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WALL CONSTRUCTION
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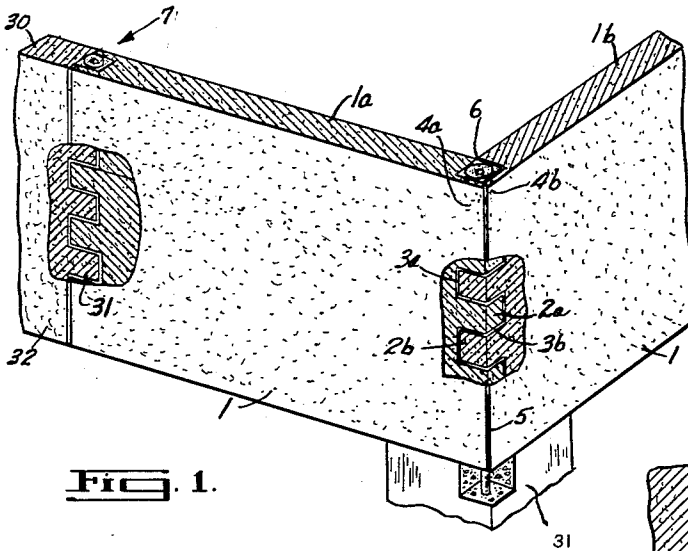


FIG. 1.

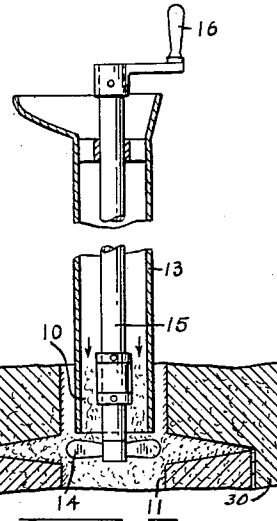


FIG. 5.

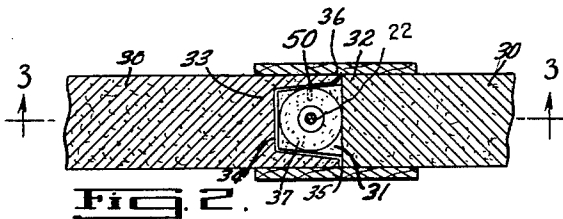


FIG. 2.

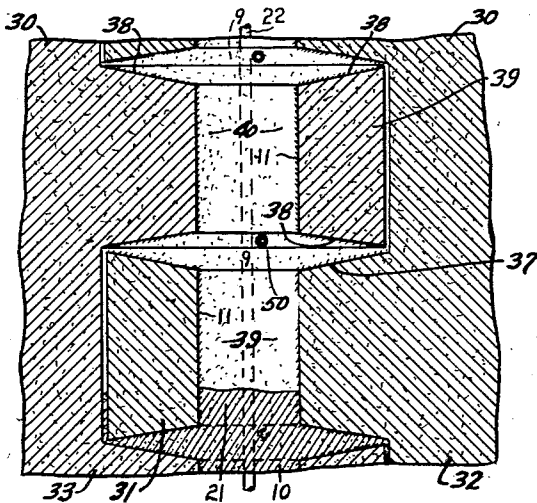


FIG. 3.

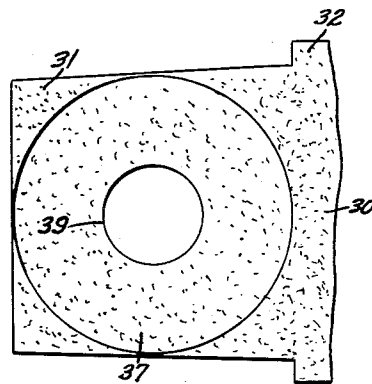


FIG. 4.

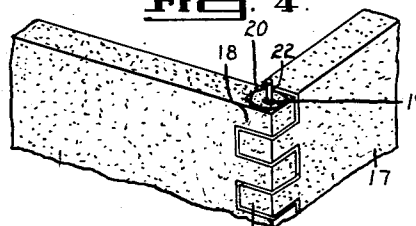


FIG. 6.

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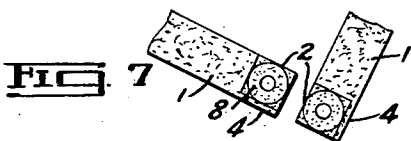


FIG. 7.

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WALL CONSTRUCTION

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1 Claim. (Cl. 50—370)

This invention relates to improvements in wall-forming building elements and more particularly to interlocking wall-forming panels or sections.

