H. M. PRIEST, R. H. FORD, A. L. GREENABAUM AND C. P. RICHARDSON.

CONCRETE BUILDING CONSTRUCTION.

APPLICATION FILED JUNE 17, 1918.

1,345,880.

Patented July 6, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

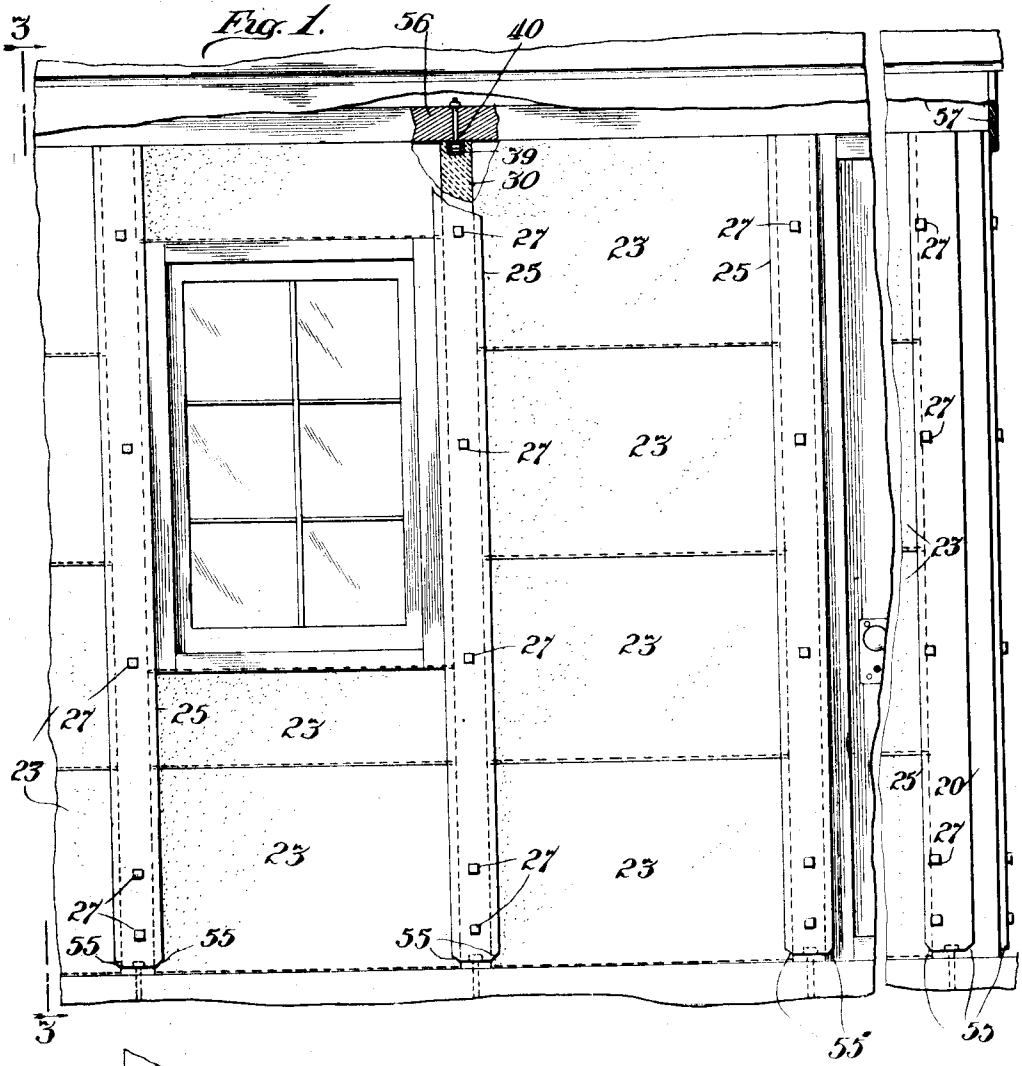
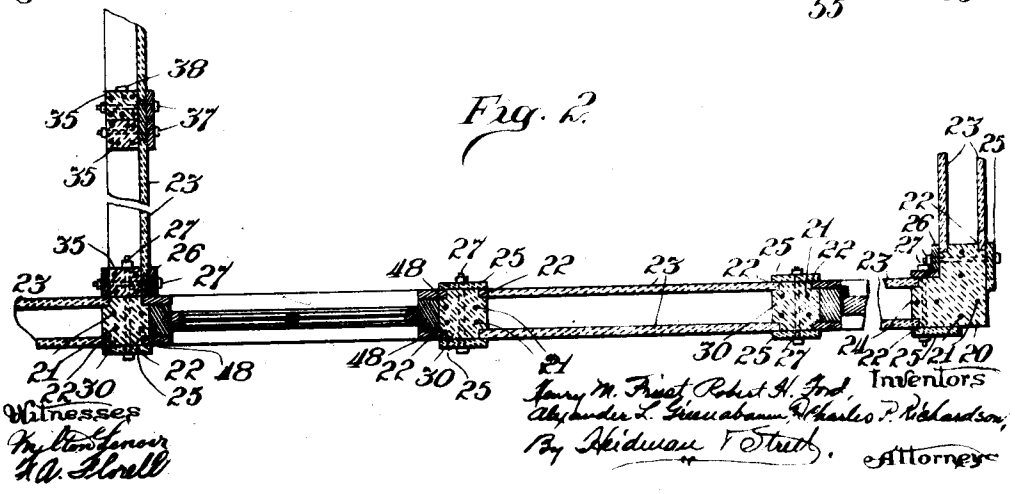


