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D. BROWN

2,023,989

BUILDING CONSTRUCTION

Filed Feb. 2, 1934

3 Sheets-Sheet 1

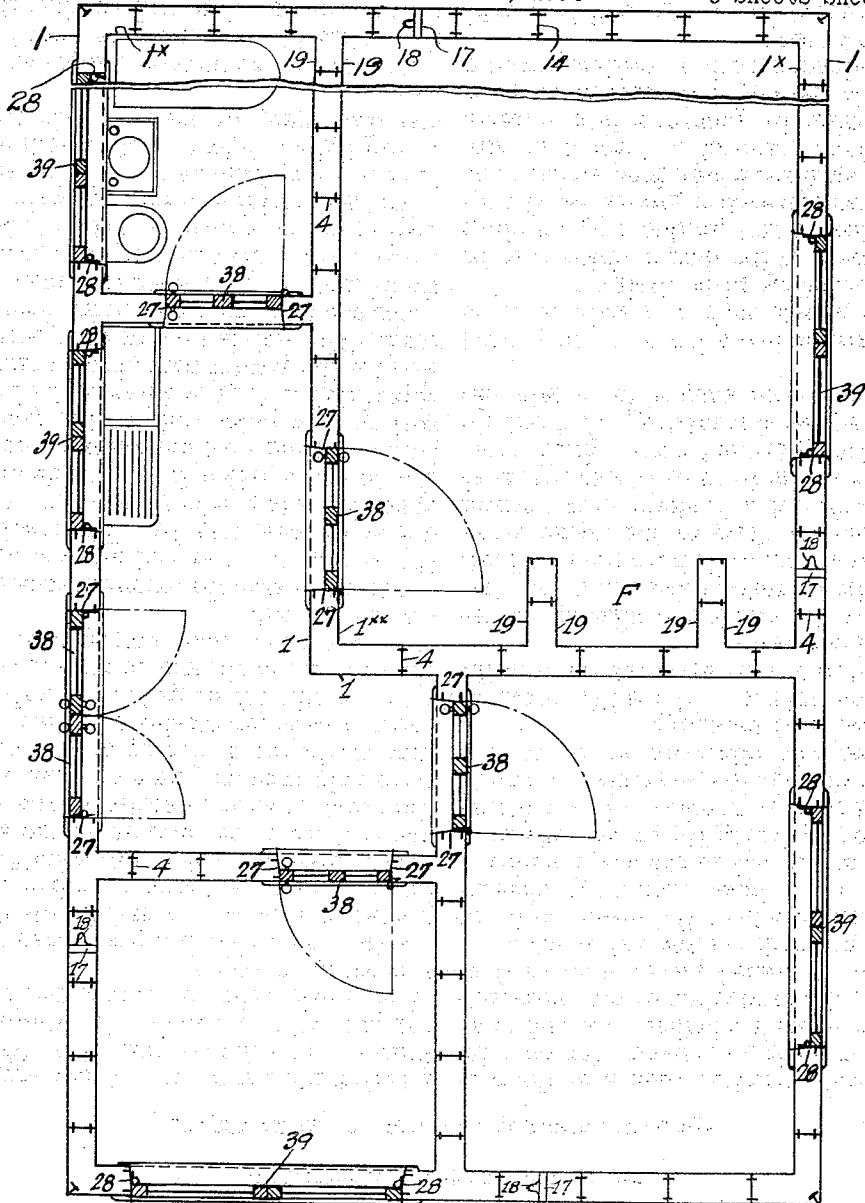


Fig. 1.

