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SUPERIMPOSED BUILDING BLOCKS WITH VERTICALLY SPACED FLAT BARS
INTERFITTED THEREWITH CONNECTED BY THREADED STUD MEMBERS
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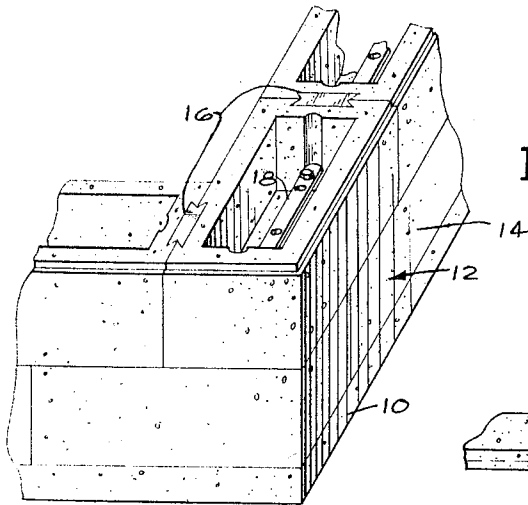


FIG. 1

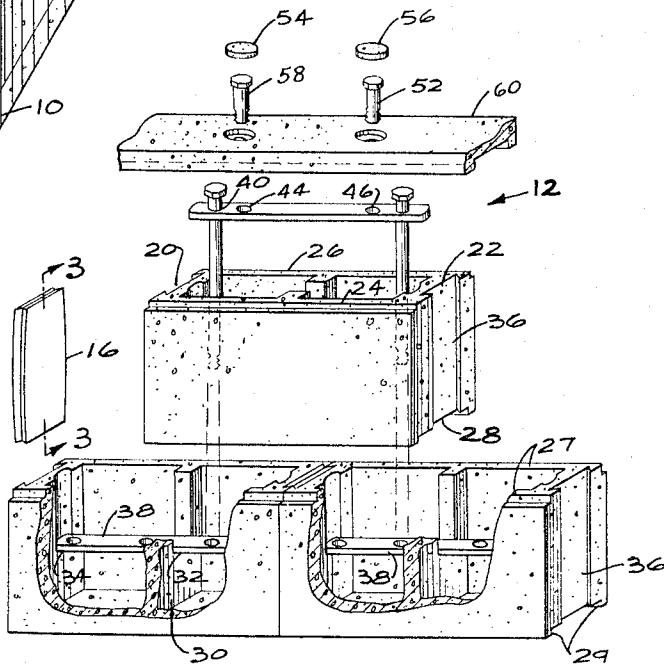


FIG. 2

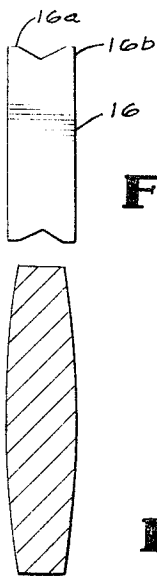


FIG. 4

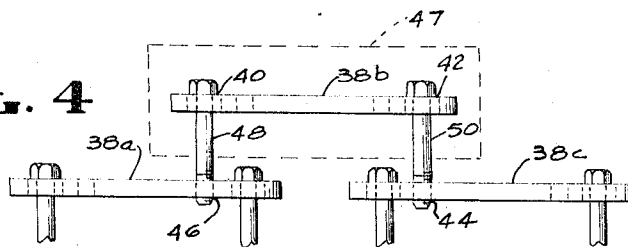


FIG. 5

FIG. 3

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1

2

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SUPERIMPOSED BUILDING BLOCKS WITH VERTICALLY SPACED FLAT BARS INTERFITTED THEREWITH CONNECTED BY THREADED STUD MEMBERS

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4 Claims. (Cl. 52-227)

The present invention relates to a building block system wherein a plurality of blocks are stacked in an interconnected relationship to provide an enduring vertical wall or other structure.

The use of bricks or blocks in various building structures dates from time immemorial. Although various changes and improvements have taken place through the years, the technique of stacking bricks or blocks with mortar bonding them together has not changed significantly in recent years. For example, it is common practice to lay blocks in superimposed rows so that the blocks in each row are offset from those in adjacent rows. If a structure is to support a vertical load, steel or other reinforcing materials may be incorporated therein to provide a more rigid construction.

