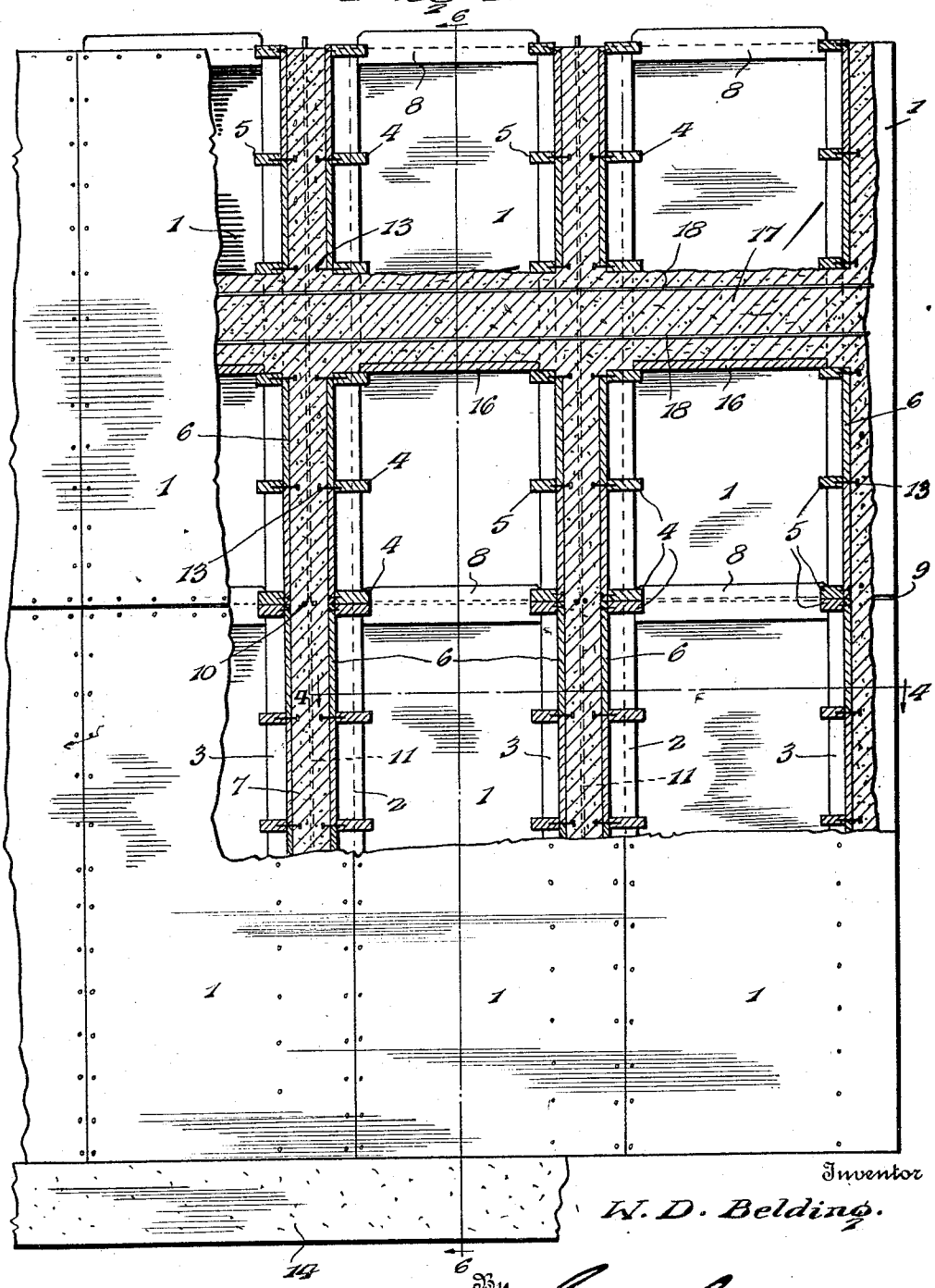
Dec. 30, 1930. W. D. BELDING 1,786,691

BUILDING CONSTRUCTION

Filed Nov. 27, 1929 3 Sheets-Sheet 1

Fig. 1.



Inventor

W. D. Belding.

By Lacey & Lacey, Attorneys

Dec. 30, 1930. W. D. BELDING 1,786,691

BUILDING CONSTRUCTION

Filed Nov. 27, 1929 3 Sheets-Sheet 2

Fig. 2.

