W. H. COGGAN.

CONCRETE STRUCTURE.

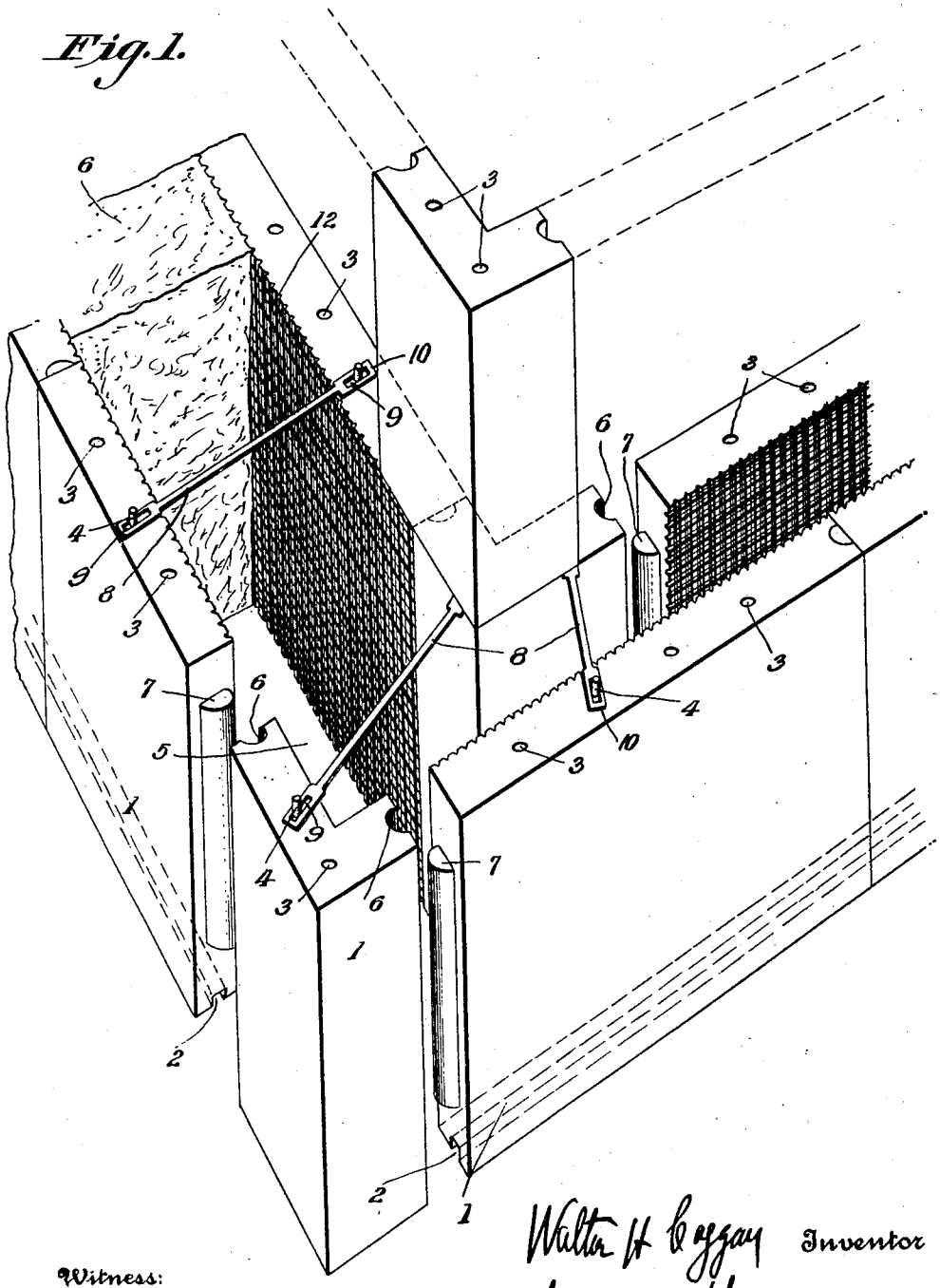
APPLICATION FILED DEC. 18, 1917.

1,325,079.

Patented Dec. 16, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



Witness:

Robert F. Beck

Walter H. Coggan Inventor

By his Attorneys Mork & Blum

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2 SHEETS—SHEET 2.

Fig. 2.

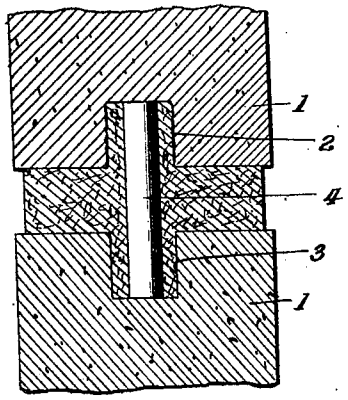


Fig. 3.

