March 30, 1937. R. L. DAVISON 2,075,338

BUILDING CONSTRUCTION

Filed Aug. 2, 1935 3 Sheets-Sheet 1

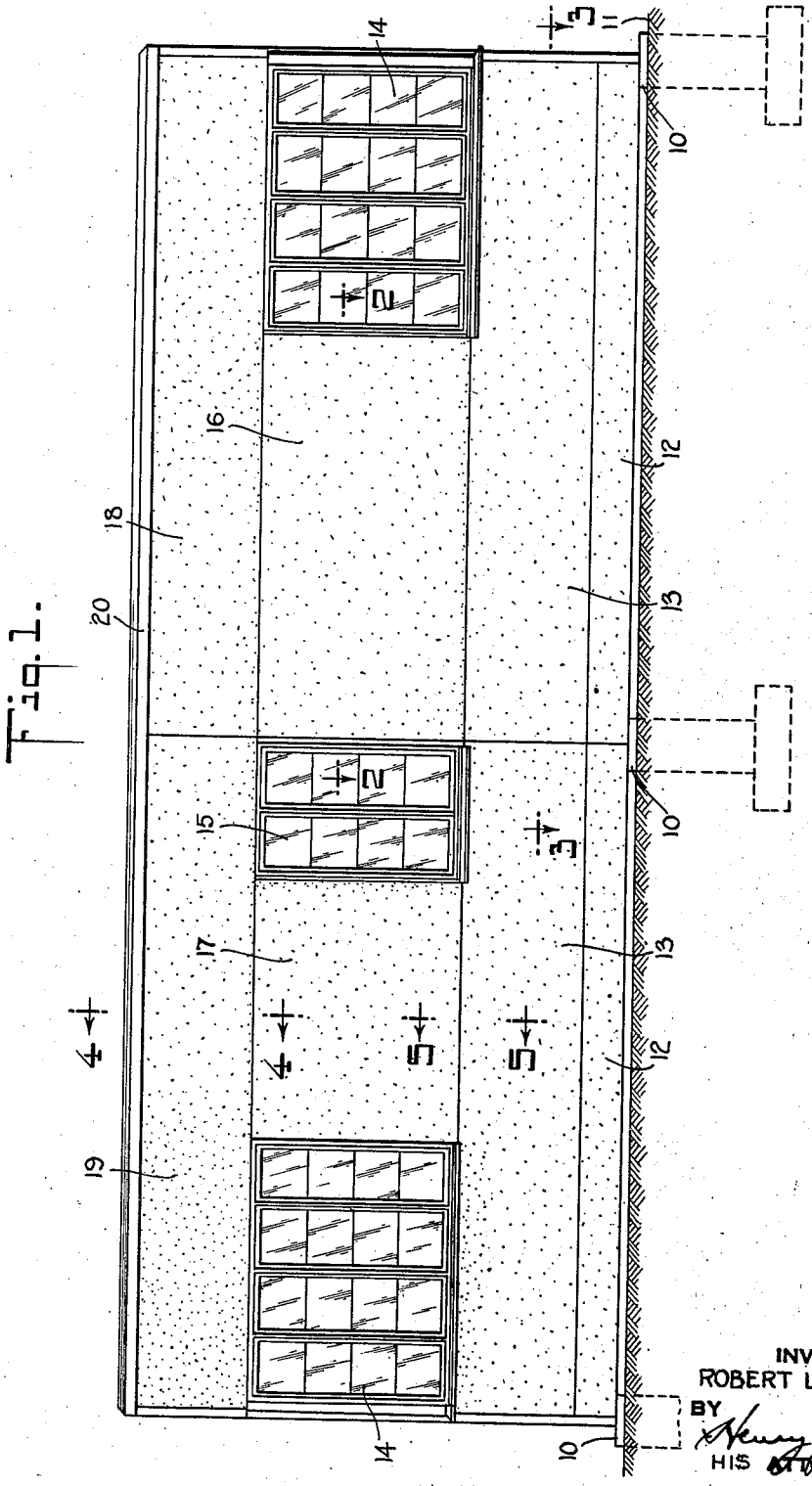


Fig. 1.