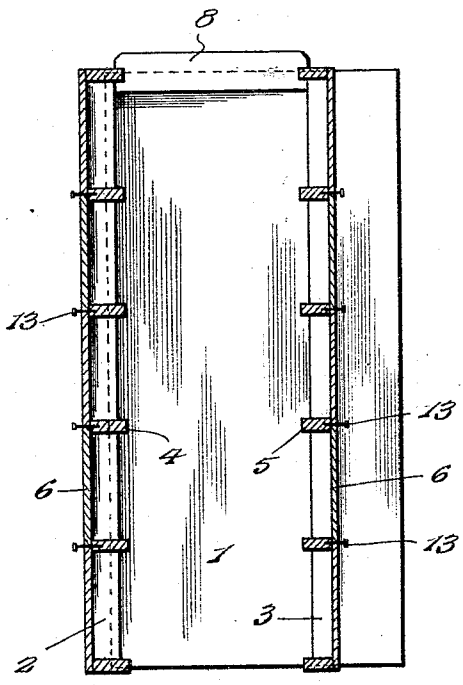


Fig. 3.

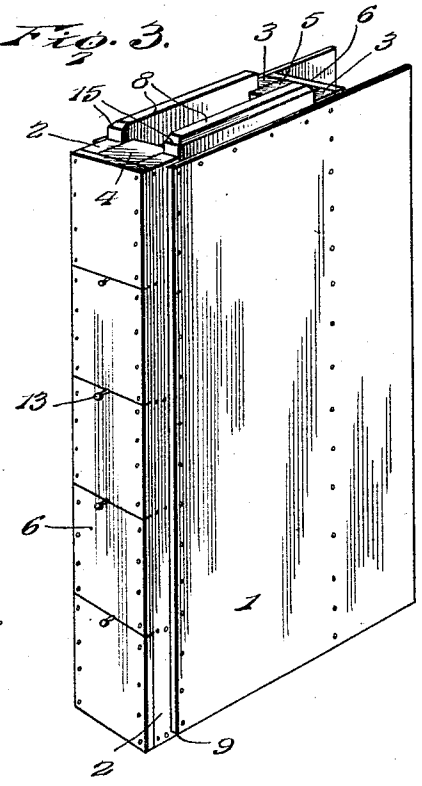


Fig. 4.

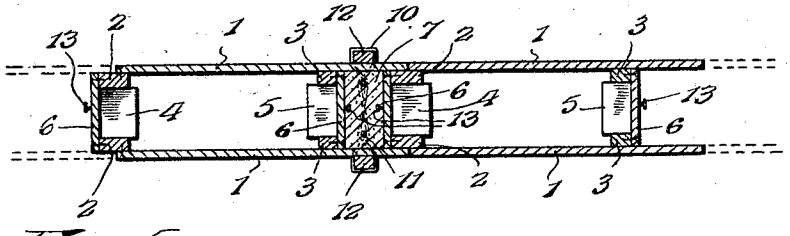
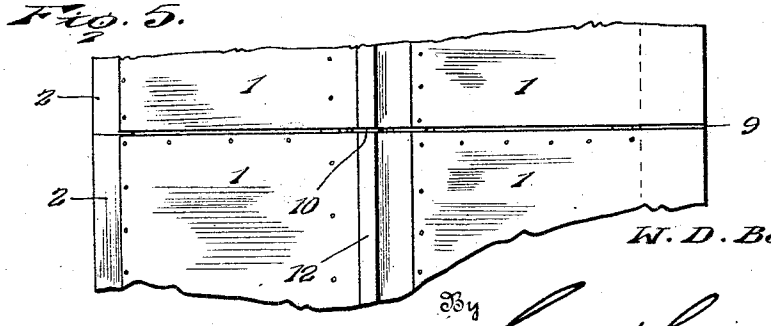


Fig. 5.



Inventor

W. D. Belding.

By Lacey & Lacey,

Attorneys

Dec. 30, 1930. W. D. BELDING 1,786,691

BUILDING CONSTRUCTION

Filed Nov. 27, 1929 3 Sheets-Sheet 3

Fig. 7.