While present types of interlocking building panels, blocks or like structures, have been found adequate to withstand average or normal weather conditions, the interlocks in a building are of little avail to maintain the building erect in the event of high winds or of concussion and reduced air pressures due to bombing or warfare.

It is therefore the principal object of the present invention to provide an interlocking wall panel and wall structure which will securely and permanently tie the interlocked wall members together into a unitary erected unit to provide a greatly increased resistance to changes in air pressure and high velocity winds, thereby enabling a building capable of withstanding the concussions of bombs or shells exploded at a relatively close range without collapse to be constructed.

Another important object of the invention is to provide an interlocking wall panel which will enable a wall to be erected in sections which can be readily assembled in interlocked relation and permanently united to form an integral monolith-like wall structure. More particularly the object is to provide a very much stronger and improved joint between panels than heretofore obtainable to permanently unite the panels and bring the load-bearing capacity of the wall in the area of the joint up to full building requirements for the wall structure and to provide maximum vertical and lateral wall stability.

A further important object is to eliminate absorption of the bonding material or mortar by the panels in the area of the joint and to eliminate all detrimental shrinkage, crazing or cracking of the bonding material to prevent weakening of the joint. More particularly in this connection it is an object to form the interlocking surfaces to assist delivery of the mortar to the area to be bonded whereby a relatively dense mortar, low in water content may be used.

Further, it is an object to enable the mortar to be compacted and densified out to the outer edges of the joints and wall to provide the high degree of stability desired.

Still a further object is to provide in one form of the invention interlocking wall panels as aforesaid which will conceal the interlocks where desired, for instance, in the forming of an inside wall.

The principal feature of the invention resides in forming the panels with horizontally projecting lug interlocks having their upper and lower faces concaved and a central vertical opening between the faces, the concaved faces of lugs of interlocked adjoining panels presenting annular wedge-shaped mortar-receiving chambers, tapering gradually from the central opening to the perimeters of the lugs, the central opening allowing mortar to be introduced between the lugs with the panels assembled and the tapering form of the chambers assisting mortar feed and allowing the mortar to be expanded outwardly

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to the lug perimeters while being progressively compacted to maximum density at the perimeter for full load-bearing capacity and to extend the bond to the edges of the lugs and hence towards the edges of the panels for maximum wall stability.

Another important feature resides in employing reinforcing members projected through the aligned vertical openings of the interlocked lugs of adjoining panels to tie the adjoining panels into a unitary structure. These reinforcing members may be tied as desired to suitable horizontal reinforcing members which again may be employed as desired according to the particular building structure to which the invention may be employed.

A further important feature resides in waterproofing the faces of the lugs and the peripheral surface of the vertical openings with a thin, preferably roughened coating of paraffin, asphaltic or other suitable material to prevent any appreciable absorption of the mortar constituents.

Still another feature resides in incorporating into the lug formations of the interlocking wall sections drainage passage means leading from the wedge-shaped mortar-receiving chambers to enable any excess moisture and trapped air to be drained therefrom, the passages being afterwards sealed to complete the construction.

Still a further feature resides in mechanically compacting and distributing the mortar to the perimeters of the chambers, and to this end the mortar may be centrifugally injected into the chambers.

With the assistance offered by the chamber walls and aided by mechanical action the mortar is deliverable to the chamber perimeters while in a relatively thick mass, permitting mortar, with a minimum water content and hence having a minimum shrinkage factor, to be employed in forming the joint.

A further feature resides in utilizing the means for distributing the mortar to and compacting the mortar at the perimeters of the chambers to work the mortar to prevent crazing or cracking.

Still a further feature resides in forming in one embodiment of the invention continuous panel surfaces which overlie the interlocked lugs and conceal the interlocks, with the panels in wall-forming relation.

These and other objects and features will become apparent from the following description taken in conjunction with the accompanying drawings, in which Figure 1 is a perspective section partly broken away illustrating a wall formation formed of panels embodying the invention.

Figure 2 is a transverse horizontal section of the interlock of adjoining panels with the forms in situ preparing the joint for the reception of mortar.

Figure 3 is an enlarged vertical sectional detail on the line 3—3 of Figure 2.

Figure 4 is an enlarged plan detail of one of the interlocking lugs formed on the panels.

Figure 5 is a fragmentary vertical sectional detail illustrating the manner in which the mortar may be compacted and distributed to the periphery of the lugs.

Figure 6 is a fragmentary perspective view of a corner of a wall formed from panels of slightly modified construction.

Figure 7 is a plan view of the corner construction shown in Figure 1 prior to assembling the panels.

