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J. C. DE VOL

1,983,020

BUILDING CONSTRUCTION

Filed Oct. 20, 1932

2 Sheets-Sheet 1

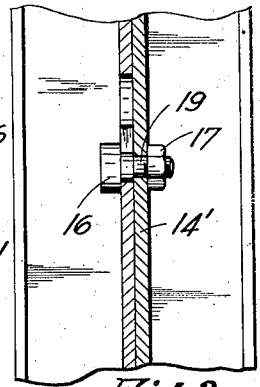
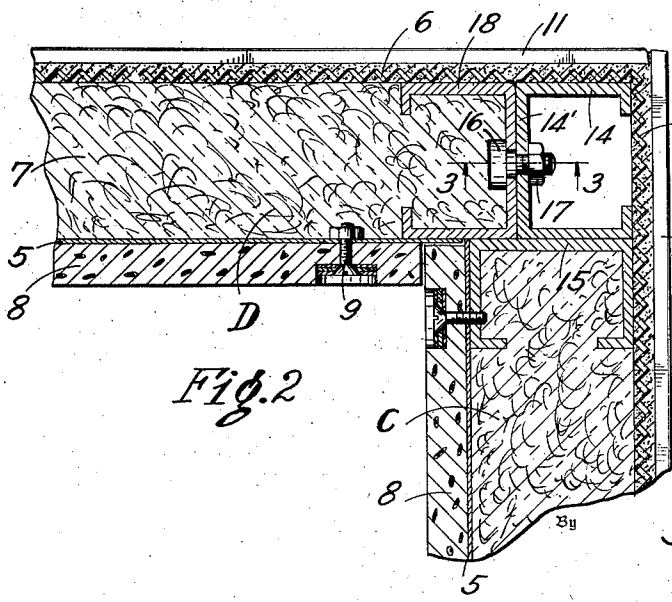
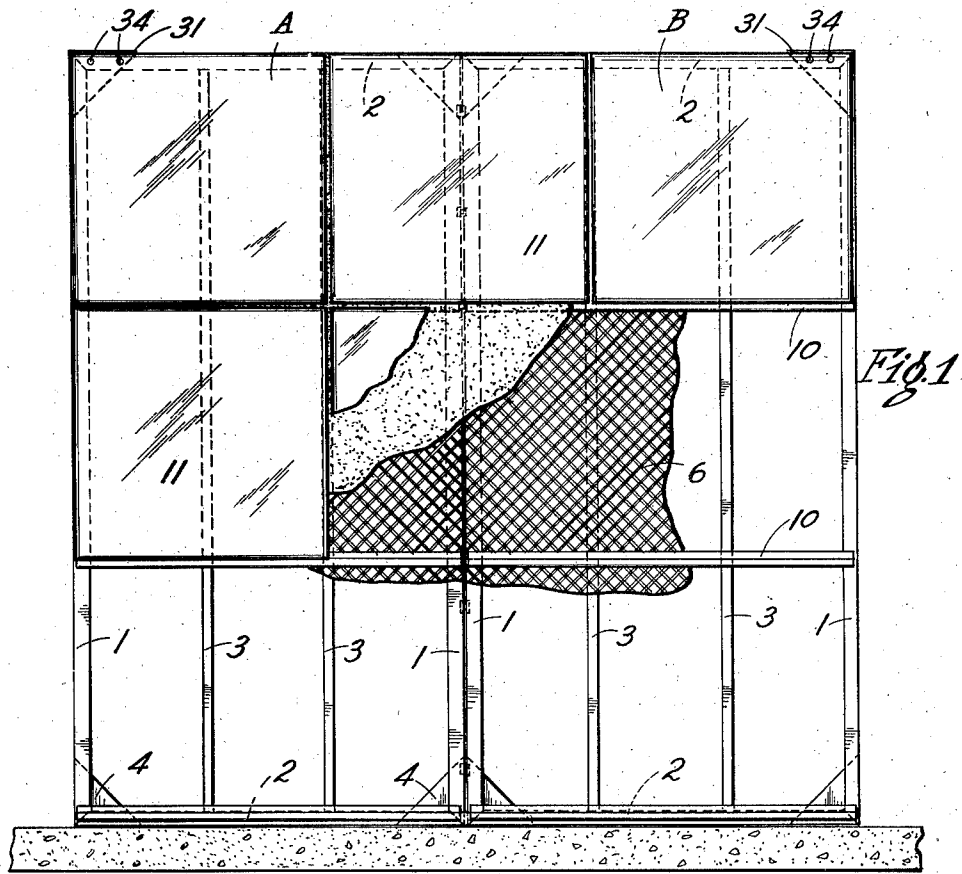