Fig. 2.



Witnesses
H. A. Howell

Inventors
Henry M. Priest, Robert H. Ford,
Alexander L. Greenabaum, Charles P. Richardson,
By Skidmore & Street.
Attorneys

H. M. PRIEST, R. H. FORD, A. L. GREENABAUM AND C. F. RICHARDSON.

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3 SHEETS—SHEET 2.

Fig. 3.

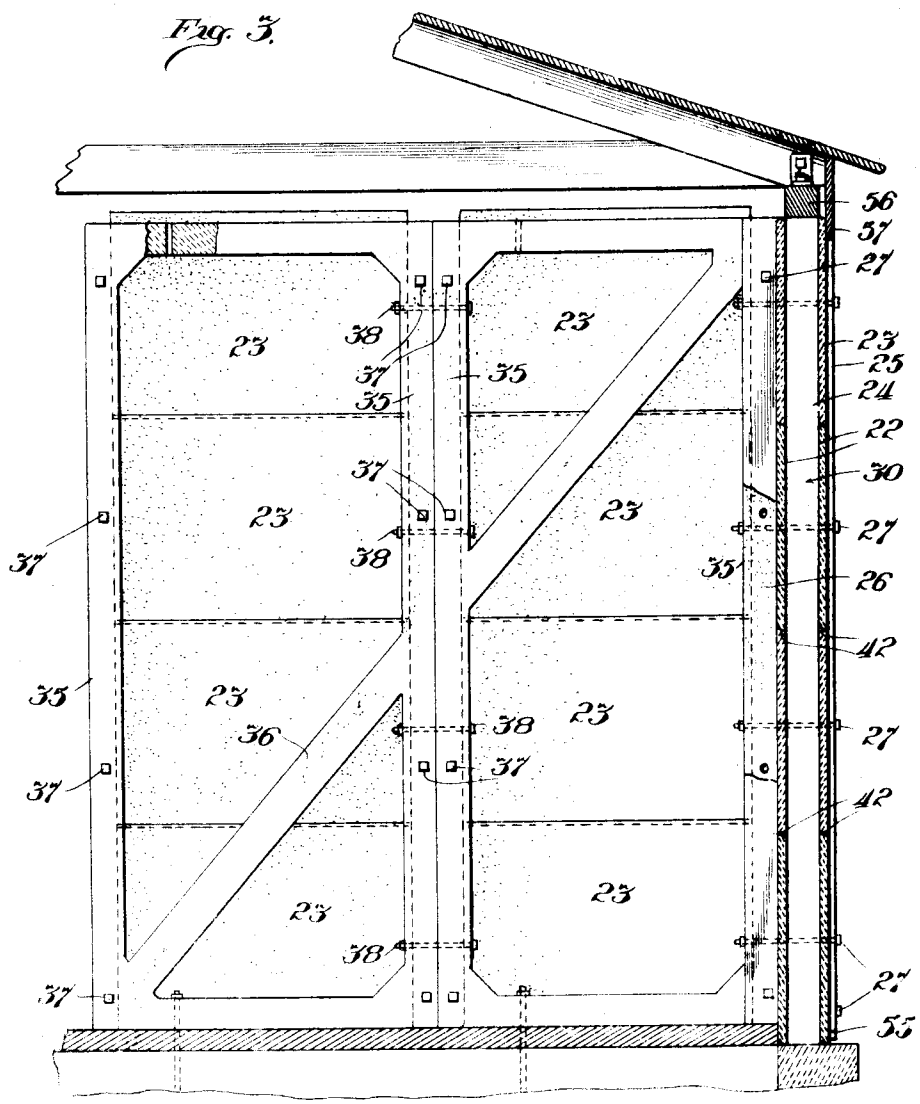
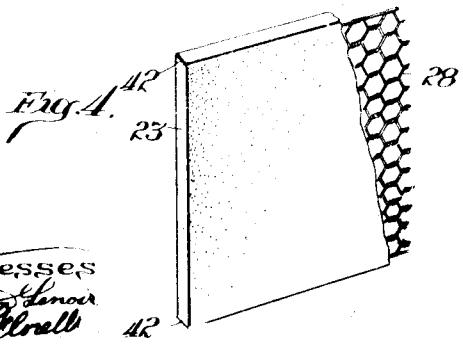