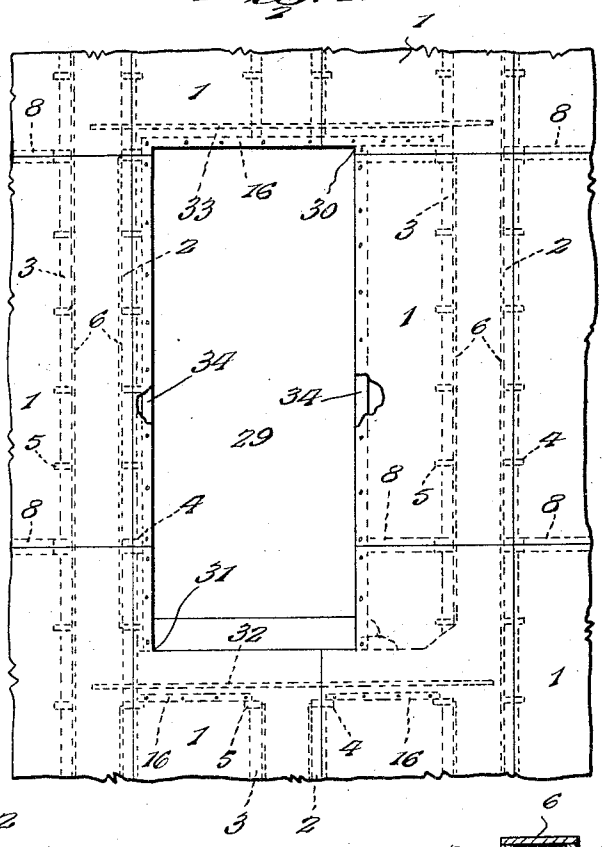


Fig. 6.

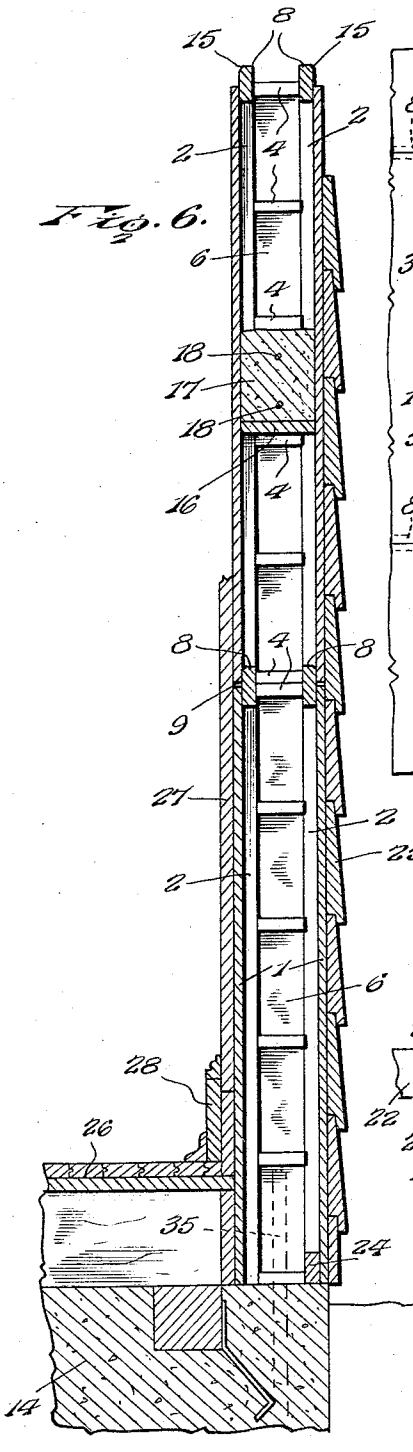


Fig. 9.

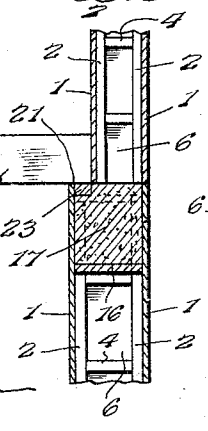
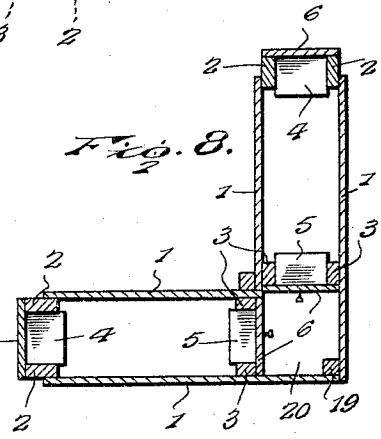


Fig. 8.



