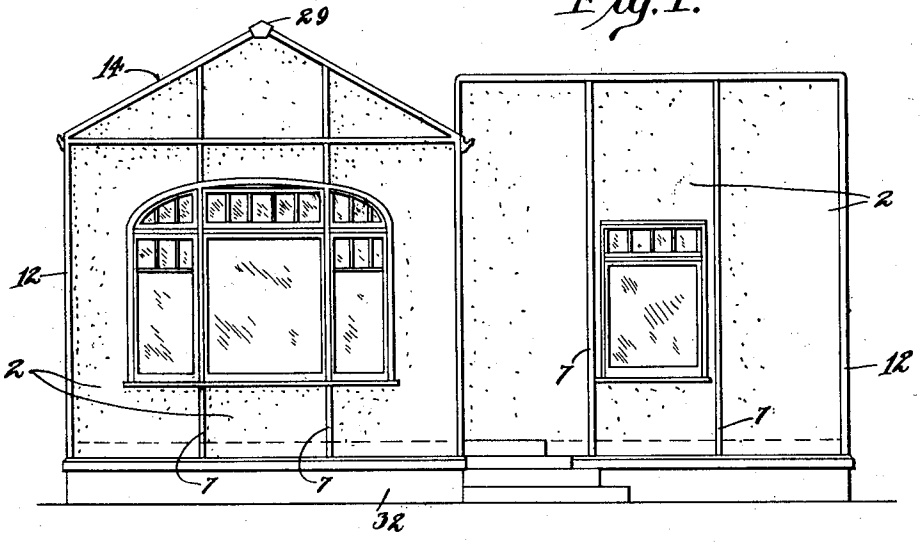
July 14, 1931. C. H. BRAINARD ET AL 1,813,909

BUILDING CONSTRUCTION

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Fig. 1.



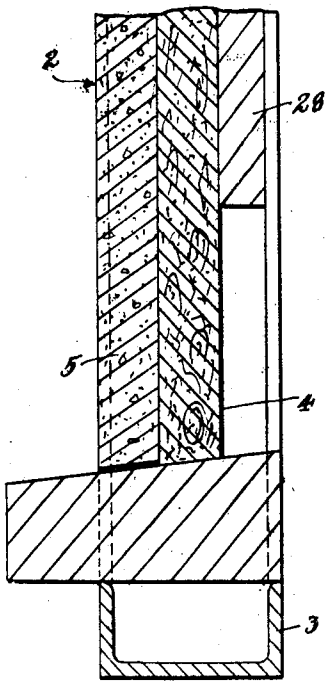


Fig. 7.

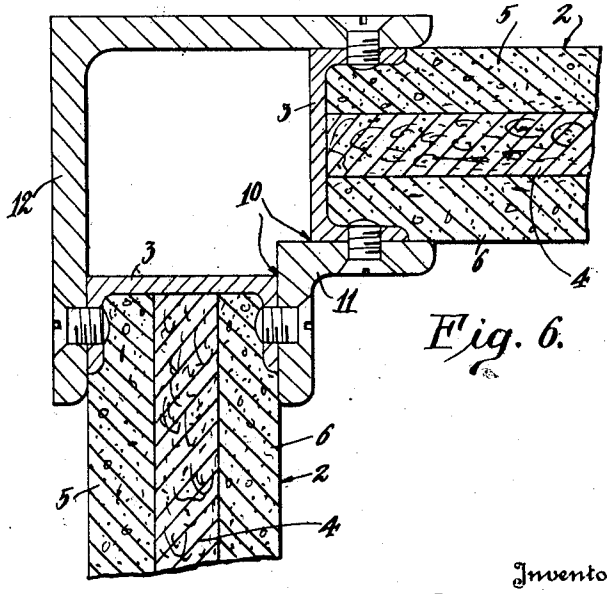


Fig. 6.

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BUILDING CONSTRUCTION

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Fig. 2.

