Feb. 16, 1926. 1,573,425

C. STEED

PROCESS OF MAKING ARTIFICIAL STONE

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Fig. 1.

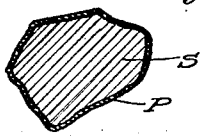


Fig. 2.

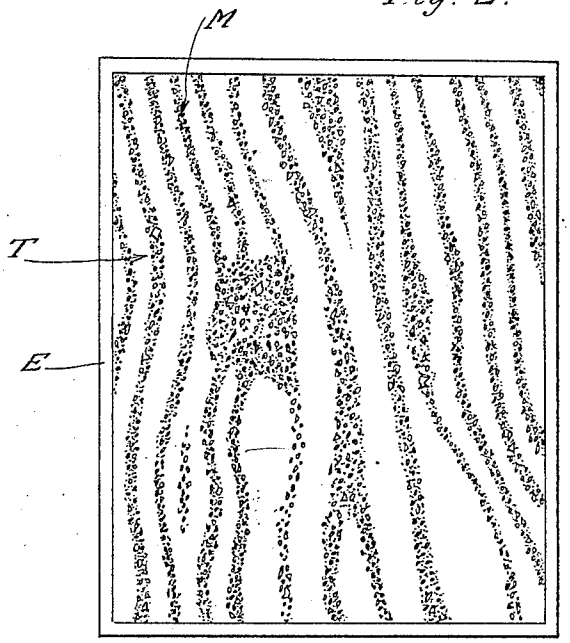
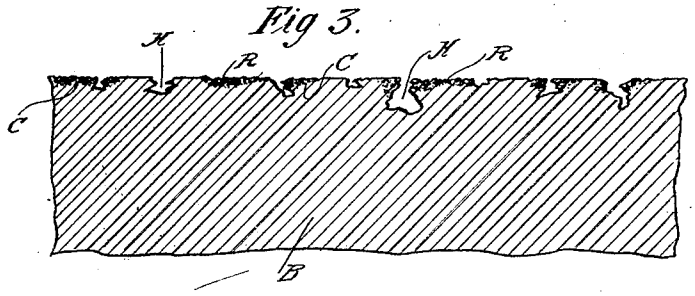


Fig 3.



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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING ARTIFICIAL STONE.

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To all whom it may concern:

Be it known that I, CHARLES STEED, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Processes of Making Artificial Stone, of which the following is a detailed specification.

This invention relates to the manufacture of artificial stone, of a kind and variety having what may be termed blow-holes in it. Specifically (although the invention is not necessarily limited to such named substances) the preferred form and practice of the invention are directed to the production of what is known as artificial travertine.

Natural travertine is a stone having dispersed cavities of various sizes, and also usually has a striated formation; so that when such natural travertine is quarried and finished its surface presents color striations, and depressions or openings of varying sizes and varyingly dispersed. The formation of natural travertine is supposed to have occurred in volcanic regions by the dispersion of volcanic gases within molten or heated rock.

Although other processes have been proposed and, to some extent, used for the production of artificial travertine, or for the production of a surface formation simulating travertine, none of these processes, so far as I am aware, have been entirely successful in the economical and efficient production of an artificial stone that closely resembles the natural rock or has the beautiful appearance of that natural rock.

It is a general object of my invention to provide a simple and efficient form of process by which natural rock may be closely and accurately simulated. In accomplishing this object I provide a process in which all of the elements going to make the finished surface are closely and accurately under control of the operator, so that he may definitely and accurately produce any desired color pattern, and also a wide range of patterns and formations as regards the depressions or holes. In some instances, these depressions or holes in the surface are readily recognizable as such, and in other instances such depressions or holes are so small and so close together that they make what might be better described as a roughness of surface. Either of these forms, or any combination of them, may be accurately obtained with my process.

With an understanding of the general features and objects of the process as above outlined, the invention itself will now be readily understood from a more detailed description of the process in its present preferred form. This preferred form is described in detail not as a limitation upon the invention, but as illustrative thereof.

