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Klem

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[54] **BUILDING STRUCTURE AND METHOD OF ERECTING SAME**

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[51] **Int. Cl.** **E04b 2/20**

[58] **Field of Search** 52/503, 505, 439, 314, 603, 52/605, 316, 284, 437, 438, 604

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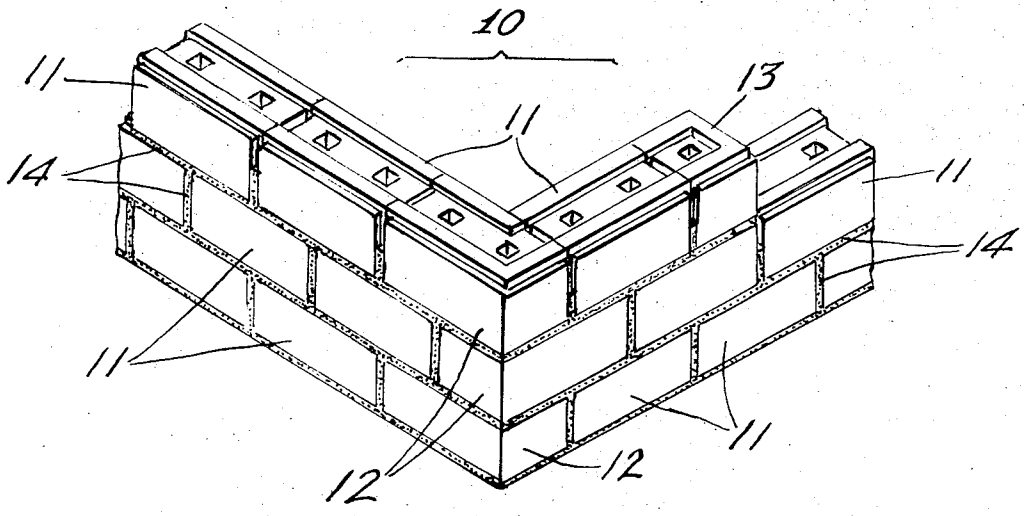
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[57] **ABSTRACT**

A structure having the overall appearance of conventional brick construction is erected from a series of building elements each of which has a peripheral channel and transverse vents connecting top and bottom portions of the channel to enable a bonding agent to be flowed downwardly through the vents and into passageways formed by the channels between the elements when they are laid one upon the other with their channels in registry with one another. The elements are provided with recesses in their side faces for receiving strips of decorative mortar which provide the illusion of mortar-joints and which are applied after the structure has been erected. Three forms of building elements are disclosed: a course element for the walls of the structure, a corner element for its corners, and an edge element for framing apertures in the structure.

2 Claims, 7 Drawing Figures



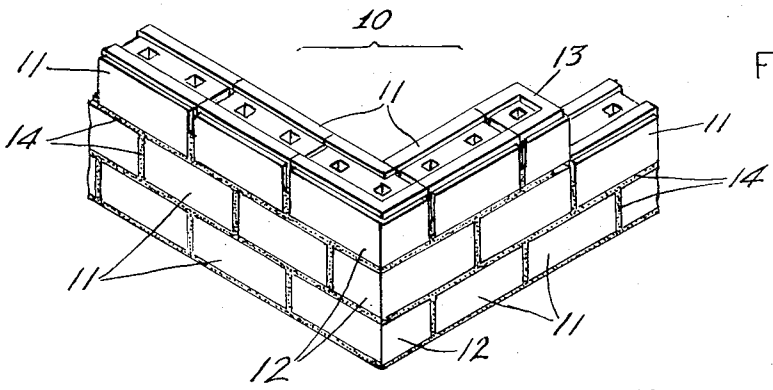


FIG. 1.

