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R. F. MOTE
WALL CONSTRUCTION

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2 Sheets-Sheet 1

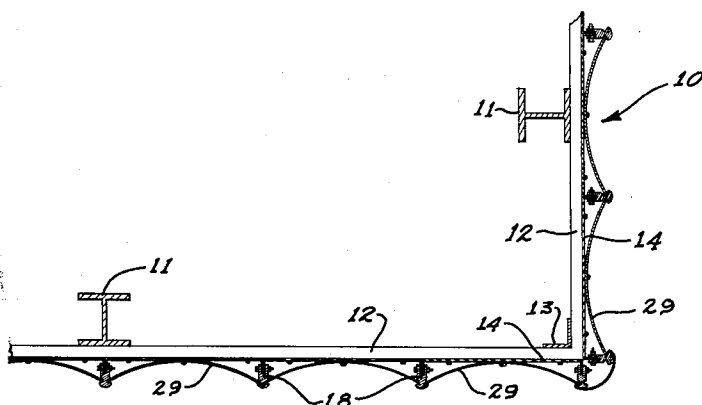


Fig. 1

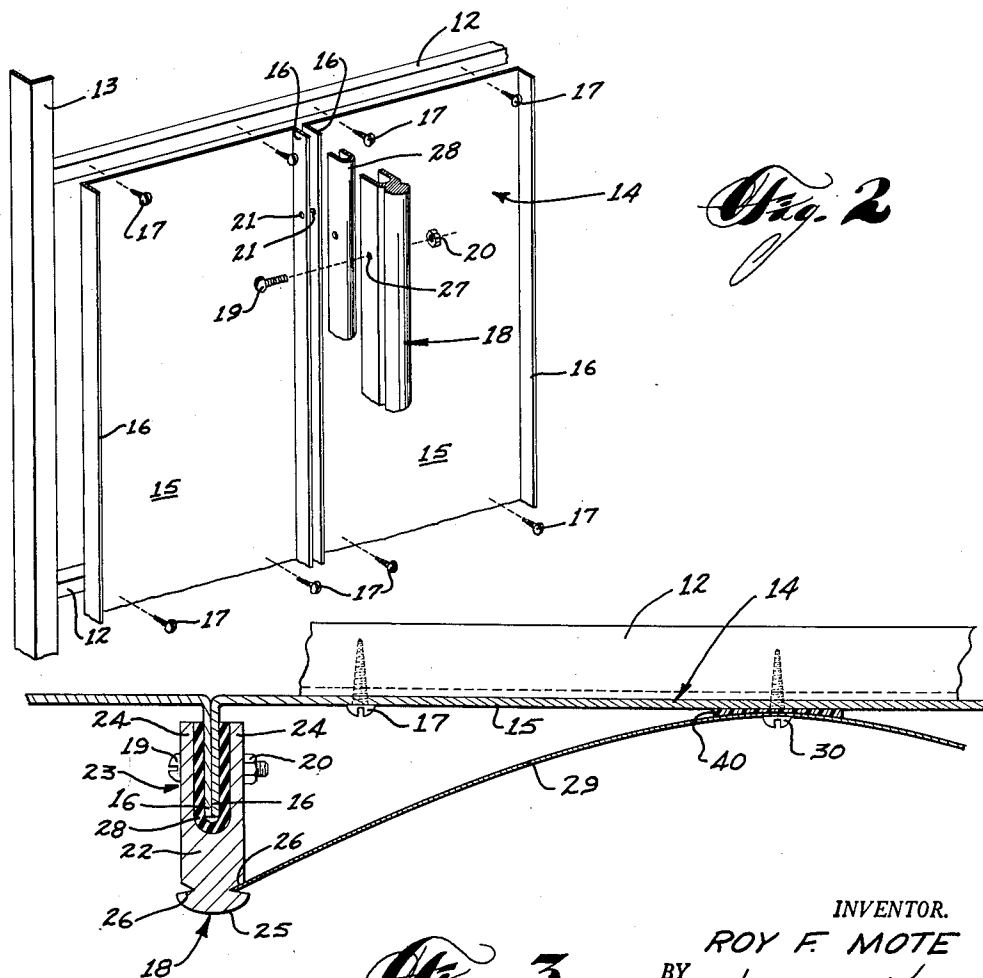


Fig. 2

Fig. 3

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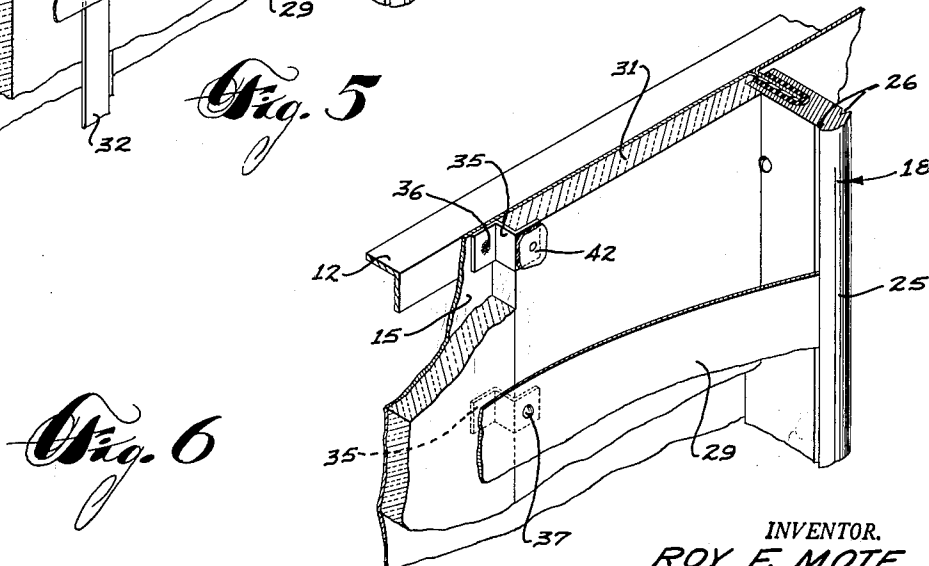
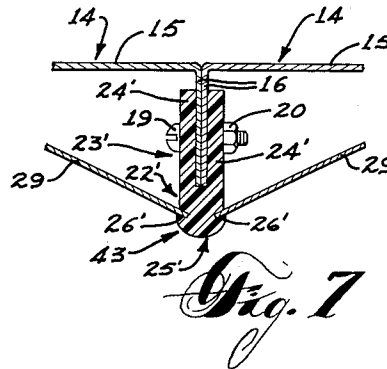
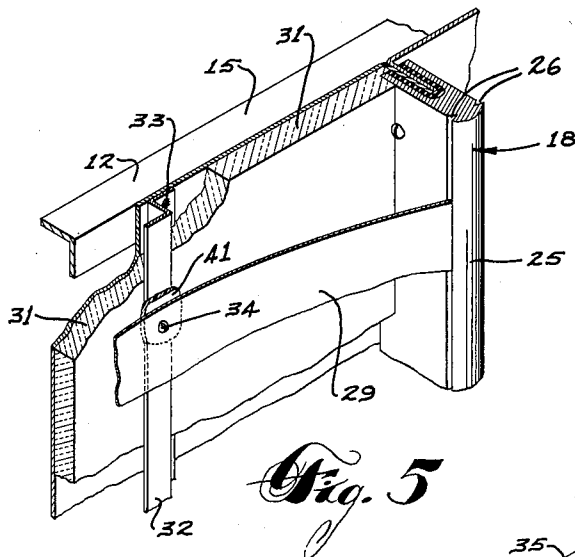
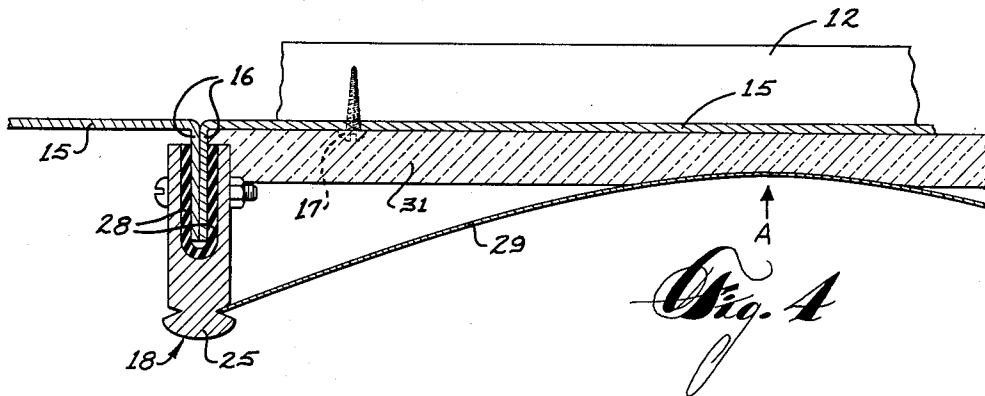
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WALL CONSTRUCTION

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6 Claims. (Cl. 189-34)

This invention relates to wall construction and more particularly to double sheathed walls.

According to the present invention, a plurality of channel shaped, metal inner pans is applied in outboard relation to the structural framework of a building skeleton (a) to serve as an inner metal sheath and also (b) to serve as spaced mounting posts for slotted vertical mullions. A plurality of bowed, normally flat outer facing sheets is provided between each pair of vertical mullions to serve as an outer sheath for the building.