INVENTOR
ROBERT L. DAVISON
BY Henry J. Lucke
HIS ATTORNEY

March 30, 1937. R. L. DAVISON 2,075,338

BUILDING CONSTRUCTION

Filed Aug. 2, 1935 3 Sheets-Sheet 2

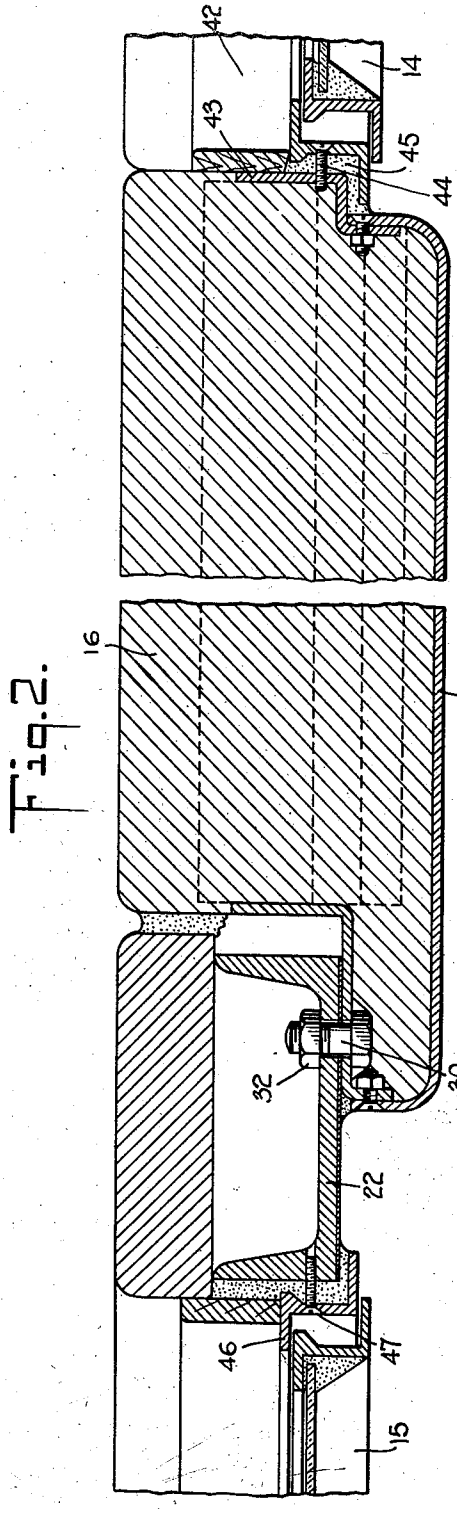


Fig. 2.

