May 1, 1923.

1,453,557

W. F. WAGNER

MASONRY STRUCTURE

Filed June 29, 1922

2 Sheets-Sheet 1

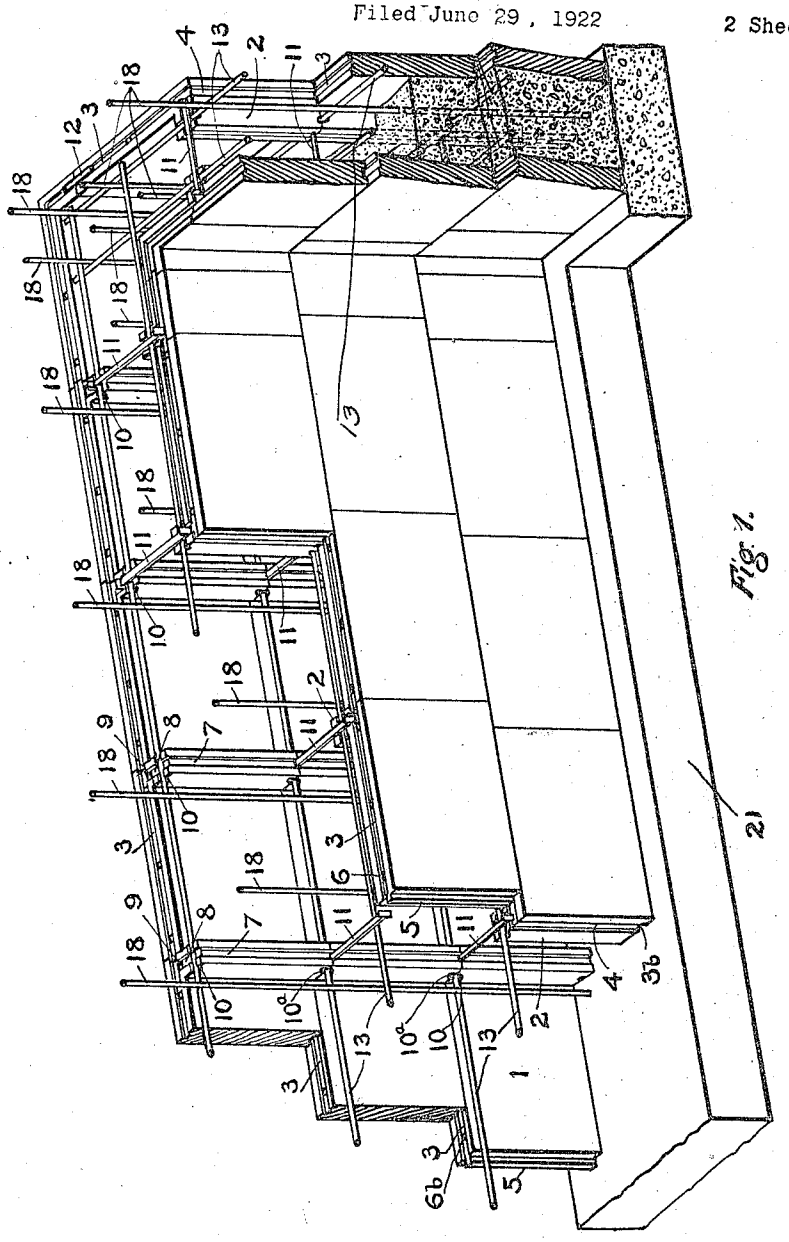


Fig. 1.

W. F. Wagner
Inventor

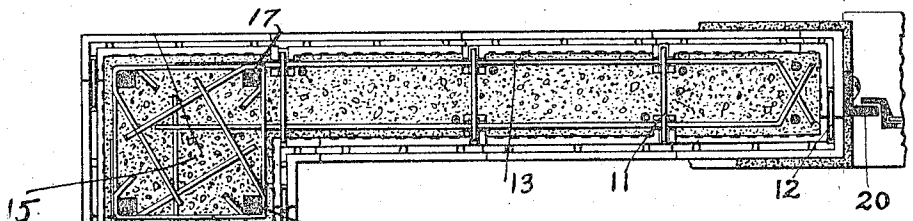
By Titus Ulke
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W. F. WAGNER

MASONRY STRUCTURE

Filed June 29, 1922 2 Sheets-Sheet 2



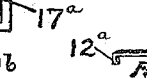


Fig. 8.

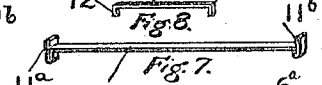


Fig. 7.

