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METHOD OF PRODUCING DECORATIVE MASONRY BLOCKS

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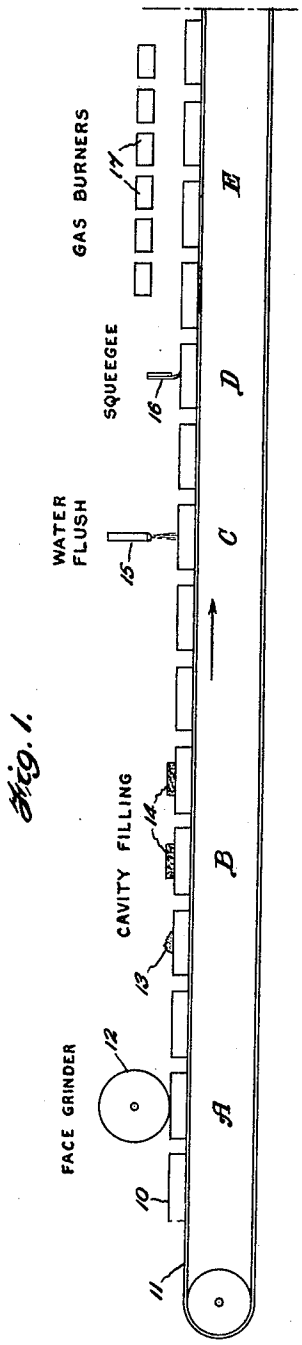


Fig. 1.

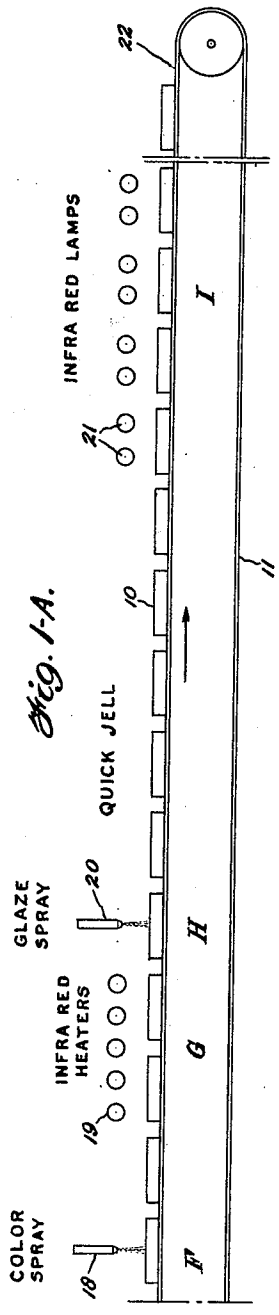


Fig. 1-A.

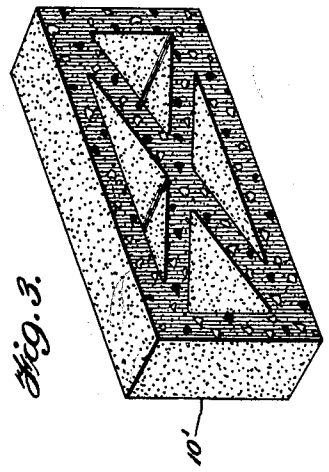


Fig. 3.

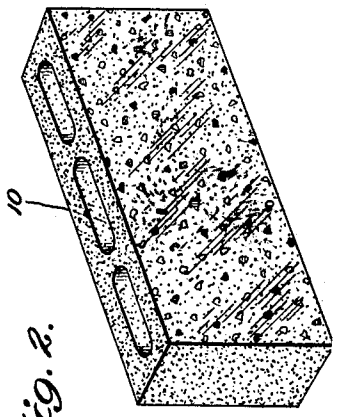


Fig. 2.

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METHOD OF PRODUCING DECORATIVE MASONRY BLOCKS

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This invention relates to a method of and apparatus for mass-producing decorative masonry blocks, and to the product thereof, and has for its principal object the provision of an improved procedure whereby molded cementitious building blocks of various shapes and/or sizes, each having one or more decorative and utilitarian faces, may be rapidly produced by an uninterrupted series of operations involving a substantial minimum of manual labor, with consequent material savings in costs.