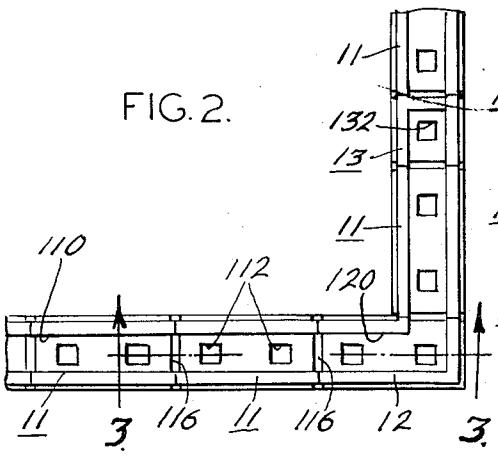
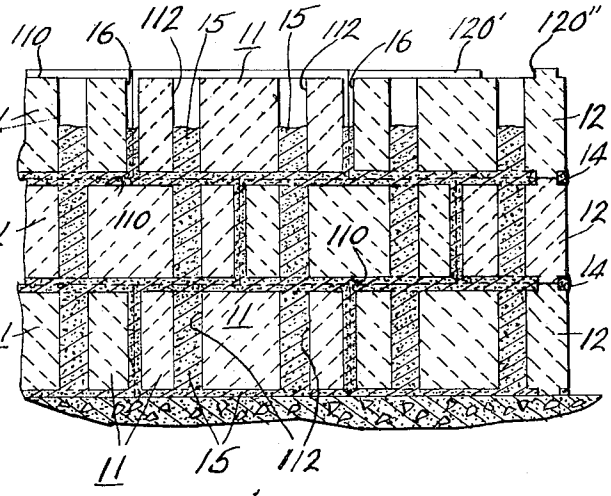


FIG. 2.

FIG. 3.



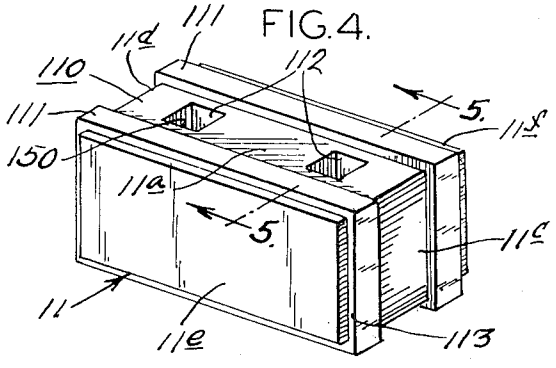


FIG. 4.

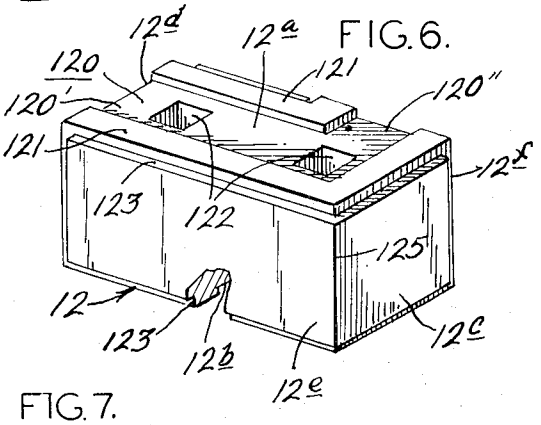


FIG. 6.

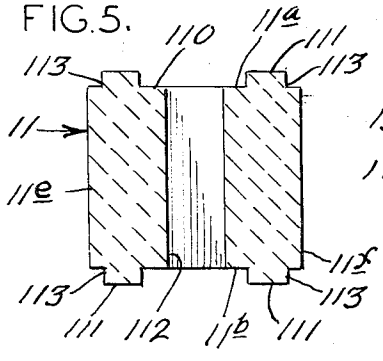


FIG. 5.

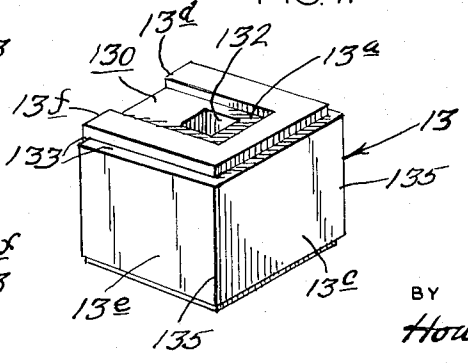


FIG. 7.

