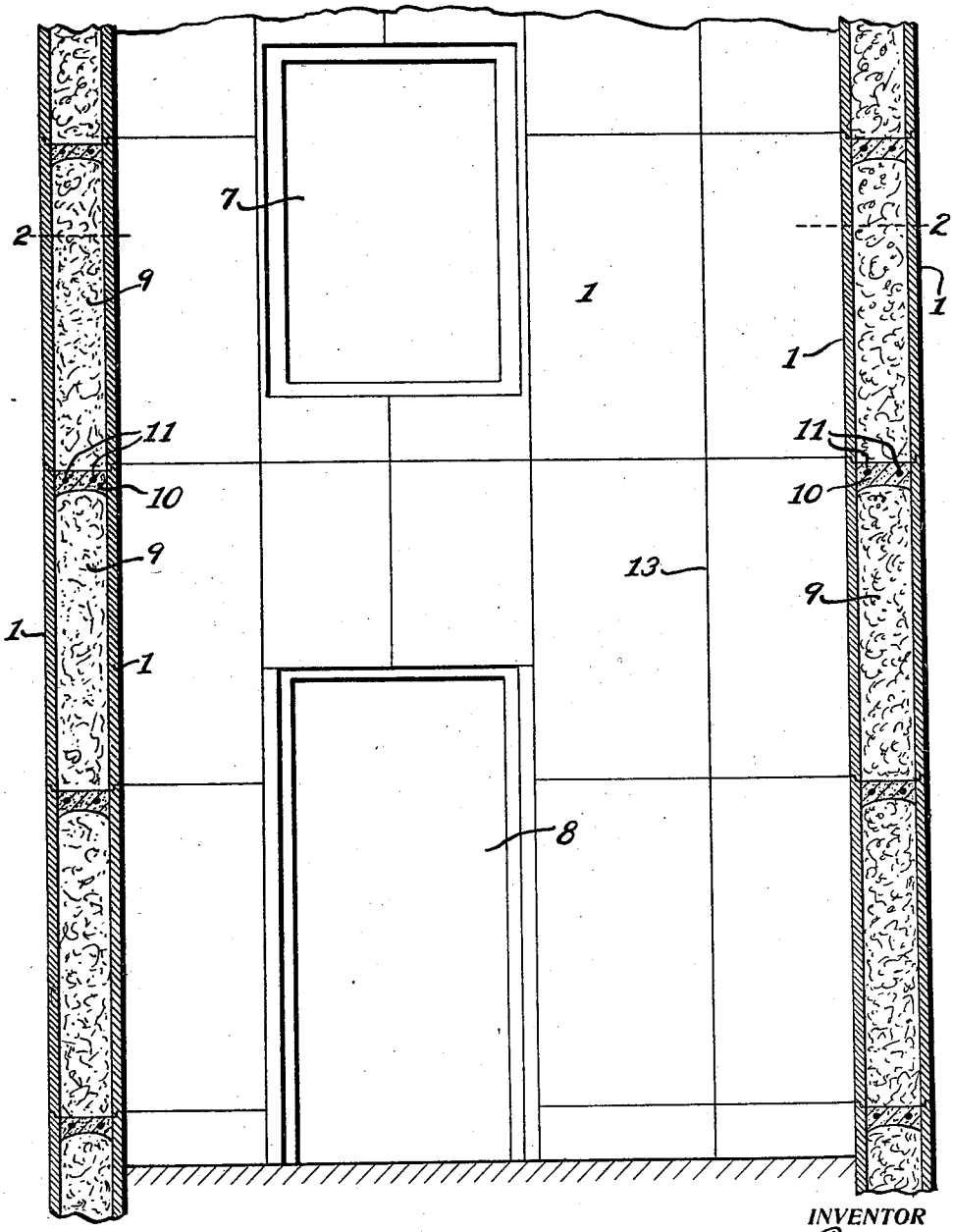
Nov. 6, 1923. 1,473,418

C. BOREL

SYSTEM OF BUILDING CONSTRUCTION

Filed April 20, 1922 3 Sheets-Sheet 1

Fig. 1.