Fig. 4.



Witnesses
Milton Lenoir
F. A. Howell

Inventors
Henry M. Priest,
Robert H. Ford,
Alexander L. Greenbaum,
Charles F. Richardson,
by Reidman Strode
Attorneys.

H. M. PRIEST, R. H. FORD, A. L. GREENABAUM AND C. P. RICHARDSON.

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3 SHEETS—SHEET 3.

Fig. 6.

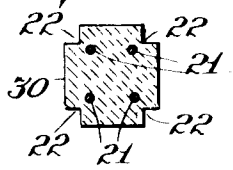


Fig. 10.



Fig. 8.

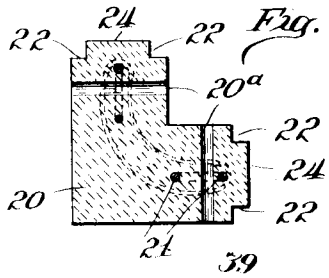


Fig. 5.

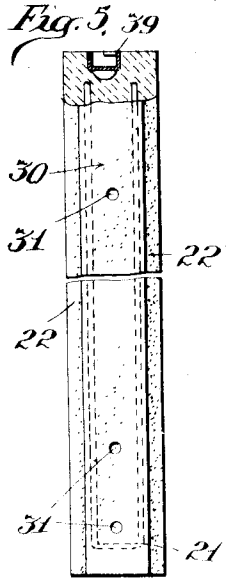
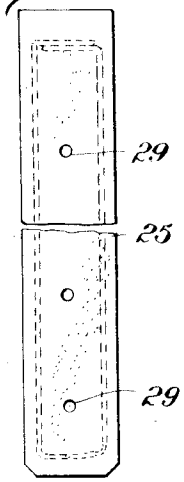


Fig. 9.



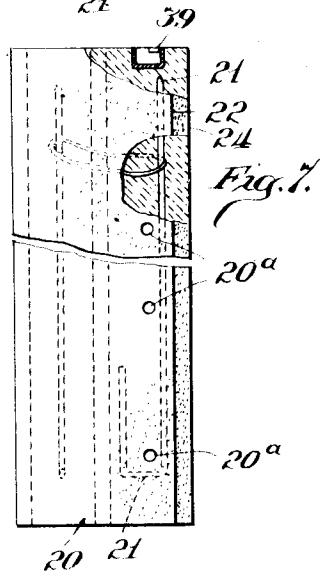


Fig. 7.

Fig. 12.