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BUILDING STRUCTURE AND METHOD OF ERECTING SAME

The present invention relates to building structures; and more particularly, the present invention relates to structures which have the overall appearance of brick construction but which comprises building elements having configurations which enable a bonding agent to be flowed between the elements after they have been erected into the structure.

In erecting conventional structures of brick or block elements, mortar is normally applied to each element and to previously laid elements as construction proceeds. Constructing walls in this manner is relatively slow; and hence, it is costly. Also, workmen constructing the structure must possess a certain degree of skill to ensure that the elements are laid properly.

Exterior or curtain walls are normally pointed only on their outsides; however, in some instances, for example where a brick wall serves as an interior partition or room divider, it may be desirable for both sides of the wall to be pointed. Customarily, the workman erecting the partition roughpoints both sides as he proceeds, leaning over the top edge to reach the opposite side of the wall. This practice is undesirable because it is slow, and hence, costly. Also, there exists the possibility of the workman's inadvertently dislodging freshly laid bricks while leaning over the top of the wall. In addition, there may be situations where it is desirable for the mortar-joints on one side of the wall to possess a color which is different from the mortar-joints on the opposite side of the wall for complementing decorator color schemes in the vicinity of the wall.

In some instances, it may be desirable for relatively unskilled persons, for example, homeowners or so-called "do-it-yourselfers" to be able to erect structures of brick or block building elements. Although conventional brick or block and cement materials are readily available, persons in this class may be deterred from erecting such structures because they may lack the degree of skill required to perform a satisfactory job. Thus, building elements which are particularly adapted for erection by persons possessing a minimum of special skills is highly desirable.

With the foregoing in mind, it is the primary object of the present invention to provide a novel building element which is adapted to be assembled with like elements by an improved method.

It is another object of the present invention to provide a unique method by which a conventional-appearing wall may be erected by persons possessing a minimum of special skills.

As a further object, the present invention provides a new building element which may be assembled dry with like elements and thereafter permanently bonded to the elements by means of mortar.

It is still another object of the present invention to provide a building structure which has mortar-joints of uniform appearance and which may be pointed with decorative mortar, the color of which may differ on opposite sides of the structure.

More specifically, the present invention provides a building structure comprising novel building elements which may be assembled by an improved method. Three basic types of elements compose the structure: a course element for walls, a corner element for corners, and an edge element for framing apertures in the

structure. Each element has a body with a top, bottom, end and side faces, and when erected in the structure, the side faces are exposed. In addition, each element has means providing a channel in its unexposed faces, and each element has vent means providing fluid communication between the channel means in the top and bottom of the element. The channel means of one element cooperates with the channel means of adjacent elements to form passageways between the elements to enable a bonding agent to be flowed into the passageways through the vent means. Recess means is provided in the exposed side faces of the course element and in the sides and one end face of the corner and edge elements for receiving decorative mortar which is applied after the elements have been erected and the mortar has been poured and which provides the illusion of horizontal and vertical mortar-joints between the elements. The elements are erected by stacking them dry one upon the other, and thereafter causing the bonding agent to flow downwardly through the vent means and into the passageways between the elements. The decorative mortar is applied in the recess means on the side faces of the elements after the bonding agent has set.

These and other objects, features and advantages of the present invention should become apparent from the following description when taken in conjunction with the accompanying drawing in which:

FIG. **1** is a fragmentary perspective view of a portion of a structure constructed from building elements embodying the present invention;

FIG. **2** is a plan view of the structure of FIG. **1**;

FIG. **3** is a slightly enlarged, cross-sectional view taken along line **3—3** of FIG. **2** to illustrate a bonding agent disposed in passageways formed by the cooperation of channel and vent means provided in the building elements;

FIG. **4** is a perspective view of one of the building elements composing the courses of the structure of FIG. **1**, the view illustrating the channel means in the top, bottom and end faces of the element and the vent means interconnecting the top and bottom portions of the channel means;

FIG. **5** is a cross-sectional view taken along line **5—5** of FIG. **4**;

FIG. **6** is a perspective view similar to FIG. **4** but illustrating one of the building elements composing the corner of the structure of FIG. **1**, the view illustrating the L-shaped configuration of the channel means in the top of the corner element; and

FIG. **7** is a perspective view similar to FIGS. **4** and **6** but illustrating one of the edge building elements used for framing apertures in the structure of FIG. **1**.

