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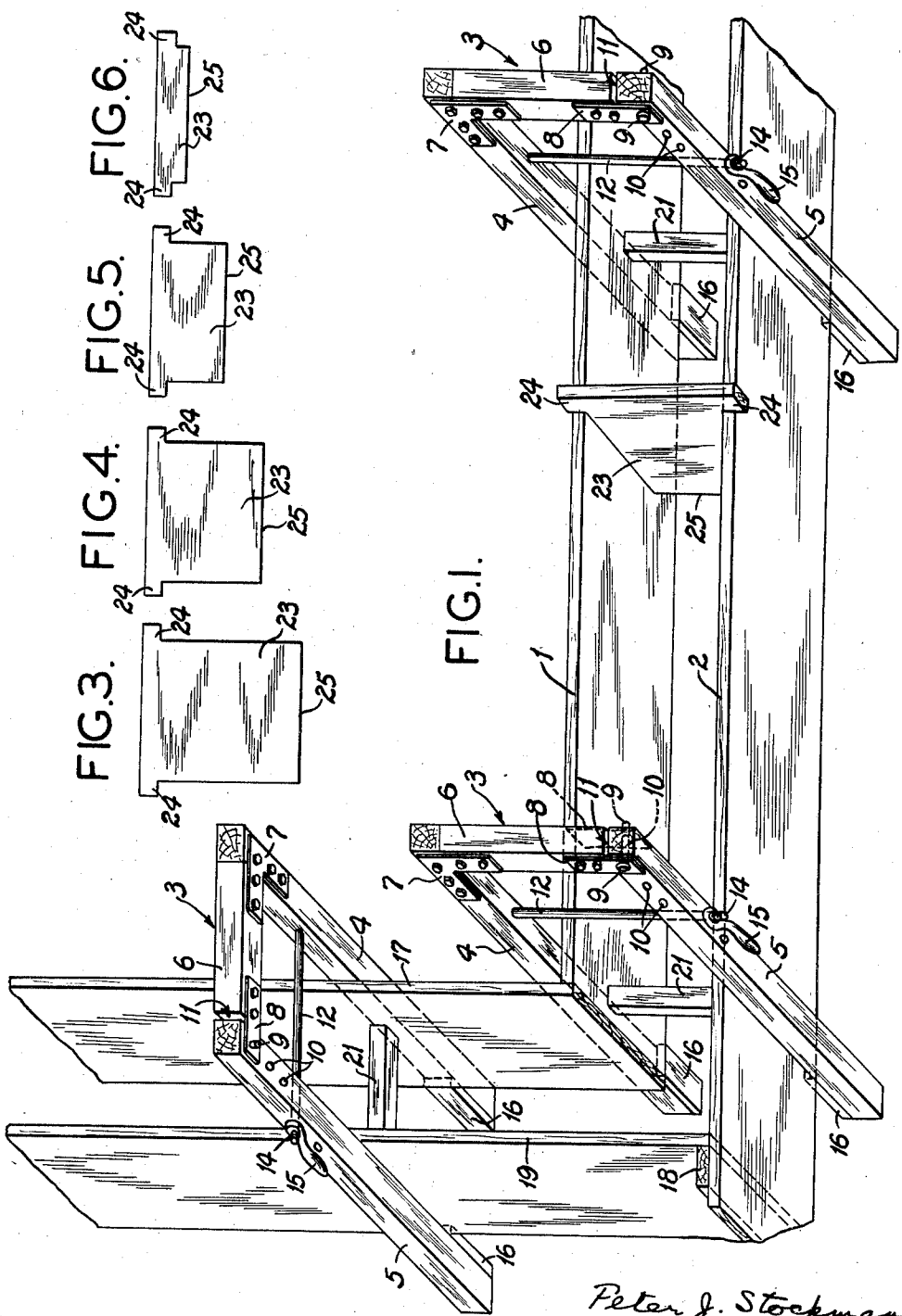
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2,174,394

