Nov. 30, 1965 R. H. GOLDMAN 3,220,151

BUILDING UNIT WITH LATERALLY RELATED INTERFITTED PANEL SECTIONS

Filed March 20, 1962 3 Sheets-Sheet 1

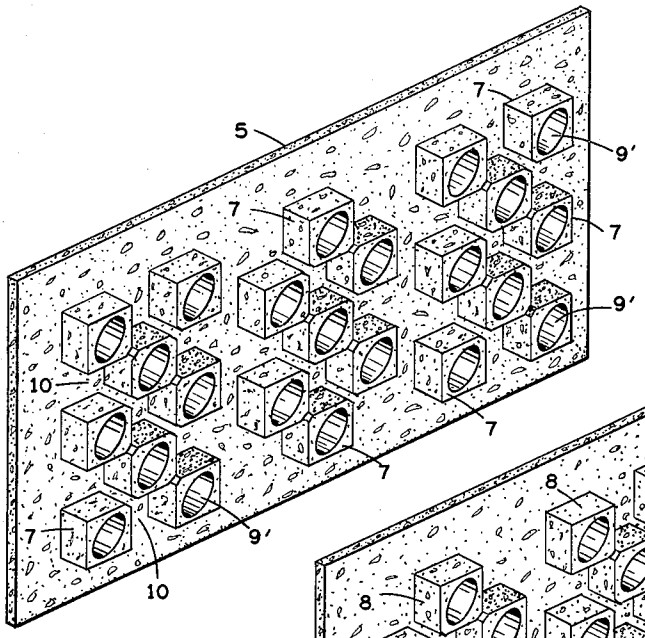

FIG. 1

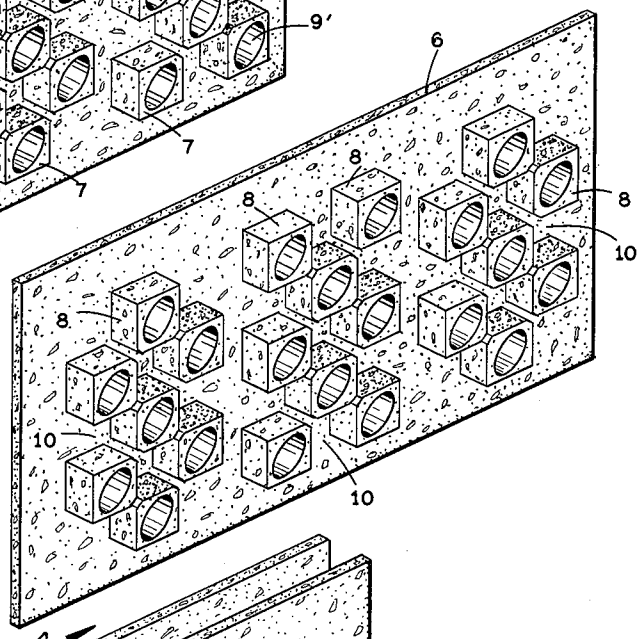

FIG. 2

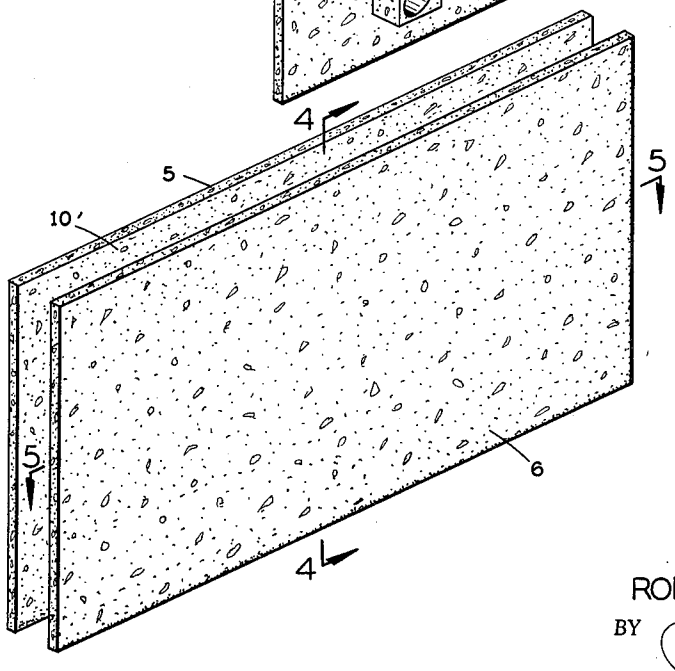

FIG. 3

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Filed March 20, 1962 3 Sheets-Sheet 2