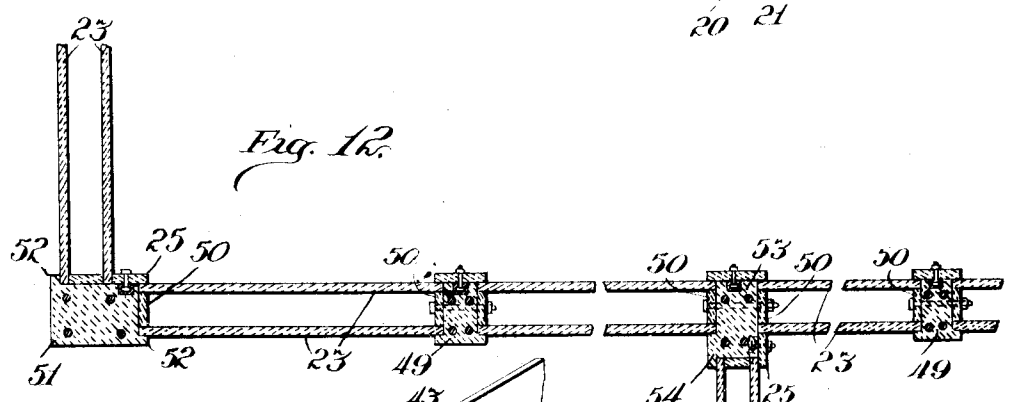
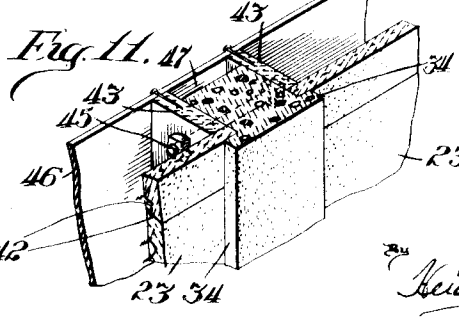


Fig. 11.



Witnesses
Milton Lenoir
H. A. Hazell

Inventors
Henry M. Priest,
Robert H. Ford,
Alexander L. Greenabaum,
Charles P. Richardson,
By Heidman & Frost Attorneys

UNITED STATES PATENT OFFICE.

HENRY M. PRIEST, ROBERT H. FORD, ALEXANDER L. GREENABAUM, AND CHARLES P. RICHARDSON, OF CHICAGO, ILLINOIS.

CONCRETE BUILDING CONSTRUCTION.

1,345,880. Specification of Letters Patent. Patented July 6, 1920.

Application filed June 17, 1918. Serial No. 240.363.

To all whom it may concern:

Be it known that we, HENRY M. PRIEST, ROBERT H. FORD, ALEXANDER L. GREENABAUM, and CHARLES P. RICHARDSON, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete Building Constructions, of which the following is a description, reference being had to the accompanying drawings, which form a part of our specification.

Our invention relates to a building construction composed of reinforced, pre-cast units of concrete, of portable nature and so formed or constructed that they may readily be set up into coöperative relation, one with the other, to form the walls and partitions of a building; the respective elements or units being so formed as to permit the various elements to be firmly and rigidly secured and locked together to provide a weather-proof construction and at the same time permit the rapid erection of a building adapted to be quickly "knocked down" and the units disassociated and transported in "knock-down" condition from place to place.

The invention and its advantages will be more readily comprehended from the following detailed description of the accompanying drawings, wherein:—

Figure 1 is a side elevation of a portion of a building, with parts broken away and shown in section.

Fig. 2 is a sectional plan of the wall construction as disclosed in Fig. 1.

Fig. 3 is a sectional elevation, taken on the line 3—3 of Fig. 1, looking in the direction of the arrows, and disclosing an intermediate wall or partition.

Fig. 4 is a detail view in perspective of a wall-forming slab or panel, with portions broken away to disclose a style of reinforcing element that may be employed.

Fig. 5 is a side elevation of one of the posts, with a portion broken away at its top in order to disclose a bolt-receiving socket or slot of predetermined construction.

Fig. 6 is a cross-sectional view of the post disclosed in Fig. 5.

Fig. 7 is a side elevation of an outside corner post, with portions broken away to disclose internal construction.