The blocks manufactured in accordance with the present method may take various forms, in one of which they resemble in shape and dimensions the well known hollow cinder blocks now in wide use in building construction; however, the aggregates incorporated into the cement or other binding component preferably are of such character as to impart to the finished blocks a more pleasing, stone-like appearance than is attainable by the use of cinders. One or more faces of each block are so processed as to enhance the appearance of the component materials visible at such face and at the same time render said face quite smooth and substantially moisture-proof. As a result, not only may the blocks be employed in lieu of ordinary glazed ceramic tiles in the erection of decorative and moisture-proof interior walls, partitions and the like, but if desired they also may be utilized in the construction of exterior walls which are subject to exposure to the weather or other normally deleterious effects, without substantial risk of deterioration resulting from such exposure.

In another form the blocks may be provided with transverse openings of various configurations whereby to produce lattice-like and other ornamental open-work effects upon erection.

When set, aggregate-containing cementitious blocks produced by conventional block-molding apparatus present exterior surfaces which are rather rough and marked by numerous pores, pits and crevices of varying shapes and ranging from approximately pin-hole size up to perhaps an inch in length, which are the result of failure of the cementitious binding constituent of the mixture to completely fill the voids between at least some of the pieces of aggregate. However, all surfaces of the aggregate pieces are covered with at least a thin coating of said binding constituent, with the result that the block faces show virtually no color differentation between the aggregate and binder components, regardless of what the true colors of the aggregates may be.

Since the decorative purposes a color contrast usually is desirable, in order to provide it the present invention contemplates that those faces of the blocks which are to be exposed to view in an erected wall or partition are initially dressed, as by subjecting them to an abrading or equivalent action which removes the surface material to a depth of say 1/16 to 1/8 of an inch. This not only exposes the true colors of the pieces of aggregate which had been hidden by the binder coating, and their contrast to the color of the binder present in the interstices between the aggregate pieces, but also substantially reduces the number and/or size of the above mentioned pits and crevices originally present in these block faces, thereby rendering such faces more smooth and even. Such openings and depressions as remain in the faces may be eliminated by the treatment thereof with a filling compound, applied in

such manner as not to destroy the color differentations obtained by the initial dressing operation, following which a thin coating or film of a transparent glaze material is applied to the surface, which moisture-proofs it while preserving and enhancing said color contrast. If desired, the block faces may be tinted or colored prior to the application of said glaze coating, or the coloring may be incorporated into the glaze itself so long as it does not destroy the transparency thereof.

In the accompanying drawing forming a part of this specification:

FIGURES 1 and 1A together constitute an elevational view diagrammatically illustrating a typical installation for carrying out the present method;

FIG. 2 is a perspective view of one form of block produced thereby; and

FIG. 3 is a perspective view of a form of block suitable for use in the construction of open-work walls or partitions.

Referring to the said drawing in detail, the method of producing decorative building blocks in accordance with this invention is as follows:

The blocks are initially prepared in a conventional manner, as by molding a plastic cementitious, aggregate-containing mixture to the desired form and size in any appropriate known type of block-molding apparatus. The said mixture may comprise, for example, a Portland cement-and-water binder constituent, and one or more discrete aggregates such as dolomite limestone screenings, granulated slag, marble and/or other natural stone chips, etc. Upon removal from the molding machine the blocks are either kiln or air cured for a time sufficient for them to attain the desired strength, subsequent to which they are subjected to the following processing constituting the invention.

The cured blocks 10 are placed serially upon a continuously moving conveyor means 11 adjacent the head end thereof, and are uninterruptedly transported thereby past successive stations at each of which certain operations are performed on each block, for the most part automatically, that result in a completely finished decorative masonry block such as above described by the time they are discharged from the other end of said conveyor. As diagrammatically illustrated in FIG. 1, the first of these stations A is a dressing station at which a thin layer of one face of the block is removed, as by abrasion, so as to present a relatively smooth surface. The dressing station may comprise a rotating carborundum or other abrasive wheel 12 which is water-cooled during the grinding operation. During the grinding, portions of the aggregates at the block face being operated upon are ground off whereby the natural colorings of such aggregates are exhibited, and as above mentioned this operation also materially reduces the number and size of the pits and other cavities appearing in the block face.