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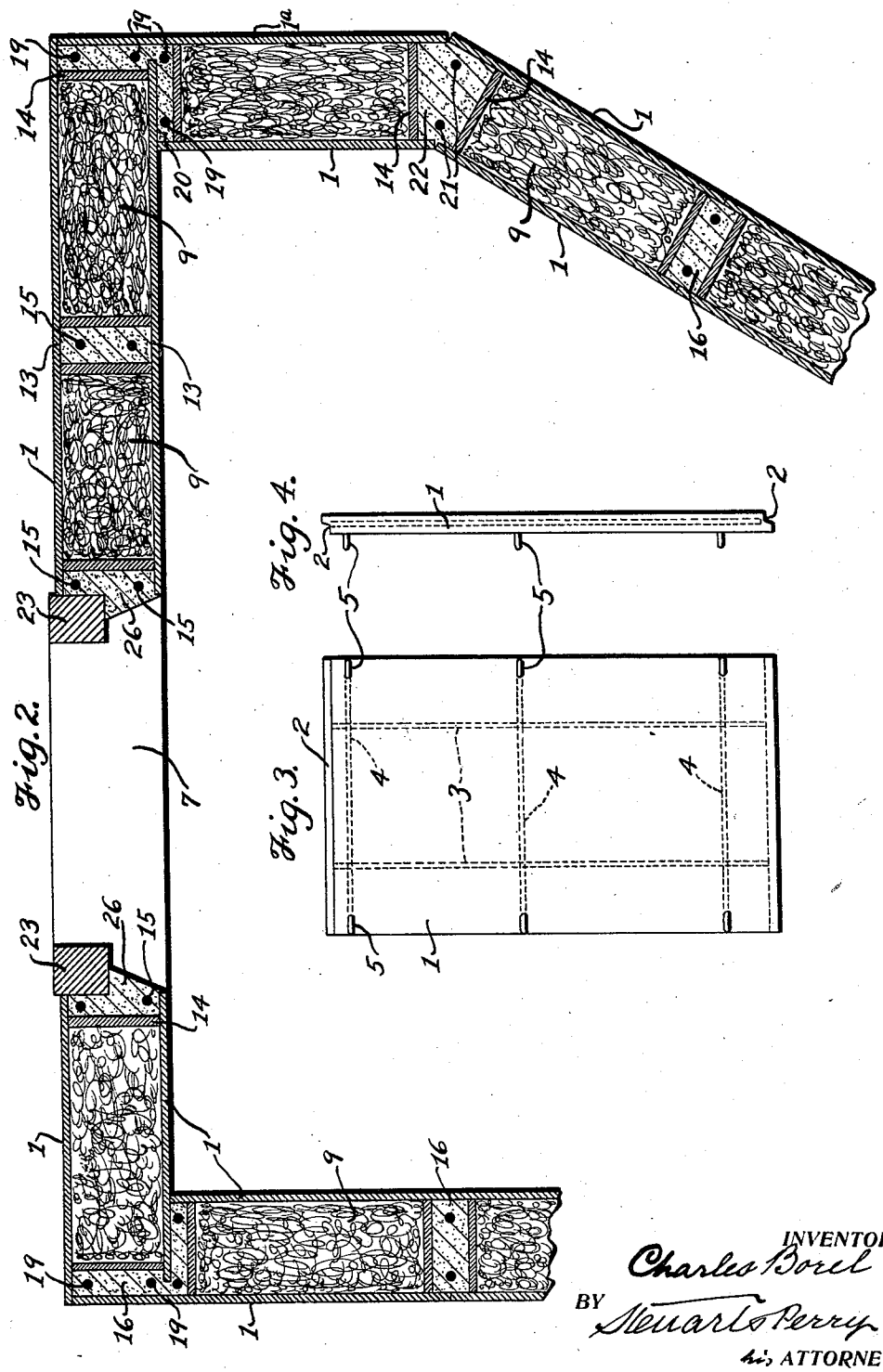


Fig. 2.