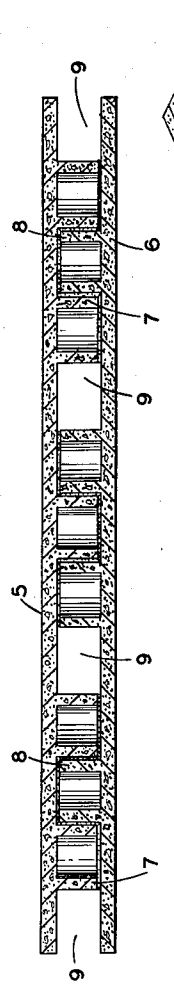

FIG. 5

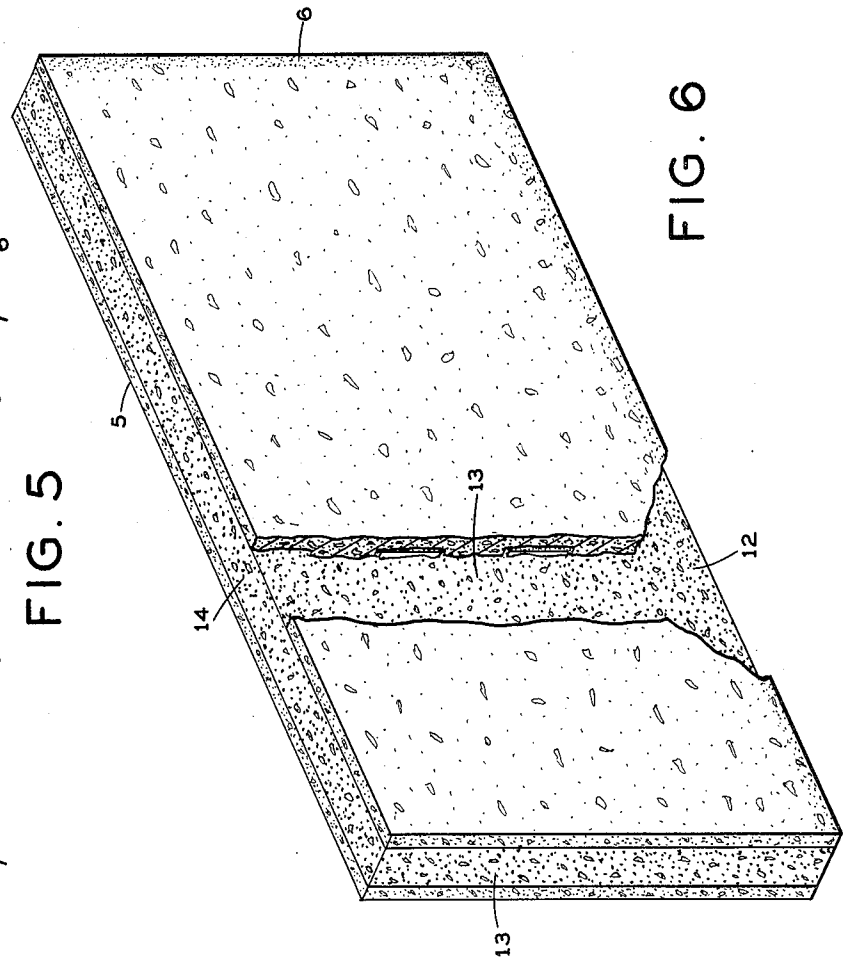

FIG. 6

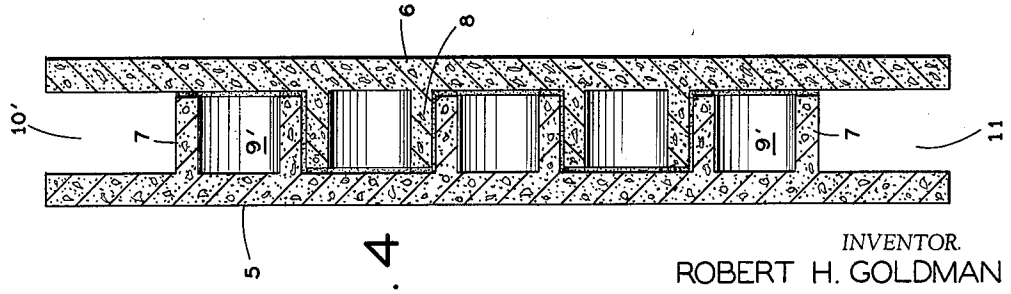

FIG. 4

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BUILDING UNIT WITH LATERALLY RELATED INTERFITTED PANEL SECTIONS

Filed March 20, 1962 3 Sheets-Sheet 3

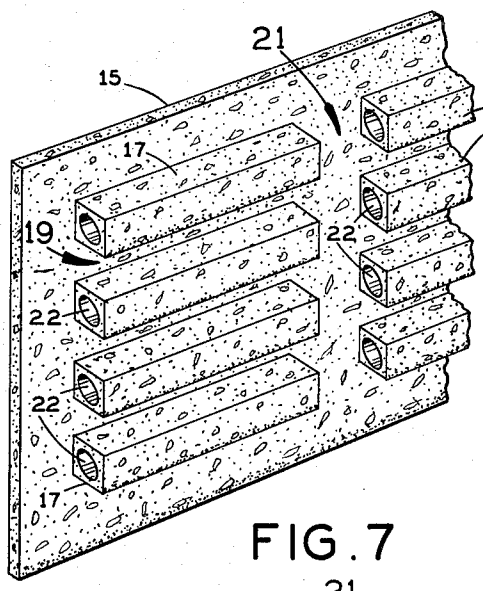

FIG. 7

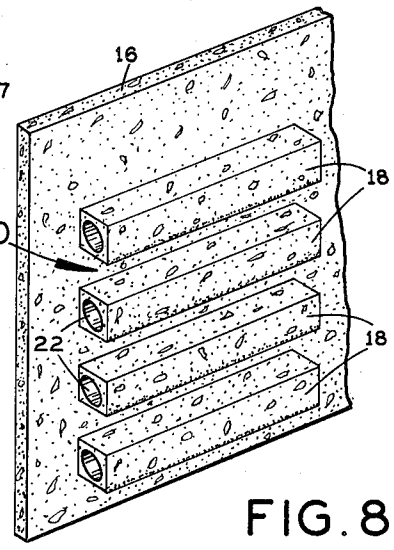

FIG. 8