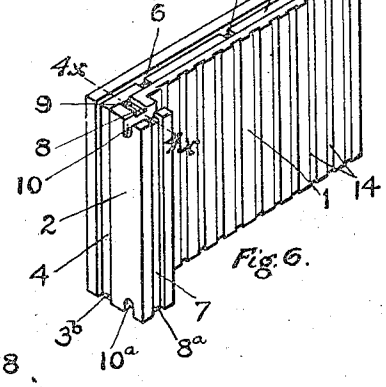


Fig. 6.

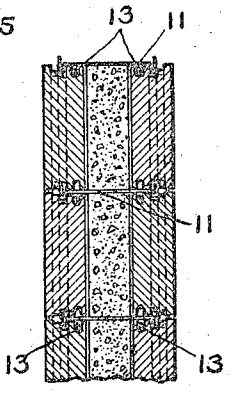


Fig. 4.

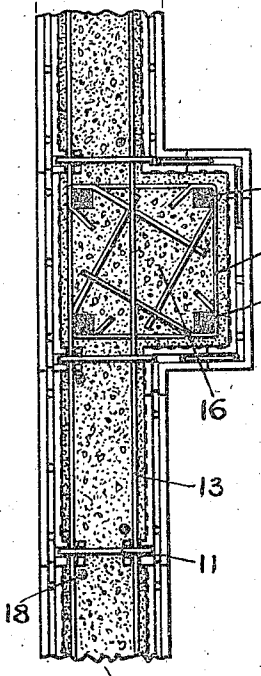


Fig. 2.

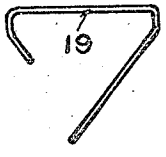


Fig. 9.

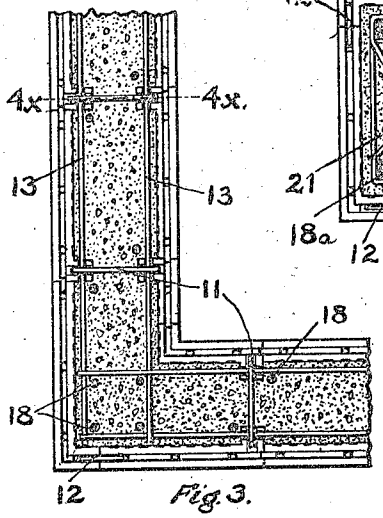


Fig. 3.

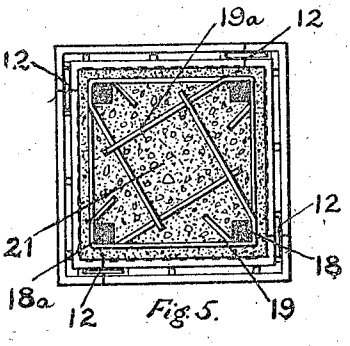


Fig. 5.

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Inventor

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Patented May 1, 1923. 1,453,557

UNITED STATES PATENT OFFICE.

WILLIAM F. WAGNER, OF WASHINGTON, DISTRICT OF COLUMBIA.

MASONRY STRUCTURE.

Application filed June 29, 1922. Serial No. 571,799.

To all whom it may concern:

Be it known that I, WILLIAM F. WAGNER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Masonry Structures, of which the following is a specification.

This invention relates to masonry structures, such as walls for buildings, pillars and piers and other enclosures and supports. In particular it is concerned with masonry constructions formed by filling up previously arranged molds with cementitious matter so as to obtain substantially, monolithic masses.

The main object underlying the invention is to dispense with the temporary molds made of wood or metal which were hitherto used in building, which molds, forming no part of the resultant wall or pier, were removed and the wooden molds discarded as of no further value after the completion of said wall or pier, and therefore made such methods not only slow but very costly.

Under my invention the mold into which the cementitious matter entering into the mass of the wall or pier is introduced or poured is constructed of blocks of any suitable masonry material, such as factitious stone, brick or tile-material, such blocks constituting the exterior surfaces of the wall or other masonry structure and when desired encasing steel columns and the like, preferably leaving space around them for receiving cement or other fire-proof material, and said blocks being combined with means for retaining them in alignment and proper position during the pouring operation, and finally forming substantially one integral mass with the cementitious filling material in the completed structure.

It is a further object of the invention to provide means whereby said blocks, which serve the double purpose of mold and wall-blocks, can be readily set up in courses, properly aligned and braced to form the exterior surfaces of a finished wall or pier, and furnish a sufficiently stable mold to permit the introduction of the cementitious filling material without disarranging said exterior surfaces, and whereby such work can be done without requiring a high order of skilled labor.