Fig. 3.

Fig. 4.

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Fig. 5.

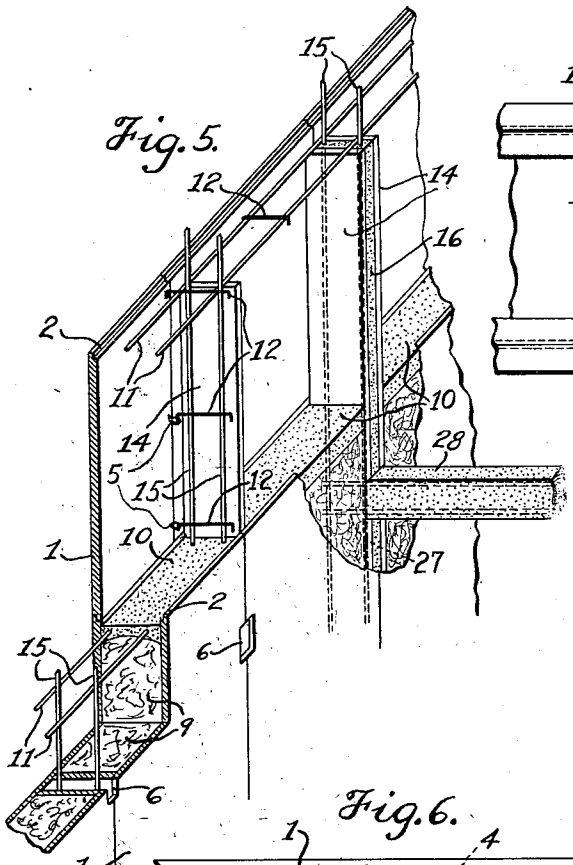


Fig. 7.

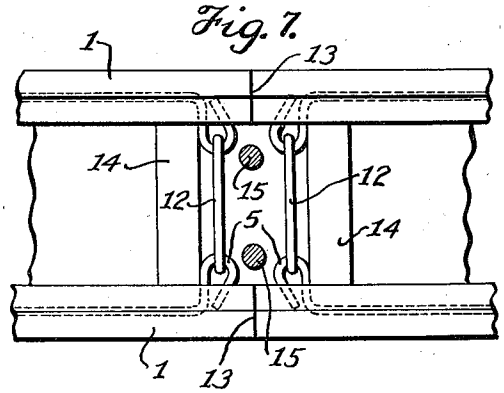


Fig. 8.

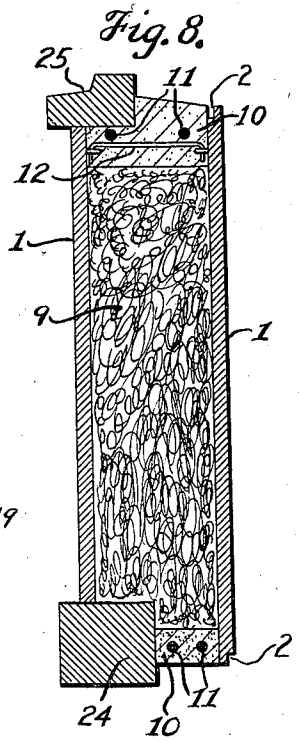
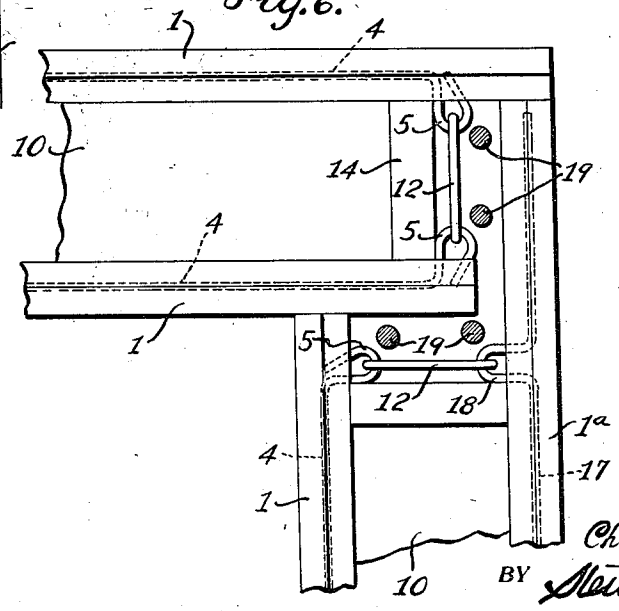