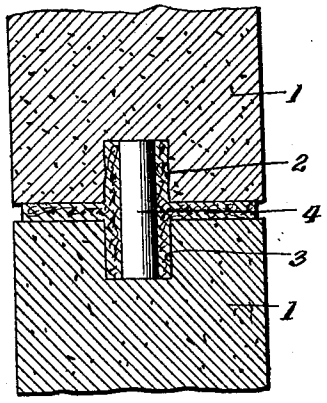


Fig. 4.

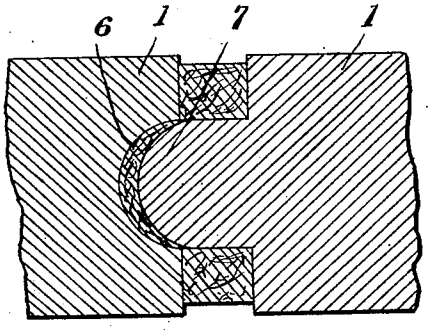


Fig. 5.

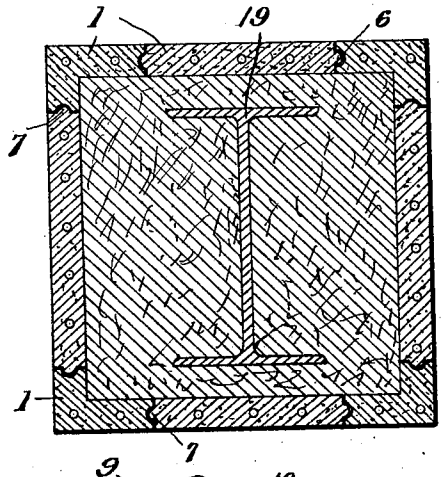
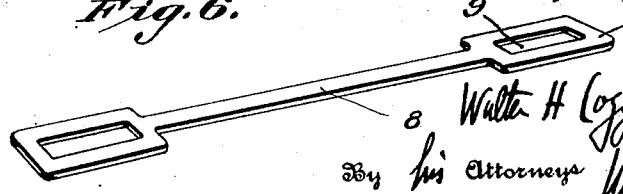


Fig. 6.



Witness:

Robert F. Beck

Walter H Coggan Inventor

By his Attorneys Mock & Blum

UNITED STATES PATENT OFFICE.

WALTER H. COGGAN, OF NEW YORK, N. Y.

CONCRETE STRUCTURE.

1,325,079. Specification of Letters Patent. Patented Dec. 16, 1919.

Application filed December 18, 1917. Serial No. 207,676.

To all whom it may concern:

Be it known that I, WALTER H. COGGAN, a subject of Great Britain, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Concrete Structures, of which the following is a specification.

My invention relates to improvements in building construction in the erection of walls, floors, ceilings, roofs and the like, especially to such parts of the same as have hitherto been erected through the instrumentality of wooden or metal forms.

In the manufacture of concrete structures the usual procedure is to make carefully constructed wooden forms between which the concrete is poured. When the concrete has "set" sufficiently hard, that is in from six to twelve days, the forms are removed and the exposed surfaces of the concrete walls display the marks of the joints once formed by the wooden boards and show up in streaks, cuts and holes.

To make them presentable therefore they have to be plastered to bring them to an even and finished surface. Neither the forms nor the plaster add to the real value of the wall from a constructional standpoint. The wooden forms are discarded and on account of the large amount of cutting to which the lumber is subjected and the many nails driven into it they cannot readily be used again and the salvage is therefore small.

Further, the existing method is comparatively slow, complicated and expensive especially in countries where wood is scarce or expensive and this scarcity or expense has not only always been a source of concern to all connected with the matter, either from a professional or financial point of view but is increasing every year and the care and cost involved is today out of all proportion to the net result obtained. In addition, this method of manufacture requires strictly skilled labor.

Another method of constructing concrete walls is in the employment of hollow building blocks.

In the construction of buildings made wholly or in part of hollow building blocks, such as have been and still are in vogue, it is the practice occasionally to fill in the hollow places within or between the blocks with concrete and thus the wooden forms described above are dispensed with, the blocks themselves taking the place of the wooden forms. These blocks are made in a variety of special sizes and shapes, are frequently very heavy, massive and difficult to handle. Almost every piece has to be separately cast as it has its own allotted place in the structure in which it is to be employed and in consequence there is no elasticity in the system on account of the blocks not being adaptable to the various positions in which they are required to be used. It requires skilled attention to keep the surfaces of the wall plumb and with a true, smooth surface and when the heavy blocks are set on the mortar bed joint the mortar is squeezed out by the weight.

The object of my invention is to provide a construction that shall be capable of universal application to all kinds of structures and one in which the use of extraneous wooden or metal forms shall be eliminated altogether, also one that shall be easy to handle and capable of being manufactured by comparatively unskilled labor.

