

UNITED STATES PATENT OFFICE.

LOUIS F. KWIATKOWSKI, OF NEW YORK, N. Y.

PROCESS OF MAKING ARTIFICIAL BRICK OR STONE.

SPECIFICATION forming part of Letters Patent No. 775,222, dated November 15, 1904.

Application filed December 29, 1903. Serial No. 186,960. (No model.)

To all whom it may concern:

Be it known that I, LOUIS F. KWIATKOWSKI, a citizen of the United States, residing at New York, borough of Manhattan, in the county and State of New York, have invented certain new and useful Improvements in Processes of Making Artificial Brick or Stone, of which the following is a specification.

My invention relates to an improved process of making bricks, artificial stone, and similar products from a mixture which includes sand or equivalent silicious material and lime, and more particularly to that part of the process relating to the admixture of the lime and sand.

The principal objects of the invention are to provide a process which may be practiced with great economy and which will result in a product of better quality than is now obtained by the working of such processes for like purposes of which I have knowledge.

To this end the invention consists, essentially, of the process to be hereinafter described, and particularly pointed out in the claims.

In working the process constituting my invention the whole of the lime intended to be used for a predetermined quantity or batch of the admixture is in its unslaked and commercial condition placed in a suitable grinding-mill, together with a part of the whole quantity of sand to be used in the predetermined quantity or batch of the admixture. The sand is used in its natural state without first treating the same to remove the moisture therefrom. By preference about one-third of the whole quantity of sand is placed in the grinder with the lime; but the particular proportion may be varied within certain limits. The particular type of grinding-machine is unimportant, any of the well-known constructions of cylindrical serving the purpose, as a ball-grinder, tube-mill, or pebble-mill. In the treatment which the ingredients undergo in this step of the process the batch, the lime, and the sand are thoroughly pulverized and incorporated with each other. During this operation of grinding and mixing a portion of the lime is hydrated or slaked by the moisture of the same, which process is accompa-

nied by a rise in temperature of the mass, and thus the whole of the moisture which was originally in the sand combines with a portion of the lime, so that when the operation of mixing is completed the whole of the mixture is in a dry pulverized form having a greater volume than the original. By this means not only a mixture of even and uniform composition is obtained by expending a minimum of power and apparatus, but also all pebbles and coarse material contained in the sand are ground down to an even fineness, saving therewith the labor of pulverizing the lime, as also the pulverizing or screening of the sand in special machines. The admixture thus obtained is then discharged into a mixing-machine, together with the remaining sand of the predetermined quantity or batch, and the whole thoroughly incorporated. During this operation sufficient moisture is added, by a sprinkler or otherwise, to augment the action of the moisture in the added sand, so as to slake or hydrate the remainder of the lime which was not so treated in the first step of the process. The mixing is continued in this apparatus, and the water is added uniformly and is evenly distributed throughout the mass, and if the operation is properly conducted, avoiding an excess of water beyond that which is chemically necessary for the hydration of the lime, the resulting mixture will be again of a dry and pulverized form. From this second mixing-machine the mass is conveyed or distributed into one or a series of hoppers, arranged either above the presses used for molding the mixture into bricks or other articles or in bins constructed on the floor. This mixture is allowed to stand until a complete hydration of the whole lime has been effected, the exact time being determined by the condition and appearance of the mass. For this purpose each hopper is divided into two compartments, one of which is full one day and allowed to remain over night for use in the process the following day, while the other compartment is being used to receive the mass intended to be used the next day. This mixture after having remained in the hopper as described, is then fed into the presses, which may be of any usual construc-

tion, and then is molded by mechanical pressure into bricks or any other articles of the desired shape and size. In order to be enabled to mold the mixture into bricks or other
5 articles, a sufficient quantity of water must be added to make the mixture plastic, which is done by adding the water required for this purpose and through sprays or jets supplying water into the conveyer, which conveyer must
10 keep the mass or mixture agitated in order that the moisture may be uniformly distributed. After the molded bricks or other articles leave the press they will be found hard enough to be piled or stacked on trucks or
15 carriages of suitable construction and without the use of any preliminary drying process. These trucks or carriages are placed in steaming-chambers of suitable size and construction, where they are subjected to the action
20 of steam under pressure of one hundred to one hundred and twenty-five or more pounds for a period ranging from six to ten hours, according to circumstances. Through the action of the steam insoluble calcium silicates are
25 formed, and as a consequence induration and hardening of the material so treated results.

If desired, the material after being molded into blocks may be placed into an inclosed chamber. Alkali salts are placed in exposed
30 pans within said chamber and steam-conducting pipes arranged in the same and provided with a series of discharge-openings which direct the steam issuing from the pipe upon the salts. Superheated steam under a pressure of 125° or more is then admitted to the
35 chamber. The steam in passing over and through the alkali salts becomes impregnated with the latter and acts as a medium to carry the same into the molded blocks when the indurating action takes place.
40

In the manufacture of artificial stone and the like under my process not only is the usual artificial drying of the sand and pulverizing and slaking of the lime before intermix-

ing the two elements avoided, but a denser admixture from which the products are molded results than has hitherto been obtained. This is due in a large measure to the fact that the interstices between the large grains of sand or the sand which is last added are
50 filled by the particles of sand resulting from the pulverization of the sand first treated, so that a very dense product is obtainable.

I claim—

1. The process of producing artificial stone
55 or brick from a composition including lime and sand consisting in simultaneously incorporating and pulverizing the entire quantity of unslaked lime and part of the sand in its natural moist state, whereby the lime is partially hydrated and the moisture in the sand
60 thereby absorbed and the ingredients thoroughly ground and intermixed, thereafter adding the remaining quantity of sand in its natural state together with sufficient moisture to
65 complete the hydration of the lime, intermixing the ingredients, then molding said mixture, and thereafter subjecting same to the action of superheated salts-impregnated steam under pressure, substantially as described.
70

2. The process of producing artificial stone or brick from a composition including lime and sand, consisting in simultaneously incorporating and pulverizing the entire quantity of coarse granular unslaked lime and part of
75 the sand in its natural wet state and thereby partially hydrating the lime, adding and mixing additional granular sand, completing the hydration of the lime, molding said mixture, and thereafter indurating same by the action
80 of superheated salts-impregnated steam under pressure, substantially as described.

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

LOUIS F. KWIATKOWSKI.

Witnesses:

CHARLES SIMMONS,

WILLIAM R. BRONK.