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Barbera

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[54] **BUILDING WALL CONSTRUCTION**

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[52] **U.S. Cl.**..... **52/426,** 52/481, 52/562

[51] **Int. Cl.**..... **E04b 2/28,** E04b 2/40, E04b 2/30

[58] **Field of Search**..... 52/314, 435, 426, 52/438, 495, 481, 496, 562, 667, 668, 315, 383, 414, 423, 424, 428, 434, 506, 568

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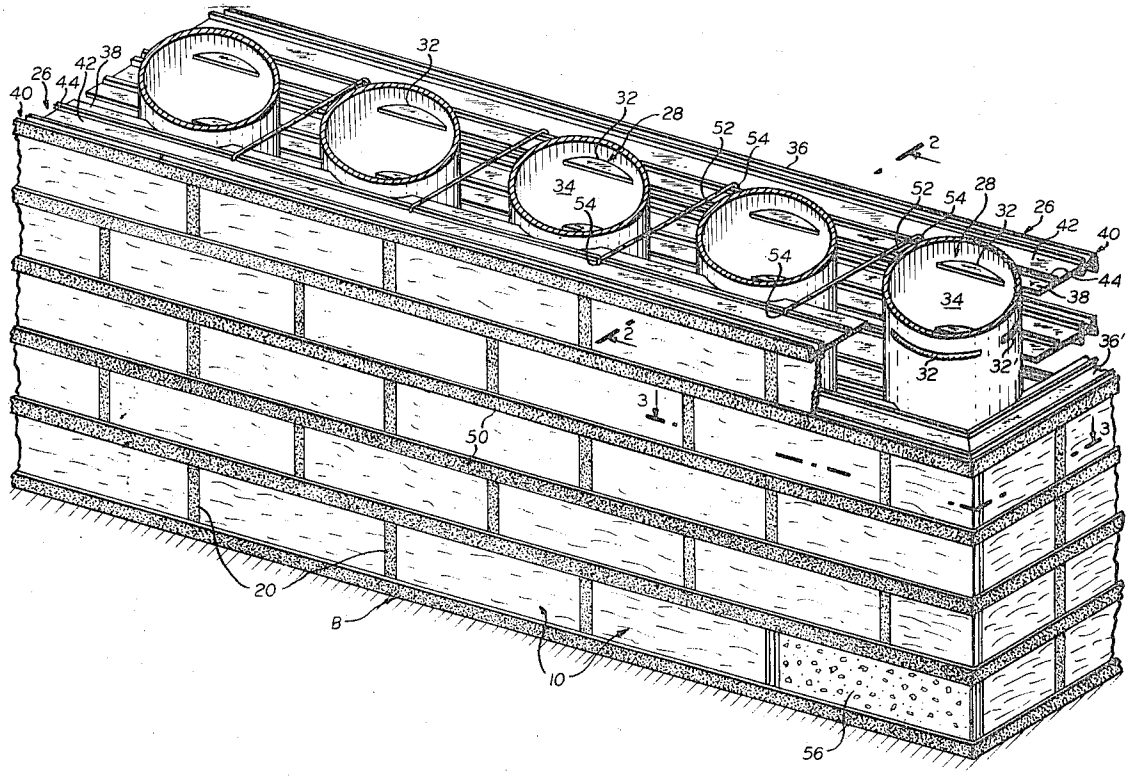
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[57] **ABSTRACT**

A building wall construction that includes a plurality of panel elements which are mounted on a slotted supporting structure to form a wall portion thereof, or which are mounted on opposed surfaces of said slotted supporting structure, in spaced apart relation, to form a spaced wall construction.