With reference to Figures 2 and 3 of the drawings, in the construction of a straight vertical wall identical panels or sections 30 are arranged in vertical edge to edge relation, each section or panel 30 being provided with aligned vertically spaced lugs 31 on vertical edge 32 thereof, projecting horizontally, the opposite vertical edge 33 having aligned vertically spaced similar sockets 34 in horizontal alignment with lugs 31 whereby, with

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the panels disposed in vertical edge to edge relation, the lugs 31 and sockets 34 can be interlocked as illustrated.

With this arrangement a straight vertical joint 35 is presented at one side. Similarly, a vertical joint 36 is presented at the other side.

In the embodiment of the invention illustrated in Figure 1 and Figure 7, corner panels 1a and 1b are provided with aligned vertically spaced lugs 2a and 2b, respectively, lugs 2a being offset in relation to lugs 2b, the spaces between lugs 2a and 2b defining sockets 3a and 3b, whereby the lugs of each panel 1a and 1b interfit in the manner illustrated. Panels 1a and 1b are each provided with edge formations 4a and 4b which edge formations are continuous with the outer surfaces of the panels 1a and 1b and extend as thin webs to conceal lugs 2a, 2b and sockets 3a and 3b. By provision of such edge formations 4a and 4b a vertical joint 5 is presented at the outer corner and a vertical joint 6 is presented at the inner corner.

In Figure 1, corner panel 1a is illustrated as having a vertical edge socket formation indicated at 7 similar to the vertical edge socket formation of the panel 30 illustrated in Figure 2.

A panel 30, provided with lugs 31 along vertical edge 32 engages the vertical edge socket formation 7, providing an interlock similar to that illustrated in Figure 2.

The vertical joints illustrated at 35 and 36 of the straight wall formation and 5 and 6 of the corner panels 1a and 1b may be filled with plaster or used as means to key plaster to the wall surfaces to provide an uninterrupted wall surface.

Referring particularly to Figure 3, each of the lugs 30 has its upper and lower faces recessed or concaved by bevelling these faces downwardly and inwardly as at 37 towards the centre of the lug. Similarly sockets 35 have their upper and lower faces recessed as at 38.

Extending centrally between the concaved faces 37 is a vertical bore 39 while extending centrally between concave faces 38 of sockets 34 are vertical bore portions 40. With the panels assembled in interlocking relation the bores 39 and 40 are in vertical alignment, as illustrated in Figure 3, and the concaved faces 37 and 38 define annular wedge-shaped chambers 9 tapering in height from adjacent the bores 39 and 40 to the extremities of the lugs where the spacing between the lugs is of the order of one quarter to one half an inch.

With adjoining panels inter-leaved the bond to integrate the panels into a unitary monolithic-like wall formation is obtained by introducing mortar 10 down the aligned bores 39 and 40 and delivering it laterally outwardly of the bores to fill the chambers 9 to the extremities thereof.

As illustrated in Figure 3 each of the lugs 31 is preferably formed with a passageway 50 leading from the lower recessed face 7 through the wall thereof by means of which excess moisture and trapped air may escape to the outside of the wall formed by the interlocking panels.

These passageways 50 may simply be small pipes embedded in the lugs and when they have served their purpose can be suitably plugged.

At this point the proper compaction of the mortar and its delivery to the extremities of the chambers 9 becomes vitally important, and it is essential that mortar having minimum shrinkage factor and maximum density or load-bearing capacity be employed successfully and that absorption of the moisture content of the mortar by the material of the panels be eliminated. To this end the concaved faces 37 and 38 and the perimeters of the bores 39 and 40 are coated with a waterproofing material to prevent moisture absorption from the mortar. This material may be a paraffin or asphaltic material or a suitable varnish and is applied as a thin film 11 preferably slightly roughened.

By virtue of the tapered formation of the chambers 9 it will be seen that feed of the mortar laterally is assisted, and additionally, the wedge shape of the cham-

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bers ensures that it is progressively compacted the maximum density as it reaches the periphery of the lugs 2.

By virtue of the assistance of the chamber walls a mortar with relatively low water content and hence having a low shrinkage factor can be forced and guided as a relatively dense mass to the extremities of the lugs and excess moisture and trapped air is forced through the small pipes 50 as above explained. On sealing of the pipes 50 and compacting the mass this compacted mass will form a strong, load-bearing bonding element. In this connection it will be noted that the lugs 31 and sockets 34 have a width approaching the full width of the panels 1 and thus the mortar 11 forms a bond which extends from the central portion of the lugs and sockets to their extremities adjacent the edges of the panels to afford a lateral stability, not previously encountered with interlocking wall structures.

The extended area of the bond outwardly from the central portions of the lugs also affords a large load-bearing area as well as providing the important factor of complete lateral stability.