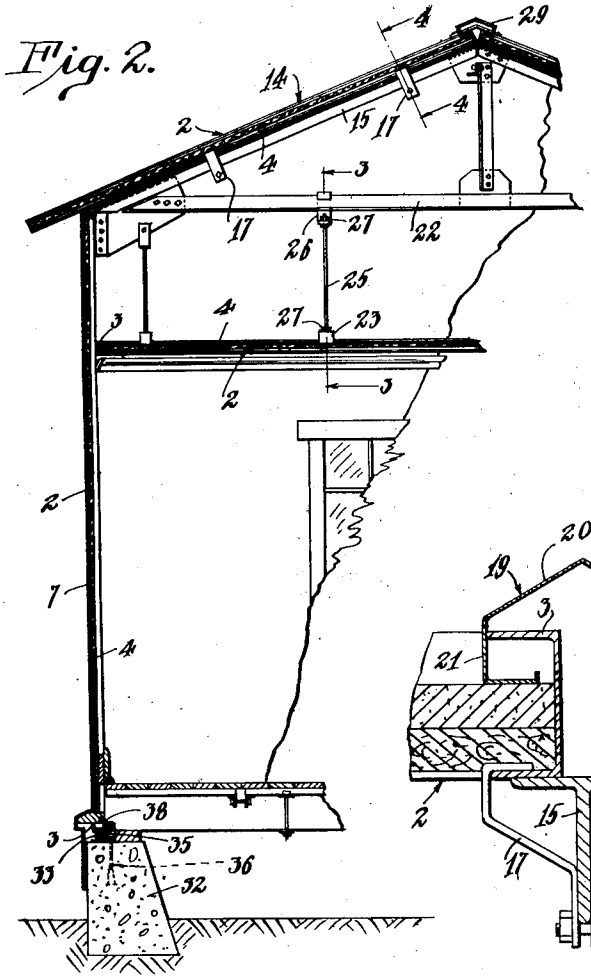


Fig. 3.

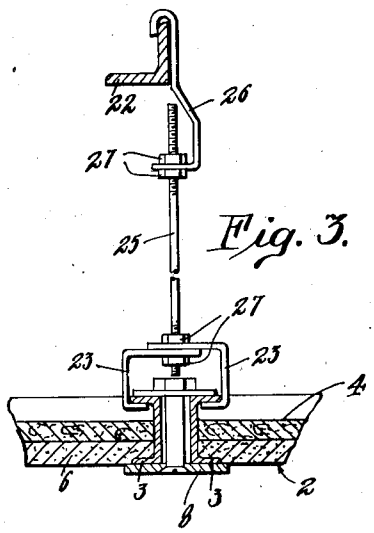
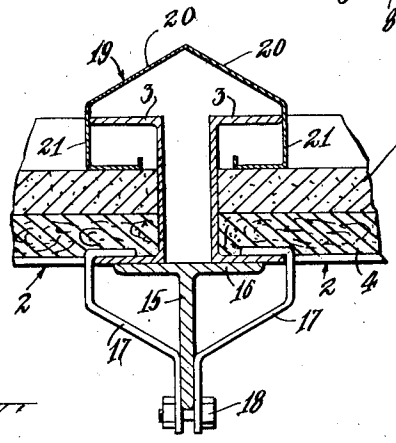


Fig. 4.



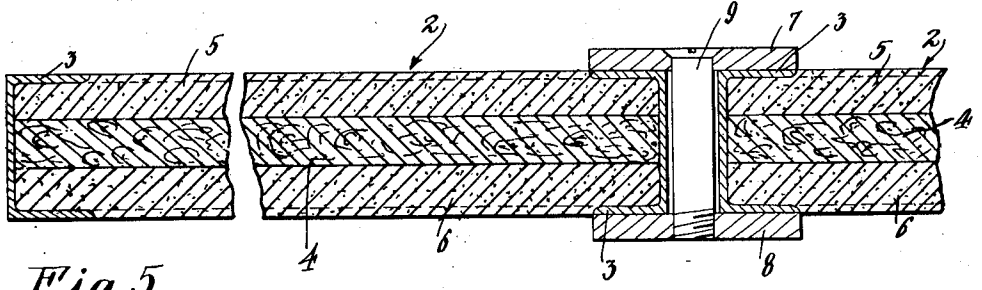


Fig. 5.

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Fig. 8.