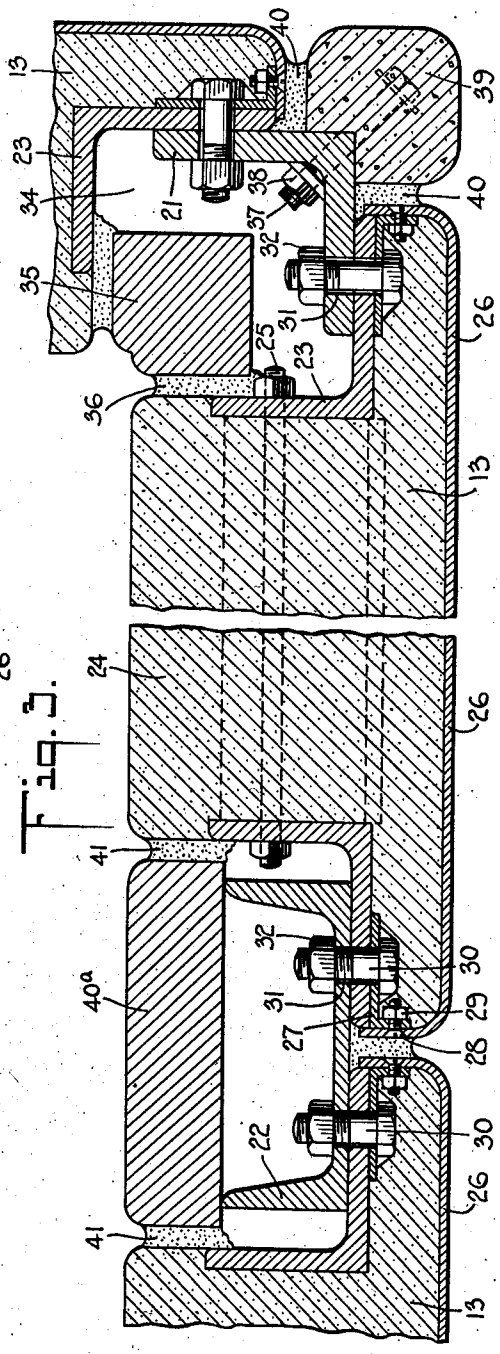


Fig. 3.

INVENTOR
ROBERT L. DAVISON
BY
Henry J. Lucke
HIS ATTORNEY

arch 30, 1937. R. L. DAVISON 2,075,338

BUILDING CONSTRUCTION

Filed Aug. 2, 1935 3 Sheets-Sheet 3

Fig. 4.

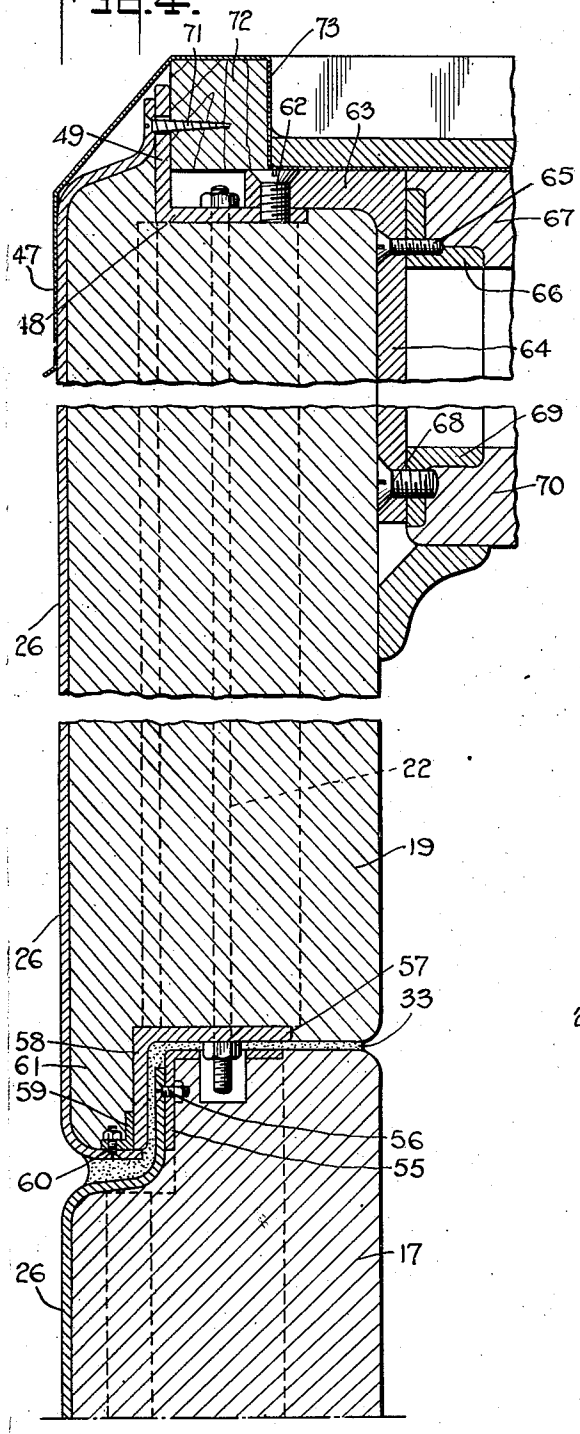
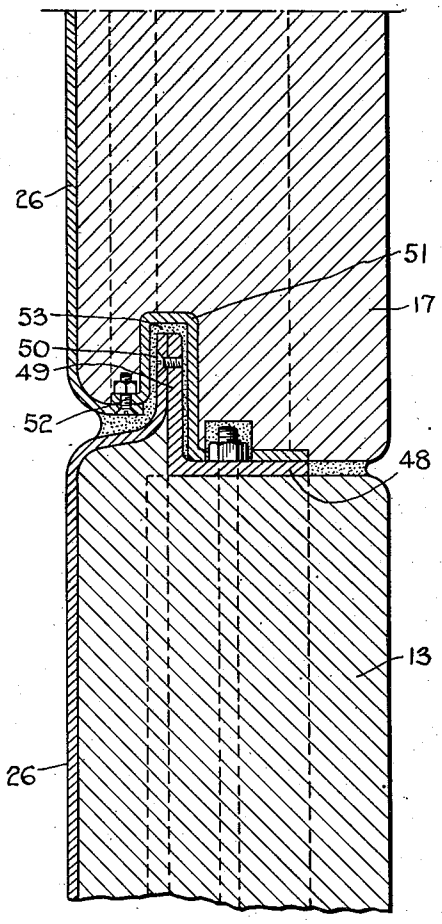


