No. 608,756. Patented Aug. 9, 1898.

W. COURTENAY.

ARTIFICIAL STONE.

(Application filed Oct. 21, 1897.)

(No Model.)

Fig. 1.

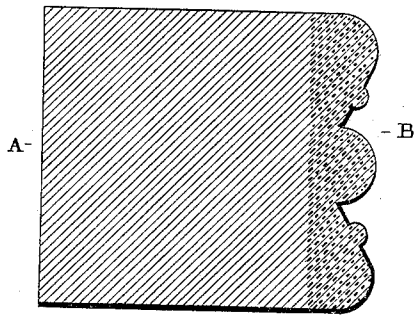


Fig. 2.

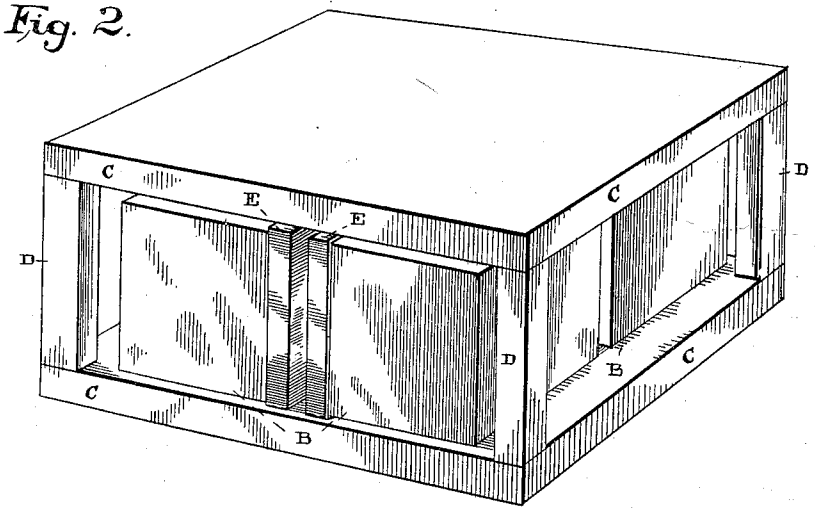
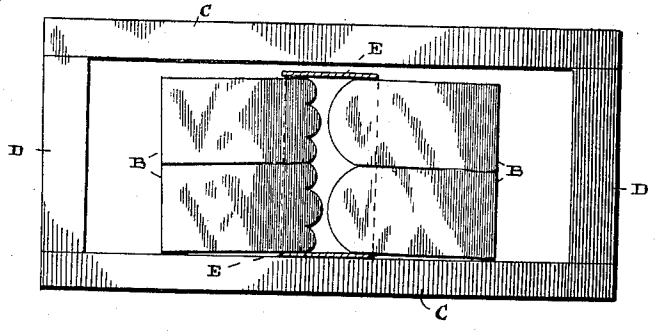


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM COURTENAY, OF NEW YORK, N. Y.

ARTIFICIAL STONE.

SPECIFICATION forming part of Letters Patent No. 608,756, dated August 9, 1898.

Application filed October 21, 1897. Serial No. 655,922. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM COURTENAY, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Artificial Stone, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to artificial stone known in the trade as "reconstructed" stone or granite.

The object of the invention is to produce building or paving blocks, tiles, statuary, ornamental blocks for cornices, balustrades, friezes, &c., having the appearance of natural stone or granite, but which may be molded to form while in a plastic or semiplastic condition and then burned, producing a material in many respects superior to natural stone, as it is fireproof and water-repellent.

The present invention consists in certain improvements in the method and means of making or producing these artificial stone blocks and in the blocks themselves.

To carry out my process, I take granite in the form of granite chips or blocks or any convenient form and calcine the same by intense heat. The granite is then pulverized, and by sifting grades of different fineness may be obtained. The pulverized granite is then mixed with other ingredients in about the following proportions: For the inner portion or body of the blocks a mixture of, say, one hundred parts of the pulverized granite, ten parts ground feldspar, and forty parts fire-clay is made, with the addition of enough water to make the mass plastic. This produces a highly-refractory composition which will not melt under a much higher temperature than that to which the blocks are exposed in the kiln. For the ornamental surface or outer skin of the blocks a different composition is made, consisting, say, of one hundred parts of the pulverized granite, thirty parts ground feldspar, and twenty parts fire-clay, with water added. Such a composition can be thoroughly fused at temperature from about 2,700° to 3,000° Fahrenheit as nearly as I am able to ascertain. The refractory body of the block may be molded to a size somewhat smaller than the desired block either by hand or in a mold, and the facing or coating of the fusible material may be applied to certain faces thereof to the thickness of, say, about one-fourth of an inch, and the block then pressed in a mold, or the mold may be lined on certain faces with the fusible plastic material and the body filled in with the more refractory material, so as to give the ornamental or exposed faces a coating of the fusible material, and this coating will generally not be of great thickness—say one-fourth to one-half an inch on blocks four inches or more in thickness and a foot or more in other dimensions; but I do not desire to limit myself in the proportions of these refractory and fusible portions of the block. It is, however, advisable to make the fusible coating no thicker than can be fused by the kiln or furnace heat in burning. The granite may be said to form the base or main substance of the blocks, the clay a binding agent, and the feldspar a flux, although this may not be entirely accurate, as the action of heat on the different materials at different temperatures is not fully understood. The blocks having been formed to the desired form are dried sufficiently to retain such form in the kiln or saggars. The ornamental faces of the blocks may be then sprayed with a glazing mixture, such as is used in glazing stoneware or pottery. This glazing mixture, such as zinc-white, white lead, or other glaze, fuses at a low temperature and both in and out of the kiln prevents the discoloration of the blocks by the oxidation of iron or other impurities which may be in the granite. The glazing mixture is used in almost imperceptible quantities, not for the purpose of forming a glazed surface in the usual sense, but for the prevention of discoloration, and is effective for that purpose. It may be applied to all the faces. The blocks having been prepared as above, either with or without the glazing compound, may be placed in a kiln, as would be the case with bricks, for burning. The kilns are then fired and a temperature approximating 3,000° Fahrenheit, more or less, maintained until the outer fusible coating is thoroughly vitrified and the body of the block baked or burned. The time required for burning depends on the composition and on the conformation of the blocks. The temperature should not be high enough to fuse the refractory body of the block, but

should fuse the less refractory surface. In some instances the blocks may be placed in saggars and fired, as usual in burning pottery. As a substitute for saggars as ordinarily constructed I have devised a plan of supporting a number of blocks in open frames, which I will now describe.

