

# UNITED STATES PATENT OFFICE.

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## ARTIFICIAL STONE AND PROCESS OF MANUFACTURING SAME.

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*To all whom it may concern:*

Be it known that I, FREDERIC M. EMERSON, of Brookline, Suffolk county, Massachusetts, have invented certain Improvements in Artificial Stone and in the Process of Manufacturing the Same, of which the following is a full, clear, and exact description, such as will enable others skilled in said art to make and use the same.

10 The aim of my present invention is to produce perfect (artificial) imitations of various stones—such as granite, sandstone, and limestone—as they appear when found in their normal or natural state, such resemblances  
15 that in color, hardness, solidity, durability, and adaptation of being cut, shaped, dressed, and finished they are respectively endowed with the same properties as these natural stones possess in their original beds or ledges  
20 and as taken from their quarries; and this invention consists in certain compositions of matter, the respective ingredients of which, their approximate proportions, and the manner of incorporating the same being herein-  
25 after fully named and described, and specifically claimed. The imitations which I produce of these natural stones are each provided with an inner core (of certain ingredients) which serves as the body or filling and an exterior or shell or veneer of different ingredi-  
30 ents from said core. The composition constituting the filling or core of each artificial stone is always the same—viz., a concrete composed of three parts of angular (fractured)  
35 stone, two parts of clean sharp sand, and one part of Portland cement; but the size of the angular stones is not necessarily large or of one size, for gravel stones of various sizes will answer if angular; but smooth stones do not  
40 present as favorable surfaces for forming the tenacious bond required. Water is added to obtain a suitable consistency. The outer shell or face of the artificial granite I form of two parts of small irregular fragments of mar-  
45 ble and one part of Portland cement, with water to mix the same to a thin-mortar consistency. The outer face or veneer of the artificial sandstone I form of two parts of fine sharp sand, either white, yellow, or red, ac-

50 cording to the color of the artificial sandstone desired, and one part of Portland cement and the necessary quantity of water. The outer face or veneer of the artificial limestone is composed of one and one-half ( $1\frac{1}{2}$ ) parts of fine sharp sand, one-half ( $\frac{1}{2}$ ) part Verona mar-  
55 ble-dust, and one part of Portland cement; but these proportions may be somewhat varied to match the particular shade of the natural stone to be imitated.

In referring to the proportions of the vari-  
60 ous ingredients employed, as hereinbefore stated, it is assumed that the parts are measured by volume.

In the foregoing I have described the ingredients and the approximate proportions in  
65 which they are employed in making the compositions of my artificial stones referred to, and I will now state in detail the successive steps which form the process of their manu-  
70 facture.

Upon the bottom and extending around the sides of the interior of a mold of plaster-of-paris of the required size, strength, and shape I first place a quantity—about three (3) inches  
75 in depth—of the mixture which is to form the outer surface, shell, or veneer of the stone, said mixture being formed of the ingredients previously specified for the character of the stone to be imitated, which ingredients are  
80 placed together in the respective proportions named in a dry state and intimately incorporated and afterward wet with water equal in volume to about six (6) per cent. of the  
85 cubical contents of the dry mixture, said quantity of water being sufficient to bring it to such a consistency that the ingredients of the mass will adhere together when squeezed with the hand without exuding any superfluous water, this quantity of water necessarily  
90 varying somewhat according to the degree of moisture of the sand employed just prior to the act of mixing. Next the central portion of the layer on the bottom of the mold—i. e., inside that portion between the surrounding  
95 sides—is thoroughly tamped and compressed until its thickness is reduced to about one and one-half ( $1\frac{1}{2}$ ) inches or about one-half of that originally spread upon the bottom, the



mixture forming the surrounding sides from the bottom up on the inside of the mold remaining untouched and being of a consistency firm enough to retain its original position at the sides of the mold. Next the upper surface or top of this compressed layer of the face mixture at the bottom of the mold is roughened by a rake or other pronged tool and is afterward moistened. Next the concrete or composition to form the core of the artificial stone is filled into this central space formed by the compressed mixture at the bottom and the untamped surrounding sides, or, in other words, is laid on top of the central tamped portion intended to form the face or veneer of the artificial stone, the height to which this core is filled being slightly below the top of the uncompressed face mixture at the sides. Next the layer of the material filled in to form the core is thoroughly tamped or rammed till its depth is reduced in thickness, this operation of compression causing the core material to be forced into and fill up not only the roughened surface of the bottom (tamped) layer of the face mixture, but also into the untamped portion of the face mixture surrounding the core at the sides of the mold, thus creating an intimate incorporation or homogeneous bond between the material of the core and that of the faces of the artificial stone being made. Next the surface material at the sides of the mold is very carefully and thoroughly compressed by tamping, (or otherwise,) after which its top or upper side entirely around the inside of the mold is roughened and moistened in the manner before described in the treatment of the face layer at the bottom of the mold, this tamping of the face mixture being continued until its top at the sides is a little below the level of the previously-tamped core inclosed thereby. Next the depression formed at the sides of the mold by the top of the face mixture being located below the tamped layer of the concrete core is filled in with another layer of the face or veneer mixture to a height of about three (3) inches above the level of the already-tamped layer forming a portion of the concrete core. The upper surface of the tamped-core portion is then roughened and moistened and another layer of concrete equal to that laid before is placed thereon, bringing its untamped surface a little below the level of the last-added layer of the face mixture at the sides of the mold.