FIG. 2

FIG. 3

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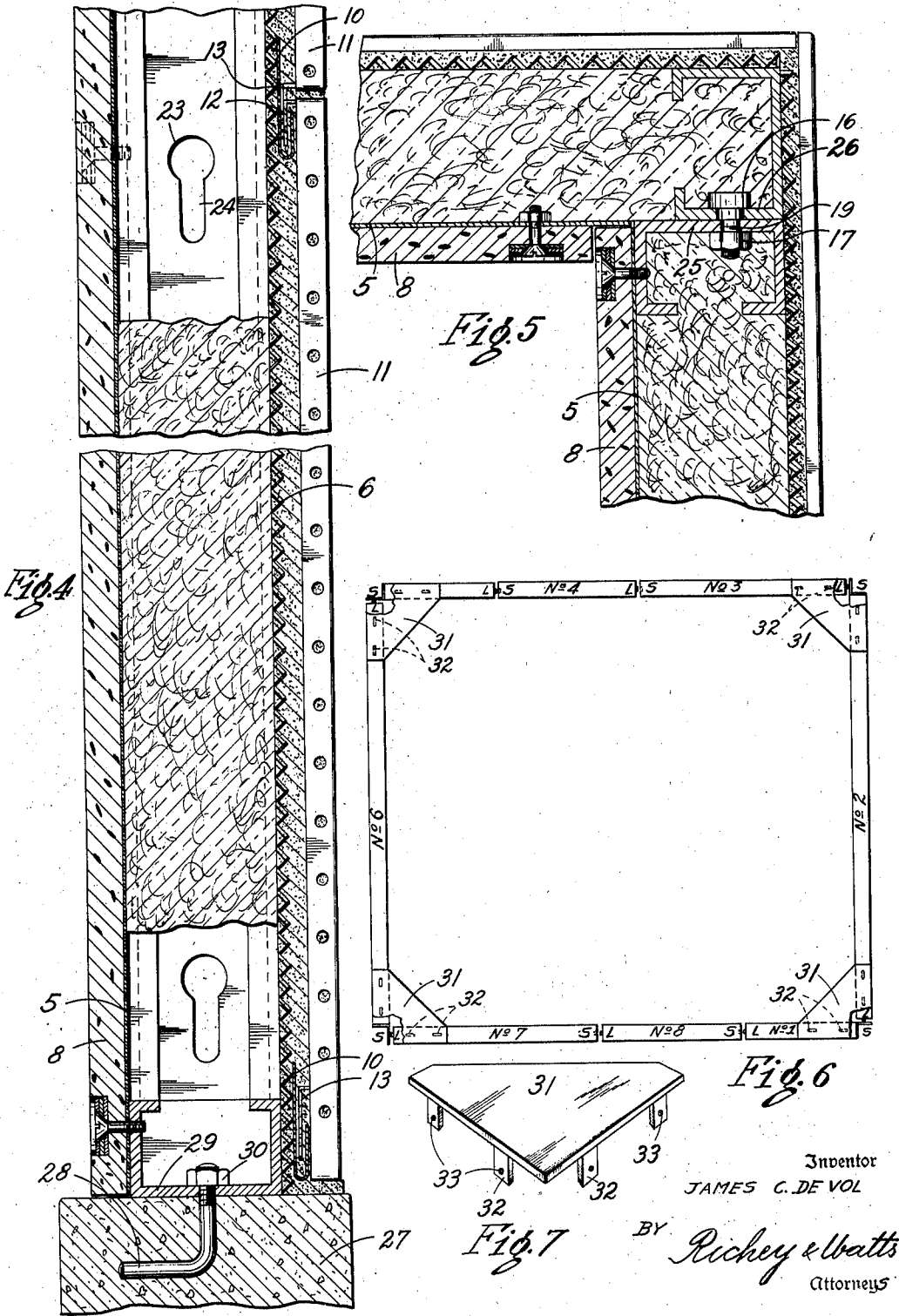
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

