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Henry et al.

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[45] **July 3, 1973**

[54] **MODULAR BUILDING CONSTRUCTION**

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[21] Appl. No.: **146,415**

[52] **U.S. Cl.** **52/284**, 52/233, 52/585

[51] **Int. Cl.** **E04b 2/42**

[58] **Field of Search** 52/233, 281, 284, 52/481, 300, 585, 586, 282, 283

[56] **References Cited**

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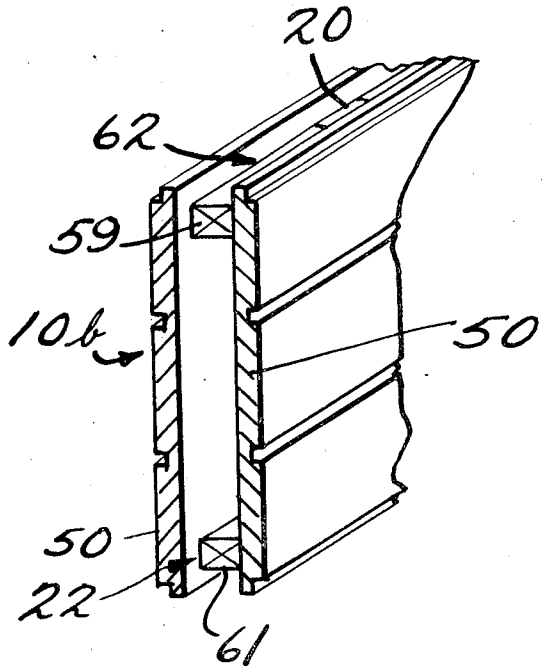
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[57] **ABSTRACT**

Building walls are constructed by erecting conventional studs and then lowering prefabricated wall sections over the studs. The prefabricated wall sections are constructed of any of a variety of materials and are provided with spaced apart passages therethrough to receive the studs. A preferred wall section is rectangular in shape and may be disposed horizontally or vertically, the smaller dimension being equal to the distance between two studs and each long edge being provided with a vertical groove for sliding engagement with a stud. Alternatively the smaller dimension may be, for example, one-third the distance between two studs, in which case three wall sections may be disposed between the studs.

7 Claims, 12 Drawing Figures



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SHEET 1 OF 3

Fig. 1.