The essential idea of my invention is to make the "forms" an integral and conglomerate part of the structure. To do this I employ thin slabs or tiles made of cement and sand, or in terra-cotta, or in a mixture of cement, sand and stone (or gravel) or burnt clay or other suitable materials. To these thin slabs or tiles I apply a number of special features described hereafter which enable them to be jointed together, both longitudinally and transversely.

An area of these tiles when thus built up and held together in double tiled formation provides a hollow space between which concrete may be poured. The tiles thus act as

the forms and adhere to the concrete poured between them in a manner hereinafter described, thus forming a conglomerate whole. No wooden forms or supports are required, the concrete being supported in its vertical position in a manner hereinafter described.

A preferred embodiment of my invention is shown in the accompanying drawings, in which,

Figure 1 is a perspective view of a portion of a structure embodying my improvements,

Fig. 2 is a vertical section through two tiles,

Fig. 3 is a vertical section through two tiles showing a different size of joint,

Fig. 4 is a horizontal section through two tiles,

Fig. 5 is a horizontal section of a column, and

Fig. 6 is a perspective view of a stay-rod.

The walls are built up of a series of tiles 1 which are made of concrete or other suitable material. These tiles have a thickness depending upon the character of the work to be performed. Because of the secure means for fastening them together hereafter provided, they ordinarily need not be more than 2 inches thick and yet provide a firm and plumb wall. At their undersides these tiles are provided with continuous grooves 2 and at their tops, with a series of spaced holes 3, which are 3 inches apart and have a diameter which varies with the character of the work to be done, but ordinarily need not be greater than $\frac{1}{2}$ to $\frac{1}{3}$ of the thickness of the tile, usually one-half inch.

Dowels 4, of slightly less diameter than the holes 3, may be inserted in these holes in an upright position and kept in place by means of suitable mortar or the like which fills up these holes 3. These holes may be filled up with soft mortar either before or after the dowels are inserted as this helps to keep the dowels vertical. Then each hole is filled with mortar and the bottom of the upper tile is also covered or "buttered" with mortar and the junction is effected. The top of the lower tile is also covered with mortar. These dowels 4 are of greater height than the combined heights of the holes 3 and the grooves 2, so that when the upper block is put into place as shown in Fig. 1, and the dowels 4 fit into the continuous under-groove 2 which is of substantially the same width as the holes 3, the adjacent faces of the superposed tiles do not contact but are held spaced from each other to a distance which may be varied but which is ordinarily about one-fourth of an inch.

By this construction, careless workmen cannot squeeze out the mortar or cement which is used to make the joint and fill up the space between the dowels 4, the grooves 2 and the holes 3, and a perfect joint is always secured even by unskilled labor. When the mortar or cement hardens, a very secure and firm joint is secured. After the mason has placed the upper tiles in their courses and before the mortar has hardened he can easily shift the tiles since their weight is held upon the dowels 4, so as to form a plumb wall. In this manner tiles much heavier than ordinary bricks can be manipulated so as to form a plumb wall with as much ease as though ordinary light bricks were being used. The tops and bottoms of these dowels, and the holes and grooves in which they fit, are made smooth so that the tiles can be easily shifted if they are first placed a little out of plumb so as to bring them into the correct position. This ready shifting of the tiles is further facilitated by the mortar which makes the joint and which completely covers the dowels, so that a thin film is formed upon the tops and bottoms thereof, which lessens friction between the parts. As these tiles can be made light, the mortar or cement is sufficiently viscous to keep the dowels and the tiles in the correctly adjusted position. Because of the continuous groove, the tiles can be adjusted horizontally so as to break joint, after they have been laid on the lower tiles. Since the dowels accurately space the tiles, the pointing-up of the joints, if this is required, is much facilitated.

By means of the simple units shown above, walls, and other structures may be readily erected. The tiles can be made so light that they can be laid from scaffolds. The shifting of the tiles to produce a plumb wall does not disturb or force out the connecting mortar or the like as it is not subjected to the weight of the blocks.

The spaces between the tiles may be left hollow as shown at 5 or filled with concrete as shown at 6, in order to secure a stronger structure. The continuous grooves 2 at the undersides of these tiles 1 allow them to be laid in any desired manner so as to break joint with the tiles in the lower courses. The vertical joints between the tiles are made by providing them with substantially moon-faced or semi-cylindrical recesses 6 and projections 7, the projections 7 being of somewhat greater diameter than the recesses 6 as shown in the drawings, so that a space is left between the tiles of any desired width, usually about one-eighth of an inch for making the joint. These peculiarly shaped recesses and projections prevent the workmen from carelessly forcing the tiles too close together and not making a proper joint. Each recess 6 meets the projection exactly on its arrises, thus causing the respective tiles to be wedged together, and produce a close fit which regulates the smoothness of the wall and holds the tiles plumb and rigid. The tiles thus line up perfectly to a straight edge and there is no unevenness anywhere.