In using conventional methods, block masonry structures must normally be erected by a skilled artisan who is capable of properly aligning the blocks and bonding them together with mortar. As a result, these structures are usually quite expensive, yet unless they are especially reinforced, they are incapable of supporting any substantial loads. The erection of a conventional mortar block wall also involves other considerations as maintaining an available supply of fresh mortar, maintaining the exposed surfaces of the blocks free and clean of loose mortar and assuring that the blocks are in intimate contact with each mortar joint.

In addition to the problems of erecting a structure of masonry blocks, certain difficulties are experienced in maintaining and preserving the structure. That is, over the years, severe temperature variations, slight ground shifts, and various shock loads often cause masonry structures to become cracked so that sections of the structure are no longer bonded together into an integral unit. These cracks, which normally occur in the joints between the blocks, may eventually result in a total collapse of the structure. A less, but still important consideration lies in the fact that a cracked structure loses much of its beauty and aesthetic appeal.

In general, the present invention comprises a block wall construction system in which individual blocks are interconnected by mechanical apparatus rather than mortar. The blocks in each row are interconnected by a wedge that locks the abutting ends of the blocks together. Adjacent rows of the blocks are then tied together by rod structures affixed between the blocks of each row. A structure accomplished in accordance with the present invention may incorporate a cap affixed at the top of the structure in a fashion somewhat similar to the manner in which the rows of blocks are interconnected, to thus complete a wall.

An object of the present invention is to provide an improved block structure wherein a multiplicity of individual blocks are stacked in interconnecting relationship to accomplish a wall or other building structure.

Another object of the present invention is to provide a mortar-less block construction system capable of supporting substantial loads.

Still another object of the present invention is to provide a block construction system which may be practiced by unskilled persons to accomplish an attractive and enduring wall or other structure.

A further object of the present invention is to provide a mortar-less construction system wherein inexpensive blocks may be economically erected to provide an attractive and enduring structure.

One further object of the present invention is to provide a mortar-less system of block construction having less tendency to become disfigured by cracks resulting from earth movements and severe temperature variations.

These and other objects and advantages of the present invention will become apparent from a consideration of the following, taken in conjunction with the appended drawing, wherein:

FIGURE 1 is a perspective view of a block wall constructed in accordance with the system of the present invention;

FIGURE 2 is an exploded view of a portion of the wall of FIGURE 1, wherein certain components are shown in section;

FIGURE 3 is a sectional view taken along line 3-3 of FIGURE 2;

FIGURE 4 is a top view of the element of FIGURE 3; and

FIGURE 5 is a plan view of the vertical interconnecting structure employed in the wall of FIGURE 1.

Referring initially to FIGURE 1, there is shown a foundation or footing 10 carrying the corner of a wall 12 incorporating the system of the present invention. Conventionally, the footing 10 extends beneath the ground level to provide a rigid base for the wall 12. Individual blocks 14 in the wall 12 are shown to lie in superimposed rows with the blocks in each row horizontally offset relative to the blocks in the adjacent row. These elemental blocks 14 may be made of various well known block material as cementitious compositions (including cinders, fibres, sand, limestone, and various other additives) or other materials may be used, which have not in the past been conventionally employed for building blocks. For example, the blocks may be formed of expanded concrete to afford lightweight and good insulation characteristics. Certain plastics, which also provide these advantages, as well as fibre materials bonded together by organic and inorganic binders may also be used. With reference to the latter materials, a formulation incorporating asbestos and Portland cement provides a very effective and attractive block.

The blocks 14 in each row of the wall 12 are affixed together by wedges 16 which interlock the abutting ends of adjacent horizontal blocks. The wedges 16 may be formed of virtually of any of the materials described for the blocks themselves, or, because these members are not exposed to the elements when the wall is complete, but rather are sealed in closed chambers and not seen, they may be made of less attractive material or material which would deteriorate upon exposure to the elements. As examples, the wedges 16 may be made of inexpensive plastic, wood, or fibreboard.

The blocks 14 in adjacent rows are affixed together by a frame structure 18 partially shown in FIGURE 1. It is to be noted, that each of the blocks 14 in the wall 12 is offset horizontally to lie above two abutting blocks 14 in the row below. In conjunction with such positioning, the structure 18 extends from each block into the two lower adjacent blocks so as to interlock the blocks in different rows.