I attain these objects under my invention by forming the said exterior surface and mold-blocks with inner supports, preferably provided with grooves, for receiving aligning rods which accurately fit said grooves and are of such length as to span a number of said blocks, so as to hold the outer surfaces of said blocks in true alignment. I prefer to arrange such aligning grooves on a flange formed at one edge of each block, said flange extending the entire height of the block. This flange, which makes the block L-shaped in horizontal cross-section, increases the stability of the same when set up on edge, as is the case in building a wall structure, and permits them to be made relatively thin and in the form of slabs or tiles, thereby largely decreasing the cost of the more expensive material entering into the resultant composite masonry structure.

These blocks are further provided at their upper and lower horizontal surfaces with recesses or sockets for receiving the bent ends of tie-bars or braces connecting oppositely arranged mold and wall-blocks and also connecting adjoining blocks. They are, moreover, provided with vertical tongues or tenons at one end of each and with a vertical groove at the other end and also at the end of the flange, adapted to engage with and receive the tenon of an adjoining block, equally as well when the blocks are aligned as when they are set at right angles for turning corners, without requiring the use of special blocks therefore, as at present.

These building and mold-blocks are so constructed that either horizontal surface thereof can be placed uppermost in building up the combined mold and outer lining of the masonry structure, and, by assembling them so that their position is reversed for alternating courses, and making the vertical flanges of the superimposed blocks to coincide in vertical alignment, the blocks of succeeding courses will break joint, thereby adding to the stability and the appearance of the whole.

Under my invention I am enabled to erect masonry structures of the character set forth with blocks or units which are in the main duplicates of each other in shape and dimensions, it being only necessary at times to provide a few additional sizes, that is to say, blocks of substantially the same height, thickness, length of flange, and general design and only differing in the length of the body position, as shown in Figs. 1 and 2 for some of the corners and reentrant angles and where curved surfaces occur. It thus becomes possible to produce all the building

units or blocks needed with a few molds, and to keep them in stock as bricks or tiles are ordinarily stored for use.

Other features of my invention will be set forth hereinafter and pointed out in the claims.

With these and such other objects in view and realized advantages, as will be apparent from the description, my invention resides in the novel construction, combination and arrangement of parts, as hereinafter described and claimed, taken in connection with the accompanying drawings, in which—

Figure 1 represents an isometric view of a portion of two abutting walls in course of erection with reinforcing and alignment rods and tie bars in place, and walls broken off and partially filled with concrete.

Figure 2 is a horizontal sectional view of two abutting lengths of wall provided with a corner column or pier, and filled with concrete and the aligning and reinforcing rods and tying bars in position, one wall embracing a pilaster and the other showing part of a window opening with its framing indicated in section.

Figure 3 is a horizontal section of two abutting lengths of plain wall, filled with concrete and reinforced.

Figure 4 is a vertical sectional view of several courses of a wall, taken along the lines 4—4 of Figures 3 and 6, showing the connections of the tie bars and blocks.

Figure 5 is a horizontal section of a detached square pier, reinforced and filled with concrete.

Figure 6 shows an isometric view of my improved block or tile.

Figure 7 is a cross tie bar or transverse anchor adapted to hold two parallel blocks in position.

Figure 8 represents an anchor bar or dowel clamp for connecting two interlocking blocks, and

Figure 9 is a plan view of a triangular shaped anchor rod suitable for reinforcing pilasters, columns or piers.

Referring now to the drawings and in particular to Figure 6, 1 represents the rectangular body portion of the L-shaped building block or tile which is constructed of suitable material, such as plaster of Paris, clay, or terra cotta, but is preferably composed of a cementitious material such as a mixture of concrete sand and cement. Extending at right angles to the body portion 1 of the block is a short arm, flange or support 2, preferably of approximately the same height and thickness as the said body portion. The body portion 1 preferably contains longitudinal grooves 3 and 3^b respectively, positioned at its top and bottom, extending parallel with the flat sides of the block and serving to receive groating or jointing mortar and preferably furnished with sockets or recesses 6 and 6^a and 6^b, of which sockets 6^a are used for receiving the ends of cross tie bars 11, shown in Figure 7, where an additional safeguard against a spreading apart of the form blocks is required and also for receiving anchors when a stucco or brick veneer is used for face-work, while sockets 6 and 6^b are used only to take the ends of dowel clamps 12 shown in Figure 8, in straight wall or pier construction. At its flanged end the body portion has a vertical groove 4, adapted to engage a tongue, tenon or dowel 5 provided on the free end of each block. A vertical groove 7 is also provided on the free end of the arm 2, likewise adapted to engage the tongue or tenon 5 of an adjoining block in forming wall corners. The top and bottom portions of each block and arm 2 are preferably made identical so that the blocks can be reversed with each course and the arm formed with grooves 8 and 8^a extending from the body portion 1 to the ends of the groove 7, and provided with recesses 9 at the junction of the arm with said body portion to receive the ends of cross tie bars 11, in straight wall construction, and also to receive the ends of dowel clamps 12 in turning corners and in pier construction. Each arm preferably contains curved-bottomed grooves 10 and 10^a for receiving and supporting longitudinal aligning rods 13. The faces of the body portion 1 may either be left smooth or furnished with grooves 14 for holding stucco, plaster or the like.