7 Claims, 8 Drawing Figures

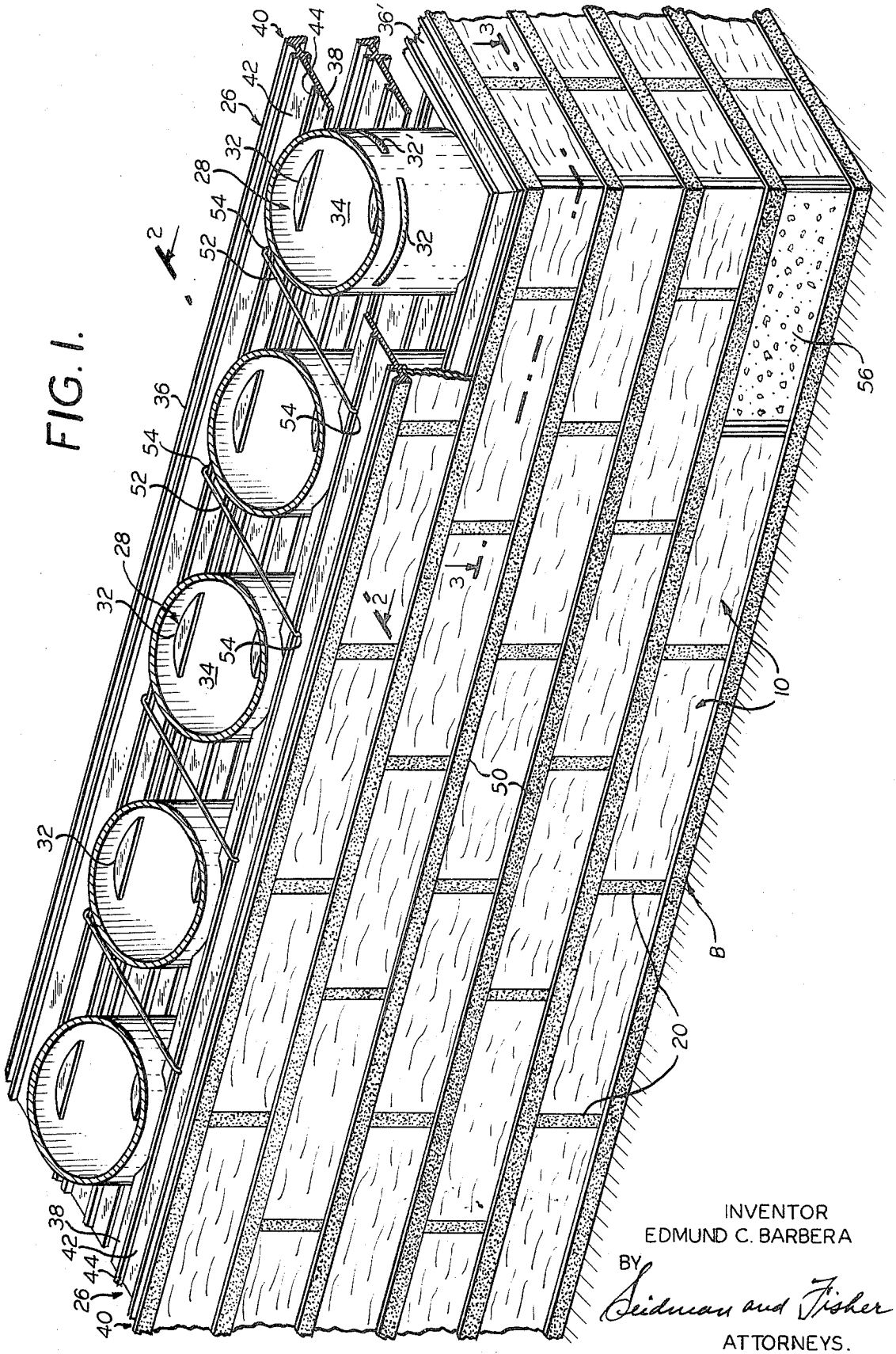


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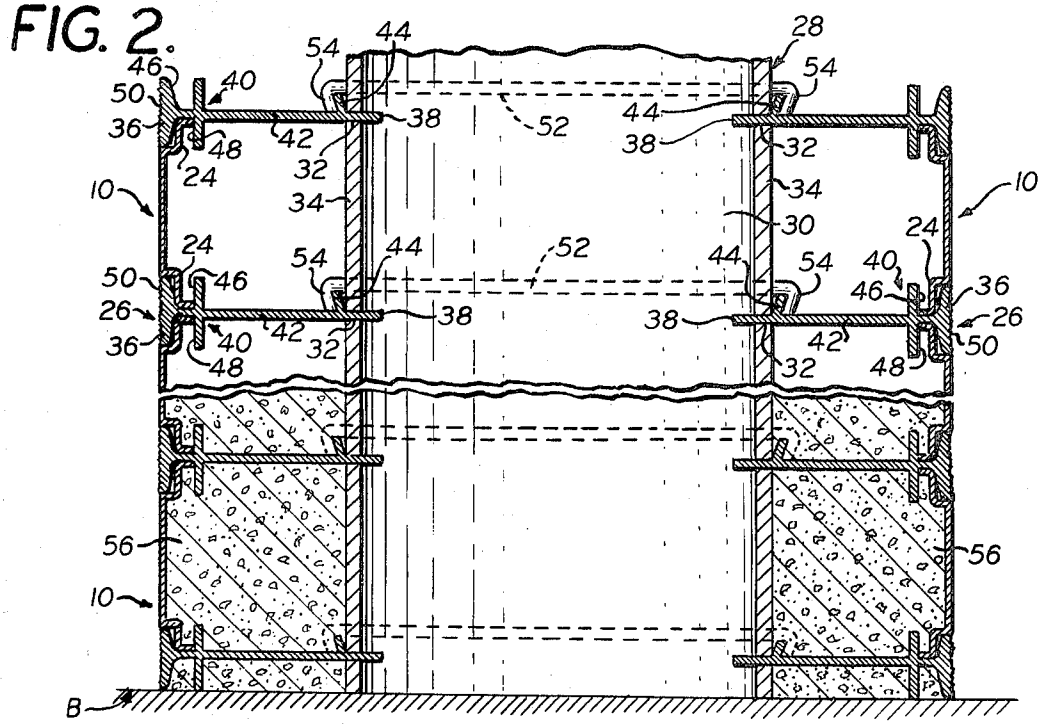