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES BOREL, OF GENEVA, SWITZERLAND, ASSIGNOR TO JOHN E. A. TRUB, OF NEW YORK, N. Y.

SYSTEM OF BUILDING CONSTRUCTION.

Application filed April 20, 1922. Serial No. 555,655.

To all whom it may concern:

Be it known that I, CHARLES BOREL, a citizen of Switzerland, and resident of Geneva, Switzerland, have invented certain new and useful Improvements in a System of Building Construction, of which the following is a specification.

This invention has reference to fabricated structures and method of producing the same, and particularly relates to the construction of buildings, walls, partitions, and similar structures, and also to the elements or media by which the structures are produced and the method is carried out. According to my invention, the wall-plates, slabs, panels, tiles or mats are specialized and their special construction aids in the method or system by which the fabricated structures are produced.

Among the objects of my invention may be noted the following: to provide a method or system of means by which fabricated structures can be produced economically, quickly and with great facility; to provide elemental means of peculiar construction which may be so combined as to produce walls, partitions, stanchions, columns or similar fabricated structures; to provide wall-plates, panels, slabs, tiles or mats of a construction for the inner and outer sides of walls of fabricated structures; to provide panels, slabs, tiles or mats of a construction such that they may be assembled, joined and built up into practically any form of structure, quickly, economically and with facility; and to provide a method or system of means by which insulated walls and similar structures can be produced which will withstand cold, dampness and avoid condensation of moisture on the inside of the structure.

With the above objects in view and others which will be detailed during the course of this description, my invention consists in the parts, features, elements and combinations thereof, together with the system of means and method of constructing buildings, walls, partitions, etc., as hereinafter described and claimed.

In order that my invention may be clearly understood, I have provided drawings wherein:

Figure 1 is a sectional elevation of a portion of a fabric, such as a house or similar structure, showing how the panels, plates, or blocks are placed and how window and door openings are provided for, and also showing the mode of insulating the walls;

Figure 2 is a transverse, sectional view which may be assumed to be taken on the line 2—2 of Figure 1, the same showing also how angles in the wall of vertical structure may be produced;

Figure 3 is a front elevation of a panel, wall-plate or slab showing the mode of reinforcing the same and the means for hooking opposite panels together;

Figure 4 is an edge view of Figure 3;

Figure 5 is a schematic perspective showing the method of and system of means employed in, building up a wall or similar structure;

Figure 6 is an enlarged top plan view showing the mode in which an angle or corner is produced;

Figure 7 is an enlarged top plan view showing the mode of producing a juncture between wall-plate or panels and uprights or stanchions at such points; and

Figure 8 is a vertical sectional view illustrating the mode of setting the sill and top trimming of a window opening.

Referring to Figures 1 and 2 of the drawings, the several wall-plates, panels, slabs, tiles or mats which are employed for inside and outside walls are indicated at 1, and in Figures 3 and 4 these wall-plates or slabs are shown to be of rectangular form, provided at the top and bottom edges with an open groove indicated at 2, the grooves being arranged along the edges of the opposite sides of the plates, in order that they may be made to properly interlock and cooperate to produce over the entire area of the inside and outside of the walls a smooth, unobstructed and unbroken surface. Additionally, the wall-plates or panels are reinforced as by longitudinal wires, rods or bars 3 and a plurality of transverse, properly spaced wires, rods or bars 4, which latter, at their opposite ends, terminate in eyes 5. These eyes may be made of special pieces or replaced by other means that allow the fastening of opposite wall linings together. These wires 3 and 4 are, in the process of making the frame-plates, slabs or panels, buried or embedded in the substance of the plates, which may be concrete, ordinary stone cement or other suitable composition or material. These panels 1 may also be

formed along their edges, one or more with cut-out portions or recesses 6, as shown in Figure 5, and the said recesses will be disposed around the edges of the plates according to the particular use thereof.