Inventor

W. D. Belding.

By Lacey & Lacey,

Attorneys

Patented Dec. 30, 1930

1,786,691

UNITED STATES PATENT OFFICE

WILLIAM D. BELDING, OF DENVER, COLORADO

BUILDING CONSTRUCTION

Application filed November 27, 1929. Serial No. 410,237.

The object of this invention is to provide means whereby a wall may be erected quickly and when finished will possess the desired strength and durability while being free of excessive weight. A further object of the invention is to provide a wall consisting of building elements or units of a hollow formation and which are light and easily handled and intimately united with and held together by a concrete core frame which will lend itself to any desired scheme for exterior and interior finish. Incidentally the invention has for its object the reduction of the cost of erecting a building as compared to the usual cost, and to provide a building unit which may be easily arranged to accommodate door or window openings or other variations. The invention is illustrated in the accompanying drawings and will be hereinafter first fully described and then more particularly defined in the appended claims.

In the drawings:

Figure 1 is a view, partly in side elevation and partly in vertical section, of a portion of a wall embodying the invention,

Fig. 2 is a vertical longitudinal section through one of the units or building elements,

Fig. 3 is a perspective view of the unit,

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1,

Fig. 5 is a detail elevation of the structure shown in Fig. 4,

Fig. 6 is a vertical transverse section on the line 6—6 of Fig. 1,

Fig. 7 is a detail elevation illustrating a window opening,

Fig. 8 is a horizontal section illustrating a corner construction and the method of arranging the units to conform to any given building plan, and

Fig. 9 is a detail vertical section illustrating a variation in the wall structure.

In carrying out the invention, I provide a building element or unit consisting of side plates 1 of fiber board or like material which is durable and light and will form insulation against sound and heat or cold. These side plates are of like dimensions and are disposed in parallel planes. They are arranged at opposite sides of end frames and are rigidly secured to said frames so that a hollow rectangular structure is produced. The end frames consist of nailing strips 2 and 3, the strips 2 being somewhat larger than the strips 3 in their longitudinal dimensions and being disposed each at one side edge of one of the side plates or panels 1 and projecting beyond said edges, as clearly shown in Fig. 4. The nailing strips 3 are disposed against the inner surfaces of the respective panels or side plates but are spaced inwardly from the side edges, also as clearly shown in Fig. 4. These nailing strips are each reinforced by blocks 4 and 5 which are arranged between the corresponding strips at intervals in the height of the same and are firmly secured thereto by nailing, as will be understood. The end frames are completed by end plates 6 which are nailed or otherwise secured against the respective nailing strips and reinforcing blocks, as clearly shown in Figs. 2, 3 and 4. It will thus be seen that the side plates or panels project beyond the end frames at one edge of the unit while at the opposite edge of the unit the side plates or panels terminate short of the edge of the unit and when the units are assembled in alined relation the projecting portions of the side plates of one unit may overlap the presented end portion of an adjacent unit, as clearly shown in Fig. 4. Obviously, the horizontal spacing of the units may be varied by reducing the amount of overlap and increasing the width of the columns. If it should be necessary, owing to some peculiarity of the plan of the structure being erected, that the projecting end frames of adjoining units be presented to each other, sheets of fiber board may be inserted between the edge of the panel on one unit and the presented edge of the adjacent panel on the other unit. This relative reversal of alined units is frequently necessary to attain the proper construction of corners. In either form it will be seen at once there is provided between the adjacent panels a hollow space which is subsequently filled with concrete, as indicated at 7 in Fig. 4, dowels, indicated at 35, being set in the foundation to be embedded by the concrete as it is poured for

reinforcing the bond. At the top of each unit longitudinally disposed guiding members or cleats 8 are disposed at the inner sides of the corresponding side plates and project above the same, the upper edges of the side plates being nailed to these cleats, as will be understood upon reference to Fig. 3, and it will be understood, of course, that the side plates are nailed to the nailing strips 2 and 3 in order that all the elements of the unit may be firmly secured. It is also to be noted that the upper and lower edges of the side plates terminate short of the upper and lower extremities of the corresponding nailing strips so that there will be a very slight space, as indicated at 9, between one unit and a superimposed unit when the units are assembled in courses. This slight space or slot will accommodate tie wires, indicated at 10, which are passed through the slot and serve to retain vertical reinforcements, indicated at 11, in place while the concrete core is being poured. The outer portions of these tie wires are looped around temporary braces 12 which are disposed against the outer surfaces of the side plates of the units, as clearly shown in Figs. 4 and 5. In order to provide anchors whereby the units will be firmly bonded to the concrete core, headed nails or the like are driven into the reinforcing blocks 4 and 5, as shown at 13, and are left projecting beyond the end plates 6 so that when the concrete is poured the nails will be embedded and anchored therein so that the units will be effectually bonded in place.