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FIG. 1.



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FIG. 2.



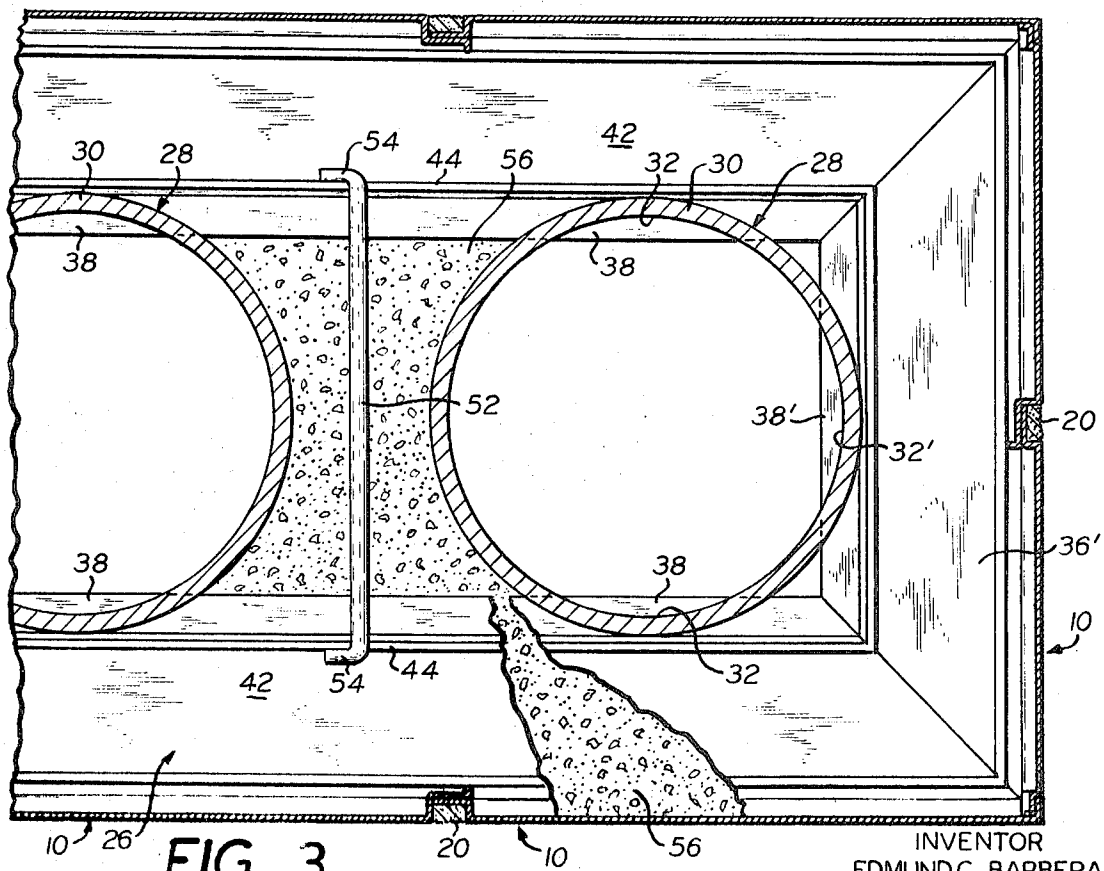


FIG. 3.