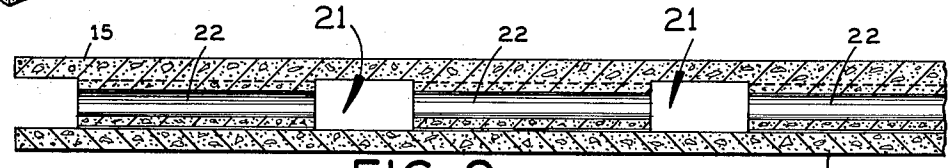

FIG. 9

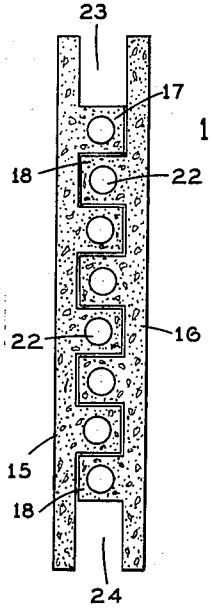

FIG. 10

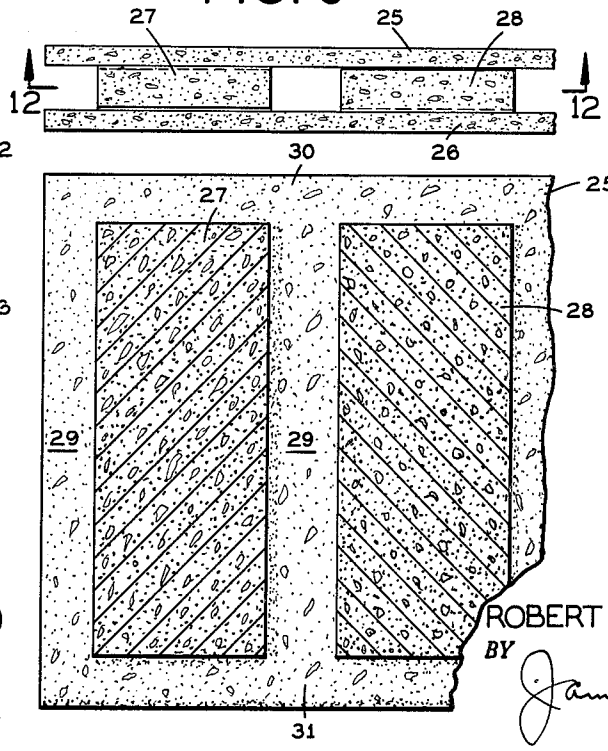

FIG. 11

FIG. 12

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3,220,151

BUILDING UNIT WITH LATERALLY RELATED INTERFITTED PANEL SECTIONS

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Filed Mar. 20, 1962, Ser. No. 181,117
3 Claims. (Cl. 52—572)

