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2,303,091

WALL CONSTRUCTION

Filed Sept. 11, 1939

2 Sheets-Sheet 1

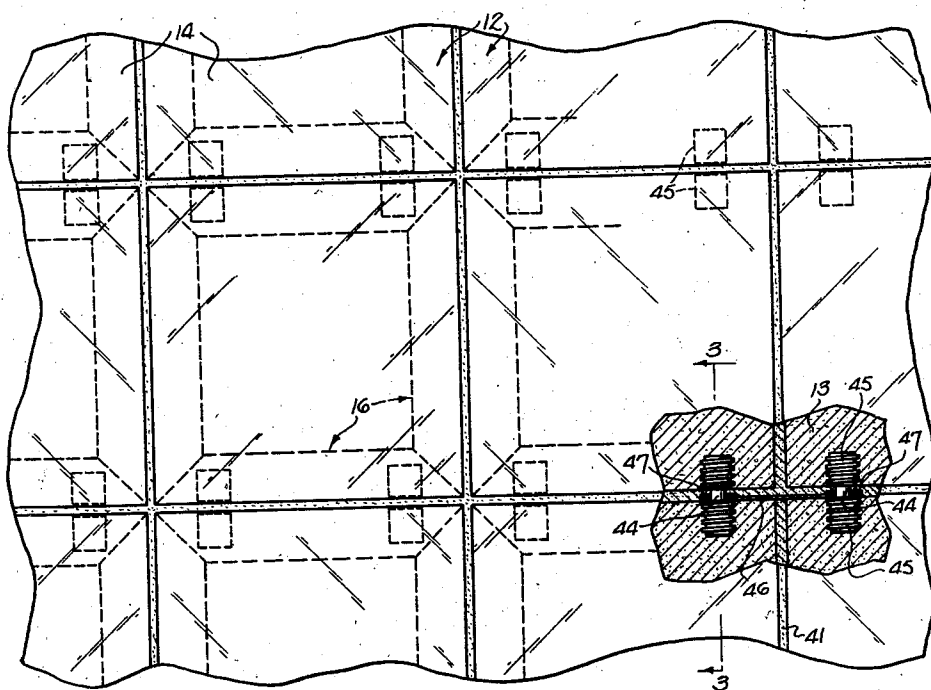


FIG. 1.

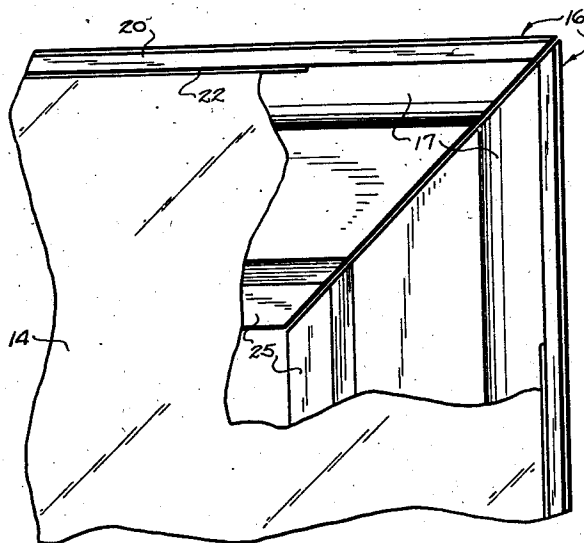


FIG. 2.

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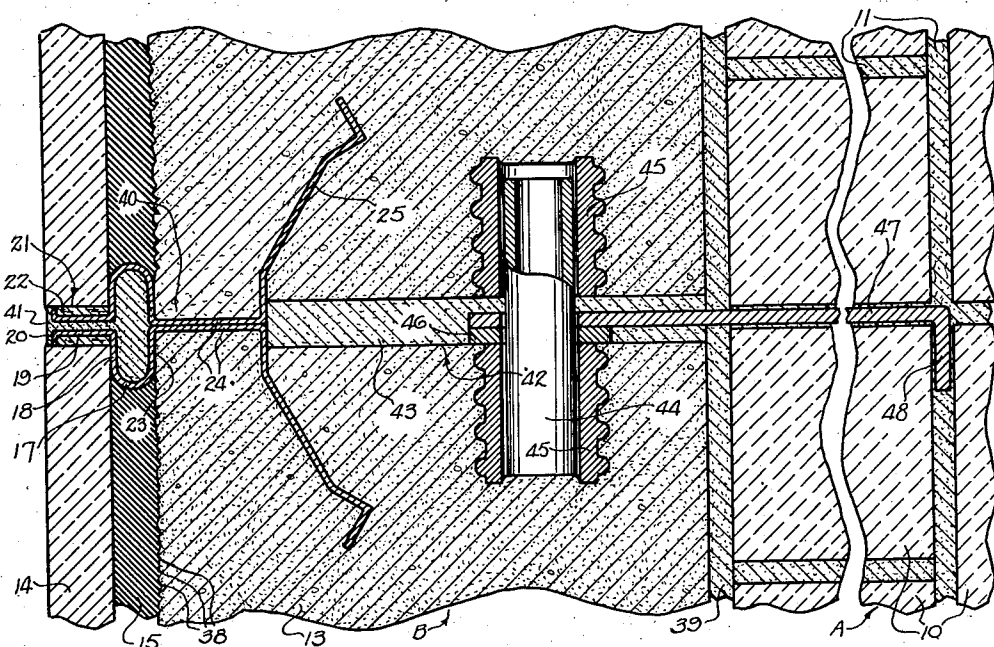