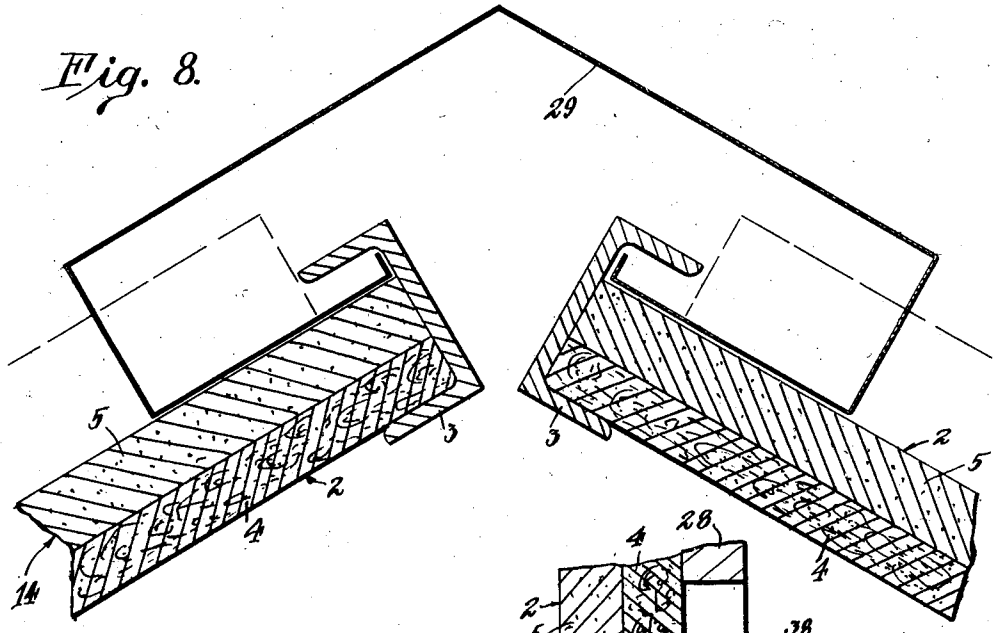


Fig. 10.

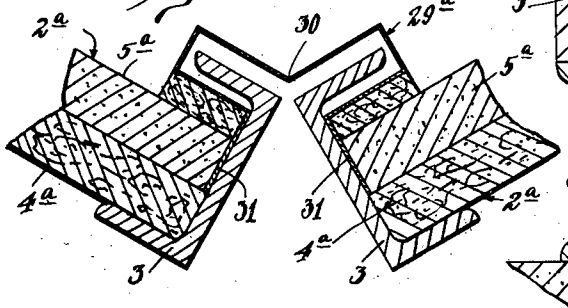
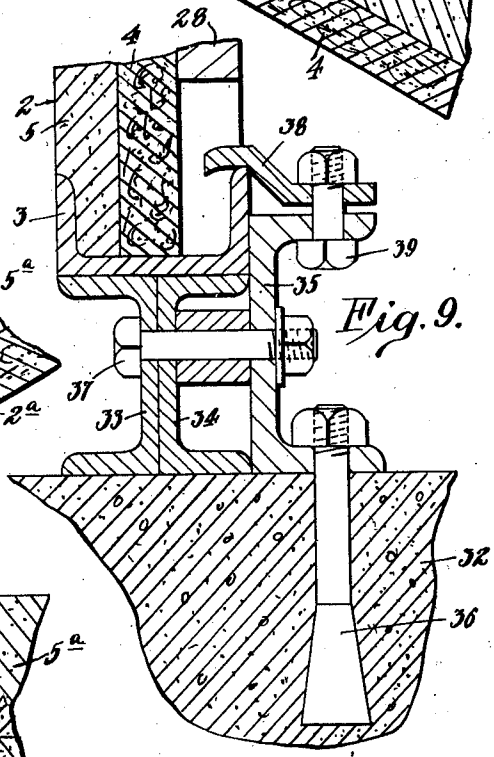


Fig. 9.



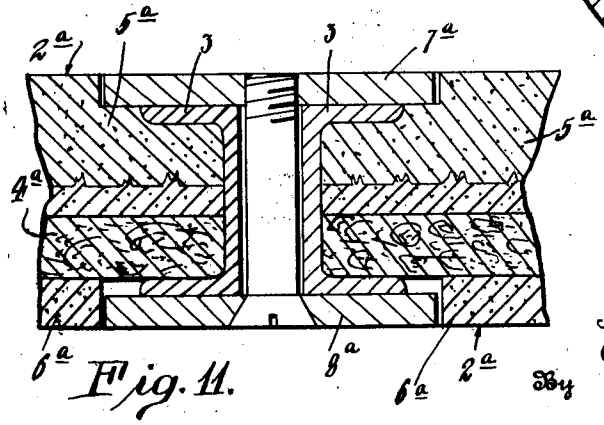


Fig. 11.

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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

Application filed April 10, 1926. Serial No. 101,063.

This invention relates to means employed for the construction of buildings, and refers particularly to means adapted to provide a structural steel building.