METHOD OF BUILDING

Filed Sept. 16, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

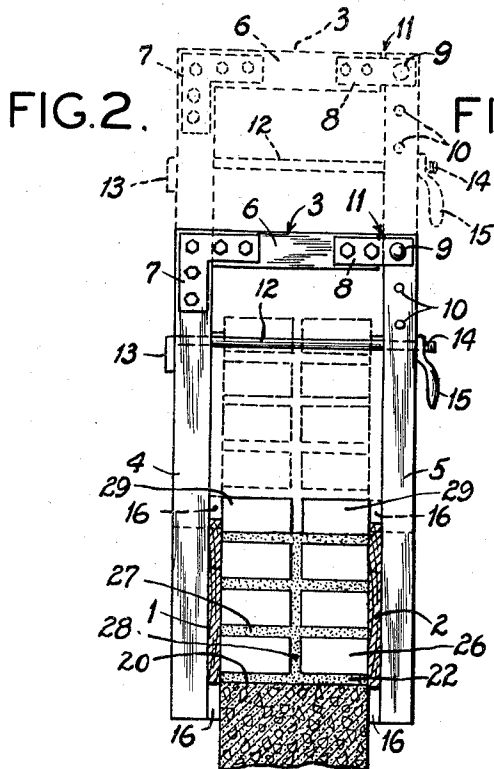
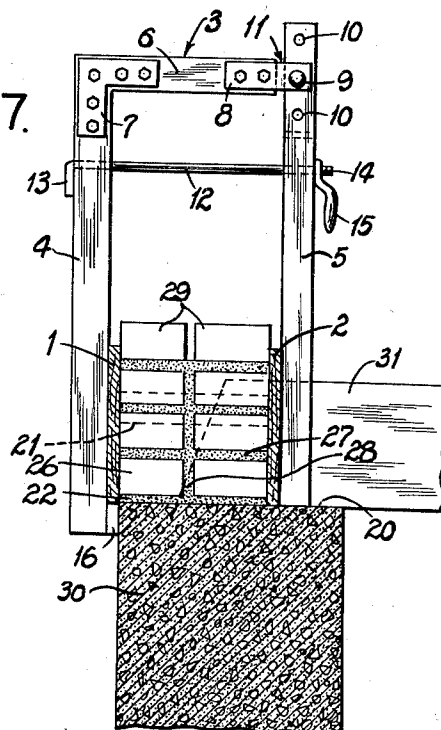


FIG. 7.



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UNITED STATES PATENT OFFICE

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METHOD OF BUILDING

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1 Claim. (Cl. 72—37)

This invention relates to methods of building, and with regard to certain more specific features, to methods of building walls or the like from bricks and similar block-like units.

Among the several objects of the invention may be noted the provision of a method of the class described whereby bricks, rubble stones, tile, terazzo, terra-cotta, and other block-like units may be laid up in a precision manner, as in the building of a wall, without necessitating skilled labor for the building; the provision of a method of the class described which makes it possible to lay brick and like material in a much faster manner than heretofore possible, while at the same time preserving or even improving the accuracy of the manner in which the bricks are laid up; the provision of a method of the class described which employs mold apparatus of relatively simple and cheap construction, which apparatus may readily be moved from place to place and reused many times during the course of the erection of a single building; and the provision of methods of the class described which are simple and economical. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the steps and sequence of steps, and features of manipulation, which will be exemplified in the methods hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawings, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a perspective view of apparatus made ready for carrying out the method of the present invention;

Fig. 2 is a vertical cross section demonstrating the use of the apparatus of Fig. 1 in the method of the present invention;

Figures 3, 4, 5 and 6 are elevations of certain striking tools; and,

Figure 7 is a view illustrating another use of the method of the present invention.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Bricklaying as it is practiced today is a semi-skilled trade; that is, it requires a considerable amount of experience before a laborer can properly lay bricks. The same is true to a large extent of the other building units of block-like type, such as rubble stones, tile, terazzo, terra-cotta, and like wall constructions. As a result of the required skill, the labor cost for such building op-

eration is inordinately high. It is a primary object of the present invention to provide a method, with its accompanying apparatus, whereby the laying of brick and like materials is reduced from a skilled laborer's task to that of an unskilled laborer. At the same time, the method and apparatus of the present invention, far from sacrificing the accuracy of skilled bricklaying, make it possible for the bricks to be layed, even by an unskilled worker, with far greater accuracy than heretofore possible even with great manual skill.

