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WALL CONSTRUCTION METHOD AND APPARATUS

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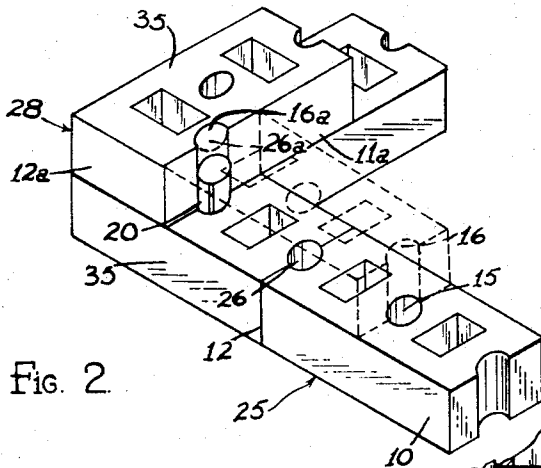


Fig. 2.

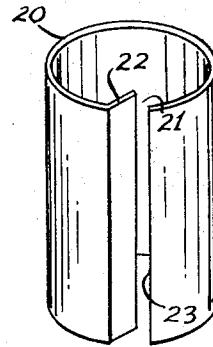


Fig. 3.

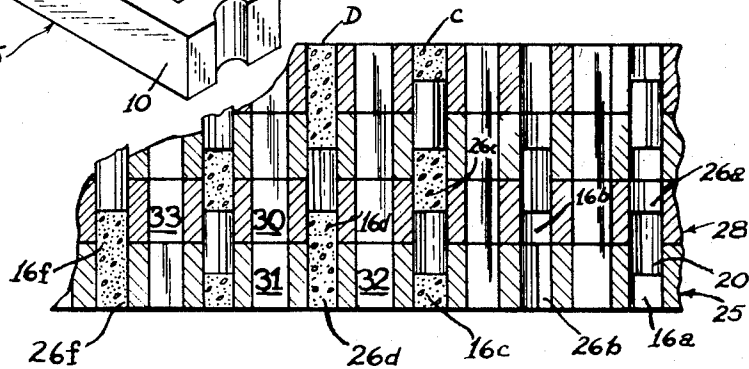


Fig. 4.

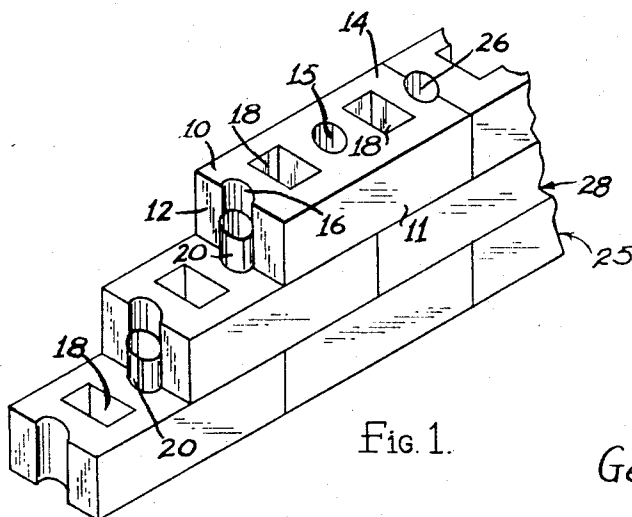


Fig. 1.

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WALL CONSTRUCTION METHOD AND APPARATUS

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3 Claims

ABSTRACT OF THE DISCLOSURE

A wall structure comprising a plurality of horizontal courses of blocks. The blocks of each course are positioned in abutting end-to-end relationship. Each block defines a centrally positioned circular aperture extending vertically therethrough and vertical grooves in each end surface of a radius equal to the radius of its aperture. As the wall structure is assembled, metal sleeves of a radius equal to the radius of the block apertures are inserted into the apertures in a manner such that a portion of each sleeve protrudes from the block, and the blocks of the next course of blocks are positioned with their grooves abutting the sleeves. When the structure is complete, mortar is poured through the openings defined by the aligned apertures, grooves and sleeves to rigidify the structure.

Background of the invention

In the past, it has been customary to assemble bricks or concrete blocks to each other by spreading a layer of cement over and around the sides of the block and then positioning another block upon or adjacent the block. This manner of assembling blocks has been utilized over the years and is a time tested method upon which few improvements have been made. However, the old method of assembling concrete blocks is time consuming, requires great skill in properly aligning the blocks with each other to form a level and straight wall, requires a ready supply of wet cement to be maintained at hand throughout the entire time the blocks are being assembled to form the wall, and requires special tools to be constantly maintained at hand and used in the construction of the wall.