Fig. 3.

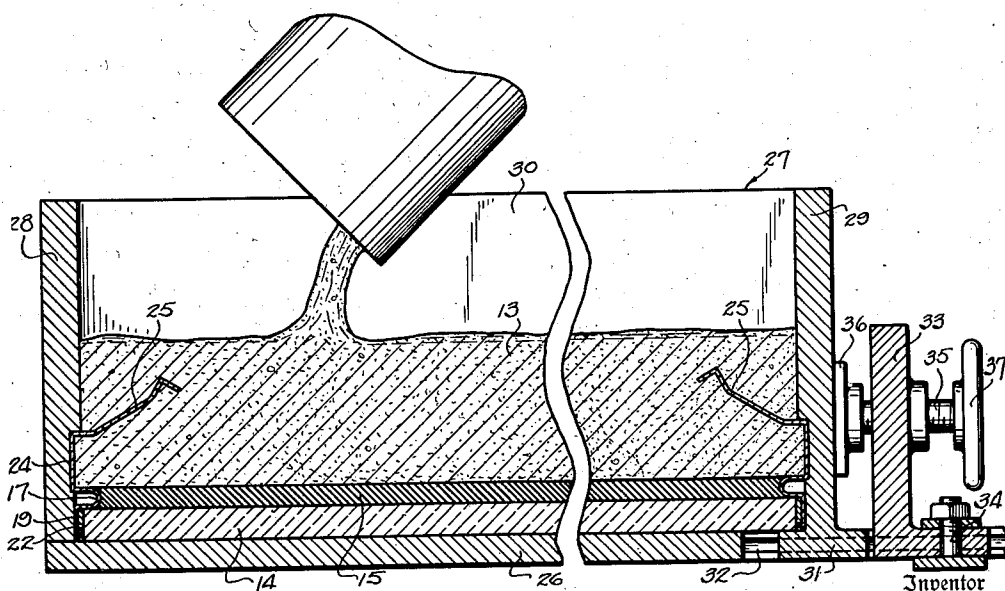


Fig. 4.

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WALL CONSTRUCTION

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5 Claims. (Cl. 72-103)

The present invention relates to an improved type of building unit adapted for use in the construction of interior and exterior walls and to the method of producing such unit.

The building unit herein provided comprises a composite block including a body portion formed from a cementitious material, such as concrete, Haydite, or the like, and an ornamental facing therefor, consisting preferably of a sheet or plate of opaque glass. The ornamental face plate is secured to the body portion by an interposed layer of adhesive material, such as an asphaltic mastic cement, and also by mechanical fastening means in the form of metal holders engaging both the ornamental face plate and body portion. In constructing a wall with building blocks of this invention, the blocks are laid up in courses in substantially the same manner as cut stone, granite, or terra-cotta, being preferably anchored to a back or foundation wall.

Generally, it is the aim of this invention to provide a composite building block of the above character wherein the ornamental face plate is more firmly secured to the body portion so that all danger of the facing becoming accidentally displaced will be eliminated and, further to provide a building block of this character having means for facilitating the laying up of the blocks and the locking of them in place in a wall.

Another important object of the invention is the provision of a novel method of associating the metal holders with the ornamental face plate and body portion during the manufacture of the block, whereby upon completion of said block, the said metal holders will be "shrunk" upon the edges of the facing in a manner to exert a strong cushioned spring pressure thereon.

A further important object of the invention is the provision, in a building block of the above character, of an exceptionally strong and effective bond between the layer of asphaltic mastic cement and the cementitious body portion.

A still further important object of the invention is the provision, in a building block of the above character, of means for aligning the vertically adjacent blocks with one another during the setting of them in a wall together with means for connecting the horizontally adjacent blocks together, and means for anchoring said blocks to a supporting back wall.