1,983,020

## BUILDING CONSTRUCTION

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mesne assignments, to Ferro Enamel Corpora-  
tion, Cleveland, Ohio, a corporation of Ohio

Application October 20, 1932, Serial No. 638,696

6 Claims. (Cl. 72—16)

This invention relates to building construction and more particularly to an improved type of unitary building wall panel which is particularly adapted for economical quantity production in a shop and rapid and effective erection on the job.

It has recently been proposed to construct buildings having substantially all-steel frames and an outer surface covering of porcelain enameled shingles or sheets. This type of construction, and particularly this type of surface covering, possesses certain distinct advantages and has already been employed to a considerable extent not only in the construction of residences but also in the construction of gasoline stations and other commercial buildings.

It is among the objects of my invention to provide a building construction which is particularly adapted for this type of porcelain enameled exterior.

Other objects of my invention are: the provision of a panel type building construction unit having excellent heat and sound insulating qualities; the provision of a relatively light weight, rigid wall panel which may be economically constructed in a shop or factory and then conveniently shipped to the point of installation and erected in the desired building form with a minimum of skilled labor and at very low cost; the provision of rapid and effective means for joining the adjacent panels of a building of the type described; the provision of a building panel and means for joining adjacent panels together whereby standard size panels may be erected in any one of a number of suitable building forms.

The above and other objects of my invention will appear from the following description of a preferred form thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a building wall made up of two of my improved panels and covered with porcelain enameled sheets, a portion of the outer covering being broken away for purposes of illustration.

Figure 2 is a horizontal cross section of a building corner illustrating one form of my improved means for joining the panel units together and also showing the panel construction.

Figure 3 is a vertical sectional view taken on line 3—3 of Figure 2 and illustrating my lug and slot joint.

Figure 4 is an enlarged end section of one of my panel units showing the enameled sheets in place and part of the rock wool removed to show the slots in the side channels.

Figure 5 is a view similar to Figure 2 but show-

ing a modified form of corner construction particularly adapted for light building construction.

Figure 6 is a diagrammatic view illustrating a simple form of building and showing the arrangement of my panel units.

Figure 7 is a detached view of my removable corner bracing gusset plate.

In Figure 1 I have illustrated a portion of the side wall of a building. This side wall, or portion of a side wall, is made up of two of my panel units which are generally indicated at A and B. These panels are substantially the same except for the complementary connecting means and each comprises a frame having side channel members 1 and top and bottom channel members 2. These outside channels are preferably of standard section arranged with the web to the outside and the frame is preferably strengthened by vertically extending brace members 3 which may be of channel or other suitable cross section. The rigidity of the panel units A and B is increased by the corner gusset plates 4 and the entire panel unit structure so far described is preferably secured together by electric welding although rivets or bolts may be used if desired.

The side channels 1 of the panel A are formed with keyhole shaped slots (see Figure 4) and the side channels 1 of the panel B are provided with outwardly extending headed lugs (see Figure 3) which are adapted to fit in the keyhole slots in the adjacent panel B. This interlocking joint arrangement will be more fully described later but it will be seen from Figure 1 that the adjacent panels A and B are held in closely abutting relation.