The invention will be described by reference to the accompanying drawings in which:

FIGURE 1 is a cross-section plan view of the building wall of this invention taken along a corner of the building;

FIGURE 2 is an exploded perspective illustration of a pair of side-by-side inner pans and a portion of a slotted vertical mullion;

FIGURE 3 is an enlargement of a portion of the wall seen in FIGURE 1;

FIGURE 4 is a fragmentary cross-section illustration similar to that of FIGURE 3 showing an alternative embodiment of the present invention including a layer of insulating material;

FIGURES 5 and 6 are fragmentary perspective illustrations of alternative constructions embodying thermal insulating material interposed between the outer and inner sheathing sheets; and

FIGURE 7 is a fragmentary cross-section view of a plastic vertical mullion which can be employed in the present invention.

Referring to FIGURE 1 there is illustrated in cross section a plan view of a corner portion of a building 10 which includes as the skeletal framework structural elements such as vertical columns 11 and horizontal subgirts 12. A vertical angle column 13 may be provided in the building skeletal structure.

Secured to the subgirts 12 in outboard relation are a plurality of inner metal pans 14, more clearly seen in FIGURES 2 and 3. Each individual pan 14 is channel-shaped and includes a web 15 or central base and a pair of flange legs 16 extended at right angles to the web 15. The inner pans 14 are secured to the horizontal subgirts 12 by means of threaded fasteners 17 extended through the web 15 and through the subgirts 12. It will be observed that the inner pans 14 are assembled in side-by-side abutting relation with the flange legs 16 in lengthwise abutting contact.

A slotted vertical mullion element 18 fits over the abutting flange legs 16 and is secured thereto by means of a fastener such as a screw and bolt 19, 20 respectively which extend through the vertical mullion 18 and through drilled holes 21 in the flange legs 16.

The slotted vertical mullion 18 (FIGURE 3) includes a body portion 22, a slotted end portion 23 having parallel legs 24 and a crown portion 25. Opposed lateral grooves 26 are provided longitudinally between the crown portion 25 and the body portion 22. Openings 27 are provided through the parallel legs 24 to receive the screw 19. The slotted vertical mullion 18 may be an extruded section of aluminum, for example. Preferably a U-shaped strip of plastic material of low heat conductivity is provided between the legs 24 of the slotted vertical mullion 18 for thermal insulation and weatherproofing between the vertical mullion 18 and the flange legs 16.

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It will be observed that the spacing of successive vertical slotted mullions 18 along a building wall surface is determined by the width of the webs 15 of the inner pan sections 14.

An outer facing sheet 29 is provided in normally flat rectangular form. The outer facing sheet 29 is snapped into position between each pair of adjacent vertical slotted mullions 18 by positioning its parallel opposed edges within the grooves 26 of adjacent vertical slotted mullions 18.

The outer facing sheets 29 preferably are formed from metallic substances such as stainless steel, aluminum, porcelainized enamel metal sheets, painted metal sheets, plastic coated metal sheets, protected metal sheets, and plastic sheets such as glass-fiber-filled polyester resin sheets. The outer facing sheets 29 are bowed between the adjacent vertical mullions 18. The outer facing sheets 29 may be additionally secured to the building structure by means of a centrally positioned fastener such as a metal screw 30 which extends through the outer facing sheet 29 into a subgirt 12. Alternatively the fastener could comprise a simple pop-rivet. Preferably a pad 40 of plastic or fibrous material of low thermal conductivity is interposed between the outer facing sheet 29 and the web 15 to minimize through-conduction of heat therebetween.

From an external vantage point, the only visual elements of the present assembled wall are the outer crowns 25 (of the vertical mullions 18) and the outer facing sheets 29. It will be observed that the outer facing sheets 29 require neither forming nor shapping, i.e., they are utilized as normally, flat, rectangular sheets.

According to the modification illustrated in FIGURE 4, the outer facing sheet 29 is spaced apart from the web 15 whereby a batt 31 of insulating material (glass fibers, mineral wool fibers, foamed plastics, and the like) may be interposed between the outer facing sheet 29 and the web 15. It will be observed that the central portion A of the outer facing sheet 29 deforms the batt 31 which resiliently resists the deformation thereby serving to secure the outer facing sheet 29 in its bowed configuration.

Alternatively, as shown in FIGURE 5, a vertical Z-shaped channel 32 may be welded to the outer surface of the web 15 by means of spot welds 33. The outboard surface of the Z-shaped metal strip 32 serves as a fastening surface for the outer facing sheets 29 and also serves with the vertical mullions 18 to support batts 31 of insulating material. Of course, a screw could be employed in place of the weld 33. Fastening means such as a metal screw 34 or pop-rivet can be applied through the outer facing sheet 29 into the Z-shaped metal strip 32.