Fig. 5.



INVENTOR
ROBERT L. DAVISON
BY
Henry J. Rucke
HIS ATTORNEY

Patented Mar. 30, 1937

2,075,338

UNITED STATES PATENT OFFICE

2,075,338

BUILDING CONSTRUCTION

Robert L. Davison, New York, N. Y., assignor to John B. Pierce Foundation, New York, N. Y., a corporation of New York

Application August 2, 1935, Serial No. 34,352

10 Claims. (Cl. 72—16)

This invention relates to building construction, and more particularly to buildings assembled from prefabricated structural units.

Embodiments of the present invention include panel units, desirably rectangular in shape, prefabricated to comprise preferably a structural framework and a filler member for same, together with means for securing the units to component constructional elements of the building and to one another.

Advantageously, in assembling the walls of the building a skeleton framework, including relatively widely spaced parallelly arranged uprights, is erected to conform to the contour and desired height of the walls, and prefabricated panel units are thereafter positioned in end-to-end horizontal alignment to form courses, each unit extending between adjacent uprights and being secured thereto. One or more of the courses so formed may comprise panel units of a reduced horizontal length, to an end or ends of which may be secured window construction to compensate for the length reduction of the panel units, and to provide, in connected relation to these shorter panel units, a length capable of spanning the distance between two uprights.

In the accompanying drawings illustrating a number of embodiments of my invention:

Fig. 1 is a front elevation of a building construction embodying my invention;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 1, and

Fig. 5 is a vertical section taken on the line 5—5 of Fig. 1.

Referring to the drawings, and particularly to Fig. 1, there is shown a building resting on a plurality of piers 10 sunk into the ground 11, which building comprises a plurality of base members or panels 12, a plurality of lower panels 13, windows 14 and 15, panels 16, 17, 18 and 19 and a roof 20.

The base panels 12 rest on the piers 10 and may be the base elements of the building construction or may be a structure which encloses a structural steel base element; in either event there extends upwardly from the base panels 12, uprights, inclusive of the corner uprights preferably in the form of angles 21, Fig. 3, and intermediate uprights, preferably in the form of channels 22, Figs. 3 and 4. The various panels 13, 16, 17, 18 and 19 are tied at their ends to the uprights 21 and 22, or in some instances one or the other end of the panels 16 and 17 is tied to, or has tied thereto, a window construction such as windows 14 and 15, one end of such window construction being in turn either connected to a corner upright 21 or intermediate upright 22.

Referring to Fig. 3 wherein is shown a sectional plan view on the line 3—3 in Fig. 1, the corner upright 21 and the intermediate upright 22 are shown in section spaced apart from each other. Attached to such uprights are the panels 13, such panels presumably resting upon the base panels 12. The panels are preferably made of prestressed microporite, and are manufactured in accordance with the invention of Frederick O. Anderegg described and claimed in application Serial #41,473, filed Sept. 21, 1935 and entitled Method of reinforcing building units and products produced thereby. I am not to be limited to the use of panels manufactured according to said patent application, and panels of any suitable material may be employed. Such panels, preferably, comprise the angle frame member 23, the microporite, or other material of cement body 24, the prestressing rods 25 and facing 26 of Morbelli cement, or other facing material, such facing cement 26 being securely attached by the flat head screws 28 and 29, around the periphery of the panel 13 to angle members 27, welded or otherwise secured to the peripheral angle frame 23.