Heretofore, the use of structural steel in buildings has been generally limited to buildings of very large size and the buildings have been constructed by first constructing or assembling in situ the structural steel frame of the building. We have devised a means for constructing structural steel buildings which is adapted for the construction of small buildings at a lower cost than the ordinary wood frame buildings and, moreover, we have devised a means for constructing buildings by which a small, light structural steel building may be produced from units made at a factory or other locality located at a distance from the place where the building is to be constructed. These units not only contain the structural steel frame for the building but the said frame is united with the materials for forming the walls, floors, ceilings or roof of the building so that by merely assembling of the different units, not only is the structural steel for the building fixed in place but at the same time, the walls, ceiling, floors and roof of the building are completed.

The invention with various other objects and advantages thereof will best be understood from a description of a preferred form or means for constructing buildings embodying the invention. For this purpose, reference is made to the accompanying drawings, in which:

Figure 1 is an elevation of a finished building constructed by the use of the means forming the subject matter of the present invention,

Figure 2 is a fragmentary sectional elevation of the building,

Figure 3 is a section on line 3—3 of Figure 2,

Figure 4 is a section on the line 4—4 of Figure 2,

Figure 5 is a transverse section through a pair of the structural units or wall panels of the invention disclosing the connecting means therebetween,

Figure 6 is a fragmentary section of a pair of the structural units showing the corner connections employed in assembling the same into a structural steel building,

Figure 7 is a fragmentary section of one of the panels adjacent the floor of the building.

Figure 8 is a fragmentary section showing the roof peak construction,

Figure 9 is a fragmentary section showing the structural means for securing the sides to the foundation,

Figure 10 is a fragmentary section of a modified form of construction employed on a tipped roof, and,

Figure 11 is a fragmentary section of a modified pair of structural units and the connecting means therebetween.

Referring to the drawings, the means for constructing the building is illustrated as comprising mainly structural units 2 made up of suitable walling material encased in rectangular form by metal members 3 which are adapted to act, when the panels are assembled or united into a building, as a structural steel frame for the building. These metal members 3 are disposed on the outer sides or edges of the body of each unit, and are preferably in the form of channel irons with their flanges turned in so that the walling material is set into the grooves of the channel irons. The material employed to form the major portion of the wall that is encased by such channel irons 3 may be of various kinds. Preferably, however, it consists in part at least of hardened, cementitious material such as plaster or stucco. The most desirable type of such walling is that illustrated in Figure 5, in which there is shown a body having a central sheet 4 of a light, porous material, such as fibre compositions, asbestos, cork, or the like, which central sheet is thus adapted to act as an especially efficient heat insulating material. For most of the structural units employed in a building, said sheet 4 of fibrous material is covered on both sides with a sheet of material of hardened cementitious material, which are indicated at 5 and 6. This material may, as before stated, be plaster of Paris, stucco,

or other like materials and the sheets 5 and 6 are preferably molded into the rectangular frame formed by the channel irons 3 before the entire unit 2 is transported to the place in which the building is to be constructed. The unit 2 so constructed is adapted to act as the entire walling of a building, reenforced and held in position by its edge encasing channel irons 3. The surface of the strip may be employed as the finished ornamental interior or exterior wall surface in which case the surfaces may be suitably decorated before the units are moved to the situs of the building, or in order to provide the interior finish, the units may be painted or tinted after the building is constructed, or other coats of finishing material, paper, sanitas, or the like, placed over the surface of the units in accordance with the particular appearance desired.

The units 2 thus described, are employed as the sides, ceilings, roof, and at times, the floor of a proposed building construction. For this purpose, it is merely necessary to provide suitable fastening or uniting means for rigidly holding together the different units as they are set in their desired place. Various examples of such uniting means are illustrated in the construction of the building of Figure 1. Referring to Figure 5, when two adjacent units 2 are to be set edgewise together and held in position, their angle irons forming their abutting edges closely adjoin and the meeting line between the same is covered on either side with a strip or bar of metal 7 and 8, preferably of a width sufficient to cover the metal angle irons and said strips or bars 7 and 8 of metal, are suitably clamped or held together as by bolts or rivets 9.

A preferred form of corner construction is shown in Figure 6, in which two of the structural units are shown meeting at 90 degree angles. These units are brought together so that their inner edges are spaced apart, as at 10, and then an angle iron 11 is set in along the inner corner, of sufficient width to cover the exposed edges of the channel irons 3 of the units 2 and an enlarged angle iron 12 is placed along the outer corner, likewise of sufficient width to cover the outer sides of the channel iron 3. These angle irons are suitably attached, fastened or affixed to the channel irons 3 of the units so that the corner construction is made rigid. For this purpose, they may be welded, riveted, bolted, or screwed thereto, or united in any other desired manner.