In erecting a wall by the use of my units, the units are laid in courses upon a foundation 14 which may be of any well known or approved construction. The units are disposed end to end upon the foundation in a line defined by the architectural plans for the building and as each course is laid concrete is poured between the ends of adjoining units so that the units will be firmly bonded together. Each upper course is laid in a like manner and the units are arranged vertically one upon another without any break-joint or staggering arrangements inasmuch as the concrete bonding filler will firmly maintain the units in their set position and will render unnecessary break-joints and similar arrangements. In imposing one unit upon a lower unit, the upper unit will rest directly on the lower by having its lowest reinforcing blocks 4 and 5 disposed directly upon the top reinforcing blocks of the lower unit and inasmuch as these blocks project slightly beyond the top and bottom edges of the respective side plates, the slot or opening 9 will be automatically produced. The upper edges of the cleats 8 are beveled, as indicated at 15, so that a superimposed unit may be easily guided into its proper place upon a lower unit. While the units may be, of course, made in any desired dimensions, it is intended that ordinarily they be quite large so that the erection of the wall will proceed rapidly, and beams or girders may be formed along the top of a complete course or at any point in the height of the unit. When a girder or beam is to be formed, the end plates 6 at the proper height are removed, as shown in Fig. 1, and bridging boards 16 are then inserted into the units and placed upon the reinforcing blocks 4 and 5 which may be at the bottoms of the openings formed by the removal of the end plates. These bridging boards may, in some instances, span the space between adjacent units and they are, of course, secured in place by nails driven through the side plates and through the nailing strips into their edges and after the boards have been fastened the concrete, as shown at 17, is poured into the forms so as to form the beam or girder and unite with the previously formed concrete columns to effectually bond therewith. Metallic reinforcements, indicated at 18, are, of course, generally provided and disposed within the beams as the concrete is poured to produce the same.

When a corner is to be formed, the units at the corner are disposed at the proper angle to each other, as shown in Fig. 8, which shows a square corner. The extended end portions of the inner panels or side plates 1 are then cut away so that the end plates 6 of the respective units will meet to form an angle, and the extreme free edges of the outer side plates will also abut to form a corresponding angle, either side plate being reduced sufficiently to abut the meeting side plate or, if preferred, the edges of both side plates being beveled so as to meet in the angle. Disposed within the angle formed by the side plates is erected a nailing strip or post 19 to which the end edges of the side plates are nailed and the space thus defined, as indicated at 20, is filled with concrete so that a corner post or column will be formed.

The wall may be of uniform thickness through its entire height but an upper story may have a wall of less thickness than a lower story and this arrangement is shown in Fig. 9 in which the wall in the upper story is of less thickness than the lower wall and rests upon one of the concrete beams 17, the outer faces of the units being flush while a shoulder 21 is formed by the top of the beam and the upper edges of the lower panel to support the floor joist 22. A plate 23 may be set in the shoulder to furnish an element to which the ends of the joists and the bracing and bridging disposed between the ends of the joists may be secured.

It will be understood, of course, that units may be provided in heights less than the height adopted as standard in order to finish a wall or story, and that the upper edges of the side plates may project above the end reinforcing blocks but detailed descrip-

tion and illustration of such minor variations are deemed unnecessary as they will readily suggest themselves to the skilled architect and builder.

Along the bottom of the lowermost course a cleat 24 is provided within the units at the inner surface of the outer side plates to reinforce the same and aid in furnishing a rigid background for the application of the exterior finish. The exterior finish may be of any desired kind, and in Fig. 6 I have indicated weather boarding 25 which is secured directly upon the outer surface of the several units through all the courses. Inasmuch as the side plates of the units are generally constructed of good quality fiber board, they will present a good fastening surface against which may be secured metal lathing for a stucco finish or ties to bond with a brick or stone veneer set in mortar. The interior finish may be of any usual or approved form, and in Fig. 6 I have shown a floor 26, plaster wall 27 and base boards 28 to illustrate the facility with which the building units lend themselves to any details.