Fig. 8 is a cross sectional view of same.

Fig. 9 is a side elevation of a batten or finishing panel.

Fig. 10 is a cross sectional view of same.

Fig. 11 is a detail view in perspective of a modified form of an intermediate post, spacing members and wall construction.

Fig. 12 is a sectional plan view of wall construction disclosing modified forms of posts.

Our invention is more especially adapted to single story buildings or cottages.

In the particular exemplification of the invention as disclosed in Figs. 1 and 2, a portion of a building is shown formed with our improved reinforced concrete units, which comprise the concrete corner post 20, see Fig. 2, of length commensurate with the height of building intended to be constructed. The post 20 is previously cast or molded with suitable reinforcing elements or rods extending lengthwise thereof, as shown at 21, and the post given the angular formation in cross-section as disclosed so as to provide portions disposed parallel with the side walls secured thereto. The corner post 20 is kerfed or rabbeted at the corners or sides 22 to a depth commensurate with the thickness of the concrete wall-forming slabs or panels 23, while the intermediate portions or extensions 24, on both legs or sides of the post 20, constitute spacing means whereby the outer and inner wall-forming members or panels 23 are maintained in spaced relation and an air space or chamber provided between the outer and inner walls of the building, as shown in Fig. 2.

The wall-forming members or panels 23 are held in the kerfs or notches of the corner posts by means of suitable concrete finishing strips or battens 25 and 26, which are, in turn, held in place by suitable bolts, indicated at 27. The bolts 27 extend through holes which are previously formed or molded in the sides of the posts 20 and the battens. The panels 23, as previously stated, are also of reinforced concrete construction, as shown in detail in Fig. 4, being reinforced with a suitable wire mesh, indicated at 28 in Fig. 4, or with any other reinforcing means. The panels, like the corner-posts, are all previously cast or formed of uniform dimensions, in length, width and thickness, as shown in Figs. 1 and 2; and their edges preferably beveled or so formed

as to provide suitable water shedding joints. The finishing strips or battens 25, like the other elements described, also consist of previously cast concrete, reinforced with a suitable wire mesh, as more clearly shown in Figs. 9 and 10, or other suitable reinforcing element. The battens are cast or formed with holes, as indicated at 29 in Fig. 9, at points spaced apart and adapted to register with the previously formed holes 20^a in the posts in order to receive the securing bolts 27.

The posts or uprights, adapted to be placed at suitable intervals apart at points intermediate of the corner posts, are shown at 30, see Fig. 2. These intermediate posts are rectangular in cross-section and of previously cast concrete with suitable reinforcing elements, indicated at 21, the posts 30 being formed with the four corners kerfed or recessed, as shown at 22, similar to the kerfs or recesses of the corner posts 20. The intermediate posts 30, like the corner posts 20, are also previously formed or molded with bolt-receiving holes 31, see Fig. 5, spaced apart and adapted to register with the holes 29 in the battens 25, for the passage of the bolts 27 whereby the battens 25, 25 are secured in place after the wall-forming concrete panels 23 have been inserted in the recesses or kerfs of the posts in the manner shown in Fig. 2.

The batten 26, shown in the right-hand corner in Fig. 2, whereby the inner wall-forming panels are secured to the corner posts, may be of angular formation in cross-section corresponding with the angular formation of the corner posts; or the batten 26 may comprise two finishing strips, similar in construction to the battens 25; with their adjacent sides in overlapping relation.

Where it is desired to provide the building with an intermediate wall or partition, in order to provide several chambers or rooms in the structure, we employ an intermediate post 30, see Fig. 2; the intermediate post 30 being preferably identical with the other intermediate posts 30; thus enabling a partition or inner wall to be placed at any suitable point in the building coincident with the intermediate posts 30. The posts 30, as previously described, are cast or formed with bolt-receiving holes either disposed transversely therethrough to receive bolts 27 or they may be provided with any suitable bolt-receiving apertures to enable the intermediate wall or partition to be secured in place; the side frame members of the partitions,—which are later described,—being provided with apertures adapted to register with those in the posts 30.