The Morbelli cement above referred to is a hard cementitious composition, impervious to moisture and produced preferably in sheet form, according to the disclosure of the co-pending application for U. S. Patent Ser. No. 469,935, filed July 22, 1930, by Giovanni Morbelli, entitled Processes for obtaining a quick-setting and hardening asbestos-cement resistant against corrosive waters.

The angle members 27 are arranged at spaced intervals around the peripheral angle members 23, and such members have preferably welded thereto and extending through a perforation therein a threaded bolt 30. The angle uprights 21 and panel uprights 22 are provided at proper intervals with perforations 31 through which the threaded bolts 30 extend and nuts 32 threading on the bolts 30 hold the panels 13 securely in position.

Advantageously, the wall panels inclusive of the base panels 12, the panels 13, the panels 16 and 17, and the panels 18 and 19, have respectively, their lower and upper edges formed for jointing relationship with units adjacent upperly

and/or lowerly thereof. Accordingly the upper edges of the base panels 12 and the lower edges of panels 13 are configurated for mutual interlocking; the upper edges of the panels 13 and lower edges of the panels 16, and the lower edges of the panels 17 are likewise configurated for mutual inter-locking; also the upper edges of the panels 16 and 17 and the lower edges of the panels 18 and 19, respectively are configurated for mutual inter-locking, the inter-locking of the respective panels being accompanied by the insertion of sealing or caulking material 33, Fig. 4. preferably in the form of a mastic composition. The panel 13 is placed in position with its bottom edge resting on the top edge of the base panel 12, and the bolts 30 slipped through the perforation 31 in the angle upright 21 and panel upright 22 and securely bolted in position by means of nuts 32 and bolts 30.

There is shown in Fig. 3 a panel 13 which extends at right angles to the front of the building structure, and the end of such panel 13 is attached to angle upright 21 in the manner above described. The panels 13 extending at right angles to each other define a rectangular chamber 34 which may be closed in any suitable manner, as by an upright 35 placed in position shown, and secured in position by the mastic adhesive 36.

The attachment of the panel 13 to the corner upright 21 leaves an exposed sharp edge of the upright 21 and to hide such exposed edge and for the purpose of ornamentation I preferably attach thereto, by bolts 37 and nuts 38, a corner member 39, and fill in the spaces between the member 39 and the ends of the panels 13 with adhesive mastic 40. The members 39 are preferably, although not necessarily of microporite or other suitable material and in the process of manufacturing same, I preferably embed the head end of the bolts 37 in the material of the panel. It is obvious that the nuts 38 are placed on the threaded ends of the bolts 37 prior to the sealing up of the chamber 34 by the use of the member 35 and mastic 36.

On the inside of the wall structure composed of the panels 13 and arranged end to end, as shown in Fig. 3, and as a sealing member for sealing in the panel uprights 22, I utilize a member 40*a*, of a width to fit easily between adjacent ends of the panels 13 and of a thickness such that when the inner face is resting on the channel member 22, the outer or exposed face will be substantially flush with the inner face of the panel 13. This member 40*a* is preferably sealed in position by means of the mastic 41.

The panels 13 as shown in Fig. 1 and as above described with regard to Fig. 3, constitute generally the lower panel course about the building structure shown in Fig. 1, and resting on such course is the second course composed generally of panels, such as panels 16 and 17 and windows 14 and 15. In Fig. 1 one end of each of the windows 14 is shown as connected to the corner upright 21, and the window 15 is shown as having one end connected to one of the panel members 22. In Fig. 2 the panel member 16 is shown having its ends connected respectively to the panel member 22 and one of the windows 14.

Referring to such Fig. 2, the panel 16 has one of its ends connected to the upright 22 by bolts 30, which bolts are similar to the bolts shown in Fig. 3, and such panel 16 rests on the top of the panel 13. The right hand end of the panel 16 has connected thereto the window frame for the window 14. Such window frame is designated generally by the reference numeral 42 in Fig. 2, and the same is connected to a peripheral member 43 of the panel 16 by the screws 44. Mastic 45 is utilized between the member 43 and the window frame 42 to maintain a tight joint therebetween. A similar construction is shown in regard to the window 15, where the frame portion 46 thereof is connected to the panel uprights 42 by the screws 47.