From the dressing station the block is carried to a station B at which a plastic or semi-fluid filling material 13 is applied to the block face, whereby to eliminate substantially all remaining openings and/or cavities. The said filling material may comprise a mixture of cement asbestos and water, which is spread over said block face and thoroughly worked into the pores and cavities thereof, as by means of spongy or other suitable elements 14 pressurally engaged with the face of the block as it passes beneath them, whereby to produce a surface substantially devoid of openings and depressions.

The block is next moved to a station C whereat any excess of the pore-filling compound is removed. This may be conveniently accomplished by a flushing liquid dripped or flowed gently upon the block face, as by a pipe or nozzle 15, following which the block is passed beneath a squeegee 16 at a station D, which removes any free

liquid and insures that the colorings of the ground faces of the aggregates are not obscured by any of the filling material. The squeegee also exerts something of a smoothing or troweling action upon the filling material retained in the depressions in the block face so that when the block leaves this station its dressed face is quite smooth.

Up to this point the block has been maintained at substantially normal room temperature but upon leaving the squeegee 16 it is passed through a heating zone at a station E, wherein it is subjected to a temperature sufficient to remove any remaining moisture quite rapidly. This may be attained by passing the block beneath a battery of open-flame gas burners 17, thereby elevating its temperature and producing a flash evaporation of any moisture remaining on or in the block and/or the pit-filling material. As a result the block leaves the station E virtually completely dry, and with the filling material set.

From this heating zone the block proceeds to a tinting or coloring station F where appropriate pigments or other coloring agents may be applied to the block face if it be desired that said face exhibit colorations other than those naturally possessed by the block constituents. The coloring agents may comprise, for example, water-soluble or suspendible pigments such as iron oxide, lead chromate, etc., and may be applied to the block face by means of a conventional spray gun 18. The apparatus and procedure at this station need not be utilized if blocks presenting the natural colorings of their component materials be desired.

Loss of heat by the block during its travel to and from the coloring station F, as well as by reason of the application of the relatively cool coloring agent if that station be functioning, appreciably reduces the block temperature below that at which it left the heating zone at station E, and since the temperature of the block face at the time the glaze coating is applied is important in order that a rapid jell of the glaze material employed may be attained while at the same time securing satisfactory adhesion of the coating to the block, upon leaving the coloring station F the block is traversed through a second heating zone at a station G, provided by a battery of infra red heaters 19. These heaters, and the time of exposure of the block to their effect, are so controlled that upon leaving this second heating zone the temperature of the block is on the order of 170° F. to 200° F., as this is most effective in securing a quick jell of the glaze material here employed.

This material is a transparent thermo-setting polyester resin which is liquid at normal room temperatures, or a mixture of hard and soft resins of this type, and a thin coating or film thereof is applied substantially uniformly to the block face, as by a spray gun 20, at a glazing station H to which the block is moved by the conveyor 11 upon leaving the second heating zone. As an example of a resin which in practice has been found particularly suitable for the purpose there may be mentioned one which is a reaction product of a dihydric alcohol, such as a glycol, and a dibasic acid. When applied to blocks heated to the above mentioned temperatures this material acquires a substantial initial jell within three to four minutes from the time of application. This quick jell feature is deemed of substantial importance in that, while permitting of sufficient penetration of the block material by the resin to attain a satisfactory bond between the coating and the block surface, it at the same time prevents over-absorption of the resin by the cementitious binder and cavity-filling materials of the block, with resultant appreciable reduction in the quantity of glaze material needed to produce a satisfactory coating.

