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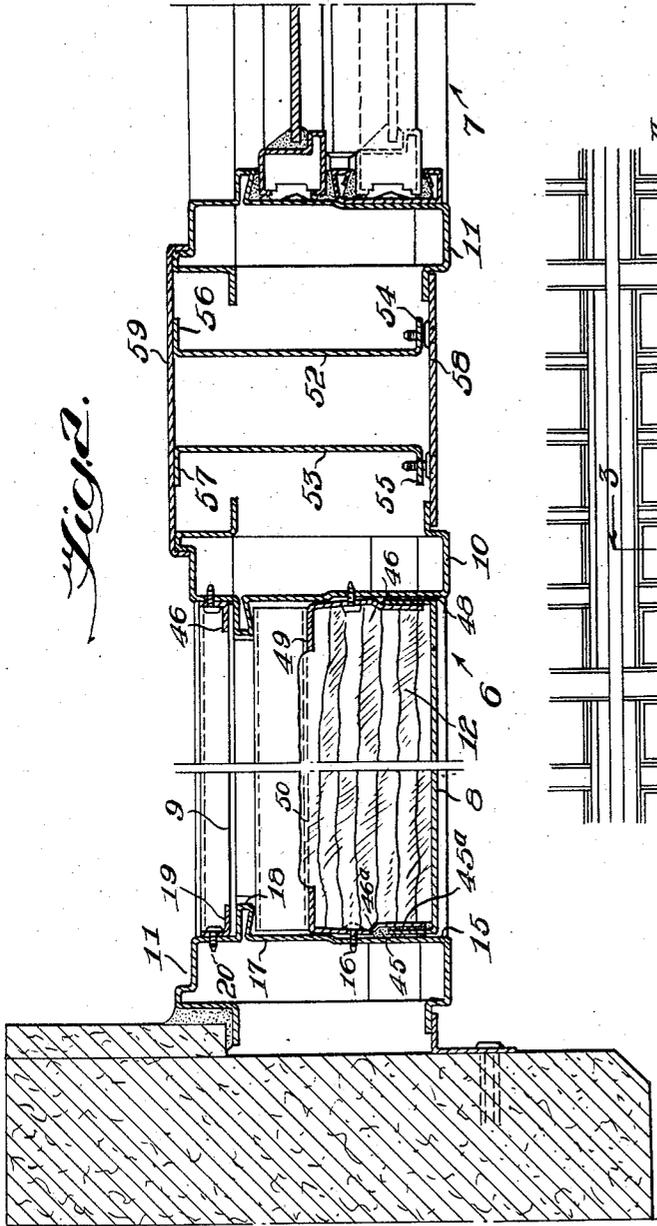
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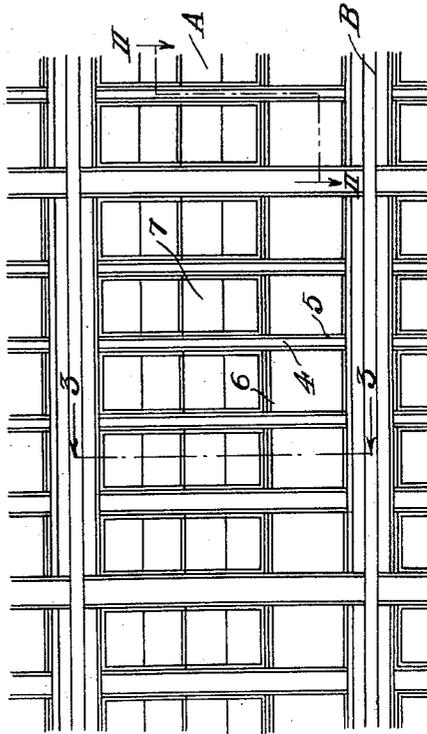
INSULATED LAMINATED BUILDING PANEL