Other objects and advantages of the invention will become more apparent during the course of the following description, when taken in connection with the accompanying drawings.

In the drawings, wherein like numerals are

employed to designate like parts throughout the same:

Fig. 1 is a front elevation of a portion of a wall constructed of building blocks provided by the invention and partially broken away to show the means for aligning and connecting the blocks together;

Fig. 2 is a front view of one of the ornamental face plates and the metal holders associated therewith, the face plate being partially broken away to more clearly show the metal holders;

Fig. 3 is a vertical section through the wall taken substantially on line 3-3 of Fig. 1; and

Fig. 4 is a vertical transverse section through a mold illustrating the method of producing the blocks.

With reference to the drawings and particularly to Fig. 3, A designates a back or foundation wall and B a front or exterior wall constructed of building blocks provided by the invention. Although the back wall A is shown as consisting of conventional bricks or blocks 10 laid in the usual manner with mortar 11; said wall may be of any other suitable construction.

The building blocks used in constructing the exterior wall B may be of any desired contour but, as shown in Fig. 1, the blocks, designated in their entirety by the numeral 12, are rectangular and this is of course the most common shape, although they may obviously be of any particular shape or shapes required.

Each building block 12 is of a composite construction comprising a body portion 13 formed of a cementitious material, such as concrete, Haydite, or the like, and an ornamental facing 14 preferably consisting of a sheet or plate of opaque glass, although ceramic tile or face plates of other materials may be used in some cases. Therefore, while the face plate will be hereinafter referred to as glass, it will be understood that a face plate of any desired satisfactory material may be employed without departing from the invention.

The glass face plate 14 covers substantially the entire front surface of the body portion 13 and is interposed between said facing and body portion is a relatively thick, substantially uniform layer of adhesive material 15, preferably an asphaltic mastic cement, which serves not only to bind the facing to the body portion but also permits relative expansion and contraction between the two without danger of the facing becoming broken or accidentally displaced. The layer of mastic 15 also serves to cushion the face plate against shock and blows thereby increasing its resistance to breakage.

Arranged at each edge of the face plate 14 is a metal holder 16 (Fig. 2) and these holders cooperate to form a frame extending entirely around the perimeter of the block for mechanically securing the face plate to the body portion. Each of the metal holders 16 comprises a longitudinally extending channel-shaped portion 17 which, as shown in Fig. 3, is received between the face plate 14 and body portion 13 of the block. The outer wall 18 of the channeled portion 17 constitutes a shoulder which abuts the rear surface of the face plate, and extending forwardly therefrom and at substantially right angles thereto is a flange 19 disposed opposite the respective edge of the face plate and terminating in an inwardly directed lip 20.

The peripheral edges 21 of face plate 14 are preferably square with the opposite surfaces of said face plate and engaging said edges 21 are strips 22 of suitable resilient material, preferably of asphalt impregnated cork, although they may be of rubber, rubber composition, etc. These strips serve to protect the edges of the face plate and act as a cushion to prevent chipping or spalling of the face plate during the setting of the block in place in a wall. As shown in Fig. 3, the cork strips 22 terminate inwardly of the outer surface of the face plate and also that the shoulders 18, flanges 19, and lips 20 of the metal holders define substantially U-shaped channels in which the strips 22 are received. The lips 20 are not essential as the metal holders 16 may be made without them. However, they do serve to confine the cork strips 22 in the metal edge.

The strips 22 may be secured to the edges of the face plate by a suitable adhesive and are relatively thicker than the width of the lips 20 so that, while the lips extend over or overlap the forward edges of the strips, they do not contact with the edges of the face plate. The channeled portion 17 of each metal holder can yield to a certain extent in expansion and contraction and also provides a semi-spring support for the flange 19 which engages the edge 21 of the face plate.

The inner wall 23 of the channeled portion 17 of each metal holder constitutes a shoulder which engages the outer surface of the body portion 13, said shoulder projecting slightly beyond the body portion and extending at substantially right angles with respect thereto is a relatively wide, flat load bearing surface 24 which is disposed opposite the body portion of the block. Formed integral with and constituting a continuation of the load bearing surface 24 is an inwardly directed flange 25 which is embedded in the body portion 13.