Referring now to the drawing, there is illustrated in FIG. **1** a section of a building structure **10** comprising building elements which embody the present invention. As illustrated therein, the structure **10** has the overall appearance of conventional brick construction. Like conventional brick structures, the structure **10** has a series of course elements **11, 11** laid end-to-end and upon one another in a plane and interlocked in angulated relation with corner elements **12, 12** to increase the rigidity of the structure. In addition, edge elements **13, 13** are provided for framing an aperture in the structure to receive a door or window or the like. As customary with structures of brick construction, a series of mortar-joints **14, 14** extend horizontally and

vertically between the elements; however, as will be more fully discussed hereinafter, the illustrated mortar-joints **14, 14** are not provided by the same agent which bonds the elements together.

As may be seen in FIG. **3**, the elements, for example the elements **11, 11,** are bonded together by means of a bonding agent or mortar **15** which surrounds each element. It is to be noted, however, that unlike conventional brick construction, the bonding agent **15** is not applied between the elements **11, 11** concurrently with the erection of the structure **10.** Rather, in accordance with the present invention, the elements **11, 11** are first assembled dry, that is, without the bonding agent, and the bonding agent **15** is thereafter flowed into passageways **16, 16** which are provided therebetween by the cooperation of the elements.

To this end, each element, for example the element **11** (FIG. **4**) is adapted to abut adjacent elements in the structure. The element has a body with a top face **11***a*, a bottom face **11***b*, end faces **11***c* and **11***d*, and side faces **11***e* and **11***f* which are exposed in the completed structure. As may be seen in FIG. **6,** the corner element **12** has similar faces; and as may be seen in FIG. **7,** the edge element **13** has similar faces. In the illustrated embodiments, the course element **11,** and the corner element **12** each have elongated configurations, and the edge element **13** (FIG. **7**) has a substantially square configuration. That is, the top and bottom faces of each of the aforementioned elements are disposed substantially parallel to one another, the end faces intersect the top and bottom faces at substantially right angles, and the side faces are disposed substantially parallel to one another and intersect the top, bottom and end faces at substantially right angles. It is to be noted, however, that if desired, the horizontal lengths of these elements may be varied to suit particular construction requirements since, unlike conventional bricks, they are not readily adapted to be cut to length at the construction site. For example, the horizontal lengths of the course and corner elements **11** and **12** may be shorter than illustrated, and the horizontal length of the edge element may be longer than illustrated, depending upon the desired dimensions of the structure. Also, the horizontal lengths may be made equal to two or three brick lengths to enable the same size structure to be constructed from fewer elements but retaining the illusion of a structure erected from a conventional number of elements.

For the purpose of forming the passageways **16, 16** between the elements when they are laid upon one another, means is provided to form channels in their abutting faces. As may be seen in FIG. **4,** the channel means **110** is formed by a pair of upstanding dikes **111, 111** which are disposed in spaced parallel relation on the top **11***a*, bottom **11***b*, and end faces **11***c* and **11***d* of the element **11** and which are imperforate and continuous around the periphery of the element **11** in the plane of the wall. It is to be noted that in the illustrated embodiment, the outwardly-facing surfaces of the dikes **111, 111** are substantially flat, and they are disposed substantially parallel to the peripheral surface portions from which the dikes upstand. Thus, when the elements **11, 11** are disposed in a common plane as illustrated in FIG. **3,** the dikes **111, 111** of one element bear against the dikes of abutting elements, thereby to form relatively fluid-tight passageways **16, 16** between the elements. Although the bottom of the channel **110** in the illustrated embodiment is flat, it may be desirable in some situations to provide the channel bottom with lengthwise corrugations to provide additional surface area for coacting with the bonding agent.