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FIG. 4.

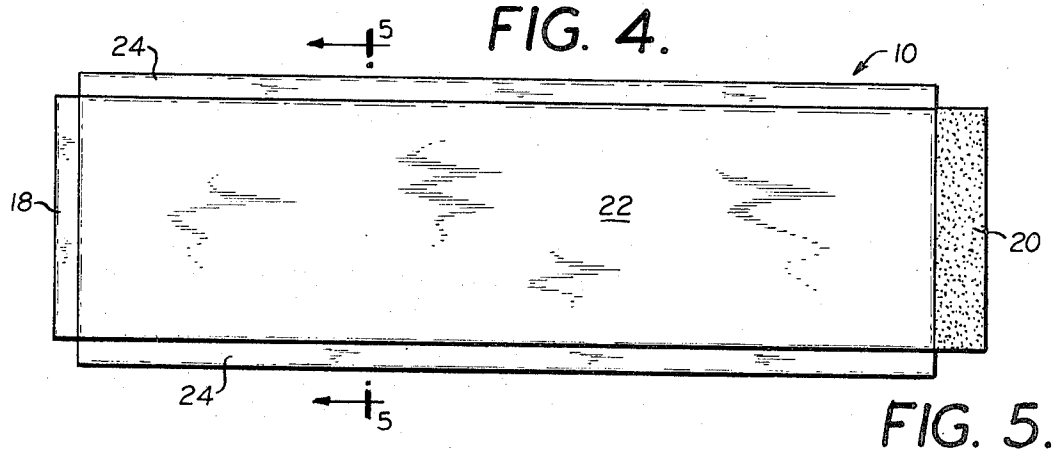


FIG. 5.

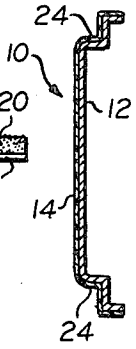


FIG. 6.

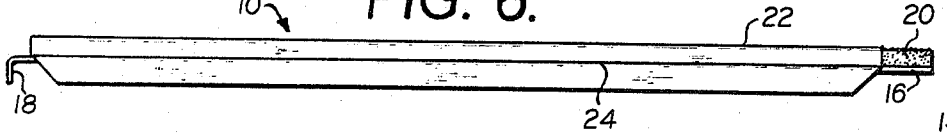


FIG. 7.

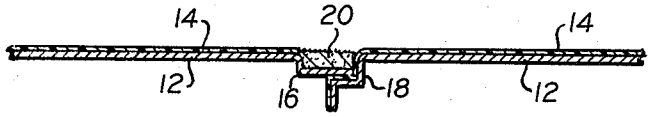
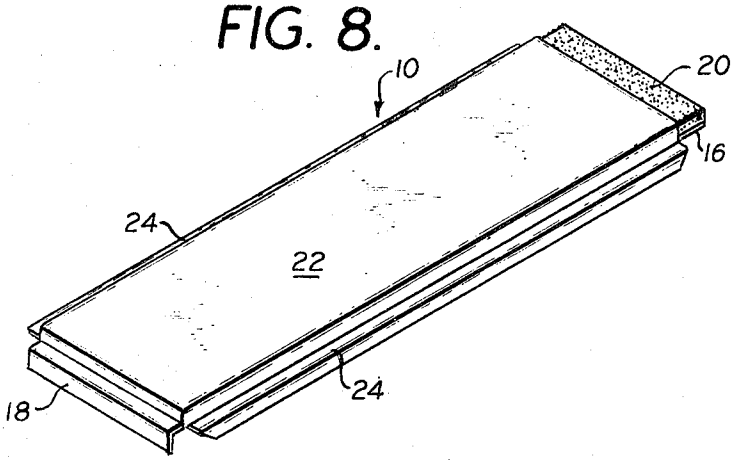


FIG. 8.