As an alternate construction, where a more finished appearance is desired, we may employ posts formed on one side, namely what will constitute the outer side, with the laterally disposed extensions or wings, shown at 34 in Fig. 11; in other words, with an integral batten which is formed by the wings 34 and the post proper, adapted to overlap the outer wall panels 23 and maintain them in place. Where this style of post is employed, the necessity for providing bolt-receiving holes extending entirely through the posts to the outside of the building, as shown in posts 30, is obviated, and a smooth outer finish is provided.

To construct the intermediate walls or partitions of a building, we prefer to employ concrete frames formed in the nature of truss members, as disclosed in Fig. 3; consisting of the rectangular open frames 35 of reinforced concrete, with one end of each frame provided with a diagonally disposed brace member 36 extending from one corner of the frame diagonally to a point intermediate of the ends of the opposite side of the frame 35; the brace members 36 being preferably cast or formed integral with the frame proper as shown. The frames 35 are identical in construction and therefore interchangeable, being all provided or cast with the bolt-receiving openings 37, spaced apart as shown in Fig. 3; and are also provided with bolt-holes or apertures adapted to register with the bolt-holes or apertures spaced apart throughout the lengths of the posts. This enables the rectangular frames to be readily secured or bolted to the intermediate posts or members, as shown in Fig. 2, and also enable adjacent frames to be bolted together by means of bolts 38, as shown in Fig. 3. The frames 35 are all identical in construction, and when installed are alternately placed in inverted manner in order to form a suitable truss; that is, the interchangeable frame members 35 are so arranged in juxtaposition that the brace member 36 of one frame 35 will be located at the upper end of the frame and disposed downwardly toward the adjacent frame, while the adjacent frame will be reversed or inverted so as to have the brace member 36, at the lower end thereof and disposed upwardly toward the first mentioned frame, thus causing the brace members 36 of the two frames to be in alinement with each other and jointly form a suitable strut. The ends of the frames 35, like the longitudinal sides, are also cast with bolt-receiving openings adapting the frames to be bolted to the floor construction of the building, as well as to the over-head rafters, as shown in Fig. 3. The frame members are then covered or provided with the concrete slabs or panels 23; panels being placed either on one or both sides of the frames as desired and the panels, shown at 23 in Fig 3, are held in place in the same manner as the other wall panels by battens 25 bolted to the frames;

the bolts for the battens passing through the bolt-holes 37.

The upper ends of the respective posts are all preferably provided with angularly formed T-shape bolt-receiving openings 39 see Figs. 1, 5 and 7, with one end of the slot made sufficiently large to receive the head of a suitable bolt; and the openings or slots are preferably provided with metallic inserts of corresponding formation. After the head of the bolt is inserted in the slot, it is moved toward the opposite or narrow end of the slot where its withdrawal will be prevented. These bolt-receiving openings enable the posts or uprights to be suitably secured to the over-head members or rafters, as shown at 40 in Fig. 1.

Where the posts are provided with an integral finishing strip or batten, as disclosed in Fig. 11, and especially where the intermediate wall or partitions are to be secured in place, we prefer to provide the posts, on their inner longitudinal sides, with bolt-head receiving slots of the nature previously described; these slots obviating the necessity for casting the posts with bolt-holes extending entirely through to the outside. The angularly formed counter-bored slots are, of course, spaced apart at predetermined distances to register with the bolt-receiving holes in the respective elements; it being understood, that all elements provided with bolt-receiving holes or slots have these holes and slots at uniform distances apart so that they will register with each other when the various units are brought into proper juxtaposition.

In Fig. 11 we illustrate in perspective the section of a wall disclosing the modified form of the post previously mentioned provided with an integrally formed batten. In this construction, the outer wall is formed of the concrete panels or slabs 23 having their longitudinal edges beveled, as shown at 42, to provide the moisture shedding connections previously referred to; the panels being held in place by the outer batten or extensions 34 and maintained in spaced relation with the inner wall by means of suitable spacing blocks 43, which may be of wood or concrete and bolted in place as shown at 45 by a suitable bolt passing transversely through the concrete post. In the construction shown in Fig. 11, the inner wall 46 is intended to be of plaster and therefore the spacing blocks 43 are preferably of wood; the lathing or plaster-receiving element being secured in place in any suitable manner, as for example by nails which may be driven into the wooden spacing blocks 43 as shown. Where the plaster construction is contemplated, we prefer to have the spacing blocks 43 of such width as to provide a slight space intermediate of the inner longitudinal side of the post and the lathing and plaster, as shown at 47, thereby preventing condensation of moisture on the inner walls.