While the problem of shrinkage has been reduced to a minimum by enabling the use of a mortar of low water content, the mortar is preferably vibrated to compact it during application and to prevent crazing or cracking. To this end suitable apparatus is utilized to provide the desired vibration and to effectively compact the mortar.

Figure 5 illustrates an apparatus which may be employed to accomplish this result.

Forms 12, such as illustrated in Figure 2, are placed on opposite sides of the joint where mortar might escape, and the mortar is introduced down the aligned bores 39 and 40 through the sleeve 13 of the apparatus illustrated in Figure 5, and this mortar is compacted and delivered laterally by an impeller 14 mounted on a shaft 15 journaled concentrically in the sleeve 13 and operated by a hand wheel 16 or connected to any suitable driving means.

The mortar is thus both mechanically and centrifugally delivered outwardly and, with the assistance of the tapering walls of the chambers 9, thoroughly compacted to fill the chambers to their extreme edges.

The film 11 has been described as a waterproofing film of minimum thinness for coverage so that it will not shrink under heat or prevent the mortar from being intimately associated with the lug faces 37 and socket faces 38. It will be appreciated that the surfaces of the bores 39 and 40 may also be vitrified or otherwise water-proofed as desired or may provide limited absorption if required to meet building specifications.

The mortar has been described as of low water content for minimum shrinkage, and to form the mortar a plasticizing agent, such as lime, is preferably added to the cement and sand and a small percentage of water.

Figure 6 illustrates modified form of panel 17 provided with vertically spaced lugs 18 corresponding to the lugs 2a and 2b of panels 1a and 1b but these are exposed to present the interlocking surfaces.

The lugs 2a and 2b of panels 1a and 1b and the vertically spaced lugs 18 of the corner panels 17, of the embodiment illustrated in Figures 1 and 6, are each provided with concave faces in a manner similar to that indicated in Figures 2 and 3 of the drawings and as well, vertically aligned bore portions whereby the corner formation may be constructed in substantially an identical manner as that indicated in Figures 2 and 3.

The panels may be formed of any suitable material, usually a cementitious material, and the surfaces of the panels may have imparted thereto any desired design, such as simulated stonework or the like, and the interlocking lugs 18 may be utilized to enhance and complement the design formation on the panel faces.

It will be understood that various modifications in the specific details of construction may be made without departing from the scope of the invention. In particular,

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the panels 1 have been illustrated without the use of reinforcing. It will be appreciated that such reinforcing may be utilized where loading on the wall structures will require a reinforced design.

While under normal conditions little reliance is made on the vertical "dowel" of mortar 21 filling the bores 8, in the case where abnormal winds or bombings etc. are to be anticipated the vertical tie between the panels becomes of paramount importance to tie the building structure into an integral unit.

To increase the strength of the tie between the wall sections in such cases, reinforcing is employed as represented by a metal tie rod 22 introduced down the aligned bores 8 to strongly and permanently bond the wall sections together.

While a simplified tie rod 22 is illustrated the particular reinforcing work to be employed will vary from building to building and corresponding to the strength and size of the wall panels.

Where these wall panels 1 are of reinforced construction it will be appreciated that the rods 22 may all be tied to the reinforcing of the wall panels to give added strength to the building structure.

In addition to enabling a stronger "tie" between the adjoining panels 1 to be effected, the tie rods 22 also provide a means of enabling the whole wall formation to be tied down to a foundation or base such as indicated at 31 in Figure 1.

Other manners of application of anchoring the wall with the reinforcing 22 will be apparent to those skilled in the art.

What I claim as my invention is:

A wall construction comprising panels disposed in vertical edge to edge interlocked relation, one vertical edge of each panel having aligned vertically spaced similar lugs projecting horizontally, the opposite vertical edge of each panel having aligned vertically spaced similar sockets in horizontal alignment with the lugs of the same panel, each uppermost and each lowermost horizontal surface of the lugs of each panel having a concaved recess disposed

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within the marginal limits of its respective surface, each uppermost and each lowermost horizontal surface of the sockets of each panel having a concave recess disposed within the marginal limits of its respective surface, the peripheral edge of each recess being continuous and in the horizontal plane of its said respective surface, said lugs of one panel being seated in the sockets of a second panel and defining said interlocked relation, the recesses of the seated lugs and sockets being vertically aligned and with the recesses of adjacent surfaces being continuous and defining a concealed internal chamber, the vertical height of each chamber diminishing from its central portion towards its peripheral edge therearound, a vertical bore connecting the aligned chambers through the central portions, and a dense mortar filling the bore and chambers thereby forming a load-bearing and bonding element for imparting structural strength and lateral stability to said wall.

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