Since the method of the present invention, to a great extent, depends on the design and construction of certain apparatus used in connection with the method, said apparatus will first be described. Broadly, the apparatus used in connection with the method of the present invention comprises a demountable mold, with which are associated certain U-shaped clamping devices for holding the mold in assembly, and certain gauge or template tools or the like for use in connection with the erected mold in carrying out the method.

Referring now more particularly to Fig. 1, the mold proper comprises parallel side-boards or elongated members 1 and 2. The lengths of the boards 1 and 2 is immaterial. Their width should not ordinarily be much greater than the length of the human arm, and ordinarily two feet is about the maximum width that can be handled with facility. The thickness of the boards 1 and 2 depends largely upon the type of construction to be carried out; ordinarily, one inch boards are satisfactory. It is important that the upper and lower long edges of the boards 1 and 2 be smooth, and parallel.

The mold boards 1 and 2 are held in assembly, in molding position, by means of a series of clamps or supports indicated generally by numeral 3. The clamps 3 have sidewardly disposed leg members 4 and 5 and an upper cross bar 6. Cross bar 6 is rigidly bolted or otherwise secured to the upper end of leg 4, as by angle iron plates 7 on each side thereof. Leg 5, on the other hand, is not rigidly attached to the cross bar 6, but is pivoted thereto in the following manner: To each side of the free end of cross bar 6 is bolted a plate 8, the end of which extends a suitable distance beyond the end of cross bar 6. The plates 8 are drilled near their ends to receive a pin or bolt 9, which passes through a suitable hole 10 drilled through the upper end of leg 5. A plurality of said holes 10 are preferably provided in the upper end of said leg 5, for purposes of adjustment hereinafter to be described. In assembly, a suitable space, indicated by numeral 11, is

left between the end of cross bar 6 and the upper side face of leg 5 so that said leg 5 may pivot, to a limited extent, upon the pin 9.

Somewhat below the cross bar 6, a tie rod 12 extends across between the legs 4 and 5. At its end extending through leg 4, the tie rod 12 is bent over, or otherwise headed, as indicated at numeral 13 (see Fig. 2), while at its opposite end the tie rod is threaded, as indicated at numeral 14, to receive a wing-nut or the like 15. By drawing up the wing-nut 15 on the threaded portion 14 of tie rod 12, the lower end of legs 4 and 5 are brought closer together, to exert a clamping action, the pivoting of leg 5 on pin 9 permitting this movement.

At their lower extremities, the facing surfaces of legs 4 and 5 are provided with removable spacing blocks 16.

Ordinarily mold boards 1 and 2 are not permanently affixed to the clamp 3. However, if in a given job a unit length of mold may be used repeatedly to advantage, it then may become advisable to secure the mold boards 1 and 2 to the legs 4 and 5, respectively, as by nailing them in place. Such securing does not interfere with the use of the mold, as a whole, in the subsequently described method.

It is usually sufficient that one clamp 3 be provided for each five or six feet of length of the mold boards 1 and 2. However, the number and spacing of the clamps 3 is an arbitrary matter, and may be decided at the time of carrying out the method of the invention to meet the peculiar conditions then existing.

Fig. 1 also illustrates the manner in which the apparatus may be used in forming a corner or like mold. To form a corner, the mold board 1 is terminated flush with the front face of leg 4 of one of the clamps 3, and a similar mold board, indicated by numeral 17, is abutted in angular relation to the end of the mold board 1 and the said face of the leg 4. The mold board 2, on the other hand, extends a suitable distance beyond leg 5. To the mold board 2 is then nailed a cleat or the like, indicated by numeral 18, which forms a shoulder against which is seated the end of a mold board 19 which is provided as a companion for the mold board 17. The mold boards 17 and 19 are held in suitable spaced relationship by means of one or more clamps 3, as shown. This corner structure, it will readily be seen, is easily demountable and can be made up readily from a second mold assembly whenever the occasion arises.