The above-recited operations are successively performed until the size of the artificial-stone block is nearly completed, when its top is finished by the facing or veneer mixture. As it may be my wish to have an exterior of one and one-half ( $1\frac{1}{2}$ ) inches as thickness for the facing to surround the entire surface of the artificial stone, it is important that the quantity of each layer both at the core and at the sides of the mold should be carefully gaged, the proper quantity being only ascertained by experience and good judgment.

The artificial block is kept wet for several days and is allowed to harden in the mold, when after the outer surface or veneering has sufficiently "set" the block is removed therefrom and is ready to be acted on by any ordinary stone-chisel to provide it with any design or figure desired.

By constructing a block of artificial stone as I have described—that is, by alternately building up and compressing the independent core and the veneer or surface layer—I am able to secure a more perfect union or bond of the several parts of the block of material, and particularly between the core and the veneer or surface coating, than is attainable when the entire body of material is placed in the mold and compressed at one operation. A block of material made according to my process does not contain air-cells, soft seams, or superfluous moisture, any one of which undesirable features renders the dressing of the surface of the stone by stone-dressing tools impracticable. The superiority of a block of material made according to my invention is evidenced by the fact that its surface may be dressed by the stone chisel or hammer in order to give it the appearance of dressed natural rock.

Instead of a mold of plaster-of-paris it may be of wood or other material suitable. Where great strength is necessary or heavy loads are to be supported, I employ a core containing one or more metal bars or wires embedded therein which reinforces the stone and endows it with greater ability to fulfil its function.

I claim—

1. The herein-described process of manufacturing artificial stone having a central core or body of one concrete material, and a surface facing or veneer of another concrete material, which consists in building up the core or body and the facing or veneer at the side thereof from uncompressed concrete materials, then compressing the material of one of these parts whereby it is caused to intimately unite with the material of the other part, then compressing the material of the other of these two parts, then continuing to build up the core and the veneer at the side thereof, both from uncompressed concrete materials, and, after they are so built up, compressing them alternately, and continuing these operations until the desired size of stone is formed, substantially as set forth.

2. The herein-described process of forming a block of artificial stone, having its exposed faces of a concrete of one composition, and its central or body portion of a concrete of another composition, which consists in placing in a mold a layer of concrete material to form the surface or veneer, compressing the central portion of such material leaving a rim or edge of uncompressed material, then filling in the depression formed by such compression with material for the body or core and compressing this, then compressing the said rim



or edge surface material, then building up the rim from material which is to constitute the surface coating or veneer to above the level of the core, then adding another layer 5 of the core material within said rim and alternately continuing these operations until the block is completed, substantially as set forth.

3. The herein-described process of manufacturing artificial stone, which consists in forming a layer of concrete material, compressing the central portion thereof leaving an uncompressed edge or rim of the material, filling the depression formed by such compressing of the material with concrete material and compressing this, then compressing the edge or rim part of the first mass of material and building a rim or edge of concrete material around the central portion of the 20 concrete secondly placed, and continuing to alternately compress and build up the rim or edge, and the core or body, whereby an intimate union or bond is secured between the facing of the block and the core, substantially 25 as set forth.

4. The within-recited process of manufacturing artificial stone, which consists in first compressing the center of the layer of the fac-

ing material in the bottom of the mold, next abrading and moistening said facing material; then compressing the lower layer of the material constituting the core, then abrading and moistening the same, then compressing the sides of the first-mentioned layer of facing material which is next to the inside of the 35 mold, then roughening and moistening the said layer at the sides, then continuing said steps in succession until the finished face of the block is produced, and finally retaining it in the mold in a wet condition until sufficiently hardened, as set forth. 40

5. An artificial stone, consisting of a core formed of a concrete of angular (fractured) stone, sharp sand and Portland cement, and an exterior facing or veneer formed of a concrete of small, irregular fragments of marble 45 and Portland cement, the concrete of the exterior facing and that of the core being intimately united by compression, substantially as described. 50

Witness my hand this 10th day of August, 1901.

FREDERIC M. EMERSON.

In presence of—

N. W. STEARNS,  
J. A. FITZ.