Figure 1 of the drawings indicates one of the blocks, A indicating the inner refractory material, and B the outer coating of more fusible material. Fig. 2 shows a pile for the kiln, C C indicating tiles, D corner-supports, and B the composition blocks. Fig. 3 is a pile with two rows of blocks.

By taking the flat tiles C C of fire-clay of large size the top and bottom plates of the tile may be readily formed. Between these plates two or more rows of blocks B may be inclosed, and the blocks may be placed upon each other two or more courses in height, with sand between the courses. Upright pillars D, of fire-brick, support the plates C, so that the composition blocks B have but little or nothing beyond their own weight to support. A slight space is preferably left between the blocks and the upper tile for heat circulation. Strips of asbestos paper E are placed over the faces of the blocks B or over the joints, the edges of these strips being held by turning under the edges of the blocks. The asbestos paper protects the face of the blocks from the direct action of flame or heat, and thus preserves the color and texture. The piles of blocks formed in this manner may be built into kilns of almost any size, and blocks burned in such kilns are produced at much less expense than when burned in saggars as ordinarily constructed, since the space occupied is much less and the loss from breakage much reduced. The blocks are also better supported.

In laying up blocks in ordinary kilns the ornamental faces of the blocks may also be protected by strips of asbestos paper, which strips may be held by turning in the edges between the blocks or under the edges thereof. Where all the edges of the blocks are of ornamental character, as in balustrades and the like, the asbestos paper may pass entirely around the block. The sheet of asbestos paper prevents what is known as "fire-flashing," or the discoloration of the blocks in whole or in part from burning in the kiln or furnace, and also prevents cracking from uneven temperature.

The glazing compound is applied solely for the purpose of preserving the color and is a mere film and not such a glaze as is applied to tiles, pottery, and vitrified brick. After burning this thin glossy film is generally removed, either by a sand-blast or by treatment with a solution of hydrofluoric acid and washing with water, leaving the blocks lusterless, like natural stone.

I propose to avail myself of known compositions and processes in this art. The proportion of material and the modes of manipulation may be changed within the limits of my claims without departing from my invention.

I have described the process as applied to blocks or articles of artificial stone known to the trade as "reconstructed" granite; but it is apparent that some other varieties of stone may be treated in like manner.

Heretofore in making reconstructed granite from homogeneous material it has been found needful to employ a very high temperature in burning, and the loss by breakage and distortion has been very great. By making the outer surface of the blocks of a more easily fusible material than the interior I secure absolutely better blocks at a less expense. The ornamental face is like natural stone, but is impervious to moisture and practically fireproof, while the body of the block, not having been fused, adheres readily to cement.

What I claim is—

1. The composite building-block described having the appearance of granite, the main body of the block being of granite, clay, and a minimum of flux, and the face being of different proportions of the material with an excess of flux, said face being solidified by fusion of the flux, substantially as described.

2. The building-block having its main body composed of granite, clay, and a flux, and its ornamental face composed of granite, clay in less proportions, and flux in greater proportion, the flux in the face portion only being in a solidified condition due to fusion, substantially as described.

3. The building-block composed as to its body of granite, clay, and a minimum of flux, its face of granite, less clay and a maximum of flux, said face compacted by fusion, and having a glazing over said face.

4. The method of producing building-blocks of granite appearance, which consists in pulverizing granite, mixing the fine granite with clay and a flux, forming the body of the block of the said ingredients with a minimum of the flux, and the face of the said ingredients with a maximum of the flux, and burning the block until the face is fused and the body left unfused, substantially as described.

5. The method of producing building-blocks which consists in pulverizing granite, mixing the fine granite with clay and a flux, forming the body of the block of the said material with a minimum of the flux and the face of the said materials with a maximum of the flux, glazing the face, and burning to first fuse the glazing and then the face composition, leaving the body unfused, but baked or burned, substantially as described.

6. The method of forming artificial granite blocks, with ornamental faces, which consists in molding the body of the block of a compound of granite, clay, and a flux, and molding the face thereon of like materials, but in differing proportions, so that the face contains an excess of the flux, protecting the face by a non-combustible covering, and firing to

the extent that the facing, under the covering, is fused, the body of the block remaining unfused, substantially as described.

7. The method of forming artificial granite blocks; which consists in molding the block of a compound of pulverized granite, clay, and a flux, and the facing of like materials, but with an excess of the flux, and coating the facing with a glazing compound, firing the blocks, whereby a glazing is first formed, and continuing the firing until the flux in the facing is fused while the body remains unfused, substantially as described.

8. The method of producing artificial granite blocks, which consists in molding the body of a compound of granite, clay, and a flux, molding the face of a compound of granite, clay, and an excess of flux, covering the face with a glazing composition, burning to first form the glaze and then to fuse the flux in the facing, and afterward cooling and removing the glaze, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM COURTENAY.

Witnesses:

GEORGE L. COURTENAY,

EDWARD J. MITCHELL.