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2 Sheets-Sheet 1



*Fig. 2.*



*Fig. 1.*

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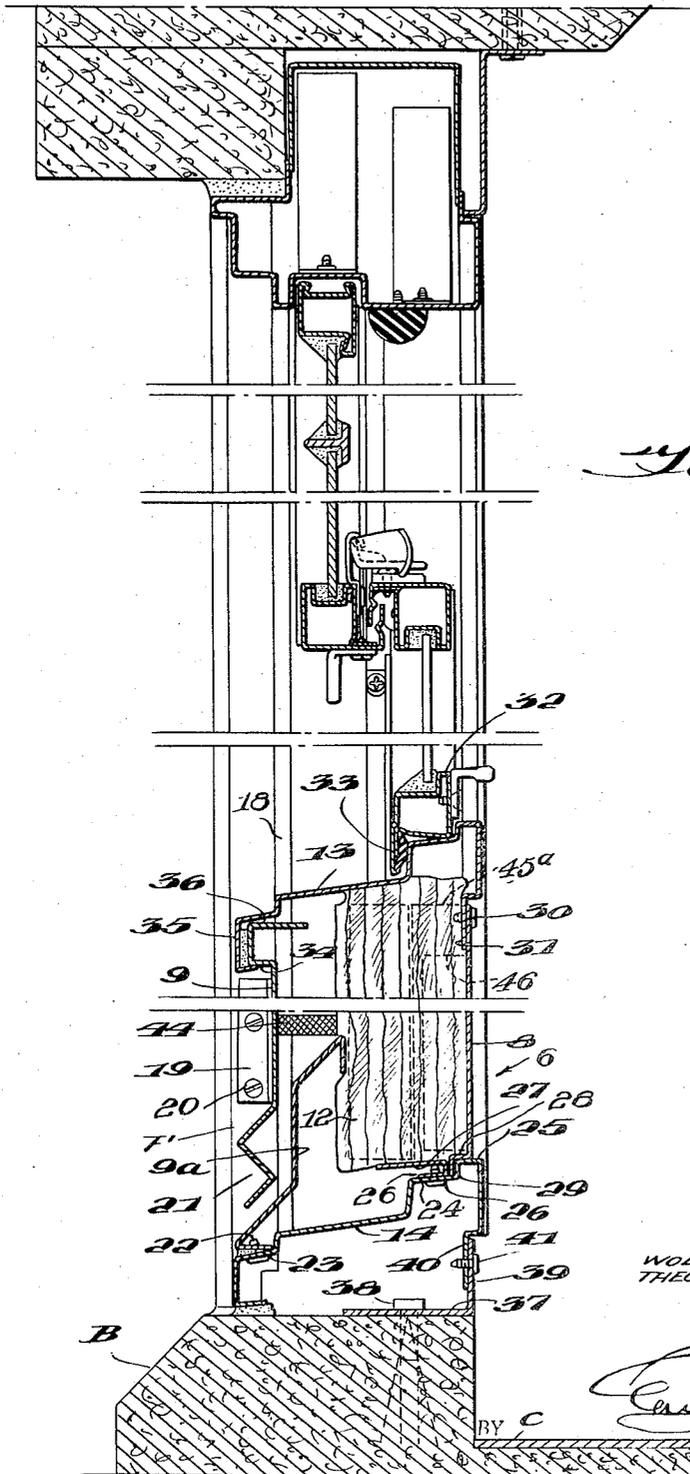


Fig. 3.

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## INSULATED LAMINATED BUILDING PANEL

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5 Claims. (Cl. 189-34)

The present invention relates to an insulated laminated metal building panel.

Heretofore, walls such as are required for large buildings to provide structural strength, insulation and waterproof properties have usually been constructed of masonry. For example, the usual masonry wall may be approximately twelve inches thick, that is, four inches of brick, six inches of backup and two inches of furring, lath and plaster. This construction is built by a large crew of laborers using elaborate scaffolding construction and such twelve inch thick masonry structures have an assembly weight of approximately 78.16 pounds per square foot. Masonry construction is expensive in the first instance because of relatively expensive building trades field labor and also because this type of construction requires additional cost in foundation over constructions having less weight per unit of wall area. Thus, reduction in cost is effected by getting the wall units, or the principal portions thereof, pre-assembled so that the assembly time at the job site is kept to a minimum.

It is an object of this invention to provide a novel all metal panel for assembly on the job site, whereby all wall masonry construction is eliminated completely.

The development of the present insulated metal panel has resulted in the formation of an exterior corrugated or crested portion that permits "breathing" or the free flow of air into the panel while still preserving the insulating and weathering characteristics of the panel. These attributes have not been attained heretofore.