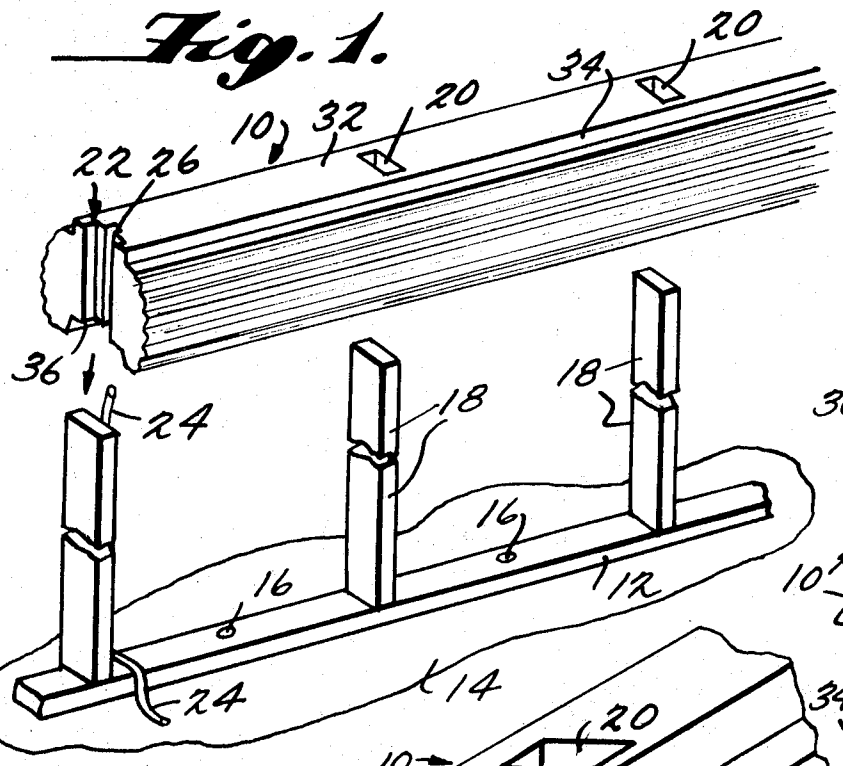


Fig. 4.

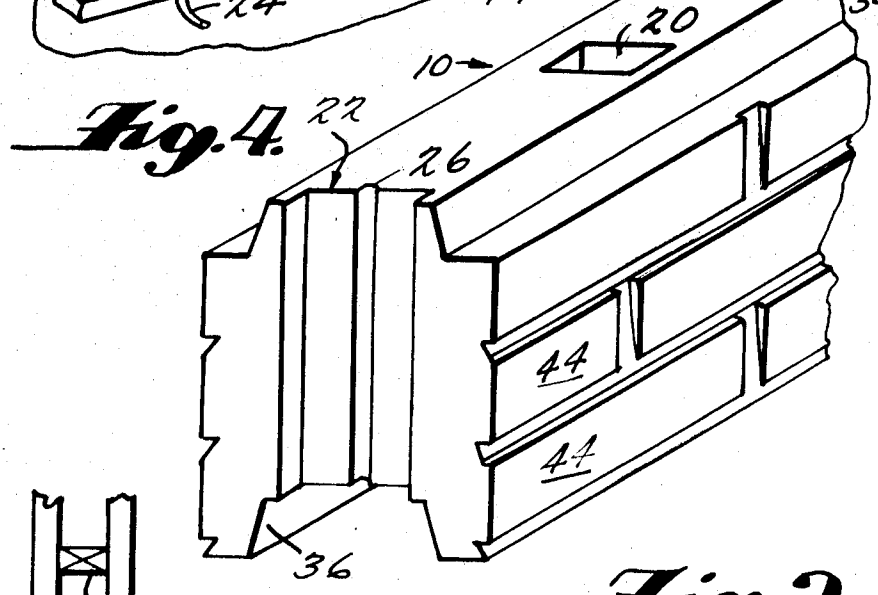


Fig. 2.

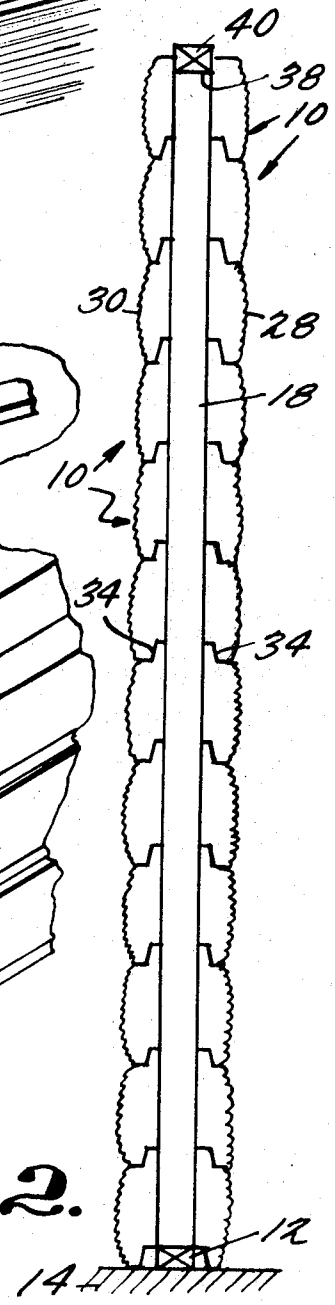
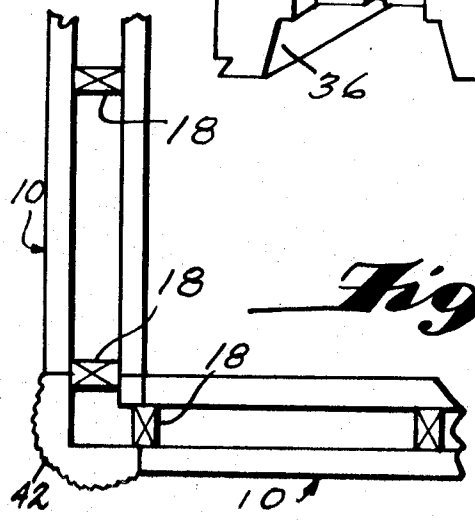