In the manufacture of the block 12, the glass face plate 14 is first laid horizontally in a mold and one of the metal holders 16 positioned at each edge of the face plate, in such a manner that the outer shoulder 18 of the channeled portion 17 rests upon the rear surface of the face plate, while cushioning strip 22 carried by the flange 19 engages the edge of the face plate. Clamping means are provided for maintaining the metal holders in proper position and the cushioning strips 22 in firm engagement with the edges of the face plate. The mastic or other adhesive material 15, in a semi-liquid state, is then poured upon the back of the face plate to cover substantially the entire surface thereof and to form a layer of a thickness approximately equal to the depth of the channeled portions 17. The concrete, Haydite, or other cementitious material forming the body portion 13 is then cast on top

of the layer of mastic to cover the same and to completely fill the space defined by the metal holders. The body portion is then allowed to set whereupon the block is ready for use.

More specifically, in constructing the block the face plate 14 is laid horizontally upon the bottom 26 of the mold 27 illustrated in Fig. 4. This mold is provided with the two end walls 28 and 29 and with opposite side walls 30. As shown, the end wall 28 is fixed while the end wall 29 is adjustable horizontally toward and away from end wall 28. One of the side walls 30 is also adapted to be fixed and the other adjustable. The adjustable side and end walls are each provided at its lower end with a base 31 slidable horizontally between spaced guides 32. Arranged outwardly of each adjustable wall is a bracket 33 secured at its lower end between the guides 32 by suitable fastening means 34. Threaded through the bracket 33 is an adjusting screw 35 provided at its inner end with a head 36 engaging the respective adjustable wall and at its outer end with a hand wheel 37 for facilitating the rotation thereof.

After the face plate 14 has been laid upon the bottom of the mold, and the metal holders 16 properly associated therewith, the movable side and end walls of the mold are adjusted inwardly to clamp the flanges 19 of the metal holders firmly against the edges of the face plate. The clamping pressure exerted upon the metal holders should be sufficient to slightly compress the cushioning strips 22 but not sufficient to bring the lips 20 of the metal holders into engagement with the edges of the face plate. In this way, the metal holders are under a definite cushioned pressure against the face plate during the pouring of the layer of mastic and the casting of the body portion. After the cementitious body portion is cast, it naturally begins to set and as the material sets into a solid it of course shrinks. I have found that as the cementitious material shrinks, it tends to draw the flanges 25 of the metal holders inwardly, and in so doing causes the metal flanges 19 of the holders to be "shrunk" onto the edges of the face plate. This adds additional spring pressure to the metal flanges so that they will definitely grip the face plate and exert a strong spring pressure thereon.

I have further found that the application of the wet concrete, Haydite, or the like to the semi-liquid layer of mastic also results in the obtaining of an exceptionally strong bond between the mastic and body portion. Thus, when the cementitious material is cast, it contains water and as the material sets some of the water evaporates. Since the water cannot evaporate through the glass face plate, it has to travel away from the face plate and mastic and evaporate through the back of the block. The rest of the water goes into a crystalline state and disappears and leaves little pores throughout the body portion. When this occurs, the cementitious material sucks the mastic into these little pores to form numerous teeth or hooks as indicated at 38 in Fig. 3 which grip the body portion to provide an exceptionally strong bond. The grip of the mastic to the body portion may be said to be like the grip of hot glue in wood—it penetrates the pores and forms numerous little hooks—to give superior adhesion. In fact, much better adhesion is thus obtained than could be gotten by simply pressing the glass face plate and mastic against an already set concrete sur-

face. As the cementitious material is curing and as the mastic is being sucked into it, the material that is up against the mastic is also under the load of the thickness of the body portion.

In constructing the wall B, the blocks 12 are laid up in courses to form a plurality of vertical and horizontal rows as shown in Fig. 1. When laying the blocks 12, they are preferably spaced from the back wall A and interposed between the two is a layer of mortar 39. Due to the fact that the load bearing surfaces 24 of the metal holders 16 project beyond the edges of the face plate 14, there will be formed around the edges of the body portion 13 a continuous load bearing ledge 40 which also projects slightly beyond the edges of the face plate. Consequently, when the blocks are laid up in courses in a wall, with the load bearing surfaces 24 of vertically adjacent blocks in engagement with one another, the adjacent face plates will be spaced slightly from each other, and in this space is adapted to be inserted a suitable pointing or caulking material 41. This pointing material may be applied by means of a spray gun and will ordinarily fill the mating channels 17 of adjacent metal holders.

When the blocks are mounted in place, the body portions 13 of vertically adjacent blocks will also be spaced from one another inwardly of the load bearing surfaces 24 as indicated at 42 in Fig. 3, and this space can be filled with a layer of mortar 43. As the lips 20 of the metal holders are disposed slightly inwardly of the outer surface of the glass face plate, the pointing material 41 will conceal the said lips and give the appearance of a wall built up of only the glass face plates, as these plates will be the only parts of the blocks exposed to view. This will result in a wall of exceptionally pleasing and attractive appearance. The pointing material 29 is also adapted to be inserted in the vertical joints between horizontally adjacent blocks.