Those panels can be replaced by slabs of tile or tile-compositions, or by mats or meshes covered with stucco or plaster and supplied with proper means to fasten them to the frame-work.

In Figures 1 and 2, the numeral 7 indicates a window opening and 8 a door opening, which are made in similar manner, as by providing a framework or molding around the opening,—which may be removed at the proper time,—and filling in with cement, wires or rods and sill and frame members as presently described; and it is to be understood that in fabricating the structure shown in Figures 1, 2 and 5, suitable scaffolding is employed.

As shown in Figures 1 and 2, the inside and outside wall surfaces are made of plates, panels or slabs, such as shown in Figures 3 and 4, or as described above, and between the same an insulating filling or lining 9 is applied, the same being preferably of some light, loose, dry material which will not fill in solidly, but will leave hollow spaces to be occupied by air, the material being such as cinders, dry turf, ashes, or mineral or other fiber. At the top of the wall-plates or panels, a capping or layer of concrete or cement 10 is applied, in which may be buried a plurality of wires, rods or bars 11, for the purpose of giving tenacity, strength and reinforcement to the structure. These concrete or cement cappings run horizontally or sometimes slightly inclined, to the wall or built-up structure between the inside and outside panels, and also between the uprights, posts or stanchions which are constructed as shown in Figures 2, 6 and 7. The said stanchions, posts or uprights are formed, in the ordinary run of the wall, by first hooking together the inside and outside opposed slabs or plates, as shown in Figure 7, by a double hook or link 12, the hooks at the opposite ends of the links tightly engaging the eyes 5 of the reinforcing wires or rods 4 of the opposed panels or plates 1. These links 12, in consequence, occur in pairs at the vertical seams or points of juncture 13 of the panels or plates and at the outside of the pairs of links, between the panels or plates 1, vertical boards or slabs 14 of suitable material are set tightly against the eyes 5. At their lower ends, primarily, the slabs or boards 14 rest upon the cement capping or layer 10, and, at their opposite ends, terminate adjacent the inner edge of the inner groove of the respective plates. These members 5, 12 and 14 all form a permanent part of the upright, post or stanchion at the juncture 13 of the inner and outer wall members, and, in addition thereto, vertical wires, rods, or bars 15 are set in position between the links 12 and then a filling of concrete, cement or other suitable plastic material is filled into the space between the slabs 14, the said concrete or filling being indicated at 16 in Figure 2. Those stanchions, uprights or posts may also be built of stones or bricks up to the inner edge of the inner groove and provided with the necessary means to fasten the outside and inside panels, slabs, etc. At corners or right-angles in the wall structure, such as shown at the opposite ends of the front wall of Figure 2 and in the detail of Figure 6, opposed panels 1 with reinforcing wires or rods 4 having terminal eyes 5 are connected by hooked links 12. On the inside of the wall-panels 1, reinforcing rods 4 and terminal eyes 5, are abutted against the surface of the inner wall panels. Outer wall panels indicated by 1^a and provided with reinforcing wires or rods 17, formed in this instance with U-shaped eyes 18, are opposed to the inner panels 1, and the hooked links 12 are engaged in the eyes 5 and 18 to hold the inner and outer panels together, the outer panels 1^a being longer than their opposites and extending up to and abutting against the inner surface of the other outer wall panels, which, in this instance, are also made a little longer than their opposites. In the angular pocket or space formed by the disposition of the members, as shown in Figure 6, a plurality of reinforcing wires, rods or bars 19 are inserted and then the concrete or cement shown in Figure 2 is filled in, as at 20. This forms a very substantial and strong coupling between cooperating or engaged walls and is readily fabricated. If an angle occurs, such as shown in Figure 2, in the end wall at the right of the figure, or is desirable to be made in the wall, the inner and outer wall-plates 1, the latter a little the wider, are abutted, and the inner and outer plates are linked together by the hooks 12 and eyes 5, vertical rods 21 are set in place, and the entire structure is then solidified by filling in with cement 22.