Fig. 3.



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Fig. 5.

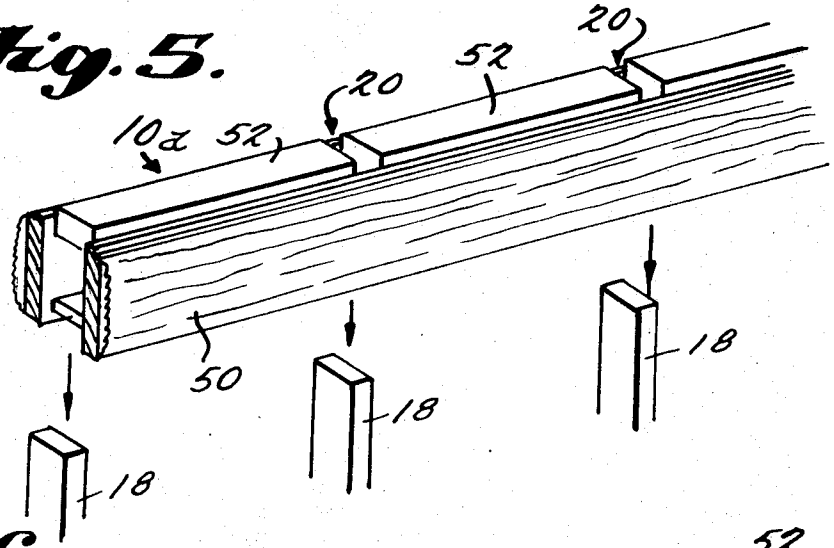


Fig. 6.

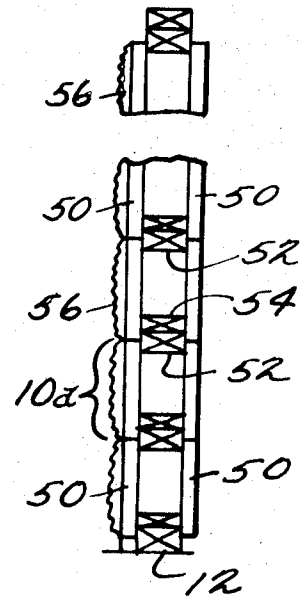


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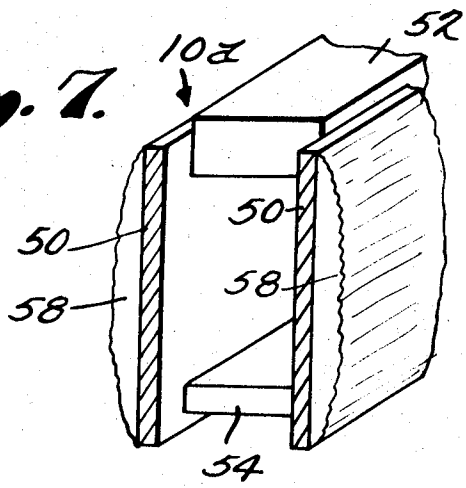
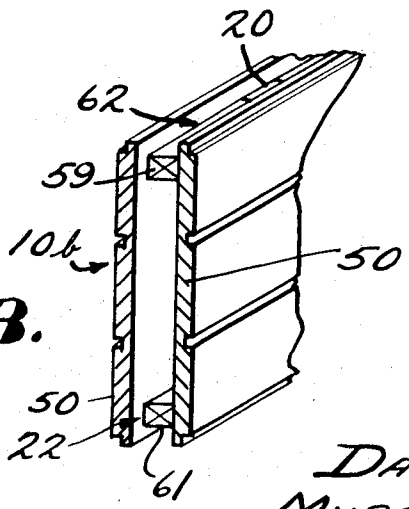


Fig. 8.



