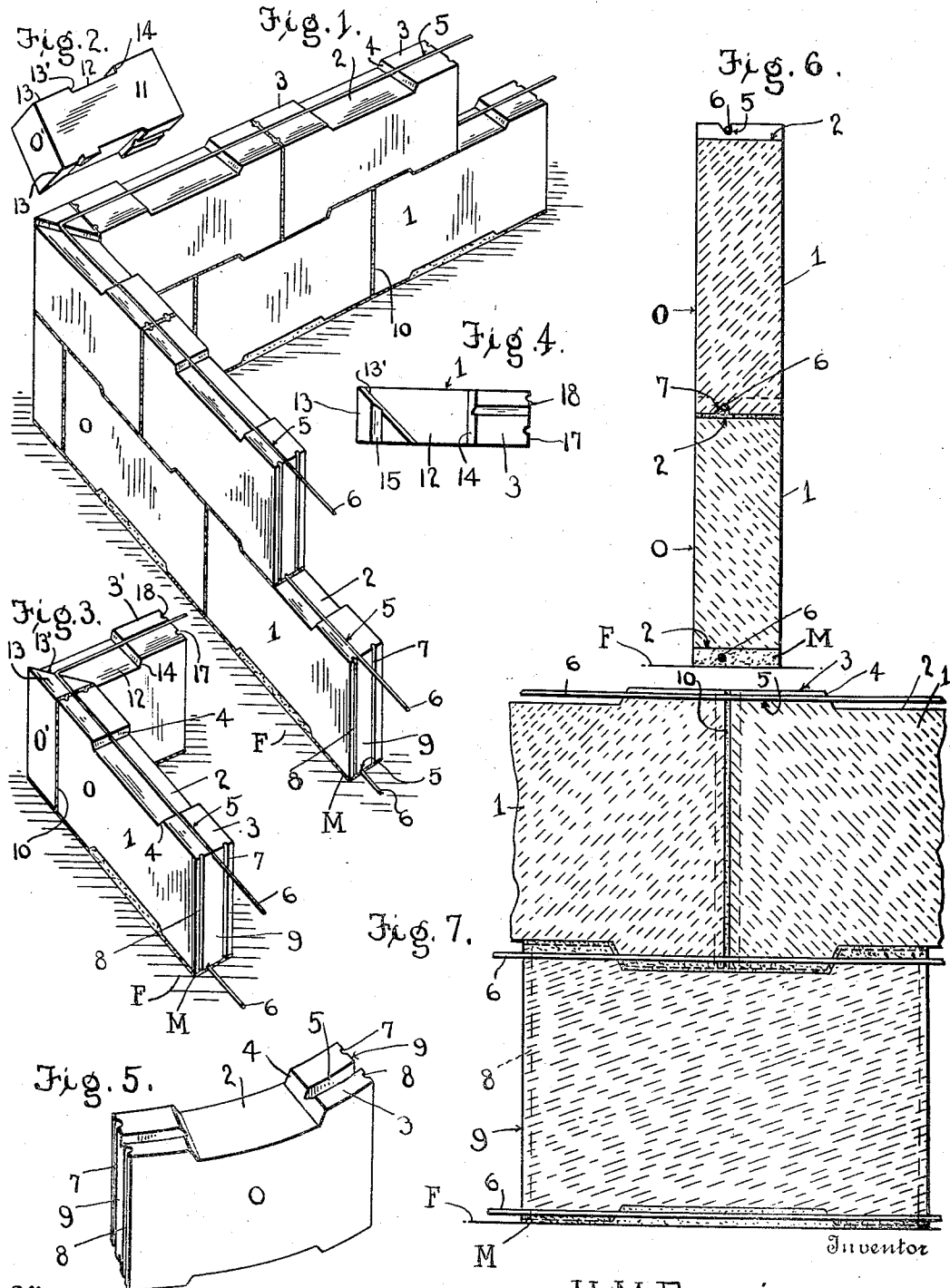


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INTERLOCKING BLOCK.
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1,077,466.

Patented Nov. 4, 1913.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HOWARD M. FRANCIS, a citizen of the United States, residing at Forrest, in the county of Livingston and State of Illinois, have invented certain new and useful Improvements in Interlocking Blocks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to walls composed of blocks of concrete and the like which may be hollow, solid cellular, or reinforced internally; and more especially to blocks of this character which are interlocked with each other when they are laid in a wall; and the object of the same is to improve and to simplify the construction of such a block so that only two forms are necessary to build a complete structure with right-angular corners, and with a corresponding face (which may be ornamented) ever outermost.