For the purpose of permitting the bonding agent **15** to be flowed into the passageways **16, 16,** vent means **150** is provided in each element. As may be seen in FIG. **4,** the vent means in the course element **11** comprises a pair of vertically disposed holes **112, 112** extending transversely through the body of the element **11** from top to bottom. The holes **112, 112** open at one end into the top portion of the channel means **110** and they open at their other ends into the bottom portion of the channel means **110** to provide fluid communication in a vertical direction therebetween. Thus, when the elements **11, 11** are laid one upon the other as illustrated in FIG. **3,** the vent means **112** enables the bonding agent **15** to be flowed downwardly into the horizontal and vertical passageways **16, 16** between the elements while permitting air in the passageways **16, 16** to escape upwardly through the vent means **112** in the passageways. Although the bonding agent **15** is preferably flowed into the passageways by means of gravity forces, if desired, the bonding agent may be flowed into the passageways **16, 16** at an increased rate by applying an external source of pressure to the agent.

As noted heretofore, the structure **10** has the appearance of conventional brick construction; however, the bonding agent **15** which bonds the elements together does not extend to the side edges of the elements as in conventional brick structures. This results in an advantage since the bonding agent **15** is completely protected against erosion by the elements or removal by birds, rodents and the like. However, in order to provide the appearance of conventional brick construction, and in order to cover the horizontal and vertical lines of juncture between the elements, recess means **113** is provided in each element for receiving decorative mortar to provide the imitation mortar-joints **14, 14** (See FIG. **1**).

In the embodiment of the course element **11** illustrated in FIG. **4,** the recess means **113** extends around each of its exposed side faces. That is, the recess **113** extends horizontally along the top and bottom side faces and vertically along each end face of the element **11.** In elements formed with a length of two to three conventional bricks, one or two vertical recesses are provided intermediate the ends of the elements to provide the illusion of two or three conventional bricks. As a result, when the element **11** is assembled in a common plane with like elements, the recess means **113** in the adjacent elements provide space for the reception of the decorative mortar which provides the illusion of conventional mortar-joints. Preferably, the decorative mortar comprises ready-mixed material adapted to be applied in the recess means **113** by a tool such as a caulking gun; and preferably, the decorative mortar **14** is applied after the structure has been completed. If desired, the decorative mortar **14** may be of one color on one side of the wall, and it may be of another color on the other side.

The corner elements **12, 12** are generally similar to the course elements **11, 11**; however, some important differences are to be noted. For example, unlike the course elements, the channel means **120** in the top and bottom faces **12***a* and **12***b*, respectively, of the body of the corner element **12** has an L-shaped configuration

with legs **120'** and **120''** intersecting the left end face **12***d* and rear side face **12***f*; and rather than extending vertically across each end **12***c* and **12***d* as in the course element **11**, the dikes **121, 121** extend vertically across the end face **12***d* and side face **12***f* to interconnect the top and bottom portions of the channel means **120.** Like the course element **11,** vent means **122** provides fluid communication between the top and bottom portions of the channel means in the corner element **12.** In addition, it is to be noted that the recess means **123** extends horizontally along the top and bottom of the front side and right-hand end faces of the element **12,** and the recess means **123** extends vertically along the left-hand front corner formed at the intersection of the front side face **12***e* and the left-hand end face **12***d* and along the right-hand rear corner formed at the intersection of the rear side face **12***f* and right-hand end face **12***c*. In this manner, an exposed vertical edge **125** is provided from top to bottom at the front right-hand corner of the element **12,** so that when the corner elements **12, 12** are angulated with one another as illustrated in FIG. **1,** the illusion of an exposed brick-end is provided. Also, when so angulated, the channel means in the corner elements register with the channel means of the course elements to enable the bonding agent to be flowed around the corner of the structure for effecting a strong bond between the elements. It is to be noted that the recess means **123** on the rear side face **12***f* of the corner element **12** is located in such a way as to provide for the appearance of a vertical mortar-joint on the inside corner of the structure **10**; that is, the recess means **123** extends along the top and bottom of the element **12** and the left-hand rear corner and the vertical portion of the left rear dike.