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Fig. 9.

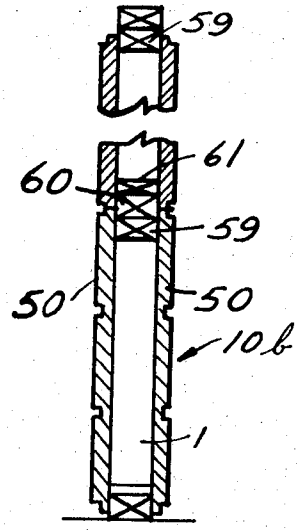


Fig. 10.

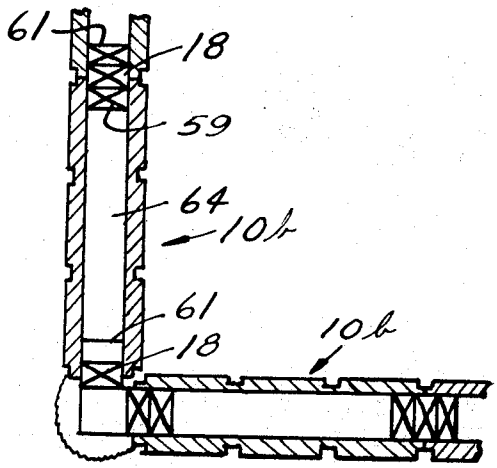


Fig. 11.

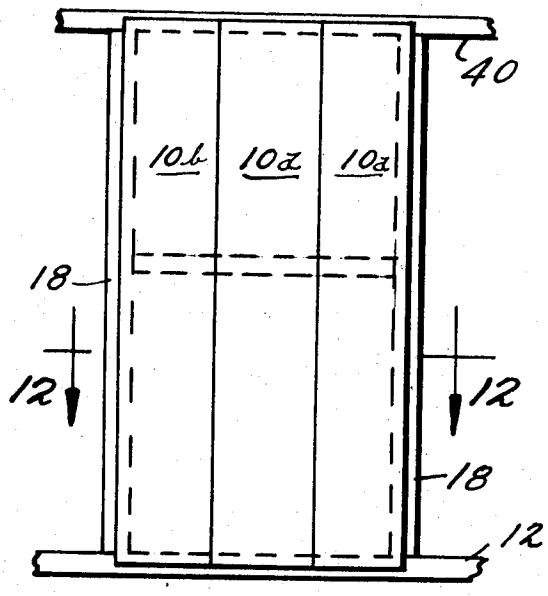
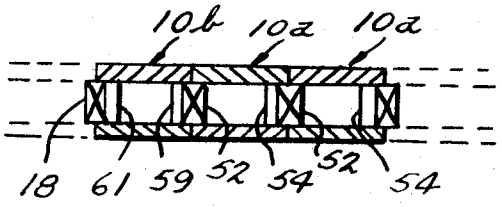


Fig. 12.



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MODULAR BUILDING CONSTRUCTION

This invention relates to modular prefabricated wall components and to a method of constructing building walls utilizing such components.

The primary object of the invention is to simplify the construction of the walls of buildings, especially residential buildings, by providing special prefabricated wall modules in the form of panels, sections or modules which are adapted to be employed in conjunction with conventional construction features. More specially, the wall modules are adapted to cooperate with conventionally erected wall studding to enable rapid and simplified finishing of exterior and interior partition walls in any of a variety of interior and exterior textures.