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BUILDING WALL CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates, generally, to a building wall construction, and more particularly, to a plurality of panel elements assembled to form a wall construction.

2. Description of the Prior Art

Heretofore, building wall panels have been proposed which included a plurality of panel elements mounted on a supporting structure which, in turn, were mounted or affixed to a base or wall surface. It has further been proposed to assemble building wall blocks which included spaced panels interconnected by some type of spacing structure. The assembly of such conventional wall panels and blocks has not proven satisfactory in view of the multiple manual assembly operations involved; such as screwing, clamping and the like, which require a fair degree of skill. Additional problems have arisen with respect to conventional building wall structures in the manner by which they are made and interconnected. For example, with respect to a wall structure constructed of spaced panel elements, it is customary to have the spacing structure inserted directly into the respective panels. This has not provided a practical and operative interconnecting arrangement and has resulted in making the conventional building panels and blocks heavy, complicated and expensive to manufacture.

The above and other disadvantages known in the aforesaid conventional building wall structures prompted the applicant to invent and develop improved structures such as those referred to in his U.S. Pat. No. 3,405,495 and co-pending application for U.S. Letters Patent, Ser. No. 848,923, now U.S. Pat. No. 3,611,664.

The aforesaid U.S. Pat. No. 3,405,495 is directed generally to a construction that includes a plurality of pairs of spaced panel members arranged in vertically staggered and longitudinally end abutting relation. Each panel member is provided with a connector member extending along and secured to a longitudinal edge thereof. The connector members cooperate in association with spacing members to support pairs of panel members in spaced apart relation.

The aforesaid Patent application Ser. No. 848,923, now U.S. Pat. No. 3,611,664 is directed generally to a spaced wall construction formed of a plurality of panel elements mounted on a supporting structure. Each panel cooperates with an elongated mounting member having a cross section defining first, second and third groove portions. Two of said grooves are substantially aligned and oppositely extending with respect to each other for receiving the tongue-like portions of the panel elements located immediately above and below said elongated mounting member. The third groove portion is laterally related to one of the other groove portions and cooperates with a clamping structure provided on a support member, which in turn, affixes said panels to a plurality of such spaced support members.

The present invention generally provides for an improved building wall construction directed toward overcoming the foregoing and other shortcomings of the prior art. In this connection, the present invention is an improvement over applicant's prior patent and co-pending patent application, and provides improved means for mounting a plurality of panel elements on a supporting structure, all as will be explained in detail subsequently herein. In another embodiment of the invention, improved means are provided for supporting a plurality of pairs of opposed panel elments in spaced apart relation.

SUMMARY OF THE INVENTION

The building wall construction of the present invention includes a plurality of panel elements that are mounted on a slotted supporting structure to form a wall portion thereof, or are mounted on opposed surfaces of said slotted supporting structure, in spaced apart relation, to form a spaced wall construction. More specifically, the supporting structure includes a plurality of support members arranged in longitudinally spaced realtion; each of said members having a plurality of vertically spaced slotted openings in the respective wall portions thereof. The spaced openings of the support members, at any given level, are in substantially longitudinally aligned relation to each other. A plurality of elongated mounting members are arranged in vertically spaced relation and extend transversely of the upport members; said mounting members, in turn, cooperating with a plurality of panel elements to thus form the building wall structure. In this connection, each of the mounting members has an inner edge portion which is received within the corresponding aligned openings in the support members. Each of said mounting members further includes a rib portion adjacent the said inner edge thereof which is adapted to abut the outer surface of the wall portion of the resepective support members to limit the projection of the inner edge of said elongated mounting member within the corresponding openings of the support members. Each of said mounting members also has a cross-section defining first and second groove portions that are substantially aligned and oppositely extending with respect to each other for receiving the edge portions of the panel elements located immediately above and below the mounting member.

In those instances where the slotted support members are utilized to form a spaced wall construction, each of said support members includes a plurality of pairs of opposed openings in vertically spaced relation along opposed wall portions thereof. A plurality of pairs of said elongated mounting members are arranged in opposed and vertically spaced relation and extend transversely of said support members, whereby the opposed inner edge portions of each pair of said opposed mounting members are respectively received within the corresponding pairs of opposed openings in the support members. In the preferred embodiment of the spaced wall construction, the invention further provides for bracing means extending between and interconnecting the opposed elongated mounting members.