Referring to Figures 1, 2 and 3, the roof 14 of the building may be constructed of the same units, although usually for the roof construction, it is not necessary to provide in the units 2 a layer of cementitious material on both sides of the fibrous sheet 4. Accordingly, the upper sheet of cementitious material is left out of the units 2 which are to be employed in the roof construction at the time these units are formed. This leaves, as shown in Figure 4, the upper side of the angle iron exposed to act as a hook. T-irons 15 are set with their top sides 16 against the abutting angle irons 3 of the units 2 of the roof, and the T-irons 15 are held thereto by the clamps 17 and bolt 18, which clamps 17 have portions which extend or hook into the lower sides of the channel irons 3. The upper side of the adjoining units 2 of the roof are held together by the metal strips 19 which are shown as galvanized iron members having an inverted V upper side 20 and with hook-shaped sides 21 which extend under the upper sides of the channel irons 3.

Irons 22 are employed as beams under the roof 14 of the building and the ceiling of the building is likewise formed of the structural units 2, having the edge encasing channel irons 3. The ceiling structural units likewise usually require only a single cementitious sheet and in this case, the upper cementitious sheet is shown as omitted. In order to provide a top bracing for the ceiling, hook members 23 are hooked under the upper sides of the channel irons 3 of adjoining structural units which form the ceiling. These hook members 23 are mounted upon a rod 25 which, at its upper end, is provided with a hook 26 by which it is supported on the beam iron 22. The rods 25 are provided with nuts 27 which provide a means by which the supporting means for the ceiling may be adjusted.

Referring to Figure 7, there is shown the lower end of one of the units 2 which is employed at the floor of the building. The units or panels meeting the floor of the building may, if desired, have a wood strip 28 formed into the structural unit at its lower edge so that the wood strip 28 is adapted to facilitate the attaching of wood strips around the floor of the building. It is, of course, obvious that other material may be substituted for wood for this purpose.

In Figure 1, there is indicated the appearance of a building constructed of the units of the present invention. As appears from Figure 1, the metal bars 7 covering the channel irons 3 at the junction of the structural units 2 suitably break up the surface of the building to assist in ornamenting the same.

Referring to Figure 8, the peak of the roof is covered by a sheet metal member 29 hooked under the channel irons 3 of the units 2, forming the roof. In Figure 10, a modified construction is illustrated, for use where the roof has a dip or valley, in which case the sheet metal member 29*a* is employed dipped, or formed with a re-entrant angle as at 30, and bent in against the inner sides of the channel irons 3, as indicated at 31.

Referring to Figure 9, the building units

are fixed to the foundation 32 by mounting two channel irons 33 and 34 back to back under the side structural units 2. Short sections of channel irons 35 are then set with their lower flanges resting on the foundation 32; these units are of sufficient height to engage the sides of the irons 3 and are bolted to the foundation as at 36, and to the channel irons 33 and 34, as at 37. The irons 35 are also clamped to the irons 3 of the units 2 by clamps 38 bolted to the upper sides of the irons 35 as indicated at 39.

Referring to Figure 11, we have shown a modified form of the structural units, in which the structural units 2*a* are shown as having their cementitious sheets 5*a* and 6*a* extending beyond the sides of the channel irons 3 encasing the units. This permits the formation of a flush wall as the holding plates 7*a* and 8*a* fit in the spaces thus left and provide a flush surface.

While the particular form of the invention herein described is well adapted to accomplish the objects of the invention, it is understood that various modifications and changes may be made without departing from the invention and the invention includes all such modifications and changes as come within the scope of the appended claims.

We claim:

1. In means of the class described, a structural unit comprising a fibrous center sheet and having a body of hardened cementitious material, and channel irons on the outside of the body, with flanges projecting inwardly toward the central portion of the sheet, said cementitious material encasing the fibrous sheet and filling the space between the same and said flanges.

2. In means of the class described, a wall unit having a body consisting of a sheet of fibrous material and a sheet of cementitious material formed together, and channel irons on the outer side of the body with flanges projecting inwardly toward the central portion of the sheet, encasing the edges of the same.

3. A structural wall unit consisting of an inner sheet of fibrous material, a channel iron extending continuously around the edge of the said sheet with its flanges projecting inwardly toward the middle of the sheet, and cementitious material on both sides of the said inner sheet completely embedding the same and having its outer face flush with the outer faces of said flanges, said cementitious filler extending into and completely filling the channel between said flanges, said flanges operating to prevent chipping of the corners of the unit and operating as a marginal frame to be engaged by retaining means for the unit.

Signed at Los Angeles, California, this 5th day of April, 1926.

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