One important feature of the special wall modules and the construction technique is the provision of stud passages through the modules which permit the modules to be lowered into place over pre-erected studs, thereby simultaneously forming both exposed surfaces of a finished wall. The technique has special utility in the construction of simulated log walls or other special-appearance walls, because the components can be prefabricated from a wide variety of materials. The technique has the further advantage that no special skill is required to install the components.

Another important feature of the invention is that a given wall module may be constructed so as to be installed with its longer dimension either horizontally or vertically.

The invention will be further understood from the following detailed description of several illustrative embodiments taken with the drawings in which:

FIG. 1 is a perspective view of one type of wall module illustrating one of the construction techniques;

FIG. 2 is a transverse vertical sectional view of a finished wall constructed of a plurality of the modules of FIG. 1;

FIG. 3 is a plan view of a corner formed by two intersecting walls of the type shown in FIGS. 1 and 2;

FIG. 4 is a partial perspective view of a modified wall module similar to the component of FIG. 1;

FIG. 5 is a perspective view of a further type of wall module;

FIG. 6 is a transverse vertical sectional view of a finished wall constructed of a plurality of the modules of FIG. 5;

FIG. 7 is a partial perspective view of another module similar to the component of FIG. 5;

FIG. 8 is a partial perspective view of a module adapted for vertical or horizontal installation;

FIG. 9 is a transverse vertical sectional view of a finished wall constructed of a plurality of the modules of FIG. 8 disposed horizontally;

FIG. 10 is a sectional view of a wall constructed of the modules of FIG. 8 disposed vertically;

FIG. 11 is an elevational view of a wall constructed of vertically disposed modules of both the FIG. 5 and FIG. 8 types; and

FIG. 12 is a sectional view taken on the line 12—12 of FIG. 11.

FIG. 1 illustrates the construction technique of the present invention, using one form of wall component 10 or module which has been prefabricated in accordance with the principles of the invention. In the lower part of FIG. 1 there is shown a conventional residential wall frame which includes a typical wood sill plate secured to the upper horizontal surface of a foundation 14 as by bolts 16. Conventional wall studs 18 are attached along the upper surface of the sill plate 12 at uniformly spaced intervals.

The special modular wall components 10 or modules are provided with vertical passages 20 therethrough at locations corresponding to the spacing between the studs 18, this spacing conventionally being 2 feet between centers. Each module 10 is set in place by lifting it to a position above the upper ends of the studs 18, aligning the passages 20 with the studs 18 and lowering the module 10 over the studs 18 and into engagement with the sill plate or equivalent structure or the previously laid module. The cross sections of the passages 20 are preferably only slightly larger than the cross sections of the studs 18 so as to form a reasonably tight fit and provide rigidity. The technique is especially useful for the construction of the exterior walls of a building, and when so employed the roof is constructed after the walls have been completed.

Each end of each wall module 10 is provided with a channel-shaped recess 22 having a depth about equal to one-half the thickness of a stud 18. The recesses 22 of two end-to-end wall modules 10 surround a single stud and are therefore equivalent to one of the passages 20. The modules 10 may be made in convenient lengths such as 4 feet, 6 feet, 8 feet and so forth.

It is often conventional for the studs 18 to support electrical conduits 24 leading to locations where electrical outlets will be installed. The wall modules 10 can be accommodated to this feature by providing a vertical groove 26 of suitable cross section in one of the walls of the recess 22 or one of the walls of the passages 20.