Accordingly, an object of the present invention is to construct a building wall structure that will provide a sturdy and competitive article of manufacture.

Another object and feature of the invention is to provide a building wall construction wherein a pair of novel panel elements are kept accurately spaced and firmly supported.

A further object and feature of the invention is to provide a building wall construction wherein the individual components are economical to manufacture and easy to assemble.

The above brief description, as well as further objects, features and advantages of the present invention, will be more fully appreciated by reference to the following detailed description thereof, when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view, partly in section, illustrating a plurality of panel elements and their associated mounting means and supporting means forming a portion of a building wall construction in accordance with the present invention;

FIG. 2 is a sectional view taken through line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken through line 3—3 of FIG. 1;

FIG. 4 is a front elevational view of the novel panel element constructed according to the present invention;

FIG. 5 is a sectional view taken through line 5—5 of FIG. 4;

FIG. 6 is a side view of the panel element illustrated in FIG. 4;

FIG. 7 is a partial side view, in section, illustrating adjacent panel elements in their associated relation; and

FIG. 8 is a reduced perspective view of the novel panel element.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and more particularly to FIGS. 1 and 4 through 8, numeral 10 represents a novel panel element constructed in accordance with the present invention. Panel element 10 has a flat face 12 which is preferably rectangular in shape and is finished, embossed, raised or provided with other finished designs. In the embodiment of FIGS. 4–8, panel 10 is formed of steel and includes a protective coating of vinyl 14 on the face and edge portions thereof. The dimensional characteristic of the panels are such as to simulate building bricks; being approximately 8-½ inches in length and 2-⅝ inches in width. It will be appreciated, however, that these dimensions are purely illustrative and are not to be interpreted as being limitations on the present invention. Similarly, panel 10 may have other shapes and can be formed of other materials such as wood, plastic or a cementitious composition. In this connection, reference may be had to applicant's previously noted U.S. Pat. No. 3,405,495 and pending application Ser. No. 848,923, now U.S. Pat. No. 3,611,664 which relate to generally similar panel elements that are mounted on a supporting structure.

Panel element 10 is illustrated as having a channel shape cross-section and is conveniently considered a plate member having oppositely disposed recessed end edge portions 16 and 18 which serve to secure and interconnect adjacent like panel elements together. In this connection, recessed end edge 16 is provided with a mortar simulating coating or composition 20 having an outer surface which is substantially co-level with the outer surface 22 of the panel or plate. In assembling adjacent like panels 10 together, as shown in FIG. 7, the end edge portion 18 of one panel is arranged in overlapping relation to the mortar coated recessed end edge portion 16 of the other adjacent like panel, while leaving the mortar coating 20 exposed to view. The result thus provides an overall appearance closely simulating an actual brick assembly. The opposed side edge portions 24 of panel 10 are also recessed to provide longitudinally extending edge portions which serve to interconnect the panel with a supporting structure in a manner hereinafter described.

Referring now to FIGS. 1, 2 and 3, there is illustrated the novel structure for assembling the aforesaid panel elements into the building wall construction of the invention. Generally, the structure incorporates mounting means 26 which cooperate with the panel elements 10 to mount said panels on a supporting structure 28. In the preferred embodiment, supporting structure 28 includes a plurality of tubular support members 30 arranged in longitudinally spaced relation, with each of said support members having a plurality of pairs of opposed slotted openings 32 arranged in vertically spaced relation along opposed wall portions 34 thereof. The slotted openings 32 on each side or wall portion of the tubular support members 30 are located to extend transversely of the axis thereof and, at any given level, are in substantially longitudinally aligned relation to each other. Tubular members 30 are preferably made of stiff paper or cardboard having 6 inch diameters and are spaced at 8 inch centers; however these dimensions are purely illustrative and are not to be deemed as limitations. Furthermore, the tubular members may be constructed of other materials; such as metal, plastic or the like. In addition, the reference to the term tubular is not confined to members having a cylindrical shape, but is deemed to mean any structure, whether it be hollow, solid or cellular, and whether it be oval, square or polygonal in section.