Several attempts have been made to construct concrete blocks in interlocking shapes such that the blocks could be assembled as a wall without the use of wet cement, and after the wall has been assembled applying the cement to the blocks to form a rigid bond between the blocks. However, the interconnection of the blocks with each other requires the blocks to be formed in a complicated shape so that they were expensive to manufacture, and the method of applying the wet cement to the block after assembling the wall of blocks has never proven satisfactory.

Summary of the invention

Accordingly, this invention comprises assembling a plurality of concrete blocks together to form a wall wherein the blocks are shaped with a centrally disposed cylindrical hole and half-cylindrical grooves at each end thereof, whereby the blocks can be placed end to end in a layer so that their ends together define a cylindrical hole of comparable shape to the center hole of each block, inserting portions of expansible cylindrical sleeves in the center hole of each block, and surrounding the remaining portion of the cylindrical expansible sleeve with the end grooves of adjacent blocks in the layer of blocks next above, whereby all the holes defined by the blocks are in vertical alignment with each other, and finally pouring wet cement down all of the holes defined by the blocks.

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Thus, it is an object of this invention to provide a method of assembling concrete blocks wherein the concrete blocks can be assembled without the use of wet cement, and the wet cement can subsequently be applied to the blocks to form a rigid bond therebetween.

Another object of this invention is to provide a method of assembling concrete blocks wherein a plurality of apertured concrete blocks can be assembled with each other in a manner that their apertures are in alignment with each other, and wet cement can be inserted through the aligned apertures of the blocks.

Another object of this invention is to provide a method of assembling concrete blocks to form a wall wherein the wall can be formed without the use of wet cement.

Another object of this invention is to provide an element for aligning concrete blocks with each other.

Another object of this invention is to provide an element for insertion into an aperture defined by a concrete block, such that other concrete blocks can be aligned with each other by extending said element into apertures of the other concrete blocks.

Another object of this invention is to provide the combination of a concrete block and an expansible aligning element that can be inserted into an aperture defined by the concrete block so that it will maintain its predetermined position.

Another object of this invention is to provide a series of concrete blocks assembled to form a wall, wherein the blocks are bonded at alternate intersections by wet cement, and at the remaining intersections by a column of wet cement surrounded by a metallic sleeve.

Another object of this invention is to provide apparatus for constructing walls that is labor saving, time saving, convenient in use, economical in manufacture, simple in design, and expedient in use.

Other objects, features and advantages of the present invention will become apparent upon reading the following specification, taken in conjunction with the accompanying drawing, in which:

Brief description of the drawing

FIG. 1 shows a partial perspective view of a wall formed by the concrete blocks and expansible sleeves of the instant invention, the wall being partially completed;

FIG. 2 is a perspective view of a partially finished wall formed from the concrete blocks and expansible sleeves of the instant invention, showing the manner in which the concrete blocks are positioned on each other;

FIG. 3 is a perspective view of an expansible sleeve utilized in the construction of walls with the concrete blocks shown in the remaining figures;

FIG. 4 is an elevational view, in cross section, with parts broken away, showing the manner in which the wet cement forms a bond between the concrete blocks and expansible sleeves disposed therebetween.

Description of the preferred embodiment

Referring now more particularly to the drawing, in which like numerals indicate like parts throughout the several views, the concrete blocks 10 of this invention are substantially rectangular in shape, having flat side walls 11, matching end walls 12, and matching upper and lower surfaces 14. The blocks each define a central cylindrical aperture 15 extending vertically therethrough, and arcuate grooves 16 also extending vertically thereof in the end walls 12. The arcuate grooves are semi-cylindrical in shape, and when two blocks 10 are placed end to end, the arcuate grooves 16 form an aperture equal in size to the central cylindrical apertures 15 of the blocks 10. The blocks 10 further define air spaces 18 extending vertically therethrough on either side of the central aperture 15, and disposed inwardly of the arcuate grooves

16 of the end walls 12. The air spaces 18 are rectangular in shape.

When the blocks 10 are assembled as shown in FIGS. 1, 2 and 4, they are positioned so the blocks disposed on one level are located with their end walls 12 disposed above the center of a block next below. This positions the arcuate groove 16 of the block so that it forms an arcuate extension of the central cylindrical aperture 15 of the block next below, and when a second block is placed beside the block with its end wall abutting the end wall 12 of the block, the arcuate grooves 16 of the two blocks form a cylindrical opening of a size and shape equal to the central aperture 15 of each of the blocks, and form a cylindrical extension of the central aperture 15 of the block next below.