This and other objects are accomplished by forming the block in the manner hereinafter more fully described and claimed, and as shown in the drawings wherein—

Figure 1 is a perspective view of a section of a wall made with my improved block, showing a corner thereof and illustrating the manner in which the rows or layers of blocks are placed; and Fig. 2 is a perspective detail of the corner block in the row next above the corner shown in Fig. 1, said corner block being in position to be put in place. Fig. 3 is a perspective detail showing the lower row and corner from Fig. 1. Fig. 4 is a plan view of one of the corner blocks, and Fig. 5 a perspective detail of a curved block which I employ where the wall is to be circular or curved. Fig. 6 is an enlarged cross section, and Fig. 7 an enlarged longitudinal section through a portion of this wall, as will be referred to hereinafter.

No novelty for the composition or the size and the specific shape of this block is claimed, further than as it is shaped for interlocking purposes when used in building a wall. That is to say, I prefer to construct this block of concrete or cement, although it could be made of clay and burned; and I prefer to construct it solid as shown, although it could be hollow, cellular, rein-

forced or not as desired, and probably ornamented on its outer or exposed face. The size of the block is not essential, save as set forth in the proportions hereinafter mentioned.

The primary object of this invention to construct a building block whereof only two forms are necessary to build a complete wall with right-angular corners, and only one form is necessary to build a circular wall as that of a silo or tank. I might add that where openings occur as for doors and windows, they may be formed by omitting the main blocks in as many rows as are necessary to make an opening the height of the door required, and breaking or cutting off the protruding ends of alternate blocks alongside the openings in a manner well known to masons and bricklayers. It is true that for this purpose the manufacturer might produce "half-blocks," and doubtless he would do so if the main blocks were reinforced because it would be necessary to reinforce the half-block so that the metal rods or other reinforcing elements did not run across their centers—otherwise they could not well be broken. But as the protruding ends of the main blocks in every other row alongside the doorway might be permitted to remain and the spaces between them filled up with brickbats which in the finished wall would be covered by the outside trim of the door- or window-frame, these half-blocks are not absolutely essential, and therefore I make the broad statement that the wall can be built with blocks of but two types or a circular wall with blocks of a single type.

The main block, whereof a good example is illustrated in Fig. 3, has a body 1 whose dimensions are unimportant but whose height is preferably about twice its thickness and whose length about four times its thickness. I may here say that the main block shown in Fig. 5 possesses every detail of construction involved in the main block illustrated in Fig. 3 and about to be described, save that it is curved slightly as shown, and of course its ornamentation if it have any must be on its outer face. On this understanding, each main block has a recess 2 in its upper edge extending the full width of the block, its depth being unimportant but perhaps one inch, and its length being slightly greater than double the

length of the lugs 3, 3, which remain between the ends of the recess 2 and the extremities of the block body 1. The bottom of said recess I preferably make flat, and its ends 4 slightly oblique as best seen in Fig. 7; and the upper faces of the lugs 3 are also preferably made flat although I provide them with longitudinal grooves 5 for the interlocking elements which are shown in Fig. 7 as rods 6; and if there can be but a single element between the blocks in each two rows as shown in Fig. 6, these grooves are disposed by preference slightly nearer the outer face O for the purpose of giving the reinforce greater strength at corners as will be explained below.

Attention is directed to the fact that the groove 5 is not cut as deep into the lug 3 as the recess 2 is cut into the body 1—in fact the groove extends down into the lug for only about half the depth of the recess or half the height of the end 4 of the latter, as seen in Fig. 5. The result of this detail is that when rods or wires 6 are laid into the grooves of a row of blocks and drawn tight, they rest in said grooves but they span the spaces or recesses 2 and are not intended to touch the bottom thereof.

The lower edge of each main block is made in precisely the same manner as its upper edge, excepting that of course the recess and the grooves there extend upward into the lower edge of the block.

By preference I make each end of the main block with irregularities here shown in the shape of upright grooves 7 and 8 disposed rather near the inner and outer faces of the block so that they will not interfere with the groove or grooves 5 for the reinforcing element. Otherwise the end face of each block is flat as shown at 9, and in laying the blocks in a row these faces are intended to come into close contact with each other, excepting for a thin web of mortar or plastic cement as indicated at 10 in Fig. 7, and the presence of the grooves or irregularities 7, 8, prevents this mortar from falling out of place in case it should become granular.