The manner of engaging the panel elements 10 with the supporting members 30 is achieved by the mounting means represented generally by numeral 26. Mounting means 26 is illustrated as an elongated member or strip 36, preferably extruded from aluminum, having opposite end edge portions 38 and 40 interconnected by intermediate web portion 42. The inner end edge portion 38 is adapted to be frictionally received within a selected slotted opening 32 of a support member 30. In this connection, the construction provides for a plurality of said mounting members 36 to be arranged in vertically spaced relation relative to at least one of the wall portions 34 of support members 30, and extending transversely thereof, whereby the inner end edge portions 38 of said mounting members 36 are respectively received within corresponding openings 32 in said support members. If desired, suitable clip fasteners (not shown) may be employed having portions thereof cooperating with a selected support member 30 and the associated inner edges 38 of the mounting members 36 to insure that said mounting members are firmly maintained in their respective assembled positions.

In order to also insure that the mounting members 36 are in vertically aligned relation to each other, means are provided to limit the extent to which the respective inner edges 38 thereof are inserted within the corresponding slotted openings 32 of support members 30. In this connection, each of said mounting members 36 is provided with a longitudinally extending rib portion 44 adjacent the said inner edge 38 thereof and upstanding from web portion 42. The arrangement is such that rib portion 44 abuts the outer surface of wall portion 34 of said support member 30 to limit the projection of said inner edge 38 within slotted opening 32. Further-

more, since the extended distance between the rib portion 44 and the other end edge portion 40 of each mounting member is substantially the same, the overall result is to locate the edge portions 40 of the respective mounting members 36 in vertically aligned relation; thereby enabling the panel elements 10 to be disposed in substantially aligned relation to each other in the manner hereinafter described.

Referring to FIGS. 1 and 2, the end edge portion 40 of each panel element 10 is shown as having a substantially H-cross section to provide substantial vertical alignment between groove portions 46 and 48. These grooves are oppositely extending with respect to each other and extend longitudinally for the full extent of the elongated mounting members. Accordingly, it will now be apparent that grooves 46 and 48 serve to receive the longitudinally extending side edge portions 24 of vertically related and adjacent like panel elments 10.

More specifically, the construction of a building wall can be readily assembled by first securing or affixing the support members 30 to a base B or other supporting surface. In the illustrative embodiment, support members 30 may be fixedly retained in a cement foundation and arranged in upstanding relation thereto whereby a plurality of said support members are disposed in longitudinally spaced relation. Thereafter, the vertically spaced mounting members 36 are connected to support members 30 in a manner to extend transversely thereof, whereby the inner edge portions 38 of said mounting members are respectively and frictionally received within the corresponding slotted openings 32 of said support members. Panel elements 10 may now be interposed and located between vertically related mounting members 36 by locating the longitudinally extending side edge portions 24 of said panels within opposed grooves 46 and 48 of adjacent mounting members. It will be readily appreciated that panels 10 are inserted within said grooves in an edgewise manner. Furthermore, as previously noted in association with the description of FIG. 7, each of the panels 10 should be suitably oriented when inserting it within the grooves 46, 48 of the mounting members so that the end edge portion 18 thereof is arranged in overlapping relation to the mortar coated recessed end edge portion 16 of an adjacent like panel, while leaving the mortar coating 20 of said adjacent edge portion 16 exposed to view. If desired, the front surface of mounting members 36 can be roughened and a mortar simulating coating 50 applied thereon, thereby contributing to the overall appearance of the wall structure in simulating an actual brick assembly.

In those instances where the slotted support members 30 are utilized to form a spaced wall construction, a plurality of pairs of said elongated mounting members 36 are arranged in opposed and vertically spaced relation, extending transversely of said support members, whereby the opposed inner edge portions 38 of each pair of opposed mounting members 36 are respectively received within the corresponding pairs of opposed openings 32 in said support members. With respect to this embodiment of the invention, the construction further preferably provides for a plurality of longitudinally spaced bracing means 52, such as rod members or the like, extending between and interconnecting the pairs of opposed mounting members 36. In this connection, each bracing rod 52 is provided with opposite end hook portions 54 which respectively engage with the corresponding rib portions 44 of a pair of opposed mounting members 36. After the pairs of opposed mounting members 36 are secured to the longitudinally spaced support members 30, the panel elements 10 may now be interposed and located between the vertically related mounting members 36, on each side of the supporting members, in the manner heretofore described.