A cylindrical sleeve 20, as is shown in FIG. 3, is provided to be positioned in the central aperture 15 of the blocks 10 when they are assembled to form a wall. The sleeve 20 is formed from a resilient material, such as plastic, tin, or other metallic substances, and is open at 21 along its length. A portion 22 of the sleeve adjacent the opening 21 is bent slightly inwardly of the sleeve so that it is positioned inwardly of the edge 23 adjacent the opening 21. With this construction, the sleeve 20 can be compressed or contracted so that it is reduced in diameter, the bent portion 22 being angled so that edge 23 will slide along its exterior surface without hindering the contraction of the sleeve. Of course, since the sleeve is composed of a resilient substance, it will spring back to its original shape, the bent portion 22 sliding outwardly of the edge 23. This ability of the sleeve 20 of being able to expand and contract allows a person to contract the sleeve to reduce it in diameter so that it can be inserted into one of the central apertures 15 of the blocks 10, and then release the sleeve 20 so that it will expand and engage the walls of the aperture 15 and hold itself in its position.

As is shown in FIGS. 1, 2 and 4, a row of blocks 10 can be layed end to end along a line to form the first layer 25 of blocks in a block wall so that the matching end walls 12 of the blocks are positioned and the arcuate grooves 16 thereof form a cylindrical aperture or openings 26 of a size and shape substantially equal to the central apertures 15 of each of the blocks. After the first layer of blocks has been assembled in this manner and it is desired to build the wall higher by placing more blocks on top of the first layer of blocks, a cylindrical sleeve 20 is disposed in the central aperture of one of the blocks 10 and a block is positioned on the first layer of blocks with one of its end walls 12 abutting the cylindrical sleeve 20; the cylindrical sleeve 20 being received in the arcuate groove 16 of the end wall. This positions the block of the second layer 28 with its central aperture disposed directly above the matched arcuate grooves 16 of the two blocks immediately below so that the central aperture of each block on the second layer of blocks is disposed directly above the openings 26 formed by the arcuate grooves 16 of the abutting blocks of the first layer. Also, the arcuate grooves 16 of the blocks in the second layer are disposed directly above the central apertures 15 of the blocks in the first layer of blocks. Of course, as each block is positioned in the second layer, the abutting blocks form with their arcuate grooves 16, openings 26 extending concentrically above the central apertures 15 of the blocks of the first layer. As each block is positioned in the second layer of blocks, a cylindrical sleeve 20 is positioned in the central aperture 15 of the block immediately below so that it extends into the arcuate groove 16 of the block in the second layer, whereupon, when another block is placed in the second layer of blocks so that it abuts the previously layed block, its arcuate groove 16 of its end wall 12 will abut the previously layed block and the openings 26 of adjacent blocks will surround the cylindrical sleeve 20. In this manner, the blocks of the second layer will be guided into proper

alignment with the blocks of the first layer so that the apertures formed in and by adjacent blocks will all be in alignment with each other throughout the entire vertical height of the wall.

As is best shown in FIG. 4, the sleeves 20 will be positioned between the layers of blocks, but will not extend the entire length of any layer of blocks. In other words, the sleeve 20 will extend less than one half the height of a layer of blocks so that it does not cover the entire interior surface of apertures 15 or openings 26 of the blocks. Also, since sleeves 20 were inserted only in the central apertures 16 of the first layer of blocks before positioning the second layer of blocks thereon (the openings 26 formed between the blocks being left without sleeves), only every other intersection of aperture with opening will have a sleeve disposed therebetween. For instance, the intersection of opening 26a with aperture 16a will have a sleeve disposed therein, while the intersection of opening 26b with aperture 16b will not have a sleeve disposed therein. This arrangement leaves every other aperture-opening intersection without a sleeve.