Accordingly, another object of the invention is to provide a novel laminated insulated panel, whereby the above advantages are obtained.

A further object is to provide a novel positioning and mounting system for insulation material between metal sheets in a laminated panel.

Also generally an object is to provide an economical light weight panel for building wall constructions having the many foregoing attributes.

Many other objects and advantages of the present invention panel will become apparent from the following detailed description when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a front elevational view of a building wall including the present invention novel insulated metal building panel.

Fig. 2 is a sectional view taken along line 2-2 of Fig. 1 and through a concrete side wall of a building structure to which the panel is anchored.

Fig. 3 is a sectional view taken along line 3-3 of Fig. 1.

In the following description like numerals throughout the several figures designate similar parts in the drawings.

Referring in detail to the drawings and first with particular reference to Fig. 1, there is disclosed a complete building wall A disclosing a concrete floor sill B with a finished floor level C, see Fig. 3. The building wall A comprises a plurality of spaced apart vertical mullions 4, and each of the mullions connect with vertical elongated frame members 5. Between frame members 5 and

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connected suitably thereto are the novel insulated metal panels 6 of this invention and vertically aligned windows 7.

The panel 6 is comprised for the most part of sheet metal elements, namely, an interior plate 8, preferably of galvanized steel, bonderized and painted, exterior upper and lower plates 9 and 9<sup>a</sup> each having corrugated or crested portions, preferably coated with porcelain enamel, side frame members 10 and 11 proportioned and shaped so as to maintain the plates 8 and 9-9<sup>a</sup> in spaced apart relation with a sheet of insulation 12 therebetween. The insulation is preferably a preformed sheet of glass fiber, see Figs. 2 and 3. In addition to the side frame members are cooperating top and bottom frames 13 and 14, respectively, see Fig. 3.

As illustrated, the side frames 10 and 11 may be continuous and thereby serve as the side supporting frame for the windows 7 as well as the insulated panels 6. In any event these frame members are formed from sheet metal into a predetermined hollow formation having an interior side with two surfaces, namely, a first surface 15 formed with threaded openings for threaded bolts 16 and a second surface 17. The first surface 15 is counter-sunk with respect to the second surface 17, see Fig. 2, and surface 17 of each side frame 10 and 11 is formed with a projecting bead 18 formed by any suitable moulding or metal bending process. This bead 18 is set back from the exterior edge of the respective side frames 10 and 11. When each side frame is in position the bead serves as a stop for the upper exterior plate 9, which is secured against the stop by angle bars 19 secured to the second surface 17 adjacent the said stops or beads 18, as for example by bolts 20, see Fig. 2.

The lower part of the upper plate 9 is bent into a crested or corrugated formation 21, see Fig. 2, with its free end spaced above the second lower exterior plate 9<sup>a</sup>. The lower plate 9<sup>a</sup> is likewise formed with a crested or corrugated configuration and is secured by rivets, bolts or the like numbered 22 to a surface or step 23 formed of the bottom frame member 14. The plate 9<sup>a</sup> is directed angularly upward and inward toward the interior plate 8 and into a holding position in contact with insulation 12 with its crested or corrugated portion spaced from the crested or corrugated portion 21 of upper plate 9.

The inner boundary surface of frame 14 is formed with tiers or steps starting with the step 23 and ending with the steps 24 and 25, which last two steps cooperate to mount the insulation 12 and interior plate 8. For example, step 24 has anchored thereto the flange 26 of a ledge or support plate 27 for supporting the insulation 12, and step 25 abuts shoulder 28 of the flange 29 of plate 8. Flange 29 seats between flange 26 and the riser to step 25 and plate 8 extends upwardly to be secured by bolts 30 to a flange 31 carried by the top frame member 13.

The top surface of frame 13 is made in identical step formation to frame 14. The step formation of frame 13 cooperates with the window frame 32 and its attached packing flange 33, while the under surface of the lower step of frame 13 curves under a shoulder 34 formed in the top flanged edge 36 of upper plate 9 at the exterior of the panel and is sealed therewith by a suitable mastic 35.