This invention relates to a novel form of structural panel that may be employed for either side walls, partition walls, floors, ceilings and also roofs.

The device comprises two molded panel sections of any desirable height and length and with the two sections adapted to be bonded together in a manner to form vertical and horizontal voids that constitute columns and upper and lower beams when concrete or other fluid plastic material is poured into the voids.

Each of the panel sections are provided upon their mating sufaces with spaced apart groups of lugs, either square, round or other configuration and whereby the lugs of one panel will have mating engagement into the spaces between the lugs of the adjacent panel and with the lugs in assembled relation being bonded together by suitable cement whereby the panel sections are held together against displacement and with the spacing of the groups of lugs constituting voids that communicate with upper and lower voids whereby, when the panels are erected in a building structure may be filled with fluent material, such as concrete and whereby the concrete will flow downwardly through the voids between the groups of lugs to constitute columns and also to flow into the lower void to constitute a continuous lower beam and, when the voids are filled, the upper beam will be created, all constituting a continuous and uninterrupted circumferential beam that is integral with the columns and whereby to form a panel structure having great strength and interlocking with the several voids to form a relatively solid panel that has cementitious material calculated to have a maximum weight bearing quality.

Each mating panel is molded in a suitable mold from any desirable cementitious material or, the panels of each mating pair may be simultaneously molded in a single mold and then split, sawed or otherwise separated to form the separate panels that are adapted to be mated with each other. It is contemplated that the panels shall be molded of a light weight aggregate and cement, or the panels may be formed of suitable plastic material such as the well known Styrofoam and, when assembled, the mating lugs will be engaged and cemented together and the lug engagement will maintain the panel sections in a suitably spaced relation so that the overall thickness of the unit will correspond substantially to the recognized thickness of a conventional wall structure and with the outer faces of the panel being relatively smooth.

It is also contemplated that the lugs on each panel section shall be provided with axial recesses to thereby decrease the weight of the unit in assembled relation.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated a preferred form of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

FIGURE 1 is a perspective view of one panel section,

FIGURE 2 is a perspective view of a mating panel section,

FIGURE 3 is a perspective view of the panels of FIGURES 1 and 2 in assembled parallel relation,

FIGURE 4 is a vertical section taken substantially on line 4—4 of FIGURE 3,

FIGURE 5 is a horizontal section taken substantially on line 5—5 of FIGURE 3,

FIGURE 6 is a perspective view, parts broken away to illustrate a composite panel structure that has been filled with concrete or other plastic material,

FIGURE 7 is a fragmentary perspective view of a panel section showing a modified form of the invention,

FIGURE 8 is a fragmentary perspective view of a mating panel section,

FIGURE 9 is a horizontal section corresponding to FIGURE 5 with the sections of FIGURES 7 and 8 in mating relation,

FIGURE 10 is a vertical section through a pair of a mating sections, illustrated in FIGURES 7 and 8,

FIGURE 11 is a top plan view of a further modified form of the invention, and

FIGURE 12 is a section taken substantially on line 12—12 of FIGURE 11.

Referring specifically to the drawings, there has been illustrated a generally rectangular panel section **5** and a mating panel section **6**. Each of the panels is molded from a suitable plastic material such as cement or concrete and the panel sections **5** and **6** may be formed of any desirable dimensions as to length and height. The panel section **5** is provided with a plurality of groups of lugs **7** and the panel section **6** is provided with a plurality of spaced apart groups of lugs **8**. Each group of lugs are molded integral with the panels **5** and **6** and are in staggered relation and spaced apart as shown so as to form voids **9** that are vertically disposed and the uppermost and lowermost lug of each group in each panel are spaced from the upper and lower marginal edges of the panels an equal distance. Each of the lugs are preferably recessed as shown at **9'** and with the recesses extending from the outer ends of the lugs to a position substantially flush with the inner faces of each of the panels. The recesses are primarily formed to reduce the weight of the overall structure, as will be apparent.