The blocks for the corner are all constructed alike, and are well illustrated in Figs. 2 and 4. Each must be of the same thickness and the same height as the main blocks; each may also be solid, hollow, cellular, or reinforced if desired; and each has in what I will call its inner end upright irregularities or grooves 17 and 18 adapted to mate with those in the contiguous main block of the same row. The body 11 of the corner block is by preference straight, because this block will most always be used at the corner of a straight wall and where a right angle is to be turned—however, I do not wish to be limited in this respect, because curved walls might be built with

angles in them, or the angle in any wall might be other than a right angle. Said body 11 is, however, three-fourths the length of the body 1 of the main block, so that if the latter be two feet long with its recess 2 slightly over one foot long and each lug 3 slightly less than six inches long, the body 11 of the corner block would be one and one-half feet long as shown in the drawings. In its upper edge it has a recess 12 whose ends 14 are beveled upwardly, and the projecting lug 3' at the "inner" end of this block exactly corresponds with one of the lugs 3 on a main block while the projecting recess at the other side of the recess 12 is cut off on a diagonal line 13' from the inner edge of the recess 12 at the inner face of the block to the outer edge of the lug 13 at the outer face of the block, said line 13' running to the extreme corner of the block and therefore of the wall being formed and being beveled upwardly like the ends 14 of the recess 12. The latter at its shorter edge along the inner face of the block is of slightly greater length than the lug 3', and at its outer edge along the outer face of the block it is of slightly greater length than twice the length of the lug 3'. The outer face of this corner block will be ornamented to correspond with the ornamentation (if any) on the outer faces of the main blocks, as also its "outer" end O'.

With this construction of my improved interlocking blocks, a wall is built in the following manner: On a suitable base or foundation F I preferably spread a little cement or liquid mortar M, and in this mortar I lay a reinforcing element 6; then I lay the first row or tier of main blocks 1, wiping additional mortar into their lower recesses and pressing them downwardly onto the mortar M; if they have irregularities 7 and 8 in their extremities, mortar 10 may be wiped over the extremities as the blocks are laid, or they may be laid in close or very close contact with each other end to end and liquid cement poured in later; and if a circular wall is being built, this process is continued all around the structure. Then I lay a reinforcing element 6 into the grooves 5 which are exposed at the top of this row or tier, fill these grooves and the recesses 2 with mortar M, level it off and repeat the operation for the next row or tier excepting that the blocks are laid so that each has its mid-length disposed above the line between the two blocks in the row below as seen in Fig. 1 and therefore each block breaks joint with those in the next rows above and below. The function of the specific form of grooves 5 and reinforce 6 will now be apparent, as also the purpose of making the recess a little greater than twice the length of each lug. It is intended that the reinforce elements shall be rods or

heavy wires, and if the latter they must be stretched tight. While they lie in the upper grooves of any row, they span the recesses exposed, and when mortar is applied it fills the unoccupied portions of the grooves and fills into the recess below and around the reinforce element; then when the block in the next row is wiped with mortar and put into place so as to break joint as described, the grooves 5 in its lugs 3 engages half the stretches of the wires across the two adjacent recesses 2 so that eventually the lugs 3 of two contiguous blocks in one row when they are pressed downward will nearly fill the recess in the block below at a time when the ends of the two blocks in the uppermost row come nearly or quite together. For the position of parts at this time, attention is directed to Fig. 7. The result will be that the reinforce elements remain strung straight through the wall, and the blocks throughout the wall are tied to or connected with each other in such manner that they may be said to be interlocked by means of these wires or rods as against lateral movement, whereas of course they cannot move vertically by reason of the superimposed weight, and they cannot move longitudinally because of the abutting of their ends against each other and the interengagement of their shoulders 4.

When a corner is to be constructed, one of the corner blocks is laid as seen in Fig. 3 so that the base of its triangular lug 13 is against the extremity of the main block last laid, the upright of said lug is at the outer side of the wall over the outer end of this corner block, and the hypotenuse of the lug faces outward and in the direction which the wall is to follow. The inner end of the corner block is grooved or made irregular as shown at 17 and 18, and against this end the irregular end of the main block in the angular wall is laid. Thereafter the reinforcing or interlocking element 6 is laid in the uppermost groove, and the groove 15 in the lug 13 permits this element to make a right angle as shown in Fig. 3. The next tier of blocks is then laid in the manner above described, and when the same corner is reached it will be found that the corner block will just fill out the space as seen in the second row in Fig. 1. As the hypotenuse of the triangular lug 13 is always disposed toward the outer face of the corner block, the latter must be inverted as this second row or tier is laid, and therefore the hypotenuse of its lower lug 13 will mate with the hypotenuse of the upper lug in the first row in a manner which will be understood. If it should so happen that a wall is to be built with a double angle in it, the row at the right end of Fig. 1 could be caused to turn an angle to the left by means of corner blocks of the same construction,

provided they were properly laid according to the instructions just given.