Referring now to FIGURE 2, there are shown: the detailed structure of the blocks 14, the wedge 16, and the interconnecting structure 18; as well as the manner in which these components are assembled into a vertical standing structure.

The blocks 14 comprise end walls 20 and 22 which form a rectangle with longer side walls 24 and 26. The

side walls 24 and 26 are substantially twice as long as they are high in one form of the block, so that the block is somewhat twice as long as it is high and deep.

The upper ends of the side walls 24 and 26 carry internal lips 27 which mate with external lips 29 at the bottom of the side walls. Therefore, each row of blocks is telescopically fitted into the row above to afford strength and alignment.

Also comprising a part of the blocks 14 is a center support 30 that is intermediate the end walls 20 and 22 and parallel those walls. A shelf 32 is formed at the base of a cut in the center support extending to a depth of substantially half the block 12. The shelf 32 is horizontally aligned with end shelves 34 formed at the ends of semi-cylindrical grooves in the interiors of the end walls 20 and 22. The shelves 32 and 34 accept a compressive load to support the interconnecting structure 18 as considered in detail below.

The exteriors of the end walls 20 and 22 contain wedge receptacles or slots 36. The slots 36 are uniform vertically extending grooves having an inside width greater than their width at the surface, so they may function as a female locking receptacle. That is, the grooves 36 are trapezoidal in horizontal section to receive a wedge interlock.

The wedges 16 which interconnect the blocks 14 by mating with the grooves 36 comprise back-to-back male locking trapezoidal sections 16a and 16b which are received in the slots 36 of the abutting ends of a pair of blocks 14. The form of the wedges 16 is best shown in FIGURES 3 and 4 which are a vertical section and a top plan view respectively. It is to be noted, that the two sections 16a and 16b of the wedge are integrally formed and mate individually with a slot in an end wall of a block to accomplish a tight, enduring joint.

Referring to FIGURE 3, it may be seen that in vertical section, the wedge 16 is of a somewhat elliptical shape, tapering from a center at which it is thickest, to thinner top and bottom sections. This taper in the wedge 16 facilitates the insertion of the wedge between a pair of the blocks 14, yet accomplishes a tight joint when the wedge is in position.

The blocks in individual rows of the wall 12 are affixed to adjacent rows by interconnecting structures 18 which are shown in detail in FIGURES 2 and 5. A bar 38 lies within each block 14 upon the shelves 32 and 34. That is, the bar 38 extends the full interior length of the block so as to lie upon the end shelves 34 and the center support shelf 32. The bar 38 may be made of metal, plastic, or various other compositions including an asbestos-containing cementitious composition which has been found to possess considerable strength. It is to be noted, that the bars 38 are contained in hollow cavities within the blocks 14 which are sealed closed so that the bars 38 are not exposed to the elements nor visible in the completed structure.

As shown in FIGURE 2, the bars 38 are flat elongate members containing unthreaded bores 40 and 42 and smaller threaded bores 44 and 46. Considering the interlock structure 18, including the bars 38, reference will now be had to FIGURE 5 showing several similar bars 38a, 38b and 38c. The bar 38b is shown within a dash-line rectangle 47 representative of the position of a block 14. The bars 38a and 38c would be contained in two blocks (not shown) lying beneath the block represented by rectangle 47. The bar 38b is anchored to the bars 38a and 38c by studs 48 and 50 respectively, extending through the bores 40 and 42 of the bar 38b, into the threaded bores 46 and 44 of the bars 38a and 38c, respectively. Thus the studs 48 and 50 hold each bar 38, and in turn each block 14, anchored to the bars and blocks immediately below it, whereby to form a rigid and enduring structure.

To further enhance the appearance of the structure and finish the same, a cap 60 (FIGURE 2) is positioned on

a course of the wall 12 and affixed thereto by studs 58 and 52 which are anchored into the bars 38 of the upper row of blocks. The studs 58 and 52 may be concealed by covers 54 and 56 placed in recesses which receive the heads of the studs.

The studs 50 and 52, along with the longer studs 48 and 50 may be formed of metal, plastic, or various other materials including the cementitious composition containing substantial asbestos. Further, regarding all the studs in the structure, in some instances, extremely coarse threads are desirable whereby to accomplish interconnection with a minimum of labor.