A typical use of the process is for the making of such things as facing slabs for walls or the like, or for making blocks or elements or other members that will afterwards be assembled, say in a building structure. In such case, a mold of proper form corresponding to the exterior formation of the finished block or member is used; or in the case of a flat wall slab a plane working table or other surface is used. Upon this working surface I distribute a mixture of dry mineral coloring matter and a soluble solid, the particles of which are encased in a non-soluble coating. The plastic substance that makes the body of the member block or slab is then poured over the distributed matter, and after the plastic substance has set, the coatings of the soluble substance are removed and the soluble substance dissolved out.

In the accompanying drawings I illustrate typically the various phases of the making of a wall slab. In these drawings:

Fig. 1 is an enlarged section of a particle of soluble solid with its coating;

Fig. 2 is a plan of a working table with the mixture of soluble substance and coloring matter distributed thereon; and—

Fig. 3 is an enlarged cross section of the finished product.

In the specific and now preferred practice of the process, I first prepare the soluble substance and the mixture of it with a coloring matter. I prepare this mixture, for instance, by taking some readily water soluble substance such as sal-soda (sodium carbonate) and first crush or otherwise break it down to particles of the desired size or sizes. For instance, I may suitably crush this soluble solid and then roughly size it by screening, and then either take certain screenings or certain proportionate mixtures of different screenings. For in-

stance, in a typical operation the sizes of these particles may run from fines up to say one quarter inch or more.

After this soluble solid substance is thus prepared I coat it with an oil that is insoluble in water, or with a wax or similar substance. I have found heavy mineral oils to be suitable, and I have also found paraffin wax to be very suitable, the paraffin preferably being of a relatively low melting point. The particles are easily coated by passing them through a bath of the oil or melted wax. Various coating substances may be used, but in this process it is only necessary that the coating substance be impermeable to and insoluble in the water of the plastic composition, and that the coating substance be not of a sticky nature, so that the coated particles will not stick together in a mass. Aside from that, it is only necessary that the coating substance be of such a nature that it can be removed from the soluble substance by some easy operation; and I prefer either a heavy oil or paraffin wax because either of them may be melted away from the enclosed solid soluble substance by the use of hot water, as will be hereinafter described.

Fig. 1 shows a particle of the soluble solid substance S with its coating P.

After these coated particles of soluble solid have been properly prepared, I next mix the mass of coated particles with a proper proportionate amount of mineral coloring matter; the coloring matter being selected so as to give the desired color on the surface of the finished stone. This mixture is then put upon the working surface and is distributed thereon as the operator may desire, the distribution depending upon the surface pattern desired in the finished product. For instance, a typical method of distribution is to sprinkle the mixture on the working surface in a thin layer and then draw a coarse-toothed comb through the mixture, thereby distributing it in more or less definitely defined striations on the working surface. Other methods of distribution, however, may be used; the mixture may be distributed in spots or splotches, or a combination of them with combed striations. Or combed striations may be formed and then may be more or less obliterated at certain places.

Fig. 2 shows a working surface T, which may be surrounded by a raised edge E, and shows the described mixture at M distributed upon it.

Upon the mixture thus distributed is poured plastic unset substance that is to form the body of the slab. Any suitable plastic substance may be used; for certain purposes I use pure plaster of Paris. This plastic substance is sufficiently fluid to be put in place over the distributed surface mixture and to flow into the spaces between striations or other dispersed forms of the surface mixture, without materially displacing the surface mixture. The slab or other body thus formed may, of course, be as thick as desired; but it is one of the advantages inherent in my invention, due to accurate control of the holes or depressions and due to the fact that they are only at the surface, that a surfacing slab of sufficient strength need not be very thick.

The unset plastic substance may, of course, be subjected to pressure after it has been poured or otherwise put in place over the distributed substance; but the unset plastic substance may be applied to the previously distributed substance in any suitable manner other than by pouring; and in any case the plastic body may be, if desired, subjected to pressure to densify it.