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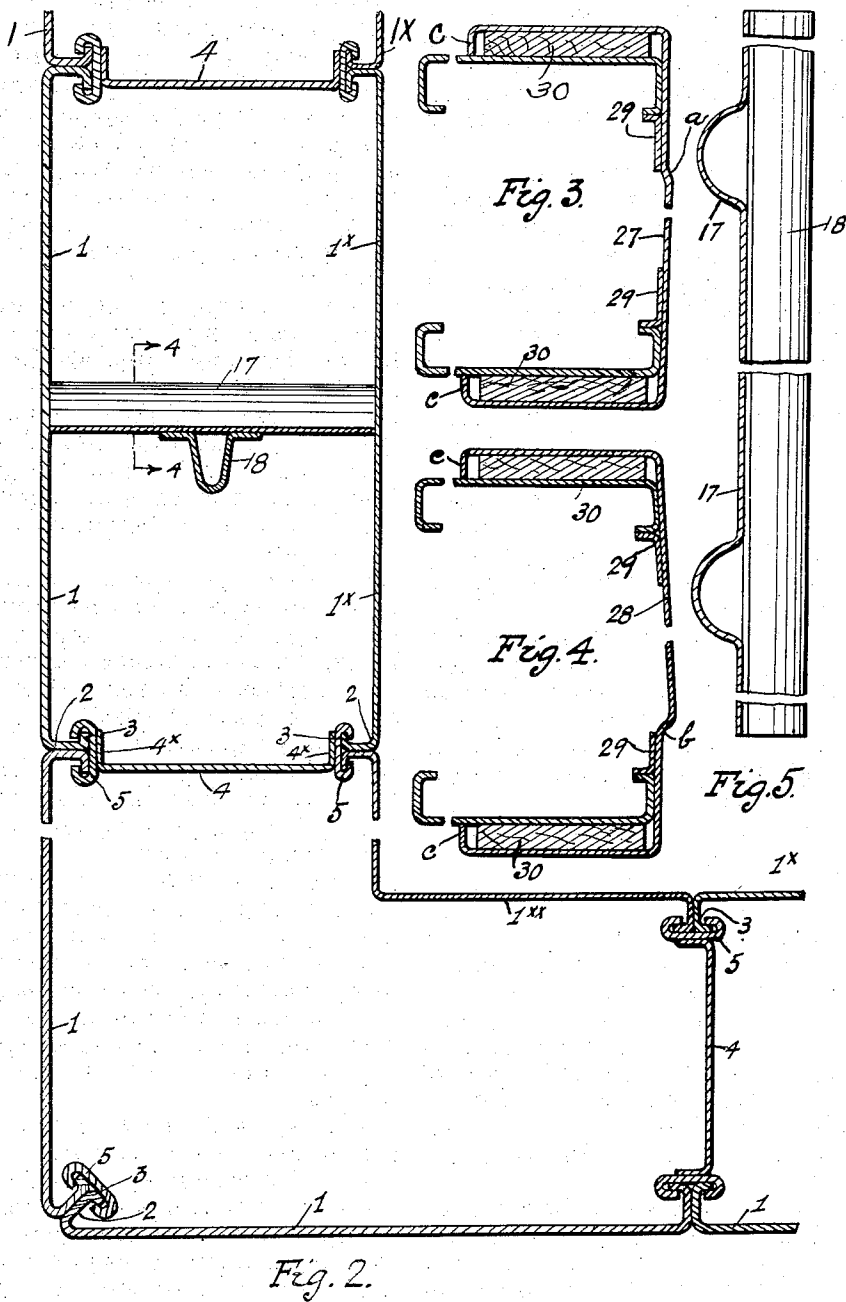
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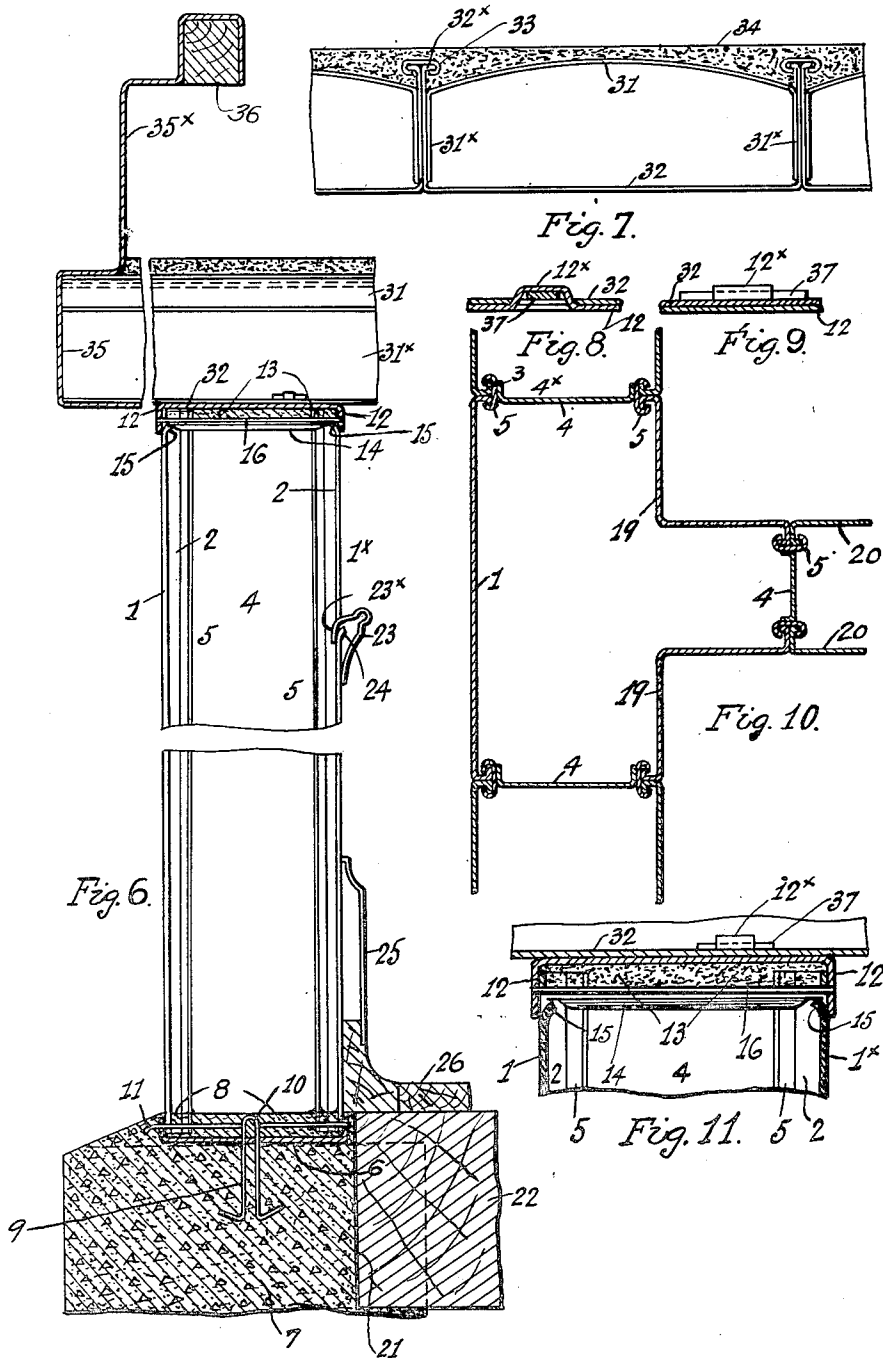
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3 Sheets-Sheet 3