While I prefer to employ the irregularities in the meeting ends of the blocks and the mortar or liquid cement 10, it is quite possible that other forms of irregularities could be used at this point. It is also possible that a greater number of interlocking or reinforcing elements 6 could be employed, or perhaps they might be done away with entirely. But I consider it desirable if not essential that the length of the recesses 2 shall be slightly greater than twice the length of the lugs 3, especially where the ends or shoulders 4 are beveled as shown, because when the extremities of two blocks in an upper row are brought together and their lower lugs borne down into a recess as seen in Fig. 7, it is desirable that a little mortar remain beneath said lugs and between the contiguous beveled shoulders 4 as therein shown. For the same reason I prefer to employ mortar 10 between the meeting extremities, because if there be mortar all around each block the wall will be airtight and probably water-tight.

What is claimed as new is:

1. A corner block for walls having on each horizontal edge a lug at one end, a lug at the other end duplicating the first excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, and a recess between said diagonal line of one lug and the inner end of the other lug.
2. A corner block for walls having on each horizontal edge a lug at one end, a lug at the other end duplicating the first excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, a recess between said diagonal line of one lug and the inner end of the other lug, all full-length lugs being provided with longitudinal grooves in their outer edges, and each divided lug being provided with a groove at right angles to the length of the groove in its full-length lug, for the purpose set forth.
3. In a wall corner, the combination with main blocks whereof each is recessed in its upper and lower edges so as to leave lugs at both ends of each recess, the latter being substantially twice the length of each lug; of corner blocks three-quarters the length of the main block, each having on each horizontal edge a lug at one end duplicating one of the lugs on a main block, a lug at the other end duplicating the other lug on said main block excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, and a recess between said diagonal line of one lug and the inner end of the other lug.
4. In a wall corner, the combination with main blocks whereof each is recessed in its

upper and lower edges so as to leave lugs at both ends of each recess, the latter being substantially twice the length of each lug; of corner blocks three-quarters the length of the main block, each having on each horizontal edge a lug at one end duplicating one of the lugs on a main block, a lug at the other end duplicating the other lug on said main block excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, a recess between said diagonal line of one lug and the inner end of the other lug, all full-length lugs being provided with longitudinal grooves in their outer edges, and said divided lug being provided with a groove at right angles to the length of the groove in its full-length lug, for the purpose set forth.

5. In a wall corner, the combination with main blocks whereof each is recessed in its upper and lower edges so as to leave lugs at both ends of each recess, the latter being substantially twice the length of each lug; of corner blocks three-quarters the length of the main block, each having on each horizontal edge a lug at one end duplicating one of the lugs on a main block, a lug at the other end duplicating the other lug on said main block excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, a recess between said diagonal line of one lug and the inner end of the other lug, all full-length lugs being provided with longitudinal grooves in their outer edges, and said divided lugs being provided with a groove at right angles to the length of the groove in its full-length lug and all said grooves being sunk in said lugs for half the distance which the latter project above the bottom of the contiguous recesses, and interlocking rods lying in said grooves.

6. In a wall corner, the combination with main blocks whereof each is recessed in its

upper and lower edges so as to leave lugs at both ends of each recess; of corner blocks each having on its horizontal edge a lug at one end duplicating one of the lugs on a main block, a lug at the other end duplicating the other lug on said main block excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, all full-length lugs being provided with longitudinal grooves in their outer edges, and said divided lugs being provided with a groove at right angles to the length of the groove in the full-length lug and all said grooves being nearer the outer than the inner faces of the block.

7. In a wall corner, the combination with main blocks whereof each is recessed in its upper and lower edges so as to leave lugs at both ends of said recess; of corner blocks each having on its horizontal edge a lug at one end duplicating one of the lugs on a main block, a lug at the other end duplicating the other lug on said main block excepting that it is cut away on a diagonal line extending from the inner face to the outer corner of this block, all full-length lugs being provided with longitudinal grooves in their outer edges, and each divided lug being provided with a groove at right angles to the length of the groove in the full-length lug and all said grooves being nearer the outer than the inner faces of the blocks, upright grooves in the meeting ends of all blocks lying out of alinement with the grooves in said lugs, and interlocking rods lying in the last-named grooves.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HOWARD M. FRANCIS.

Witnesses:

VAN ESS McDOWELL,
J. G. BORNHIZER.