If a door or window opening is to be made or formed, as shown in Figures 1, 2 and 8, the proper form-plates or molding are set in place and boards or slabs 14 are properly located, as shown in Figure 2, wires 15 are inserted, the window or door frame, as the case may be, is set in place, the side members being indicated at 23, Figure 2, the sill at 24, and the top ornate member 25, Figure 8. At the sides of the frame, Figure 2, the spaces are filled in with cement 26. The sill and upper portion of the frame may be formed as shown in Figure 8. The cement capping 10 with

rods 11 is applied behind the sill 24. The top ornate member is set in place and more or less embedded in or incased by the cement capping or filling 10 with rods 11.

With the foregoing structural members, practically any form of wall or similar fabricated structure with windows, doors or other openings properly incased, can be produced according to my method, which latter, as schematically portrayed in Figure 5, consists of the following steps:

Assuming a scaffolding and proper mold structure to have been prepared and set up, but which, obviously, is omitted from the drawings on account of the limitations thereof, and assuming that a portion of a wall has been constructed composed of inside and outside wall-plates or panels 1, tiles or mats, with filling of insulating material 9 and capping cement 10 and reinforcing wires 11 laid in, the next step will be to place the inside and outside wall-plates or panels 1 into position with the lower grooved edges thereof cooperating with and overlapping the upper grooved edges of the lower tier of plates. Then the hooks 12 are linked into the eyes 5 of the opposed plates; slabs 14 are slid into place at opposite sides of the pairs of links; wires, rods or bars 15 are set in place and then the filling fiber or material 9 is filled into the space between slabs 14 and wall-plates. Next the cement is filled into the space between the slabs 14 at the edges of the abutted panels 1, and, when the top of the slabs is reached, the cement is spread over and upon the insulating filling material 9, and the longitudinal wires 11 are laid in, linked together with a plurality of hooks 12, and more cement filled in until the horizontal wires and hooks 12 holding the same are entirely covered and embedded, as shown, for example, in Figure 1. If the stanchions, uprights or posts are constructed of stones or bricks, the construction method is slightly changed. First the posts are built up to the elevation of the under side of the upper tier, then the panels, plates, tiles or mats are fixed with proper means to the posts. The insulating filling material is filled and the tier or sill constructed as described above. The slabs 14 are omitted. This process is continued throughout the entire wall structure and, when the point is reached where a flooring is to be laid, girders or floor beams may be constructed and interlocked with the wall structure as follows:

The proper scaffolding and form-plates having been set in position, a mold-box is made to extend between opposite walls, and plates 1, provided with the necessary cut-out portions or recesses 6 having been built into the wall structure, cement is filled into the girder form-box, reinforcing rods, bars or wires 27 laid and embedded therein, and extended into the space through the apertures 6 between the inner and outer walls. When the next tier of wall structure is set up, the filling for the uprights or stanchions between slabs or boards 14 is allowed to run down into, and cooperate with, the filling in the girder mold-boxes, thus forming a bond or union between the uprights and the horizontals and embedding the ends of the wires, bars or rods 27 extending beyond the girder 28, in the upright or stanchion portions 16 of the cement filling. These girders between walls may be arranged at various points 6 previously prepared for them, and the uprights or stanchion portion 16, so that the one will reinforce, support and render rigid the other. If wooden or steel girders are applied, the corresponding concrete tier forms the support and is built of the necessary strength.