The top and bottom edges of the various panels may be all similar, or may be of any desired cooperative form. Several different forms are shown in the drawings, notably in Figs. 4 and 5. In Fig. 5 is shown one form which may be given to the upper edge of the panels 13; in such form the upper peripheral edge includes an angle member 48, one portion of which extends upwardly as indicated by the reference numeral 49. In such form the Morbelli cement facing 26 is upturned and is secured to the angle member 41 by the screws 50. The upturned member 49 and the Morbelli facing 26 for such angle member constitute a vertically arranged tongue which cooperates with a groove formed in the lower edge of the panel 17. Such groove is formed in the panel 17 by a metallic member 51 which has secured to the lower front edge thereof, by screws 52, the Morbelli cement facing 26. In assembling the panel 17 in position on the top of the panel 13 the groove 51 has placed therein a mastic cement 53. The weight of the panel 17 flows the mastic cement into and around the tongue formed by the angle 49 and Morbelli facing 26 so as to produce a weather-tight joint between the upper edge of the panel 13 and the lower edge of panel 17.

Another form of connecting joint between the upper and lower horizontal edges of the various panels is shown in Fig. 4 where the upper edge of the panel 17 cooperates with the lower edge of the panel 19. In the panel 17, the upper edge has formed therein the angle member 54 and such angle member 54 has one portion 55 thereof extending downwardly from the portion 54. In this form the Morbelli facing 26 is folded onto the outer face of the downwardly extending portion of the angle 54 and is secured thereto by screws 56. In this figure, the lower edge of the panel 17 has formed therein the angle member 57 having a downwardly extending portion 58, and secured to such downwardly extending portion 58 by welding, or in some other similar or desired manner, is a small angle member 59 which lies horizontal and has secured thereto by the screws 60, the Morbelli facing 26. There is thus formed in the lower edge of the panel 19 a downwardly extending lip 61, and there is also formed in the upper edge of the panel 17 a recess slightly greater than the thickness of the lip 61. Therefore when the lower edge of the panel 19 is in position in the upper edge of the panel 17 the Morbelli facings 26 of such panels will lie in the same vertical plane.

In Fig. 4, there is also shown the means for connecting the roof and ceiling to the upper edge of the panel 19. The upper edge of the panel 19 is for this purpose preferably constructed in a manner similar to the upper edge of the panel 13 shown in Fig. 5. The angle member 48 has secured thereto by screws 62 an angle member 63, one portion 64 of which extends downwardly in engagement with the inner face of the upper edge of the panel 19. Secured to the portion 64 of the angle 63 is an angle member 66 which acts as a support for the roof panels 67. Also secured

to the member 64 of the angle 63, by screws 68, is an angle 69 to which is secured the ceiling panels 70. The portion 49 of the panels 48 has secured thereto, by screws 71, blocks 72 of microporite or other similar or suitable material, to which is attached the flashing 73 of the roof, which flashings extend downwardly over the front of the upper edge of the panel 19, as indicated by the reference numeral 74 in Fig. 4.

The angle formed by the ceiling slab 70 and the inner face of the panel 19 may be finished off by a corner molding 79, or other similar construction.

The panels 16 and 17 may be made of any width or length desired and with their upper and lower edges constructed to conform with the desired construction of the upper and lower edges of the panels 13 and 18 respectively. The panels 13, 16 and 19 have been described as having different characteristics, but obviously the construction of such panels may be identical. The space in the panel uprights 22 closed by the members 40a may be utilized as a conduit for wires, pipe and the like, and also the chamber 34 may be used for a similar purpose.

A building constructed according to my present invention may be prefabricated in substantially standard units of a size relatively easy to handle and the building itself may be erected by relatively unskilled labor.

Whereas, I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1 In an improved building construction, the combination of a skeleton framework, having spaced parallelly arranged upwardly extending members, said members comprising corner structural-angles, having their vertices directed outwardly, and intermediate structural channels having their flanges directed inwardly, prefabricated panel units spanning the space between adjacent uprights, each of said panel units having an outer member that partially encloses said adjacent uprights, and an inner member fitting between said adjacent uprights, and means for securing the ends of the panels to the uprights.