Each of the lugs are so spaced to form recesses **10** into which the lugs of a mating panel may have relatively snug engagement in the assembly of the unit. The panels **5** and **6** may be individually molded or, as found desirable the two panels may be formed in a mold device and then split, sawed or otherwise separated to provide the separate mating panels.

In the use of the device so far described, the panels having been formed, they are engaged in mating relation with the lugs **7** and **8** interfitting to form a substantially square separator between the panel walls **5** and **6**. In such assembly, a suitable cement, such as the well known epoxy resin is coated upon the mating faces of the lugs **7** and **8** so that when assembled, the two panels **5** and **6** will be held together in parallel relation against separation, forming an upper void **10'**, a lower void **11** and the vertical voids **9**. The panels in assembled relation as before pointed out, may constitute the full length of any proposed wall area and also are made in such proportions as will, constitute the full height of the wall. The panels may be formed to provide both window and door openings customary in building structure. With the panels in assembled interlocking and cemented relation, the panels are installed into a building opening and the fluent cement or concrete shall be poured into the upper void **10'**, flowing downwardly through the voids **9** to create the lower beam **12**, the columns **13** and the upper beam **14**, completely surrounding the interlocked lugs **7** and **8**. It will be apparent of course that the ends of the assembled unit will be closed by the abutment of the device against preformed corner columns of the building, such limiting the flow of the concrete to the ends of the unit and the flow of the concrete in the end columns will have a bonding

engagement with the corner columns of the building. The assembled structure will preferably have an overall width of approximately eight inches, being the recognized width of walls normally formed of concrete blocks although not limited to such width. In most concrete structures, a floor area is first installed to overlap the footings of the building and the panels of course will rest upon such floor extensions. The lugs **7** and **8** may be of any desirable configuration but, are formed in groups for interlocking or abutting side engagement with the lugs of a mating panel and so spaced that they will form the voids **9**, **10'** and **11**. The lugs may be of diamond or other shape but definitely the lug will correspond and have interfitting or abutting side engagement with the lugs of the mating panel.

Referring now to FIGURES 7 and 8, there has been illustrated panel sections **15** and **16**. The panel section **15** is provided with a plurality of generally rectangular groups of ribs **17** of any desirable length while the panel sections **16** is provided with substantially identical ribs **18**, that are staggered and spaced with respect to the upper and lower edges of the panel sections **15** and **16** so that the ribs **18** will fittingly engage into the spaces **19** of the panel **15**, while the ribs **17** will fittingly engage into the spaces **20**, formed by the spacing of the ribs **18**. The ribs when in mating interlocked engagement will dispose the marginal edges of the panels **15** and **16** at an identical elevation. The groups of ribs **17** and **18** are spaced apart on each panel, forming voids **21** between the groups of ribs, corresponding to the voids **9** of the first form of the invention. Each of the ribs **17** and **18** are preferably longitudinally apertured, as at **22** to reduce the overall weight of the assembled unit and also to permit a certain amount of the concrete to flow into the ends of the apertures thus further interlocking the members together. The ribs **17** and **18** are also coated with epoxy resin or a similar bonding agent at assembly so that the complete panel may be formed and rigidly held together during such time as the panel is being elevated and installed into a wall opening. The panel sections **15** and **16**, when united also form the columns between the ribs and the end column and also to form the voids **23** and **24**, that extend longitudinally of the unit and to permit the forming of the upper and lower beams that are integrally formed with the columns poured into the voids **21**. Basically, the structure is substantially the same as the first form of the invention, the only difference being that the lugs **8** are in the form of ribs.

In the form of the invention illustrated in FIGURES 11 and 12, panel sections **25** and **26** have been provided but here, the panel section **25** is provided with an integrally molded vertically extending rectangular block **27**, while the panel section **26** is provided with a corresponding block **28**. The blocks establish the predetermined spacing between the panels **25** and **26** and are spaced apart so as to form the voids **29**, **30** and **31**, that constitute the means for forming the columns and beams according to the forms of the invention previously described. This form of the invention, having no definite interlocking engagement between the blocks **27** and **28**.