With such a construction, the structural load of the wall will be supported entirely by the body portions 13 of the blocks, with none of the load being placed upon the face plates 14. In other words, the load of one block is transferred directly to the body portion of the next lower block and each block takes the full strain of the blocks above it. Since it is impossible for the vertically adjacent face plates to engage one another when the blocks are set in place in this manner, strain upon the face plates will be reduced to a minimum thereby eliminating breakage and chipping thereof. While the load bearing surfaces 24 are shown in Fig. 3 as directly contacting one another, they may be slightly spaced by a relatively thin layer of mortar and in such case the load of one block will be transferred to the next lower block directly through this layer of mortar.

The construction of the block is such that the face plate does not support any of the load when the block is set into the wall and the layer of mastic between the face plate and body portion takes care of any differences in expansion and contraction between the two materials, thus minimizing danger of breakage of the face plate under expansion and contraction. Also, the uniform layer of mastic provides a cushion for the face plate to minimize the liability of breakage thereof. By this combination of mechanical fastening means and mastic, coupled with the action of the cementitious material upon the metal holders and mastic during the setting thereof, the face plate will be firmly secured to

the body portion with practically no danger whatever of its becoming accidentally displaced.

To facilitate the lining up of vertically adjacent blocks during the setting thereof in a wall, there are provided the vertical dowel pins 44 carried by the body portions 13 of the blocks inwardly of the metal holders 16. These dowel pins 44 are loosely received within metal sleeves 45 set into the body portions of the blocks. After one block has been properly positioned, dowel pins 44 are inserted within the sleeves 45 thereof. These pins project upwardly beyond the block and serve to line up the next block when it is set upon the first block; the upper ends of the dowel pins being received within the sleeves 45 of the upper block. The metal sleeves 45 may be omitted, if desired, to decrease the cost of the blocks and the dowel pins 44 fitted directly within holes drilled in the body portions of the blocks.

When the blocks are arranged in a plurality of vertical and horizontal rows as shown in Fig. 1, the horizontally adjacent blocks are adapted to be tied together by metal straps 46 which fit over the dowel pins 44 of adjacent blocks. For the purpose of anchoring the blocks to the supporting back wall A, there are provided the metal tie members 47, the forward ends of which also fit over the dowel pins while the opposite ends 48 thereof are bent at substantially right angles and anchored in the mortar 11 between the blocks 10 of wall A. The provision of the metal straps 46 and metal tie members 47 in no way interferes with the proper setting of the blocks one upon the other. This is due to the fact that the body portions 13 of the blocks are spaced from one another inwardly of the load bearing surfaces 40 and it is within this space, indicated 42, that the metal straps and tie members are positioned. In case the space 42 between the blocks is not sufficiently deep to accommodate both the metal strap and metal tie members, the body portions of the blocks can be suitably rabbeted out to provide sufficient space.

It is to be understood that the form of the invention herewith shown and described is to be taken as the preferred embodiment of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. In a wall construction, a plurality of blocks arranged side by side and also one upon the other in horizontal and vertical rows, dowel pins carried by the blocks and each having portions engaging two vertically adjacent blocks to align them with one another, and means for connecting the dowel pins of horizontally adjacent blocks for securing said blocks together.

2. In a wall construction, a plurality of blocks arranged side by side and also one upon the other in horizontal and vertical rows, vertical dowel pins carried by the blocks and each having portions engaging two vertically adjacent blocks to align them with one another, metal straps fitting over and connecting the dowel pins of horizontally adjacent blocks for securing said blocks together, and metal tie members also fitting over said dowel pins and adapted to anchor said blocks to a supporting wall.

3. In a wall construction, a plurality of blocks arranged side by side and also one upon the other in horizontal and vertical rows, dowel pins carried by the blocks and each having portions engaging two vertically adjacent blocks to align

them with one another, means for connecting the dowel pins of horizontally adjacent blocks for securing said blocks together, and means carried by said dowel pins and adapted to anchor said blocks to a supporting wall.

4. In a wall construction, a plurality of blocks arranged side by side and also one upon the other in horizontal and vertical rows, means carried by two vertically adjacent blocks to align them with one another, and means for connecting the last-named means of horizontally adjacent blocks for securing said blocks together.

5. In a wall construction, a plurality of blocks arranged side by side and also one upon the other in horizontal and vertical rows, means carried by two vertically adjacent blocks to align them with one another, means for connecting the first-named means of horizontally adjacent blocks for securing said blocks together, and means carried by the said first-named means for anchoring said blocks to a supporting wall.

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