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BUILDING CONSTRUCTION

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3 Claims. (Cl. 189—1)

This invention relates to building construction, and has for its object to provide an improved system of construction wherein standardized elements of pressed or drawn sheet metal are employed with consequent reduction in cost, labor and time for erection as compared with brick, stone or concrete buildings.

The primary object of the invention is to provide a building construction in which the wall and partition members may be assembled and locked in position without the use of connecting members other than the units themselves. That is to say, bolts, screws, and welding operations are eliminated in assembling the walls and partitions, so that the building may be very rapidly constructed and after construction may be rapidly disassembled for re-erection at another place.

In a constructional system in accordance with my invention the walls, partitions, floors and roof, or any of them, are formed of abutting air-tight cavity panels, each comprising a pair of face members spaced and maintained in parallel relationship by perpendicular end or side members which carry the means for connecting said face members together. The end members interlock with the face members in such manner that when opposed sets of face members are placed in position, the face members are not only connected, but the sides are mutually connected by sliding an end or side member into position, the connection being permanent without the use of bolts, screws or fastening members.

The panels may be closed at top and bottom by channels sealed with bitumen or the like to render air-tight and weatherproof the joints between the tops and bottoms of said panels and said channels. The top and bottom channels are anchored to the foundations and to the upper floor or roof panels respectively. The floor or roof panels are interlocked side by side in similar fashion to the wall or partition panels, their ends being closed by overlapping plates of channel form.

The invention will be described with reference to the accompanying drawings, in which

Fig. 1 is a sectional schematic plan view of a building constructed in accordance with the invention.

Fig. 2 is a sectional plan of a portion of an exterior wall.

Figs. 3 and 4 are similar views showing the construction adjacent to a door and window respectively.

Fig. 5 is a section on the line 4—4, Fig. 2.

Fig. 6 is a vertical section of an exterior wall showing the foundation and roof or first floor construction.

Fig. 7 is a transverse section of the roof or ceiling.

Figs. 8 and 9 are sectional elevations at right angles showing one method of attaching the ceiling or roof to the wall.

Fig. 10 is a sectional plan showing the connection of an inner partition to the outer wall.

Fig. 11 is an enlarged vertical section of the upper portion of a wall assembly showing the roof or first floor connections.