Preferably a pad 41 of plastic or fibrous material of low thermal conductivity is interposed between the outer facing sheet 29 and the outboard surface of the Z-shaped metal strip 32 to minimize through-conduction of heat therebetween.

In place of the vertical Z-shaped metal strip 32 of FIGURE 5, it is possible to use several Z-shaped metal elements, as shown in FIGURE 6 wherein a section of a Z-shaped element 35 is secured at each horizontal subgirt 12 by means of a spot weld 36 extending through the web 15. In place of the spot weld 36, of course, a screw could be employed. The outer facing sheet 29 is secured within the grooves 26 of the vertical mullions 18 as before and is fastened at its center portion by means of a screw 37 extending into the outer surface of the Z-shaped element 35. The Z-shaped elements 35 also serve to confine batts 31 of thermal insulating material. Preferably a pad 42 of plastic or fibrous material of low thermal conductivity is interposed between the outer facing sheet 29 and the outboard surface of the Z-shaped metal elements 35 to minimize through-conduction of heat therebetween.

The plastic material pads 40, 41, 42 may comprise a

small section of plastic tape or a fibrous pad adhesively secured over one of its surfaces to the metal structure.

Although not specifically illustrated herein, it will be apparent that the Z-shaped metal strip 32 also could be provided horizontally against the building skeletal framework instead of vertically as illustrated in FIGURE 4.

The split vertical mullion, as shown in FIGURE 7, may be fabricated by extrusion of plastic substances of relatively low thermal conductivity and substantial toughness. Referring to FIGURE 7, the vertical mullion 18' has a body portion 22', a slotted end portion 23' having parallel legs 24' and a crown portion 25'. Opposed lateral grooves 26' are provided longitudinally between the crown portion 25' and the body portion 22'. The vertical mullion 43' is secured to the abutting flange legs 16 by means of a screw 19 and bolt 20. The vertical mullion 43 serves as a barrier to any metal-to-metal through-conduction between outer facing sheets 29 and the pans 14 to minimize heat conduction through the wall.

Suitable plastic composition for the vertical mullions 43 include polyvinyl-chloride, epoxies, polyamides, polycarbonates and the like.

As illustrated in the drawings, all of the inner metal pans 14 have the same width. When these inner metal pans 14 are abutted and secured to the building skeleton, the flange legs 16 will be accurately spaced apart for subsequent assembly of the outer facing sheets 29. The actual distance between the longitudinal grooves 26 of the vertical mullions should be slightly less than the width of each individual facing sheet 29. This predetermined spacing will provide the desired bowed configuration of the normally flat facing sheets 29 when they are fitted into position.

Where the architectural features of the building provide panels of differing widths, then differing width-pans are provided which correspond to the architectural features of the building. The outer facing sheets 29 also would correspond in width to the architectural features. The inner metal pans 14 of the present invention permit the assembly of the building with accurately positioned vertical mullions even where the architectural features require differential widths.

According to the provisions of the patent statutes, I have explained the principle, preferred construction, and mode of operation of my invention and have illustrated and described what I consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. In a building structure having a skeletal framework of structural elements, an improved outer sheathing comprising in combination a plurality of abutting channels

formed from sheet metal and having a central base and a pair of outwardly projecting legs, said channels being vertically aligned in outboard relation to said skeletal framework and being secured thereto along each said central base, a slotted vertical mullion secured over abutting outwardly projecting legs of adjacent channels which legs are positioned within a vertical slot of said vertical mullion, fastening means for securing said vertical mullion to said abutting outwardly projecting legs, a plurality of normally flat facing sheets having parallel opposed edges, a lateral groove on each side of said vertical mullions for receiving a straight edge of one of said normally flat facing sheets, said facing sheets being resiliently confined along said opposed edges thereof in said lateral grooves of adjacent vertical mullions, the central portion of each said facing sheet being inwardly bowed and thereby retained.

2. The building structure of claim 1 wherein said abutting outwardly projecting legs are separated from said vertical mullion by means of a layer of thermal insulating material located within the said vertical slot of the said vertical mullion.

3. The building structure of claim 1 wherein said abutting outwardly projecting legs and said vertical mullion are secured together by means of a fastener extending through said abutting outwardly projecting legs and also through said vertical mullion.

4. The building structure of claim 1 wherein a fastener extends through said central portion of said facing sheet and also through the said central base of said channel to secure the said facing sheet in inwardly bowed relation.

5. The building structure of claim 1 wherein a vertical Z-shaped strip is provided having a central web and a first and second flanges, the said first flange being secured outboard to the central portion of the said central base and the said facing sheets being secured at their central portion to the said second flange.

6. The building structure of claim 5 including thermal insulating material interposed between the said channels and the said facing sheets, said thermal insulating material being supported between a said vertical mullion and a said Z-shaped strip.

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