The uprights or posts may be anchored when desired to any suitable foundation element; although in most instances the weight of the building will be sufficient and anchoring found to be unnecessary.

In Fig. 12 we illustrate, in sectional plan, a wall construction formed with the panels or slabs 23, while the intermediate posts 49 are identical with the intermediate post shown in Fig. 11, being provided with an integral finishing strip or batten on the outer side whereby the outer wall panels are held in place. In this construction the inner and outer walls are maintained in spaced relation by the spacer members 50, which, like the members 43 in Fig. 11, may either be of wood or concrete and bolted to the posts as shown. The corner post 51 in Fig. 12 has the sides that are disposed parallel with the adjacent walls, provided with extensions or batten portions 52, 52 adapted to overlap the adjacent edges of the outer panels to maintain them in place; and spacer blocks 50 are employed to maintain the spaced relation between the inner and outer wall panels; while the inner wall panels are maintained in place by the inner batten or strip 25 which is bolted to the post 51 by suitable bolts, the heads whereof are shown inserted in angular or large ended bolt-head slots of the formation previously described, formed in the longitudinal side of the post 51.

The construction illustrated in Fig. 12 also discloses what may be termed an interior corner post 53, to be employed in situations where the building is to be provided with a wing or portion extending out at right angles to the main or other portion of the building and where all of the walls are to be of the double panel construction shown and previously described. The post 53 is rectangular in cross section and provided at one corner with an integral finishing portion or batten 54 whereby the adjacent outer wall panel is held in place. These wall panels are shown maintained in spaced relation with the inner wall panels by suitable spacing members or blocks 50, which may be formed and secured in place as previously described; while the wall panels constituting the inner side of the extension or wing of the building are held in place by the batten 25 which is preferably bolted to the post 53 by means of bolts having their heads inserted in bolt-receiving slots of the nature shown at 39 and previously described.

As shown in Figs. 1 and 2, door and window frames may readily be put into place between the respective uprights or posts; the frames being provided with portions

adapted to extend into the kerfs or notches formed in the sides of the posts which received the wall panels as previously described; the frames being maintained in place by the batten strips, in a manner similar to the wall panels, as shown at 48 in Fig. 2.

In the erection of a building constructed of our improved units, the respective posts are first placed in proper upright position at predetermined distances apart commensurate with the length of wall panels employed; the posts being maintained in place in any suitable manner. The finishing strips or battens are then loosely bolted to the posts; the battens being merely bolted, initially, to the posts at the lower ends so as to permit the battens to be swung laterally on the bolt; and in order to permit the battens to be swung in the manner mentioned, we prefer to bevel the lower corners of the battens, as shown at 55 so as to provide sufficient clearance. The battens are moved laterally, just sufficient to uncover the recesses or kerfs to enable the panels 23 to be placed in the recesses; the panels being placed edgewise on top of each other until the wall section has been completed; the batten being gradually moved into proper perpendicular position to maintain the different panels in place, when all of the bolts are inserted through the registering bolt-holes of the batten and post. In the construction illustrated in Fig. 1, a wall plate of wood or concrete is bolted to the top of the posts, as shown at 56, by means of bolts whose heads have been previously inserted into the sockets or apertures as shown at 40 in Fig. 1; the wall-plate serving to keep the posts braced and properly spaced, as well as providing means for securing and supporting the roof timbers. The roof may be of the usual construction, or the rafters may also be of reinforced concrete and bolted to the wall-plate or member 56; while the upper part of the wall beneath the eaves may be finished with a suitable frieze board as shown at 57 in Fig. 1 notched or kerfed so as to fit over the various finishing strips or battens of the wall. The intermediate walls or frames are then erected in the manner previously described and as illustrated in Fig. 3.