In Figure 1 the footing is indicated by the numeral 21, and similar reference characters to those heretofore used indicate similar parts in the partly assembled structure.

In Figure 2 are shown horizontal sections of two abutting walls provided with a square corner column or pier 15, an engaged square columnar pillar or pilaster 16, each preferably furnished with vertical reinforcing rods 17, 17^a and 18 and 18^a respectively, and a plurality of horizontal anchoring rods 19, 19^a and 19^b, shown in Figure 9 and preferably made of steel and bent to fit around two of the rods 17 and 17^a or 18 and 18^a. At the right end of the upper wall section of Figure 2 a portion of a metal window frame 20 is indicated, and shows that my improved building blocks are adapted to form operings in a wall without the necessity of cutting them to fit said openings.

Each tie bar 11 is preferably made of a flat bar of steel with T-shaped bent ends 11^a and 11^b. The dowel clamps 12 are preferably made of similar material, but with their ends 12^a and 12^b merely bent downwardly to adapt them to fit into the recesses 6 or 6^b.

In Figure 5 a horizontal section of a detached square columnar pillar or pier 21 is shown built with four of my improved build-

ing blocks in each course, and containing four vertical reinforcing rods 18, 18ª together with four anchoring rods 19 and 19ª and four dowel clamps 12 in position.

In practicing my invention, I usually proceed as follows in building a wall:

I first lay the blocks on the footing in two parallel rows spaced apart by fitting the vertical tenons and grooves of adjacent blocks into one another so as to interlock them, then place the preferably round aligning rods in the upper grooves of the supporting arms or flanges of a series of blocks, and the ends of the flat dowel clamps and the bars in the recesses adapted to receive them wherever required, and imbed them in a thin joint of mortar. I now lay down a new course of reversed blocks on the first course with their arms in vertical alignment and repeat the above outlined procedure, for as many courses as desired, but usually 2 to 4 courses, and finally pour cementitious material, usually concrete, into the space between the two parallel rows of blocks. If desired, I may insert vertical reinforcing rods into the hardening but still plastic concrete, and then continue laying the blocks and repeating the above procedure until the desired height of wall is reached.

It is to be understood, of course, that the surface of my building structure or wall may be described as being flat, which it is in a general or distant perspective, notwithstanding the fact that it may be provided with projecting or depressed members or portions, such as pilasters, columns, piers, footings, and framing for openings and the like.

In building piers, as in the case of flat walls, all necessity of cutting is avoided with my improved blocks, their adaptability constituting a signal advantage over ordinary building blocks.

It is believed that 30% of the present cost of erecting walls of buildings may be saved by the employment of my improved tiles. In the present practice, wooden forms, once used, because of their containing nails, and their being made up of lumber cut in unusual shapes, generally are of little or no further use. Moreover, these forms must be held in place by wiring, stays or other adjustments. As against iron forms my combined mold and building tiles may be set up in at least the same time as the former, but do not have to be taken down, as both the wooden and iron mold forms used at present must be, for my tiles remain as an integral part of the monolithic wall. Finally, in present practice the setting of the concrete necessitates a delay of several days, before the temporary forms can be removed, which delay I avoid.

Columns are usually about 10 or 12 feet high, and the molds must be built up to this height in present practice before the concrete is poured in, after which pouring, time must be allowed for the excess water in the wet concrete to run off. This delay is also avoided by my method of construction, in which the columns or walls are gradually built up in courses of about 2, 3 or 4 feet at a time and the concrete or other cementitious binder poured in immediately thereafter by an ordinary laborer following up the tile layer or mason, and the water is absorbed by the tile itself and helps to strengthen the resulting masonry structure.

It is to be understood, of course, that piers, pilasters or columns, constructed according to my process may be of any desired polygonal cross section, without departing from the essence of my invention.