In each of the forms of the invention illustrated in FIGURES 1–10 inclusive, the members carried by the panels have a definite interlocking engagement. The shape and size of the blocks **8** and the ribs **17** and **18** may be varied so as to define any desirable configuration that will perform the interlocking engagement between the panels while the form of the invention illustrated in FIGURES 11 and 12 merely constitute spacers between the panels **25** and **26** but in each form of the invention, the several voids have been provided into which concrete is poured after the panel has been installed in an upright manner into a wall opening. While the device has been primarily described as being of molded concrete, it will be clearly apparent that the panels and their associated interlocking lugs and ribs may be molded of a suitable relatively light weight material such as Styrofoam. It is also contemplated that the panels and their interlocking members may conceivably be formed of extruded Styrofoam or like plastic materials. Basically, the panel sections are initially molded and bonded together with their lugs or ribs in interlocking engagement, thus maintaining the panel sections in properly parallel and aligned position and obviously will be held against accidental separation by the use of the selected cement that may be brushed or sprayed over the several interlocking elements. The structure described may of course be formed in any desirable dimensions and it should be understood, that the panels may be of such dimensions as to constitute wall blocks or similar structural elements.

It will be apparent from the foregoing that there has been provided a very novel form of structure that may constitute the outer walls of a building, partition walls, flooring and also roof structure. The panels and their integral lugs may be molded of any desirable material having adequate strength as a weight bearing member and are quickly and economically formed in a suitable plastic mold requiring only that the lugs of the two mating sections be cemented together in the forming of the complete panel device. The structure is light in weight and easily installed, requiring a minimum of labor for the installation of the units and the subsequent pouring of the cementitious material into the voids to form the columns and the beams. The use of such a device is relatively cheap as compared with the usual cost of constructing a wall device of concrete blocks and simultaneously forms a complete and relatively solid structure having a maximum weight bearing factor. As before pointed out, the panel section **5** and **6** may be molded of Styrofoam or other light weight plastic material and then the added strength of the unit being formed by the pouring of the cementitious material into the voids formed by the lugs. While the lugs have been illustrated as being groups of square protuberances integrally molded with the panels **5** and **6**, these groups of lugs may be formed in one solid block with alternate groups of blocks being omitted. The lugs constitute the spacing means between the walls of the panels **5** and **6**. It will be clearly apparent to anyone skilled in the art, that suitable reinforcing steel may be installed in the voids **9**, **10'** and **11** and with the steel being suitably connected at the base of the unit to the supporting floor structure and also, where superimposed panels are installed, the steel may extend upwardly beyond the beam **14** to be suitably connected to the reinforcing steel in the next adjacent units.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A wall-forming unit comprising laterally spaced panels of substantially equal longitudinal and transverse length and a plurality of ribs integrally formed with and extending laterally from a face of each of said panels, the ribs of both of said panels being spaced and arranged to jointly provide between the panels a plurality of spaced groups of ribs located within and spaced from the peripheries of the panels and forming a peripheral void within the peripheries of the panel and at least one void between the spaced groups of ribs, the ribs of both panels within each group comprising a plurality of longitudinally spaced rows of ribs extending transversely along the inner face of the respective panel, the ribs of each row being in transverse spaced relation, the peripheries of all of said ribs presenting a plurality of rectilinear surfaces of substantially equal dimenison, the adjacent rectilinear surfaces of two transversely spaced ribs of one row of a first panel and the adjacent rectilinear surface of a rib located in the row immediately adjacent said last-mentioned one row providing, with the

inner face of said first panel, at least one laterally extending void substantially equal to the transverse dimension of the ribs formed on the other panel, the adjacent surfaces of two transversely spaced ribs of one row of said other panel and the adjacent surface of a rib located in the row immediately adjacent said last-mentioned one row providing, with the inner face of said other panel, at least one laterally extending void substantially equal to the transverse dimension of the ribs located on said first panel, all of said ribs extending laterally of the inner face of the panels a distance substantially equal to the spacing of the panels and at least one rib within each row of one panel extending within the voids defined by the ribs of the remaining panel providing an interfitting engagement therebetween whereby cementitious material may be located within the peripheral void and the void partially formed by the spaced group of ribs.

2. The wall-forming unit as set forth in claim 1 wherein the ribs are of square cross-sectional configuration and each group comprises three rows of ribs, at least one rib of each row of said first panel extending into voids formed by the ribs of the other panel.

3. The wall-forming unit as set forth in claim 1 wherein a third panel is located adjacent said first panel and the ribs of one group of said other panel extend into voids formed by the ribs on the first panel and the remaining ribs of said other panel extend into voids formed by ribs located on said third panel.

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