Referring now to Figures 1, 2 and 5, my improved panels are built up on the frame work described above and, in the preferred form illustrated, include an inner covering sheet 5 of relatively thin sheet metal which is welded or otherwise suitably secured to the channels 1, 2 and 3 on one side of the frame. On the opposite side of the channel frame members is welded or otherwise suitably secured the metal lath covering 6. In the space between the sheet 5 and the metal lath 6 I prefer to place rock wool 7 or other suitable sound and heat insulating material. A sheet of asbestos wall board 8 of the type known commercially as Celotex, or other material having similar characteristics, is secured to the inner metal sheet 5 by means of screws or bolts 9 which preferably have their heads counter-sunk in the Celotex in order to give the desired smooth wall surface. Transversely extending supporting strips 10 of U-shaped cross section (see Figure 110

4) are welded or otherwise suitably secured on the outside of the metal lath 6. These strips 10 are spaced as shown in Figure 1 and are adapted to support and hold in position the porcelain enameled covering plates or sheet 11.

In building up my panel units I prefer to make them complete in the factory up to the point thus far described, that is, the completed frame work covered on one side with metal lath and on the opposite side with Celotex or the like and having a filler of rock wool and having the properly spaced supporting strips 10 secured to the metal lath. When the panels are erected on the job they are secured together in the position shown in Figure 1 by the lug and slot fastener arrangement to be later described. The entire outer wall surface is then preferably covered with plaster or cement and, before the plaster or cement sets, the porcelain enameled cover sheets 11 are placed in position. As seen in Figure 4 the cover sheets 11 are provided with top and bottom supporting and positioning hooks 12 and 13 which fit in the U-shaped strips 10 and serve to properly align and support the enameled panels. The cement or plaster fills the joints between the sheets 11 and assists in holding them firmly in position on the wall. As is clearly seen in Figure 1 the panels 11 are positioned so that they break the joint between the panels A and B. The plaster or cement covering also extends across the joint between panels A and B and thus a strong and weather proof construction is readily obtained.

In Figure 2 I have shown a corner arrangement in which an auxiliary channel member 14 is welded to the side channel 15 of the panel C. The headed lug 16 is secured to the web 14' of the channel 14 by the nut 17. This lug 16 engages a keyhole shaped slot in the channel 18 of the panel D. This lug and slot connection is illustrated in Figure 3 in which the reduced shank 19 of the lug extends through the web 14' of one of the side channels. The shank 19 is provided with a shoulder which abuts against the outside surface of the web 14' and the nut 17 is adapted to hold the lug firmly in position. The enlarged head 16 of the lug is made of a diameter such that it will freely pass through the enlarged upper portion 23 (Figure 4) of the keyhole slot and the shank of the lug is adapted to fit the downwardly extending smaller portion 24 of the keyhole slot. In joining two adjacent panel units together it is, therefore, only necessary to pass the enlarged heads 16 of the lugs through the portions 23 of the corresponding keyhole slots and then move the panels relatively until the shanks of the lugs are in position in the portions 24 of the keyhole slots and the heads 16 hold the panels firmly together. This arrangement is adapted both for joining adjacent side panels of a wall and also for joining the corner panels of the building. The construction shown in Figure 2 is particularly adapted for relatively large and heavy structures as the additional channel 14 reinforces the corner. It is seen that the metal lath 6 extends completely around the corner and it will be understood that the panels may be built up in the shop with the metal lath placed to give this complete corner covering or they may be made with the metal lath stopping at the end of the side channels and a small piece of metal lath may then be bent around the corner and secured in position on the job. The porcelain enameled cover sheets 11 extend to the apex of the corner thus forming a complete wall covering.

In Figure 5 a somewhat simpler form of corner construction is shown in which the lug member is secured to the web of the channel 25 and the corresponding keyhole slot is formed in the side face 26 of the channel of the adjacent panel.

As is seen in both Figures 2 and 5 the Celotex sheets 8 and the metal sheets 5 are cut to suitable lengths for the corner panel members so that a neat joint will be formed.