FIGS. 1 and 3 further illustrate the novel utility and structure of the present invention in forming a 90° corner construction. The arrangement is such that the cornermost support member 30 is additionally provided with a plurality of vertically spaced slotted openings 32', in a suitable wall portion thereof, so as to respectively receive the corresponding inner edge portions 38' of elongated mounting members 36', and angularly locate said mounting members 36' relative to the aforesaid spaced mounting members 36. The degree of angular corner construction need not be limited to forming 90° corners, but can be selectively chosen or adopted within a given angular range. Furthermore, the shape of the end edge of the panel element located at the juncture of a corner is suitably chosen and adopted to provide a neat finish to the corner construction.

If desired, upon completion of the spaced building wall construction of a selected height, concrete 56 may be poured into the spaces between the panel elements 10 of the enclosed structure, and the supporting members 30, to provide additional strength and rigidity to the assembled structure. It is understood that various insulating and/or structural reinforcements may be used in lieu of concrete 56, such as mineral wool, insulating foams and granular insulators or the like. Furthermore, the supporting structure 28 may be constituted of longitudinally successive support members 30 suitably coupled together in end to end relation to provide a desired length thereof.

While the invention has been described with reference to a spaced wall construction, it is to be noted that the term "wall" is merely illustrative and that the use of said term is not to be deemed a limitation on the invention. For example, it is within the scope of the invention to practice the concepts thereof in building a spaced floor construction, wherein the panels 10 on one side of the supporting structures 30 would define the floor surface of a room at one level and panels 10 on the other side thereof would define the ceiling surface of a room at the next lower level. In other words, the structure hereinabove defined may be readily used in horizontal as well as vertical disposition thereby providing exterior and interior walls, floor panels, ceilings or combinations thereof.

It will now be appreciated from the above description, that the present invention provides for an improved building wall construction that eliminates the difficulties and other shortcomings heretofore referred to in the description of the prior art. The wall can be constructed and assembled rather quickly with a minimum of effort, and such assembly does not require the services of highly skilled personnel. Labor and material costs are thus sharply reduced as compared to conventional construction designs and techniques.

While specific embodiments of the invention have been shown and described in detail, it will be readily understood and appreciated that various changes or modifications thereof may be made without departing

from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. In a building wall construction having a plurality of pairs of opposed panel elements, means for supporting said pairs of panel elements in spaced apart relation and means for mounting said pairs of panel elements on said supporting means, wherein the improvement comprises:

a. said supporting means including a plurality of vertical tubular support members located between the opposed panel elements in longitudinally spaced relation;

b. each of said support members having a plurality of pairs of opposed slotted openings formed along opposed wall portions thereof in vertically spaced relation, said slotted openings extending transversely of the vertical axis of said support member and defining extended support surfaces;

c. said mounting means including a plurality of pairs of opposed elongated members extending transversely of the support members in vertically spaced relation;

d. each of said mounting members having a longitudinally extending inner marginal portion received within the associated slotted openings in the walls of the support members, said marginal portion projecting interiorly within said support members and supported throughout its length in the slotted openings thereof;

e. rib means on said mounting members to limit the projection of the respective inner marginal portions thereof within the associated slotted openings of said support members; and

f. groove means on said mounting members adjacent the respective outer marginal portions thereof for receiving and locating edge portions of the panel elements in spaced relation to the support members.

2. The building wall construction as recited in claim 1, wherein said rib means project upwardly from the mounting members adjacent the respective inner marginal portions thereof, said rib means extending longitudinally of said mounting members for abutting relation to wall portions of the support members.

3. The building wall construction as recited in claim 1 wherein said groove means includes a first groove portion for receiving an edge portion of a panel element; and a second groove portion for receiving an edge portion of another panel element and locating said other panel element in a predetermined spatial relation to said first mentioned panel element.

4. The building wall construction as recited in claim 3, wherein said first mentioned groove portion and said second groove portion are substantially aligned and oppositely extending with respect to each other.

5. The building wall construction as recited in claim 1 further including bracing means extending between and interconnecting the pairs of opposed mounting members, said bracing means having opposite end hook portions respectively engaging the associated rib means of the mounting members.

6. The building wall construction as recited in claim 1, wherein the spaced slotted openings on the respective sides of the support members, at any given level, are in substantially longitudinally aligned relation to each other.

7. The building wall construction as recited in claim 1, further including structural filler means extending between the pairs of opposed panel elements and the support members.

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