After the blocks have been assembled in this manner to form a wall, wet concrete can be poured through the aligned apertures and openings of the wall to permanently connect the concrete blocks to each other. As is shown in FIG. 4, concrete is poured down apertures C and D in such a manner that it passes through the aligned apertures and openings, and through the cylindrical sleeve 20. Since the intersection of aperture 16c with aperture 26c has a sleeve inserted therein, the wet cement poured down the aperture C will not thoroughly adhere to the inner surface of the blocks at this intersection; however, the concrete will be completely exposed to the inner surface of the blocks at the junction between opening 26d and aperture 16d, to form a rigid connection between the adjacent blocks. Accordingly, it can be seen that the wet cement poured down the aperture D will form a rigid connection between the three blocks adjacent the intersection of the exposed apertures; viz., blocks 30, 31 and 32. Block 31 will also be connected by a cement bond to block 33 at the intersection of opening 26f with aperture 16f. Thus, it can be seen that each block in a layer of blocks will be connected to two blocks in the next adjacent layer by a direct concrete bond, and also connected to two blocks in the next adjacent layer by cylindrical sleeve with a concrete column passing therethrough. This provides the usual cement bond between blocks and blocks of adjacent layers and also provides a bond between blocks that is highly resistant to shear force since the sleeves 20 will have the cement poured through them which, after hardening, acts as a reinforcing wedge to the sleeve so that it will not contract. Of course, the sleeve 20 adds its resistance to shearing forces to that of the concrete column located in the aligned apertures.

While the blocks 10 have been shown as having arcuate grooves 16 located in their end walls, it can be seen, as is shown in FIG. 2, that when coming to the end of a wall, or when turning the corner of a wall, it is desirable to have a smooth surface at the corner of the wall and also to have a groove disposed in the side of the corner block to facilitate locking the corner block to the row of blocks extending from the corner. To provide this function, corner block 35 is constructed with one of its end walls 12a constructed with a flat surface, and one of its side walls 11a constructed with an arcuate groove 16a disposed vertically thereof and centrally of one half of the length of the blocks. Since the blocks 10 are twice as long as they are wide, disposing the arcuate groove 16a centrally of one half of the length of the block will position it so that another block can be positioned adjacent the side 11a of the block 35, adjacent the half portion having the groove 16a therein, so that the groove 16a and the groove 16 of an adjacent block will form an opening 26a. Of course, the opening 26a functions in a manner similar

to the opening 26, previously disclosed, so that sleeves 20 can be inserted in the central apertures 15 of one layer of blocks and the groove 16 and 16a can be positioned adjacent the sleeve 20 to form the aperture 26a which would be coextensive with the aperture 16 next below.

With this construction, the blocks forming the corner of the wall would all be constructed of blocks 35 whereas the blocks forming the central area of the wall would be formed of the blocks 10.

While the apertures 15 and openings 26 and 26a have all been disclosed as being circular in cross section, and while the sleeve 20 has been disclosed as being cylindrical, it should be appreciated that the apertures and openings can be made of any cross sectional configuration and that the sleeve 20 can be of similar non-circular configuration. Also, while the sleeve 20 is shown with a bent portion 22 adjacent the slot or opening 21, it is anticipated that the sleeve can be constructed without a bent portion; the slot or opening 21 being large enough to accommodate a reduction of the sleeve diameter without the edges of the opening 21 contacting each other. The only criterion of the sleeves 20 is that they have a means for retaining their position in the apertures 15 of the blocks. While this function can be attained by an expansible sleeve, it is not beyond the scope of this invention to utilize a sleeve having tabs or other projections extending outwardly from a portion thereof that would engage the upper surface of the blocks of a layer of blocks to prevent the sleeve from dropping completely inside the aperture 15 of the block.

It will be obvious to those skilled in the art that many variations may be made in the embodiments chosen.

What is claimed as invention is:

1. In a wall, the combination of a plurality of courses of construction blocks the blocks of each course being positioned in end to end relationship and the blocks of each course of blocks overlying the blocks in the next adjacent course of blocks, each of said blocks defining an aperture disposed centrally thereof and grooves defined in its ends and disposed parallel to said apertures, the grooves of each block being sized and shaped to mate with the grooves of a similar abutting block in the same course of blocks to form an opening of a size and shape similar to the aperture of its overlying block, expansible

sleeve elements each defining a slot along its length and each being of a longitudinal cross section similar in shape to the longitudinal cross section of the apertures of the blocks and openings defined by abutting blocks, said sleeves being expandable and frictionally engaging the inner surfaces of the apertures and openings of the blocks, and columns of solidified mortar extending through said aligned sleeves, apertures and openings, whereby the sleeves can be contracted for rapid insertion into the apertures and openings of the blocks, and after a wall has been constructed, mortar can be poured down through the aligned sleeves, apertures and openings to rigidify the sleeves and the blocks.

2. The invention of claim 1 wherein each of said sleeves is of a length shorter than the combined length of the apertures and openings of the blocks.

3. The invention of claim 1 wherein said sleeves are fabricated of metal and are expandable in diameter.

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