In the production of a wall 12 as shown in FIGURE 1, various techniques may be employed to first manufacture the blocks 14 and other components. For example, the blocks may be cast of certain materials previously indicated, or may be extruded and sectioned if made of certain plastic materials.

Prior to placing the first row of blocks 14, threaded bores may be provided in the footing 10 to receive the studs 48 and 50 for the first row. An example of such structure is a single strip containing spaced apart threaded bores that is affixed to the top of the footing 10. Alternatively, small thread-bearing appliances may be cast in the footing 12 at spaced-apart positions to receive the studs. In still another alternative of the base structure, anchor bolts are positioned in the footing 10 and bars 38 are placed over these members to be locked in position by nuts that are threaded on the anchor bolts. The first row of blocks 14 are positioned and locked then additional rows are stacked upon one another and locked in place until the wall is completed to the desired height.

In installing the rows of the blocks 14, the end block may be first placed in position and may be formed to have the mating groove 36 at one or both of its ends, or alternatively may contain the groove in a side wall as the corner block shown in FIGURE 1. In placing the block in position, studs 40 and 42 are inserted through a bar 38 which is then dropped onto the shelves 32 and 34 to be seated within the block. The studs 40 and 42 are then threaded into engagement with the bars of the lower blocks and tightly affixed thereto so that the block is seated in a position to lie over two of the lower blocks. Next, the adjacent block is positioned end to end with the block which has been seated, and the wedge 16 is inserted in the mating grooves 36 of the abutting blocks to interlock the blocks. It is to be noted, that the tapered vertical section of the wedge 16 facilitates the insertion of the wedge into the grooves 36 and at the same time results in a rigid coupling between the two blocks.

After the wedge has been inserted, a bar 38 is seated within the block which has just been laid, and the studs 40 and 42 are inserted to lock the block to the lower row. Thus, the work may be done intermittently on any schedule, and the blocks are self aligning so that an unskilled person can create a very desirable structure.

At a time when the wall or other structure has attained the desired height, the cap 60 is placed in position along the top of the uppermost row overlapping and mating with the blocks in that row, so as to provide an effective and attractive closure for the blocks in the upper row of the wall. The cap 60 is affixed in position by insertion of the studs 58 and 52 which may be concealed simply by dropping plugs 54 and 56 into bores provided in the cap 60.

It is to be noted, that in the structural system of the present invention, blocks may be laid or placed at any desired rate because there is no compelling consideration to provide fresh mortar for each block. That is, a person can place one block in the structure, then go off about other business, to return at a later time and place any number of additional blocks without waste or inconvenience.

5

Another important consideration applicable to the present invention resides in the fact that a wall or other structure constructed in accordance with this system of the present invention is extremely strong and capable of bearing substantial loads; however, temperature changes and minor ground shifts will not open offensive cracks in the structure.

Still a further feature of the present invention resides in the consideration that the components of the system of construction may be manufactured of a wide variety of materials including several materials which are relatively inexpensive in mass production.

Still one further feature of the present invention resides in the consideration that the system of the present invention does not require the use of skilled labor to accomplish structural buildings.

Although various features and concepts of the present invention have been set forth in the foregoing illustrative embodiment, the present invention is not to be limited in accordance therewith but is to be constructed in accordance with the claims set forth below.

What is claimed is:

1. A wall construction comprising:

- a multiplicity of hollow blocks laid in superimposed rows, said blocks including a bottom, side walls and end walls to define an opening to the top thereof, said blocks further including a seat defined therein intermediate said top and said bottom, and still further defining coupling spaces in said end walls;
- a plurality of locking members engaged in said coupling spaces in adjacent blocks for mating adjacent blocks in each of said rows, said locking members in each of said rows being offset from the locking members in adjacent rows; and

6

clamp means interlocking said blocks in different rows including flat bar means seated against said seats defined in said blocks, said bar means defining one pair of locking apertures and one pair of bores, said clamp means further including bolts passing through bores in one of said bars and locking to said locking apertures in other of said bars.

2. Apparatus according to claim 1 wherein said blocks are made of masonry and said clamp means are steel.

3. A wall construction according to claim 1 wherein said upper surface of said blocks is irregular in one manner, and said lower surface is irregular in a mating manner.

4. Apparatus according to claim 1 wherein said coupling spaces in said blocks comprise female grooves of increasing internal width, and said locking members comprise symmetrical male inserts integrally formed to be received in said grooves.

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