The thickness of the vertical joint can be regulated by lengthening the intermediate dowels. These peculiarly shaped recesses and projections permit the mortar in these vertical spaces to harden unaffected by any movement or stress on the tiles.

To afford additional stability to the walls, means of connection are provided. These connecting means consist of stay-rods 8 which can be made of any suitable material, as metal, and are preferably of uniform thickness throughout and are provided with slots 9. These stay-rods also serve to brace the completed wall and can be very cheaply manufactured because of their simplicity of shape. They are placed with their slots 9 upon the dowels 4 in opposite walls before the upper tiles 1 are placed in position. Hence, they encircle the dowels 4 as shown in the drawings and project into the joint between the superposed tiles. Their flattened ends are made sufficiently thin so as not to make the joint too thick. After the stay-rods 8 have been placed into position, the dowels 4 may be moved slightly in their holes 3, because the slots 9 permit this adjustment and these slots also permit a movement of the stay-rods with respect to the dowels. By this construction, slight variations in size of the stay-rods 8 are allowed for, and when the superposed tiles 1 are placed into position, the heads 10 of the stay-rods 8 extend into the joints between the superposed tiles and further strengthen these joints. The mortar binds the tiles, dowels, and stay-rods into a homogeneous mass, so that none of the parts can move with respect to the other.

These tiles can also be made with horizontal and vertical grooves 12 on their inner sides so that the laborers can easily knock off a portion in completing the end of a course. The outer sides are preferably smooth. The grooved inner faces of the tiles also make a firm connection with the concrete that may be poured in between the walls.

Since the tiles form an integral part of the wall, a saving is effected in the amount of concrete poured in, and a further saving is produced by the fact that the outer faces of the tiles may be finished in any desired manner during their manufacture, so that no plaster is necessary.

Angles and corners may be formed by the corner piece shown in the drawings. This has the same finish on both sides and may serve as an inside or outside angle. One face is longer than the other and when one piece is reversed and placed on the other it breaks joint.

When a column is formed of these units as shown in the drawings, it can be reinforced in any suitable manner as for instance by the I beam 19, and in similar manner known features of construction can be combined with the improvements herein pointed out.

I have shown one embodiment of my invention but it is clear that numerous changes and omissions can be made without departing from its spirit.

What I claim is:—

1. A tile having a continuous groove in one lateral face thereof, the opposite lateral face being substantially plane and having a series of spaced holes which extend into the body of the tile, whereby the said faces can be connected to adjacent tiles by means of dowels placed in said continuous groove, and in said spaced holes, and the tile can be longitudinally moved with respect to the dowels placed in the said continuous groove.

2. In combination, a plurality of tiles, each having a continuous groove in one lateral face thereof, and a series of spaced holes in its opposite lateral face, the adjacent faces of said tiles having said holes and said groove respectively, and connecting dowels intermediate and connecting said tiles, said dowels being of greater length than the combined depth of said groove and one of said holes, the transverse dimensions of said dowels being such that the said tiles can be moved relatively to each other, after the said dowels have been put into place.

3. In combination, a plurality of spaced walls, each wall consisting of a plurality of tiles having their adjacent faces spaced from each other, said adjacent tiles being connected by dowels, and stay-rods intermediate and connecting said walls, the said stay-rods being of greater length than the perpendicular distance between said walls and being freely movable with respect to said tiles and said dowels, said stay rods having heads projecting into the spaces between adjacent tiles.

4. In combination, a plurality of spaced walls, each wall consisting of a plurality of tiles having depressions in their adjacent faces, said tiles being connected by dowels of greater length than the depressions in said tiles in which they are located, so that said tiles remain spaced from each other, and stay-rods having slotted heads intermediate and connected to the dowels of said walls, the respective dowels of said opposite walls being fitted into the slots of said heads, the said stay-rods being of greater length than the perpendicular distance between said walls and being freely movable with respect to said tiles and said dowels.

5. In combination, a plurality of spaced walls, each wall consisting of a plurality of tiles having depressions in their adjacent faces, said tiles being connected by dowels of greater length than the depressions in said tiles in which they are located, so that said tiles remain spaced from each other,

and stay rods having slotted heads intermediate and connecting the dowels of said walls, the respective dowels of said opposite walls being fitted into the slots of said heads, the said stay-rods being of greater length than the perpendicular distance between said walls and being freely movable with respect to said tiles and said dowels, the transverse dimensions of said dowels being such that said tiles can also be moved with respect to each other.

In testimony whereof I hereunto affix my signature.

WALTER H. COGGAN.