In erecting the structure **10,** it may be desirable to provide apertures such as door-openings and the like at predetermined locations in its walls. For this purpose, the edge element **13** is provided. Like the aforementioned elements, the edge element **13** has channel means **130** in its periphery; however, the channel means **130** extends horizontally in its top face **13***a*, bottom face **13***b*, and, in the present instance, vertically across its left-hand end face **13***d*. Like the course and corner elements, vent means **132** provides fluid communication between the top and bottom portions of the channel means **130.** The edge element **13** also has recess means **133** for receiving decorative mortar; however, unlike the course and corner elements **11** and **12,** respectively, the recess means **133** of the edge element **13** extends horizontally along the top and bottom of the front and rear side faces **13***e* and **13***f*, respectively and the top and bottom of the right-hand end face **13***c*, and the recess means extends vertically across the corners formed at the intersections of the side faces **13***e* and **13***f* and the left end face **13***d* to provide a pair of vertically disposed edges **135, 135** at the intersection of the side faces **13***a* and **13***b* and the right-hand end face **13***c*.

In order to practice the method of the present invention, it has been found that certain dimensional relationships are preferred for the channel and vent means, and the bonding agent should be of a certain consistency. In practice, it has been found that a channel width which is substantially equal to one-half of the width of the element and which has a depth approximately equal to one-eighth of the channel width provides satisfactory results when the vent holes are square and have cross-sectional areas substantially equal to one-sixteenth the area of the top portion of the channel. The consistency of the bonding agent is preferably like the consistency of batter; that is, the agent is flowable but viscous. In practice, it has been found that a mixture of "ready-mix" cement and water in the ratio of 2.5 to 1 provides a satisfactory bonding agent. An example of a type of ready-mix cement which is satisfactory is sold under the trade designation "Top and Bond" by the Harry T. Campbell & Sons Company, a Division of the Flintkote Corporation.

Preferably, the structure **10** is erected by laying the corner elements **12, 12** and three to five courses of the course elements **11, 11,** and laying the edge elements **13, 13** where desired. Thereafter, a bonding agent such as described above is flowed into the vent means in the elements to fill the passageways **16, 16** therebetween. During pouring of the bonding agent, the workman may gauge its depth in the passageways **16, 16** and regulate its flow-rate by observing its height in the vent means. Additional courses and corners of the elements are erected by repeating the foregoing procedure until the desired structure is completed. After the structure has been completed the decorative mortar is applied in the recess means around the elements.

If desired, reinforcing rods may be disposed between the elements during erection of the structure. Also, lintels for spanning across the tops of apertures in the structure may be constructed from the elements by assembling and pouring a few courses thereof at the construction site; thus, after the mortar has set, the lintels may be positioned across the tops of the apertures.

In view of the foregoing, it should be apparent that the present invention now provides novel building elements for erection into a structure having the appearance of conventional brick or block construction. Also, the present invention provides a method which enables persons having a minimum of special skills to construct brick structures.

While preferred embodiments of the present invention have been described in detail, various modifications, alterations, or changes may be made without departing from the spirit and scope of the present invention as defined in the appended claims.

What is claimed is:

1. In a built-up structure comprising a series of elements disposed end-to-end in courses and one upon the other in a plane with lines of juncture disposed horizontally and vertically between the elements, and a bonding agent surrounding the elements to permanently bond them together, the improvement wherein each of said elements includes a pair of continuous dikes projecting outwardly from said element in spaced parallel relation and having flat outer faces abutting like faces of adjacent elements in non-interlocking fashion, said dikes cooperating to define therebetween a continuous relatively shallow channel around said element and forming passageways between adjacent elements for receiving said bonding agent, said channel having a width substantially one-half the width of said element and a depth substantially one-eighth of the width of the channel, vent means including a pair of vertical holes extending from top to bottom in said element to provide fluid communication between top and bottom portions of said channel, said vent holes having a cross-sectional area corresponding to substantially one-sixteenth of the area of the top channel portion, said element also having exposed faces extending in said

plane and terminating inwardly of the outer faces of said dikes to cooperate with said dikes for defining a peripheral recess around each of said exposed faces and along said lines of juncture, and including decorative mortar in said recess and spanning across said lines of juncture.

2. A structure according to claim 1 wherein the top and bottom portions of said channel have L-shaped configurations.

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