The apparatus as thus described is used in the method of the present invention in the following manner, reference now being directed more particularly to Fig. 2:

Numeral 20 indicates the upper edge of a concrete or like foundation wall, or footing, or the like, that is provided for the building in the usual manner, prior to the commencement of the method of the present invention. It will be assumed, for present purposes, that the wall 20 is of the same width as the brick wall it is desired to build.

The mold apparatus is now clamped into position on the top of said wall 20. The actual clamping surfaces are the inner, facing surfaces of the spacer blocks 16. The mold boards 1 and 2 are of the same thickness as the blocks 16, so that when the wing nuts 15 are drawn up tight, the inner faces of said boards 1 and 2 form in effect continuations of the planes of the side surfaces of the foundation wall 20. To assist in position-

ing the mold boards properly, it is desirable to use a number of spacing blocks 21 (see Fig. 1) of correct length, particularly if the mold boards 1 and 2 are not rigidly secured to the clamps 3. The spacing blocks 21 hold the mold boards 1 and 2 apart, through the reaction of the sides of the legs 4 and 5 towards each other. The mold is positioned so that the upper edges of mold boards 1 and 2 are level, and parallel to the top surface of the foundation wall 20 (assumed likewise to be level).

With the mold apparatus thus in position, a quantity of mortar is now poured in so that it forms a thin layer 22 on top of the foundation wall 20. In order that said layer 22 may be of uniform thickness, and level along its upper surface, a template or tool 23 of the type shown in Fig. 3 is now used. This tool 23 comprises a rectangular plate having projections 24 extending from the opposite sides of its upper edge. To use the tool 23, the lower portion thereof is inserted between the mold boards 1 and 2, with the projections 24 resting upon the upper edges of said mold boards. Said tool is then moved back and forth along the mold boards, and the lower edge 25 thereof constitutes a striking-off means which levels the layer of mortar 22. Fig. 1 shows the position, for example, in which the tool 23 is placed for use.

After the layer 22 of mortar has thus been leveled off, an initial course of brick, indicated by numeral 26, is set in position on top thereof. The inner surfaces of mold boards 1 and 2 permit the accurate, quick positioning of the bricks of course 26 in their desired location, and no particular skill is needed in the placement of the bricks for this reason.

After the bricks of the first course have thus all been set in position, an additional quantity of mortar is placed into the mold. The quantity in this instance is sufficient not only to provide a top layer 27 of mortar, but also to provide vertical layers of mortar, indicated by numeral 28, between the individual bricks of the first course.

The top layer 27 is now struck off and leveled with a tool 23 of the type indicated in Fig. 4. The tool 23 of Fig. 4 is identical to the tool of Fig. 3, with the exception that it is shorter, along its vertical dimension, by an amount equal to the thickness of one course of brick plus the desired thickness of the mortar layer 27.

After the first course 26 of brick has been laid, or the second course, it will clearly be seen that the spacing blocks 21 can be knocked out from position, as they are no longer needed. The spacing blocks 21 thus do not interfere in any manner with the laying of the bricks, as said laying progresses.

Additional courses of brick are laid up in like manner, one after the other, using progressively shorter tools 23 (see Figs. 5 and 6) to strike off or level the successive layers of mortar, until a course of brick (indicated in Fig. 2 by numeral 29) is laid, the upper surface of which is above the edges of the mold boards 1 and 2. The wing nut 15 is then loosened on the tie rod 12, thus disengaging the clamping faces of blocks 16 from the foundation wall 20. The mold as a whole may then easily be removed from the brick wall thus built.

As soon as the section of wall thus built has achieved sufficient rigidity, the mold is again clamped thereto, as shown in dotted lines in Fig. 2, with the upper edges of blocks 16 now level with the upper surfaces of the top course 29 of

brick. The laying of brick then proceeds in the same manner as heretofore described, until the mold is again filled. It will clearly be seen that the mold may be raised and reclamped in position as often as necessary, until the entire height of the wall is built.