What I claim as new is:

1. In a masonry structure, two series of blocks arranged apart so as to leave a space between them, the blocks of each series being provided with inner retaining supports and with sockets on their upper surfaces, in combination with aligning rods engaging the retaining supports and each spanning a number of said blocks, and transverse tie bars, each engaging the sockets of opposite blocks with its ends.

2. In a masonry structure, two series of blocks, each series being arranged in superimposed horizontal courses and so as to leave a space between the two series, the blocks being provided with inner retaining supports and with sockets on their upper surfaces in combination with aligning rods engaging said retaining supports, tie bars, each engaging the sockets of opposite blocks with its ends, and a cementitious filling in the space between the two series and forming an integral mass with the said blocks.

3. In a masonry structure, a wall containing a rectangular projecting member, both wall and member having outer and inner faces built of interlocking blocks, and the space between said faces filled with cementitious material to form a monolithic structure, said wall having horizontal aligning rods extending into said member, and said member having a plurality of vertical strengthening rods and horizontal triangular-shaped anchoring rods bent around a pair of said vertical rods and extending toward the center of said member to retain said vertical rods in position.

4. In a masonry structure, a wall section provided with a rectangular column, said column being built of L-shaped interlocking blocks of masonry to form a hollow mold and having metallic members for aligning reinforcing and tying said blocks in its interior, and said mold being filled with cementitious material.

5. A masonry structure comprising interlocking exterior blocks arranged in a column

having a rectangular cross section and a plurality of vertical reinforcing rods in combination with substantially horizontal anchor rods bent into angular shape, and each embracing two of the reinforcing rods and with its free arm extending substantially toward the center of said column, the interior of said column being filled with cementitious material.

6. A masonry structure comprising a plurality of exterior blocks and dowel clamps connecting adjoining blocks, said blocks being arranged to form a column having a polygonal cross section and a plurality of substantially vertical reinforcing rods arranged in the space formed by said blocks, in combination with substantially horizontal anchor rods bent into angular shape, and each embracing two of the reinforcing rods and with its free arm extending substantially toward the center of said column, the interior of said column being filled with cementitious material.

7. An L-shaped building and mold block for masonry structures comprising a body portion and an inwardly and rectangularly extending flange provided at one end of said body portion, said body portion and flange being of substantially the same thickness and height, and having substantially plane sides, and said flange being provided with a groove adapted to hold an aligning rod without cement against lateral movement.

8. A building and mold block for masonry structures comprising a main or body portion provided with sockets at its upper surface for the reception of the ends of tie bars and dowel clamps and a vertical flange extending inward at one of its side-edges, said flange being formed with a groove for fitting an aligning rod.

9. A building and mold block for masonry structures comprising a flat main portion provided at its upper surface with a longitudinal groove and a recess for the reception of the end of a tie bar and at one of its side-edges with an inwardly extending vertical flange, said flange being formed with a groove for receiving and retaining an aligning rod.

10. A building and mold block for masonry structures comprising a body portion and a flange portion forming an L with each other, the ends of said body-portion adjacent said flange, and said flange portion being provided with a groove, a tongue at the other end of said body-portion adapted to fit into either of said grooves, so that adjacent blocks will interlock either when placed in longitudinal alignment or at right angles with each other, and the body and flange portions having sockets both at their tops and bases for receiving the ends of connecting members for holding adjacent and opposite blocks in predetermined relation to each other.

11. An L-shaped building and mold-block comprising a main or body portion formed at one end with a tongue or tenon and at the other end with a mortise for engaging the tongue or tenon of an adjoining block when placed in longitudinal alignment, and a flange portion also formed at its end with a mortise for engaging the tongue or tenon of an adjoining block in turning wall corners.

12. An L-shaped building and mold-block comprising a main or body portion and a vertical flange-portion, the body portion being provided at one end with a vertical tenon and at the other end with a mortise, and the flange-portion with a vertical mortise at its end, and also with a longitudinal groove for the reception of an aligning rod both at top and bottom.

13. An L-shaped building and mold-block comprising a main or body portion and a vertical flange portion extending the entire height of the block, the upper and lower surfaces of the main portion being formed with sockets for the reception of the ends of tie bars or dowel clamps, and the upper and lower surfaces of the flange portion being formed with grooves for fitting aligning rods.

14. An L-shaped building and mold-block comprising a main or body portion and a vertical flange portion extending the entire height of the block, the upper and lower surfaces of the main portion being formed with sockets near each end for the reception of the ends of dowel clamps and one or more intermediate sockets for receiving the ends of tie bars, and the flange portion having sockets adapted to receive the ends of either cross tie-bars or dowel clamps.

WM. F. WAGNER.