The whole slab is then allowed to set. The surface mixture has preferably been put in place and distributed thereon in dry condition, although it may be somewhat wetted if desired, if that is found necessary, to make the coloring matter of the mixture bind readily with the plaster. However, as a surface mixture does not form a layer of much thickness, I do not find it necessary to wet it; the dry coloring matter will bind while with the wet plaster. After the whole slab has set sufficiently so that it may be handeled, it is removed from the working surface and turned face up. Then the coatings of the soluble particles are removed by an application of heat, preferably by a simple application of hot water to the surface of the slab. The hot water melts the oil or paraffin sufficiently to allow the water access to the enclosed soluble particles. Up to this time the insoluble coating has projected the soluble particles against the water or moisture of the plastic mass, preventing the particles from being prematurely dissolved and preventing the sal-soda from permeating the plastic body. Continued application of the water, also preferably warm or hot, quickly dissolves the solid particles and the solution is washed away as fast as formed. It is desirable, particularly when sal-soda is used, to dissolve and wash it away quickly so as not to allow the substance or the solution of it to permeate the slab to any substantial extent, as such substance would thereafter work out to the surface of the finished slab and deteriorate it in appearance. The slab is now finished and ready for use.

Fig. 3 shows, in section, the finished slab with body B and with its surface depressions or holes H, and with rough parts of the surface R formed by the removal of relatively small particles of the soluble substances, and with the coloring matter imbedded in the surface as at C.

From the foregoing description, it will be readily understood how members other than slabs may be given a surface formation such as described. If it is desired to manufacture a member with ornamental surface configurations, or an element of a column or the like, the process is substantially the same as before described, except that instead of a plane working surface, the working surface becomes the interior surface of a suitable mold.

It will also be apparent that my invention is not limited to the use of the specific and particular substances herein described, as other substances having the qualities herein pointed out may be used in carrying out the invention. For instance, other soluble substances may be used in place of sal-soda; I have found sal-soda preferable because it breaks up well into suitable sizes and formations, the form of the individual broken particles being angular and irregular rather than round; it also dissolves easily and quickly, but it will be readily understood that other soluble solids may, to a greater or lesser extent, fulfill these requirements.

It will also be understood that the use of coloring matter to obtain color striations in the finished product is not, at least broadly speaking, an essential part of the invention. If it is desired to obtain a rough surfaced product, or a product with dispersed surface holes and having a uniform color throughout, that color may, if desired, be obtained by coloring the cement or plaster body as a whole so that the color of the finished product is uniform.

Also from the foregoing description it will be readily understood how my process may be applied to structures that have been previously erected. For instance, in the case of an erected wall, where it is desired to apply the described finish, that finish may be applied by placing manufactured slabs thereon, or it may be applied by manufacturing the surface directly upon the wall. For instance, a coating of plaster may be applied to a wall, and while that plaster is unset the coated soluble particles, and coloring matter if desired, may be distributed upon the unset plaster surface, being imbedded in the surface, and then after the plaster has set, the soluble particles washed out as before described. The distribution and imbedding of the soluble particles and coloring matter may be obtained, for instance, by blowing with an air brush, or such distributed matter may be pressed into and imbedded in the unset plaster by troweling, or the application of a form board or the like.

Having described a preferred form of my invention, I claim:

1. The herein described method of forming artificial stone, that includes coating particles of a soluble substance with an insoluble coating, imbedding such particles in a plastic body, and then after the plastic body has sufficiently set, breaking the said coatings and dissolving away the soluble particles.

2. The herein described process of forming artificial stone, that includes coating particles of a water soluble solid with a coating insoluble in water but capable of being melted by application of heat, imbedding such coated particles in a plastic body, and then after the plastic body has sufficiently set, melting the coatings of the soluble particles and dissolving away the soluble particles.

3. The herein described process of forming artificial stone, that includes coating particles of a water soluble solid with a coating insoluble in water but capable of being melted by application of heat, said coating being non-adhesive, imbedding such coated particles in a plastic body, and then after the plastic body has sufficiently set, melting the coatings of the soluble particles and dissolving away the soluble particles.

4. The herein described method of forming artificial stone, that includes coating particles of sal-soda with paraffin wax so that each individual particle is entirely encased in a coating of the wax, imbedding such coated particles in a plastic body, and then after the plastic body has sufficiently set applying hot water to the surface of the body thereby melting the coatings of the particles and dissolving away the sal-soda.

CHAS. STEED.