2. In an improved building construction, the combination of a skeleton framework having parallelly arranged upwardly extending members, said members comprising corner structural-angles having their vertices directed outwardly, and intermediate structural channels having their flanges directed inwardly, prefabricated panel units spanning the space between adjacent uprights, each of said panel units having an outer member that partially encloses said adjacent uprights and an inner member fitting between said adjacent uprights, and means extending between the inner members of adjacent panels for boxing in the skeleton framework.

3. In an improved building construction, a panel comprising a circumferential metallic member substantially rectangular in form, rods extending between opposite ends of the rectangular framework, a relatively light porous material filling the space within the rectangular framework and having a filling member greater in superficial extent than the space within the rectangular framework, and a facing of relatively hard, impervious cemetitious material secured to the outer face of the panel.

4. In an improved building construction, the combination with a rectangular framework of angle iron or similar material, of a panel arranged in and secured to the rectangular space defined by the angle iron, said material being of greater thickness than the thickness of the rectangular space, said extra thickness being formed on the front of the panel and being co-extensive with the outer peripheral edge of the rectangular framework defined by the angle members, and a facing of relatively hard, impervious material being secured to the facial area of the panel and having its peripheral edges mechanically secured to the peripheral edge of the face portion of the panel.

5. In an improved building construction, a prefabricated panel unit comprising a circumferential framework, a relatively light porous material filling the space included within the framework and having a filling member greater in superficial extent than the space within the framework, means for retaining said material within said framework and a facing of relatively hard, impervious, cementitious material secured to the outer face of the said filling member.

6. In an improved building construction, the combination of a skeleton framework having relatively widely spaced parallelly arranged uprights extending upwardly a distance equal to the desired wall height; and a plurality of prefabricated panel wall units, long horizontally as compared to their height vertically extending in horizontal alignment around the said skeleton framework to form courses of the wall structure, each unit extending between two of the said uprights and being secured thereto at its ends, the courses being built up vertically and bonded to adjacent courses at locations of joinder; at least one course comprising units embodying panel sections of a reduced horizontal length, and window frames secured to said panel sections, a panel section and a window frame or frames together forming an individual unit for spanning the distance between two of said uprights, and for securement at their free ends thereto.

7. In an improved building construction the combination of parallelly arranged vertical uprights, associated to define the general wall contour of the building; prefabricated panel wall units assembled in end-to-end horizontal alignment around said associated uprights to form courses of the wall structure, each of said wall units comprising a structural framework and a filler member therefor and each of said wall units extending between and partially enclosing, two adjacent uprights; means for securing said wall units to their respective uprights; means integral with each of said wall units for joining vertically adjacent units of vertically adjacent courses to one another; and inserts secured at vertical joints between units to complete the enclosure of said uprights.

8. In an improved building construction, the combination of parallelly arranged vertical uprights, inclusive of corner uprights of angle-iron, the vertex of the angle being directed outwardly, and intermediate uprights of channel-iron the flanges of the channel being directed outwardly, associated to define the general wall contour of the building; prefabricated panel wall units assembled in end-to-end horizontal alignment around said associated uprights to form courses of the wall structure, each of said wall units comprising a structural framework and a filler mem-

ber therefor and each of said wall units extending between and partially enclosing, two adjacent uprights; means for securing said wall units to their respective uprights; means integral with each of said wall units for joining vertically adjacent units of vertically adjacent courses to one another; and inserts secured at vertical joints between units to complete the enclosure of said uprights.

9. In a building construction, closely associated prefabricated panel units, each of said units comprising a circumferential frame member; a filler member partially enclosed by and partially enclosing said frame member; means securing said filler member to said frame member; a weather proof facing covering the outside face of said filler member, means securing said facing to said frame member, and means for joining contiguous edges of adjoining panels and weather sealing the joints so formed.

10. In a building construction, uprights associated to define the general wall contour of the building, prefabricated panel wall units, each having a horizontal length greatly exceeding its vertical height and each extending between two adjacent uprights and being secured thereto, the assembled wall units extending in horizontal alignment around the periphery of the said associated uprights, and in vertical alignment upwardly thereof.

ROBERT L. DAVISON.