From the foregoing it will be seen that a very rigid and substantial fabric may be constructed, which may be either inside or outside walls, housings of various kinds, and provided with all the necessary angles, dependent upon the site or the surroundings. Heat and cold and water-proof walls are thus constructed which are durable, strong, quickly constructed with considerable facility, and the independent elements of which are cheap and economical to produce. A skilled workman is not required, since one of ordinary intelligence can be quickly instructed how to manipulate and use the various elements, thus doing away with high grade labor, as well as the inconvenience and difficulties often experienced in obtaining the latter.

The panels or wall-plates are also quickly fabricated and may be made of any material desired, ornamental or otherwise, for either interior or exterior decorations, and they may be made of such materials as will readily take paints, stains, and other coloring matter, and which are susceptible of various decorations.

I have in the foregoing referred to the reinforcement media 3 and 4 for the wall-plates or panels as wires, rods or bars; but, by this I do not desire to impose a limitation as to material, since the plates or panels can be reinforced by reeds or other similar strips embedded as described, and the eyes 5 formed in the ends of short wires incorporated suitably in the plates. As stated above the panels or plates may be replaced by a tile-slab, a slab composed of tiles, by meshes or mats covered with stucco or plaster and fixed to the framework.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The building construction method described herein consisting in assembling a plurality of parallel wall-plates or panels

in end-on-end relation; temporarily securing opposed plates together; setting in place a plurality of pairs of stanchion panels in spaced apart relation set on end between the wall-plates; filling the chamber between the wall-plates and stanchion panels with insulating material; and filling in between the stanchion panels and on top of the insulating material with reinforced cement.

2. The building construction method described herein consisting in assembling a plurality of similar wall-panels arranged in parallel alignment and in end-on-end relation; temporarily fastening opposed wall panels together; setting in place stanchion panels so as to embrace the temporary fastening means; filling in the chambers between panels and stanchion plates with insulating material; and filling in between the stanchion plates and capping the insulating material with cement whereby to embed the temporary fastening means.

3. The building construction method described herein consisting in assembling a plurality of wall panels in parallel alignment and end-on-end relation; temporarily fastening the panels together; inserting stanchion plates between the panels at the points of connection between the latter; filling the chamber formed by the stanchions and panels with insulating material; filling in the chamber between the stanchion plates with reinforced cement; and simultaneously applying to the insulating material a reinforced capping layer of cement.

4. A fabricated wall structure composed of rectangular parallel wall panels with a plurality of stanchion plates interposed between said wall panels at predetermined intervals, forming wide cavities between opposed faces of the stanchions and narrow cavities between the other faces of the cavities, an insulating filler contained between the larger of said cavities formed by the panels and stanchions, said filler rising to a point adjacent the top thereof, reinforced concrete contained between the stanchion plates forming the lesser of said cavities and also filling the space between the filler and the top of the plates and stanchions, that is to say, to the level of the plane at the top of the plates and stanchions, said insulating filling and the concrete filling alternating longitudinally of the wall, said reinforced concrete overlying a plurality of said sections of the wall substantially as and for the purposes specified.

5. A fabricated structure composed of rectangular panel plates having interlocking grooves arranged in end-on-end relation and in parallelism, in combination with stanchion plates, insulating filling and reinforced cement, the latter extending between stanchion plates and capping the insulating material.

6. A fabricated structure comprising walls at a right-angle to each other and composed of parallel, spaced apart panels, said panels being alternately long and short and arranged in cooperative relation such as to produce an angular chamber; stanchion plates interposed between the panels and arranged to close the opposite ends of the angular chamber; and reinforced cement filled into the angular chamber whereby to produce an angle in a fabricated structure.

7. A fabricated structure wherein a double insulated and cement filled wall surrounds an opening, the opening having a frame set therein; the surrounding structure comprising wall panels spaced apart; stanchion panels interposed between the wall panels; and insulating material on one side of the stanchion panels and reinforced cement on the other side and in engagement with the frame.

Signed by me at Geneva, Switzerland this 25th day of March 1922.

CHARLES BOREL.

Witnesses:

ROBT. B. MACATEE,

WM. E. DE COURCY.