The principal feature of the special wall modules 10 is the presence of the stud passages 20, but it is also important that the horizontal and vertical surfaces of the modules be adapted to cooperate with adjacent wall components or other structural elements and to present the desired external appearance. The particular wall module 10 illustrated in FIG. 1 is a simulated log having slightly convex front and rear surfaces 28,30 resembling the bark of a tree trunk. The height and thickness of the log may be about 8 inches. The upper and lower surfaces are contoured to fit with adjacent wall components in a manner to assist in aligning the components and to form a weather resistant joint. In the illustrated configuration the upper surface of the log 10 is defined by a relatively wide longitudinal rib 32 having upwardly and inwardly inclined side walls 34; and the lower surface is defined by a longitudinal channel 36 which is complementary to the rib 32. In FIG. 2 it will be seen that the uppermost log is somewhat modified in that its upper surface is defined by a channel 38 adapted to partially receive a conventional horizontal cap 40 which is secured to the upper ends of two or more studs 18. The roof structure may then be secured to the cap 40.

FIG. 3 illustrates a typical corner construction. As shown, the end studs of two walls remain partially exposed after assembling the walls by the above-described stacking of wall modules one on top of each other. A vertical corner element 42 having, in this illustration, an outer convex surface similar in appearance to the bark of a tree is then secured to the exposed surfaces of the end studs in any convenient manner. The outer contours and surface texture may be varied to

complement the contours and surface texture of the particular module.

It will be appreciated that the wall modules can be constructed in a variety of ways from a variety of materials. Each module of the type illustrated in FIGS. **1, 2** and **3** is molded as an integral structure from a suitable lightweight, weather-resistant plastic. The plastic material may be foamed or unfoamed and may contain distinct relatively large voids to conserve material. Internal reinforcing structure may also be included. The modules may also be constructed of wood, concrete, sheet metal or other materials.

FIG. **4** illustrates a different form of wall module **10** which is structurally similar to the previously described components in that it is formed by a molding technique. The module of FIG. **4,** for example, may be molded as an integral structure, the front and rear surfaces of which have the contour and coloring of bricks. Also, the modules may be made up of pre-molded elements which are subsequently bonded together. For example, these modules may each consist of two molded face sheets bonded or otherwise secured to molded spacer blocks which are disposed to define the end channels and the stud passages. The face sheets may have outer surfaces simulating logs, bricks, clapboard and shingles.

FIGS. **5, 6** and **7** illustrate wall modules **10*a*** which have been made up of separate elements constructed of wood but which are otherwise similar to the previously described molded modules. Each of these modules **10*a*** consists essentially of two parallel coextensive face boards **50** and a plurality of upper and lower internal stringers **52,54** which together form an elongated hollow box-like structure. The stringers **52,54** are horizontally spaced apart so as to define the stud passages **20.** The upper stringers **52** project above the face boards **50** and the lower stringers **54** are recessed so that the modules key together when stacked on each other, as seen in FIG. **6.**

In the FIG. **5** construction one face board **50** may have applied thereto a layer or coating **56** of aggregate in a suitable bonding medium to serve as an exterior wall surface. The other face board **50** may be finished with paint or a clear protective coating to serve as an interior wall surface. In the FIG. **7** construction each face board **50** has secured thereto a thin panel of log-like material **58.**

FIGS. **8, 9** and **10** illustrate wall modules **10*b*** which are generally similar to those of FIGS. **5, 6** and **7** in that they are made up of separate face sheets **50,** upper stringers **59** and lower stringers **61.** Both stringers **59** and **61** are recessed so that the upper and lower edges of each module are channel shaped. As seen in FIG. **9,** these channels may cooperate with a conventional stringer **60** which can be secured between the studs after each module is placed in position with its longer dimension horizontal. The face sheets **50** in the FIG. **8** construction are wood siding. Alternatively, both face sheets may be plywood to which shingles are attached, or one face sheet may be siding and the other shingles.

FIG. **10** illustrates a wall in which the FIG. **8** modules **10*b*** are disposed with their long dimensions vertical. The smaller dimension of each module **10*b*** is equal to the distance (conventionally, 2 feet) between two studs **18,** with the result that the channel **62** along each long edge engages a stud **18** so that each module is held in position by two studs **18.** Each module **10*b*** is installed by sliding it downwardly between the two pre-erected studs. The passages **20** (FIG. **8**) in the module are how horizontal, and stringers **64** may be inserted therethrough as the module is lowered into place, if desired, in order to increase the rigidity of assembly.