Where the style of post shown in Figs. 11 and 12 are employed, the longitudinal edges of the post, as previously described are preferably provided with the bolt-head receiving slots at points registering with the bolt-holes of the batten, thus enabling the batten to be bolted to the inner longitudinal sides of the posts as shown in Fig. 12. Where the posts shown in Figs. 11 and 12 are employed, the outside wall panels are first put into place; the spacing members or blocks positioned and secured in place; after which the inner panels are put into position and the inner finishing strip or batten put into place as described.

It will be understood, of course, that instead of having all posts of the same length, they may vary and certain of the posts be of greater length, as for example where they are to be used at the gable ends of a building, to enable them to extend entirely to the roof supporting elements or rafters, to which they may be secured in the same manner as the posts are shown secured to the wall-plate or member 56 in Fig. 1, or in any other suitable manner, the posts being all preferably provided on the ends with bolt-receiving slots or apertures.

We have shown and described what we believe to be the simplest embodiments of our invention, but modifications may be made in certain details of construction without, however, departing from the spirit of our invention.

What we claim and wish to secure by Letters Patent is:—

1. A concrete building construction, composed of pre-cast reinforced concrete units, comprising concrete outside corner posts or uprights, interior corner posts and intermediate posts, the sides of all of said posts disposed toward the exterior having their longitudinal edges extended beyond the adjacent sides of the post, superposed reinforced concrete slabs or panels of uniform dimensions having their longitudinal edges formed to provide lapping joints while the ends of the panels are arranged in abutting relation with the adjacent posts so as to have the extended edges of the posts overlap the ends of the panels, the panels being arranged in parallel superposed relation to provide an inner and an outer wall with an air space therebetween, and spacing members secured to and disposed throughout the length of the posts whereby the rows of superposed panels will be maintained in spaced relation.

2. A concrete building construction, consisting of pre-cast reinforced concrete units, comprising reinforced, concrete posts of suitable length, the longitudinal edges of the exterior sides of the posts being extended laterally in uniform manner throughout the lengths of the posts, a plurality of reinforced concrete slabs or panels of uniform dimensions and thickness arranged in superposed and parallel relation intermediate of the posts so as to provide double walls, with the extended longitudinal edges of the posts overlapping the outer wall panels, the posts or uprights being spaced apart at distances corresponding with the length of the slabs or panels, the longitudinal edges of the slabs or panels being beveled so as to provide weather-proof joints between the superposed slabs or

panels, the ends and inner longitudinal sides of the posts being cast with bolt-head receiving sockets restricted at the ends to prevent withdrawal of the bolt-heads, and concrete finishing elements or battens cast with openings at predetermined distances apart adapted to register with said sockets in the sides of the posts, for the passage of the fastening bolts, said battens being of greater width than the inner longitudinal sides of the posts so as to overlap the adjacent ends of the superposed panels constituting the inner wall.

3. A concrete building construction consisting of pre-cast reinforced concrete units, comprising posts having the longitudinal edges, of the sides disposed to the exterior, extended laterally, the ends and inner sides of the posts being provided with bolt-head receiving sockets at predetermined distances apart, the ends of said sockets being restricted to prevent withdrawal of the bolt-heads, a plurality of slabs or panels of uniform dimensions and thickness disposed between adjacent posts in superposed and spaced relation to provide an inner and an outer wall, with the extended longitudinal edges of the posts overlapping the outer wall panels, the posts or uprights being spaced apart at distances corresponding with the length of the slabs or panels, concrete finishing elements or battens cast with bolt-receiving openings at predetermined distances apart registering with the bolt-head receiving sockets in the sides of the post, said battens being of greater width than the inner longitudinal sides of the posts so as to overlap the adjacent ends of the superposed panels constituting the inner wall, and interchangeable partition elements cast with bolt-receiving apertures at predetermined distances apart adapted to register with the sockets and apertures of the posts and battens.

Signed at Chicago, in the county of Cook and State of Illinois, this 31st day of May, A. D. 1918.

HENRY M. PRIEST.
ROBERT H. FORD.
ALEXANDER L. GREENABAUM.
CHARLES P. RICHARDSON.

Witnesses:
A. E. KORSELL,
JOSEPH E. FEELEY.