The units may be easily cut to accommodate a door or window opening, and in Fig. 7 a window opening 29 is shown. It will be noted that to locate the upper end of the window opening angular recesses 30 have been cut in the lower ends of side plates in an upper course while the units of an intermediate course have been cut away at their respective ends to form the sides of the window opening, and substantial angular recesses 31 have been formed in the upper ends of side plates in a lower course. To provide a complete adequate support for the window frame, a concrete sill is poured, as indicated at 32, and immediately above the opening a concrete beam, indicated at 33, is poured to form a lintel, bridging boards, of course, being inserted. The spaces between the side plates or panels, which are left open by cutting the units to form the sides of the window opening, receive filler strips 34 which not only close the open spaces but reinforce the edges of the panels which are nailed thereto. The window or door frame is secured to the filler strips, as will be understood. In the particular arrangement shown, it will be noted that the window opening is not on the central vertical line of the panels but extends unequal distances into adjoining panels. At one side, there is just enough of the panels left to hold the end plates and form a side mold for the column while at the other side substantial portions of the panels are left to cover the space between the window jamb and the adjacent column. These variations in details, of course, will be determined by the conditions in the particular building being erected.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided an exceedingly simple and inexpensive building unit which may be arranged in a wall of any desired height and of any desired form. A wall constructed in accordance with my invention furnishes a unitary concrete core and a shell held by the core and interlocked therewith. The units may be alined both vertically and horizontally inasmuch as no dependence is placed upon their strength for wall stability. The arrangement of units set in the first or bottom course is maintained all around the building in the superimposed courses so that the vertical spaces between adjacent units are continuous from top to bottom of the wall except where door or window openings intercept and, consequently, the concrete core may be very easily pored. While the units are light in construction, they are so fabricated as to resist the thrust from fresh poured concrete and they serve initially as a form shell for molding the permanent concrete frame and then constitute insulating material and a base for surface finishes.

Having thus described the invention, I claim:

1. A building unit consisting of side plates, end frames disposed between the side plates and secured thereto, and end plates closing the outer sides of the end frames, one end frame projecting beyond the adjacent edges of the side plates and the other end frame being disposed inwardly from the adjacent edges of the side plates.

2. A building unit consisting of side plates, end frames disposed between and secured to the side plates, one end frame projecting beyond the side plates and the other end frame being located inwardly from the side edges of the side plates, said end frames comprising nailing strips disposed against the inner surfaces of the side plates, reinforcing blocks disposed between and secured to the nailing strips at intervals in the height thereof, and end plates secured against the outer sides of the nailing strips.

3. A building unit comprising side plates, end frames disposed between and secured to the side plates, one end frame projecting beyond the edges of the side plates and the other end frame being located inwardly therefrom, and cleats extending longitudinally of the upper edges of the side plates and secured to the inner surfaces of the same.

4. A building unit comprising side plates, end frames disposed between and secured to the side plates, one end frame projecting beyond the side plates and the other end frame being located inwardly from the adjacent side edges of the side plates, the side plates terminating at their tops and bottoms short of the tops and bottoms of the end frames.

5. The combination of building units ar-

ranged in courses alined both vertically and horizontally, the units having overlapping side portions whereby to form closed spaces extending the full height of all the superposed courses and all the units including removable end plates, bridging boards disposed within the units in one horizontal course and supported by the end portions thereof, said bridging boards being alined horizontally through the entire course, and a concrete core formed in the vertical space and filling the same and extending through the units and resting on said bridging boards to form a beam extending horizontally through alined units.

6. The combination of building units arranged in courses alined horizontally and vertically, the units being hollow and having end frames and overlapping side portions whereby vertical shells will be formed between the adjacent ends of meeting alined units, bridging boards disposed within some of the units and carried by the end frames thereof in horizontal alinement, anchoring projections on the end frames, and a concrete core formed in and filling said vertical shells and resting on the bridging boards.

7. A building comprising a foundation, dowels embedded in and rising from the foundation, building units laid in courses and forming a hollow shell resting on the foundation, and a cementitious core within the shell embedding the dowels and extending around the edges of the units and bonding adjacent units.

In testimony whereof I affix my signature.

WILLIAM D. BELDING. [L. S.]