Referring to the drawings, the exterior walls are constructed of vertical air-tight cavity panels, each comprising two lengths of sheet metal forming face members 1, 1x, the vertical edges of which are flanged at 2, and internally lipped at 3, said face members being spaced and maintained parallel by sheet metal end members 4 of corresponding length, the vertical edges of which are flanged at 4x. C-shaped strips 5 are welded to the flanges of the end members 4, said strips being at right angles to the end members and being adapted to receive the lips 3 of the face members as shown. The strips 5 serve to seal and also to connect abutting panels together.

The bottoms of the panels are received in sheet metal channel members 6 (Fig. 6) supported by a concrete foundation 7, a filling 8 of bitumen or the like being applied to render airtight and weatherproof the joints between the bottoms of the panels and the foundation channel members.

The channels 6 are anchored by flanged U-shaped members 9 sunk in the concrete, said members projecting through holes in the channel members. Wedges 10 are inserted in the loops formed by the upper ends of the members 9, and transverse pins 11 are passed through the panels, and the flanges of the channel members 6 at intervals to anchor the panels to said channel members. The tops of the panels are closed by sealing plates 12 which enclose a layer of bitumen or other plastic filling material 13 supported by plates 14 resting on intumed projections 15 punched out of the face members 1, 1x of the panels, said sealing plates 12 comprising sheet metal channels, the flanges of which are secured to the panels by transverse pins 16 at intervals.

The face plates 1, 1x, may be engaged with the clips 5 of the end members 4 by entering the lipped edges of the face plates edgewise into the clips and swinging the face plates into proper position, or the end members may be inserted

vertically after the face plates have been positioned.

Transverse stiffeners may be inserted in the panels intermediate of the end members 4 during erection, if desired, said stiffeners comprising horizontally corrugated or bulged plates 17 spot welded to vertical V-shaped upright sections 18 as shown in Figs. 2 and 5.

The vertical corners of the walls are formed by panels each composed of an internal face plate 12x bent to form a right-angled corner and a pair of external face plates 1 disposed at right angles, the abutting lips 3 of which are connected by a C-shaped strip 5. Vertical strut-plates (not shown) disposed at 45° may, if desired, be inserted to strengthen the corners.

The interior partitions of the building are constructed in exactly the same way as the exterior walls except that they are of less thickness. Fig. 10 shows how the ends of the partitions are connected to the outer walls, 19 being internal face plates bent at right angles and connected to the face plates 20 of the partition by clips 5 carried by end members 4.

It will be observed that the walls and interior partitions are formed of a series of hermetically sealed vertical cavity panels, which, if desired, may be filled during erection with any suitable material which is a non-conductor of heat and cold (for example, cork dust or peat moss), thereby converting the separate panels into sealed insulating boxes. The sealing of the panels prevents corrosion of their inner surfaces.

The vertical cavity panels may conveniently be twelve inches wide by ten feet high with a space of six inches between exterior and interior face members for the outer walls and four inches for the interior partitions.

Where concrete foundations are used, they may conveniently be moulded in well-known manner. Recesses 21 (Fig. 6) for the ends of wooden joists 22 may be moulded in the foundation by means of suitably spaced formers. 23 is a beaded picture rail made in lengths suitably connected together, said rail having rearwardly projecting hooks 23x at intervals adapted to be thrust through apertures in the face plates 12 of the wall panels to engage behind out-turned projections 24 thereon. 25 is a metal skirting board which may be similarly mounted. The joists support the floor boards 26 in the usual way.

Vertical door frames 27 (Fig. 3) and window frames 28 (Fig. 4) are provided, said frames being of channel section and of depth to suit the thickness of the wall or partition into which they are fitted. They are recessed at a and b respectively to accommodate the door or window and their flanges are lipped at c.

The frames are adapted, during assembly, to be engaged with the face plates of the panel last erected, the lipped flanges of which bear against stops 29 welded on the inside of the frames. The panels above the door frames and above and below the window frames are reduced in height to suit, and closed in similar fashion to the wall panels illustrated in Fig. 6.

The door and window frames lock the shorter panels in position and are themselves locked in position by the abutting full-length panels. The portions of the door and window frames which overlap the face members of the adjacent panels may be stiffened by creosoted wood filling pieces 30 as shown. The doors and windows, which are preferably of metal, are mounted in their frames in any suitable manner.

Projecting panels are formed in the interior partitions to receive fireplaces where desired, and the flues and chimneys may pass through the cavities of convenient panels, said panels being lined with concrete.

