is next put in place and the doors and window frames secured in the openings provided therefore in any suitable manner. Additional braces and reinforcements may be provided when necessary or desirable. Additional roof sections (not shown) may then be erected in a similar manner. Care should be taken to secure each part to the next adjacent part by fastening elements and tie rods which extend both vertically and horizontally so as to secure all parts rigidly and firmly in place and against relative movement. All of the securing means are preferably when possible disposed between the inner and outer wall sections or within suitable recesses or grooves so that the joints will be flush and smooth. Both the inner and outer walls may be colored, treated or otherwise covered with a decorative coating either before or after assembly.

The feature of my invention is that all or practically all of the fastenings, spacing and strengthening elements are hidden from view and disposed either between the spaced inner and outer walls or within cooperating grooves or recesses provided in adjacent parts so as to obtain a generally smooth flush continuous surface on both the interior and the exterior. The spaces between the walls may receive suitable insulation when desired. The dimensions of each panel are determined by the architect's plans and drawings so as to facilitate assembly of the construction. The several parts are all precision made with small tolerances so that the construction when assembled is rigid and sturdy.

It will now be clear that I have provided a building construction of the character described which will accomplish the object of the invention hereinbefore stated. It is to be understood that various changes may be made in the shape, size and arrangement of parts as well as the material used without departing from the spirit of my invention. The invention is therefore limited only in accordance with the scope of the appended claim.

What is claimed is:

A prefabricated building construction comprising a plurality of pairs of spaced inner and outer wall panels, each panel of each pair being vertically disposed with the vertical edges thereof abutting the vertical edges of the panels of adjacent pairs and defining therewith a continuous wall

5

cavity, vertically spaced recesses in each vertical edge being positioned in adjacent panels in opposed relation and defining a common passage terminating in a socket that extends horizontally in each of the adjacent panels, metal tie members seated in said passages and said sockets and securing said inner and outer panels in spaced relation, each tie member being comprised of a stem of circular cross section having a cross head of circular cross section and the same diameter at each end, each cross head projecting into a portion of the socket in each of the adjacent panels, the stem of each tie member extending between adjacent pairs of said inner and outer wall panels and metal links, each having its opposite ends looped about the tie members on opposite vertical edges of a pair of said inner and outer panels, one link of each pair of panels having its ends looped about the tie members that are horizontally aligned and common to the links of the adjacent pairs of panels abutting each of the opposite vertical edges of said each pair of panels and said links

5

10

15

with the common tie members defining a continuous horizontal reinforcement in said wall cavity.

6

References Cited in the file of this patent

UNITED STATES PATENTS

1,877,898	Kotrbaty -----	Sept. 20, 1932
2,014,778	Pedersen -----	Sept. 17, 1935
2,078,144	Kenan -----	Apr. 20, 1937
2,205,730	Morgan -----	June 25, 1940
2,627,176	Levy -----	Feb. 3, 1953

FOREIGN PATENTS

519,718	France -----	of 1921
571,872	France -----	of 1924
565,882	Great Britain -----	of 1944
122,526	Australia -----	of 1946
610,825	Great Britain -----	of 1948
264,837	Switzerland -----	of 1950
978,816	France -----	of 1950