In mounting the interior plate 8, which is continuous, it may be necessary to adjust the same vertically for an accurate fit with respect to the upper window frame 32. To provide for this adjustment the floor sill B includes an angle brace 37 anchored by bolt 38 to the concrete structure, so that its vertical leg 39 extends upward vertically in adjusted lapped relation with respect to a downwardly extending vertical flange 40 from the rear of the step 25 of the frame 14. This lapped joint between

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flanges 39 and 40 is preferably vertically slotted and provided with securing means, such as bolts 41, which may be adjusted to permit vertical positioning of the parts.

The insulated panel by means of the crested or corrugated spaced plates 9 and 9<sup>a</sup> provides a breathing space leading into the insulation material and provides also for liberation of any water resulting from condensation or the like.

If desired, an elongated filter screen 44 may be positioned in the panel between the exterior plate 9 and the insulation 12, see Fig. 3.

The plate 8 is flanged on each side, namely, 45 and 46 and is made to fit between the countersunk surfaces 15—15 of the side frames 10 and 11, respectively, see Fig. 2.

The bolts 16, above referred to in connection with surface 17 of frames 10 and 11, serve to secure side anchor plates 45<sup>a</sup> in position on the side walls adjacent to surface 15. The anchor plates are formed with a spacing shoulder 46<sup>a</sup>, so that the flanges 45 and 46 of plate 8 can fit between the plates beyond the shoulder and be sealed therebetween by a gasket or suitable mastic material 48. The opposite end of each anchor plate 45<sup>a</sup> is angled inwardly toward the insulation 12 and formed with a retainer flange 49, which laps over the face edge of the insulation. The flange 49 of each plate 45<sup>a</sup> may be connected together by an insulation retainer strip 50, if desired.

Each mullion 4 is comprised of angle beams 52 and 53 with legs 54, 55, 56 and 57 turned outwardly at substantially right angles. The legs are anchored to cover plates 58 and 59 on the respective interior and exterior sides of the wall panel. The cover plates are formed to fit neatly in connection with the sides 10 and 11.

Thus, there is provided a novel laminated metal panel arrangement comparable with the conventional masonry constructions in insulation value and superior in many other respects, such as providing for construction and maintenance economy and interchangeability, as well as being vermin proof, fire resistant and self adjusting for weather variations and for slight misalignment of the wall frame members.

While only one embodiment of the invention is specifically shown and described in detail, it is to be expressly understood that there may be changes made in the individual parts, combinations thereof and methods of assembly without departing from the concept of the invention. To determine the scope of the invention reference should be had to the appended claims.

We claim:

1. A panel for building construction, comprising top and bottom frame members, opposite side frame members, an interior plate disposed within said frame members, and a pair of exterior plates disposed within said frame members in substantially laterally spaced relation

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to said interior plate and said exterior plates being in laterally spaced relation, a sheet of insulation disposed between said interior plate and the innermost one of said exterior plates, a pair of vertical step portions on said bottom frame member vertically supporting said sheet of insulation, and the innermost one of said exterior plates comprising an upwardly and inwardly directed portion whose inner edge is supportingly engaged with the outer side wall of said sheet of insulation, said laterally spaced exterior plates providing a ventilating opening therebetween in communication with said sheet of insulation.

2. A building construction panel according to claim 1, wherein said innermost one of said exterior plates includes an inwardly and upwardly directed lower portion whose lower edge is secured to said bottom frame member, and the outermost one of said exterior plates comprising a corrugated lower portion and including a free edge portion inclined inwardly and upwardly in parallel relation with and in spaced relation to said inwardly and upwardly directed lower portion of said innermost one of said exterior plates providing the mouth of said ventilating opening.

3. A building construction panel according to claim 2, together with a filter screen disposed between the outermost one of said exterior plates and said sheet of insulation and in a position adjacent the upper edge of the innermost one of said exterior plates.

4. A building construction panel according to claim 1, wherein said interior plate is provided with a shoulder on its lower edge which is supported on the innermost one of said pair of vertical step portions on said bottom frame member, said lower edge of said interior plate terminating in a vertical flange engaged with the outermost one of said pair of vertical step portions, and a generally U-shaped plate having one leg thereof secured to said outermost one of said pair of vertical step portions with the bight thereof engaged with said vertical flange and the other leg of said U-shaped plate being in supporting engagement with the lower face of said sheet of insulation.

5. A building construction panel according to claim 4, wherein the top frame member is provided with a horizontally inset vertical flange, and the upper edge of said interior plate lapping said flange and being secured thereto.

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