Complete polymerization or curing of this resin may be secured by the admixture therewith of a catalyst, such as methyl ethyl ketone peroxide, and/or the further application of heat, in view of which after the film or coating has attained its initial quick jell, the block is passed through a third heating zone provided at a station I by a battery of infra red lamps 21. This zone is so spaced from the glazing station H that, at the speed at which the block is advanced by the conveyor 11, the resin coating will have attained its initial jell by the time the block reaches station I, and the said zone is of such length as to effect complete curing and setting of the resin. Upon leaving this zone the block preferably is retained on the conveyor for a time adequate for its temperature to drop to a point at which it may be manually handled, if desired, when it reaches the discharge end 22 of the conveyor.

With the conveyor 11 moving at a speed on the order of eight feet per minute a block may be completely processed as described above within fifteen minutes from the time it is placed on the head end of the conveyor; and with blocks of conventional cinder block size placed upon the conveyor in relatively close proximity, as indicated in FIG. 1 of the drawing, a production rate of at least six blocks per minute may be readily attained in a single line.

As previously indicated, use of the coloring station F is optional, depending upon whether tinted or uncolored blocks are to be produced. If only blocks exhibiting the natural colorings of their constituents are to be made, the said station may be omitted entirely, in which case either the first or the second heating zone may be eliminated. However, it is preferred to arrange the installation substantially as indicated in the drawing in order that blocks of either type may be produced at will.

While the foregoing description has made reference to the processing of only a single face of a block, if it be desired or intended that more than one block face be exposed to view in the finished structural element, the blocks may be returned to the head end of the conveyor 11 and such additional face or faces processed in the manner above described.

What is claimed is:

1. The method of treating molded and cured blocks composed of a cementitious binder component and discrete aggregates whereby to produce decorative masonry elements, said method comprising: uninterruptedly advancing such a block along a predetermined path and, concomitantly therewith, sequentially dressing a face of the block to produce thereon a smoothed but porous and pitted surface which displays the contrasting colorations of the respective block constituents; applying a plastic, settable composition to said face and working it into the depressions and openings therein to fill the same; removing excess filling composition from the block face, to preserve the color contrasts of the block constituents appearing therein; heating the block to a temperature sufficient to produce a rapid jelling of a liquid resinous material applied thereto; coating the dressed face of the so-heated block with a film of a transparent thermo-setting polyester resin; further heating the block after attainment by such resin coating of the initial jell induced therein by said block temperature, to complete the settling theerof; and cooling the block.

2. The method defined in claim 1, wherein the filling composition embodies a liquid component which is evaporated by the heating of the block, with resultant setting such composition.

3. The method defined in claim 1, wherein the filling composition comprises a water-asbestos cement mixture, the water of which is evaporated by the heating of the block.

4. The method defined in claim 1, wherein the removal of the excess filling composition is effected by subjecting said face to the action of a flushing liquid.

5. The method defined in claim 4, wherein subsequent to the flushing of the dressed face of the block, said face is subjected to a squeegee action to remove at least a major portion of any flushing liquid remaining thereon

and effect a smoothing of the filling composition retained in the cavities of said face.

6. The method defined in claim 1, wherein a coloring agent is applied to the block face while the block is at an elevated temperature.

7. The method of making decorative masonry blocks which comprises: uninterruptedly advancing a molded and cured cementitious, aggregate-containing block along a predetermined path and, concomitantly with such continuous movement, sequentially dressing a face of the block to provide thereon a relatively smooth but porous and pitted surface which displays the contrasting colorations of the respective block constituents; applying a plastic, settable cavity-filling composition to said face and working it into the depressions and openings therein to fill the same; subjecting said block face to the action of a flushing liquid, to remove excess cavity-filling composition therefrom whereby to preserve the color contrasts of the block constituents appearing therein; subjecting said block face to a squeegee action to remove a substantial portion of any liquid remaining thereon and effect a smoothing of the filling composition retained in the face cavities; elevating the temperature of the block to a point sufficient to remove any remaining moisture therefrom; applying a coloring agent to said block face while the block is at said elevated temperature; bringing the block to a temperature within a range of approximately 170° F. to 200° F.; spraying upon said block face while at such temperature

a substantially uniform film of a liquid transparent thermosetting polyester resin which will jell rapidly within said temperature range; further heating the block upon completion of the initial quick jell of the resin coating to complete the setting thereof; and cooling the block.

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