FIGS. **11** and **12** illustrate a wall formed of vertically disposed modules each of which has a width, for example 8 inches, which is less than the distance between studs **18.** In the illustrated embodiment three vertical modules are disposed between each two studs, and it will be seen that two of the modules, indicated at **10*a***, are of the FIG. **5** construction while the third module, indicated at **10*b***, is of the FIG. **8** construction with respect to the disposition of the stringers. Thus, one of the recesses in the long edge of the **10*b*** module receives a stud **18** while the other recess receives a stringer **52** from one of the **10*a*** modules. The passages **20,** now horizontal, receive stringers **64** which are inserted before the modules **10*a*** and **10*b*** are slid downwardly between the studs. The channels at the ends of the modules receive either a sill plate **12** or a cap **40.**

The above description is illustrative of the principles of the invention, and the details are not intended to limit the scope of the invention except as they appear in the appended claims.

What is claimed is:

1. A building wall constructed of a plurality of rectangular modules each of said modules having parallel longitudinal edges and parallel end edges, a front face and a rear face, and a plurality of uniformly spaced apart parallel passages extending therethrough from one longitudinal edge to the other longitudinal edge for receiving studs of a wall frame, the longitudinal dimension of each module being at least twice the short dimension, and each end edge having a groove therein parallel to said passages for complementary engagement with an additional stud, said wall including uniformly spaced apart parallel studs, said modules being arranged one on top of the other with their longitudinal dimensions horizontal, a stud lying within each of said parallel passages and a stud lying within each of said grooves.

2. A building wall constructed of a plurality of rectangular modules each of said modules having parallel longitudinal edges and parallel end edges, a front face and a rear face and a plurality of uniformly spaced apart parallel passages extending therethrough from one longitudinal edge to the other longitudinal edge, the longitudinal dimension of each module being at least twice the short dimension, each longitudinal edge having a channel extending the length thereof and each end edge having a groove extending the length thereof, said wall including uniformly spaced apart parallel studs, said modules being arranged with their long dimensions vertical, the short dimension of each module being equal to the distance between two adjacent studs, and the channel in each longitudinal edge of each module engaging a stud.

3. A building wall constructed of a plurality of modules each of said modules having parallel longitudinal edges and parallel end edges, a front face and a rear face and a plurality of uniformly spaced apart parallel passages extending therethrough from one longitudinal edge to the other longitudinal edge, the longitudinal dimension of each module being at least twice the short dimension, each longitudinal edge having a channel extending the length thereof and each end having a

groove extending the length thereof, said wall including uniformly spaced apart parallel studs, said modules being arranged with their long dimensions vertical, the distance between adjacent studs being a whole number multiple of the short dimension of one of the modules so that a plurality of modules fit between two adjacent studs, each stud being received into the longitudinal channels in the adjacent modules.

4. A building wall as in claim **1** wherein each longitudinal edge has a channel extending the length thereof whereby the opposed channels of adjacent modules defining a horizontal passageway, and a stringer disposed in and generally complementary to each said passageway, said stringers having opposite ends abutting and secured to two adjacent studs.

5. A building wall as in claim **4** including an elongated horizontal cap member disposed above and secured to the upper ends of a plurality of said studs, said cap member lying in the channel in the uppermost longitudinal edge of the uppermost module.

6. A building wall as in claim **5** wherein each of said modules is constructed of two mutually coextensive face sheets spaced apart by and secured to a plurality of stringers, said stringers being arranged so as to define with the edge portions of the face sheets the respective channels and grooves, and to define the respective passages which extend from one longitudinal edge to the other.

7. A building wall as in claim **2** including a stringer disposed in and generally complementary to each of said passages, said stringers having opposite ends abutting and secured to two adjacent studs.

* * * * *