Corners may easily be taken care of in the same manner, by using the construction shown at the left-hand end of Fig. 1.

The numerous advantages of the method of the present invention as thus described will now be apparent. In the first place, the positioning of the individual bricks in the courses is exceedingly accurate—far more accurate in fact, than can at any time be achieved by hand laying, inasmuch as each brick is positioned against a form or wall that is pre-established in accurate position. Then, too, the layers of mortar between courses of brick are all of uniform thickness, and accurately positioned, because of the provision of the tools 23 of accurate size and shape. Furthermore, the topmost course of brick for any one setup is precisely level with, or parallel to, the bottom course, and this situation is maintained throughout the entire height of the wall so constructed. For example, precise horizontal leveling may be achieved by using a spirit level or the like along the upper edges of the mold boards 1 and 2 as the apparatus is clamped into position, and even imperfections in the level of the top surface of the foundation wall 20 may thus be corrected in the initial setting of the apparatus. Of primary importance is the feature that no previous skill in bricklaying is needed for a man to build up a wall, using the method of the present invention, achieving all of the advantages of accuracy inherent in the method of the present invention.

An advantage of the apparatus provided for by the method of the present invention is its adaptability to a variety of circumstances. In Fig. 7, for example, is indicated the manner in which the apparatus may be used for commencing the building of a wall on a footing, or foundation wall, indicated by numeral 30, that is wider than the desired width of the brick wall. For this purpose, the pin 9 is removed from its original position and the leg 5 of the clamp 3 is raised relative to the cross bar 6, so that said pin 9 may be reinserted in the next lower hole 10. One leg 5 of the clamp 3 is thus made shorter than the other leg 4. The spacing block 16 is now removed from the lower end of the shorter leg 5.

The apparatus as thus modified is now set up on the upper surface of the foundation wall 30 in the manner indicated in Fig. 7. Clamping block 16 of the leg 4 is made level with the top surface of said foundation wall 30, as in the Fig. 2 arrangement. Spacing blocks 21 are used to suitably position the mold boards 1 and 2. In order to hold the apparatus in position on the

foundation wall 30, however, since it is no longer clamped thereto, the leg 5 may be temporarily nailed or bolted or otherwise affixed to a floor joist, for example, such as that indicated by numeral 31, which floor joist is almost invariably positioned in substantially the proper location anyhow.

The first few courses of brick are then laid up in precisely the same manner as set forth in connection with Fig. 2. After the mold is once filled, it is reassembled in its normal, Fig. 2 manner, and subsequent levels are built up in the same manner as heretofore described.

It will be noted that none of the relatively moving parts of the apparatus, such as the threads 15 on the tie rod 12, or the pin 9 and its supports, are positioned in a region with which one mortar or the like will normally come in contact. This is particularly advantageous, as it means that the movable parts of the apparatus are not at all likely to jam from mortar accumulations. The only parts of the apparatus that normally come in contact with the mortar are parts that are not likely to be injured thereby, in any event.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above methods without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

The method of constructing walls and the like from brick comprising establishing a mold having mold walls defining the wall to be constructed, said mold walls having aligned upper guiding edges, and being of a depth at least equal to several courses of brick, placing a layer of mortar on the bottom of the interior of said mold and striking said layer off to a level surface by inserting a suitably sized tool into the mold, which tool has projections resting on the aforesaid edges, and moving said tool back and forth along said edges, positioning a first course of brick in the mold on top of said mortar layer, aligning the individual bricks of the course in position by abutting them against the mold walls, placing additional mortar in the mold on top of the said course of brick, said additional mortar being sufficient in amount both to fill the vertical spaces between the bricks of the first course and to provide a second layer of mortar over the tops of bricks of the first course, striking off said second layer of mortar to a level surface, with a tool similar to the aforementioned tool, and thereafter repeating the brick positioning and mortar layer placing alternately until the mold is substantially filled.

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