In Figure 4 I have illustrated a concrete foundation 27 in which are set the angle bolts 28 which extend up through suitable holes in the bottom channel 29 and which coact with the bolts 30 to hold the wall panels firmly in place on the building foundation.

Figure 6 illustrates diagrammatically how a simple building of rectangular form might be erected. In this figure the panels are numbered consecutively in the order in which they are to be set up and the ends of each panel marked with an "S" or "L" according to whether they carry slots or lugs. Thus, it will be seen that panel No. 1 carried a slot and its right hand end is engaged by the lug at the adjacent end of the panel No. 2. The opposite end of panel No. 2 carries a slot and the adjacent end of panel No. 3 carries a lug. Thus, the opposite ends of each panel are provided with slots and lugs respectively and when the panel 8 is finally placed in position the resulting structure will be completely locked together. Removable gusset plates 31 are preferably installed to strengthen the structure. As is seen in Figure 7 these gusset plates have downwardly extending legs 32 which are adapted to fit in corresponding apertures in the top channels of the panel members and which may be provided with holes 33 to accommodate locking pins 34 (Figure 1) for holding the gusset plates in position.

Although I have illustrated a portion of a solid wall it will be understood that in practice my panels are made with built in windows, door frames, etc. and are built in the sizes required to obtain the desired structure when erected.

My improved panel type building construction makes possible the economical erection of substantially weather proof, well insulated buildings in a very short time.

Although I have illustrated and described in considerable detail several embodiments of my invention it will be understood that modifications and variations may be made without departing from the spirit of the invention. For example, the exact order of the various layers of the panel units might be changed as in some instances it might be desirable to have a plaster inner coating as well as a plaster outside coating. For this reason I do not wish to be limited to the specific building construction shown and described but claim as my invention all embodiments thereof coming within the scope of the appended claims.

I claim:

1. A unitary panel for building wall construction comprising a frame of metallic channel members or the like, a relatively thin sheet metal covering secured to one side of said frame, a sheet of fire proof heat insulating material of substantial thickness secured to said thin metal sheet, a covering of metal lath secured to the opposite side of said frame, the space between said metal lath and said thin metal sheet being filled with rock wool.

2. In a building construction a wall formed of a plurality of unitary panels, said panels having

their adjacent side edges provided with headed lugs and keyhole slots adapted to interfit and secure the panels together, the outer face of said panels being formed of metal lath, a layer of plaster covering said metal lath, and a plurality of porcelain enameled plates set into said plaster surface, and horizontally extending supporting members secured to said metal lath and adapted to support said porcelain enameled plates.

3. A building wall construction comprising a plurality of panel units in edge abutting relation, said panel units being provided with coacting slots and lugs formed in their adjacent side edges and parallel horizontally extending U-shaped members secured to their outer surfaces and having porcelain enameled sheets secured to the outer surface of the wall by said U-shaped members and breaking the joints between said plurality of panel units.

4. Building construction comprising a plurality of panel units arranged in abutting relation and secured together at their abutting edges, each of said units having a plurality of horizontally extending U-shaped strips secured to the outer surface thereof, and a plurality of porcelain enam-

eled sheets supported by said U-shaped strips disposed on the outer surface of said panel units and adapted to break the joints between the adjacent panel units.

5. Building construction comprising a plurality of panel units arranged in abutting relation and secured together at their abutting edges, a plurality of porcelain enameled sheets disposed on the outer surface of said panel units and adapted to break the joints between the adjacent panel units and means for supporting said sheets in position on the surface of said panels.

6. Building construction comprising a plurality of panel units arranged in abutting relation and secured together at their abutting edges, a plurality of porcelain enameled sheets disposed on the outer surface of said panel units and adapted to break the joints between the adjacent panel units and means for supporting said sheets in position on said panels, said means including transversely extending supporting strips secured to said panel units and hook members on said enameled sheets adapted to engage said supporting strips.

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5	80
10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150