The ceilings and upper floors or roof are formed of sealed horizontal panels as shown in Figs. 6 and 7, each panel comprising an arched plate 31 with depending side flanges 31x bearing on a plate 32 with upstanding side flanges which are lipped at 32x and held together by C-shaped strips 33 in similar fashion to the panels of the walls and interior partitions. A layer 34 of bitumen or like plastic filling material is applied over the tops of the arched plates 31 and the C-shaped clips 33 to form the floor or roof.

Where the span of a roof or floor is considerable, the flanges of members 31 and 32 are increased in depth to carry the load and reduce deflection.

The roof is conveniently graded to drain towards a central point, and the drainage may be discharged by a pipe (not shown) within a convenient partition panel which may be filled with concrete.

The ends of the upper floor and roof panels are closed by end plates 35 of sheet metal which overlap the ends of the plates 31, 32, said end plates being of channel form and of depth equal to the total thickness of the roof or floor. The end plates 35 bind and hermetically seal the ends of the upper floor and roof panels and form similar cavity panels to those of the walls. The upper floor and roof panels can be similarly filled in with suitable material of a non-conducting nature.

The end plates 35 of the roof panels may be extended upwards to form a vertical parapet 35x around the roof. The upper edge of the parapet may be flanged and formed with an inverted channel into which is fitted a horizontal wood location bar 36.

The upper floor and roof panels 31, 32, are located in proper position and anchored to the wall and partition panels by wedges 37 passed through loops 12x punched out of the sealing channel plates 12 of the wall and partition panels, said loops projecting inwards through holes punched at intervals in the plates 32 of the upper floor and roof panels as shown best in Figs. 8, 9, and 11.

It will now be seen that, by my invention I provide a system of building construction employing standardized elements of pressed or drawn sheet metal, such standardized elements being suitable for any size of building and making it possible for an architect to design any size of building having component parts the sizes of which are multiples of the standard elements. The walls, interior partitions, upper floors and roof are composed of closed cavity panels which, being airtight, are not subject to internal corrosion. Moreover, the still air within said panels will act as thermal insulation. As the abutting panels provide a practically continuous flat surface with no exposed raw edges, internal plastering may be dispensed with. The necessary apertures for pipes and electric wiring can be readily punched in the face members of the panels during manufacture. The construction is fireproof, and can be completely erected without the use of rivets or like fastening means, the whole assembly of wall and partition panels, door and window frames and floor and roof panels being interlocked in course of erection. My improved method of erection makes it possible to take down the build-

ing piece by piece in the reverse manner to that in which it was erected and without damaging the plates or other elements.

Where the weight to be carried by the cavity panels is considerable, they may be suitably reinforced internally and filled with concrete, and they may also be filled with concrete where heat may be present, for example, adjacent to fireplaces.

10 In Fig. 1, I have shown a horizontal section of a cottage constructed in accordance with the invention, the same being largely a schematic view. Doors are indicated at 38 hinged to end plates 27 and casement windows are shown at 39 hinged

15 to the end plates 28. A fireplace is indicated at F.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, what I claim and desire to secure by Letters Patent, is as follows:

20 1. A building construction comprising abutting sets of panel members, each set comprising a pair of opposed spaced sheets, the sheets being formed with perpendicular marginal lock flanges, having 25 intumed lips, and perpendicular spacing-tie members, each tie member being a sheet extending substantially the length of the panel members carrying at its lateral margins C-shaped strips engaging with and throughout the lengths of the 30 lips of the flanges of two abutting sets of panel

members for locking the same together and closing communication between said panel members, the spacing tie members and panel members bounding contiguous insulation chambers.

2. A building construction comprising abutting 5 sets of panel members, each set comprising a pair of panels, each formed with a longitudinally extending marginal L-shaped flange, the flange of one panel being projected toward the other, and perpendicular tie members, each comprising a 10 sheet extending longitudinally of said abutting panels and carrying at each margin a C-shaped strip very substantially greater in area longitudinally of the panels than in width, each strip being adapted to interlock with the flanges of two 15 abutting panels, said perpendicular tie members thus being adapted for holding the pairs of panel sheets of two sets of panel members spaced and in interlocked relationship and affording walls of substantial area between and transversely of the 20 panels.

3. A building construction in accordance with claim 2 and in combination with reinforcing means applied between a pair of panel sheets and adapted to be held in position by the locking ac- 25 tion of said tie members and comprising abutting plates, the plates being arched one transversely of the second plate.

DONALD BROWN.

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