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FINISHING LIME AND PROCESS OF MAKING THE SAME.

No Drawing.

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This invention relates generally to a finishing lime and the process of making the same, and more particularly to a high plastic, hydrated finishing lime which is produced from high calcium or any other kind of limestone.

High calcium and certain other kinds of limestone are unfit for making high plastic, hydrated finishing lime for various reasons which are very well known, and the object of this invention is to utilize these limestones to make the desirable high plastic finishing lime. The finishing limes now on the market are made out of dolomitic limestones exclusively, their average chemical composition being 50 per cent CaCO_3 and 50 per cent MgCO_3 . In burning these so called high magnesium limestones there is obtained CaO and MgO . In the following hydration the CaO becomes Ca(OH)_2 , whereas the MgO remains as such. In mixing these finishing limes with water MgO , a coarse material, almost insoluble in water, swells gradually but slowly, and the result after soaking for from twelve to twenty-four hours is a lime putty of such consistency that it can be cut out of the mortar box in large pieces, piled up in large pieces, piled up in the hod, and readily discharged therefrom to the mortar board. It is of such plasticity that it slides off the trowel and "stays put". The easy working and far spreading qualities of these finishing limes enable the plasterer to do good and fast work with the least energy, but these finishing limes have to be soaked for from twelve to twenty-four hours to get such consistency, handling and working qualities.

All the other types of limestones (except the above-mentioned high magnesium limestones) are absolutely unfit for making finishing lime for the following reasons:

In burning and hydrating same there is obtained at least 80 per cent Ca(OH)_2 , and in the case of a high calcium limestone even 99.5 per cent. As soon as these limes are mixed with water a doughy mass is obtained, which turns very soon into a tough and, from the standpoint of the plasterer, hopeless material, because Ca(OH)_2 , a very fine, flour-like powder, very soluble in water, is present to excess, and that coarse insoluble powder MgO with its characteristic physical properties and functions is practically absent. This lime cannot be handled in the prescribed manner and cannot be applied

with satisfactory results. It sticks to the mortar box, the shovel and the hod. It "works short", it "pulls" and it "rolls up under the trowel". Since there is a large waste of time and labor, the plasterers have always rejected these limes.

So far as I am aware, no one has ever produced a finishing lime out of such types of limestones, nor has there ever been any finishing lime on the market made out of such types of limestone.

I have discovered that by adding amounts of colloidal clays and colloidal earths (bentonites) to an amount of high calcium limestone, or other limestone which is so constituted as to be unfit for making high plastic hydrated finishing lime, a high plastic, hydrated finishing lime may be produced. Ordinarily I do not include in finishing lime made in accordance with my invention a protecting colloid. However, in the event the limestone is poor in alumina and iron oxide, I find it necessary to include organic protecting colloids.

The bentonite overcomes the before-mentioned defects of such limes and accomplishes the same function as the MgO in the high magnesium limes, although in a different manner. The bentonite particles swell gradually (though relatively rapidly), absorbing a large quantity of water, and force the particles of the lime putty from each other to the utmost distribution. Every particle of the bentonite envelopes itself with a fine film of water, thus increasing the tension of the surface. The larger percentage of particles are transformed into a colloidal suspension. The result is a very high plastic lime putty of the desired consistency with splendid working and spreading qualities.

The physical state of this lime putty, produced by the addition of bentonite, is not permanent. After a short time flocculation starts.

Whereas the Ca(OH)_2 acts in the beginning as a peptizing agent through its increasing the negative-hydrogen-concentration of the mass and thus prevents flocculation, it acts later, as soon as the swelling has reached its maximum and the bentonite particles are in the highest colloidal dispersion, as a flocculating agent through its increasing positive Ca-ion concentration.

This process passes on quite slowly and depends upon many factors, for instance, the

concentration of the mass, the temperature, and especially the presence of soluble salts in the bentonite clays, which form electrolytes that promote the flocculation. The bentonite even from different sections of the same deposit contains variable amounts of such electrolytes which, when in a larger amount present, flocculate the dispersed colloids. As a result the particles of the lime putty are drawn into closer physical contact with each other, the mass shrinks gradually, and the plasticity will be reduced. To eliminate these reactions, which diminish the plasticity, urea is used. I have found that traces of urea act here as a true protecting colloid and stabilize the physical state of the lime putty.

Each type of limestone requires its particularly suitable amount of bentonite and urea according to its chemical composition, and its physical properties.

The applicant adds colloidal clay of the bentonite type to a high calcium hydrated lime or to any other type of hydrated lime, which is so constituted as to be unfit for making finishing lime, for the purpose of making desirable finishing lime with its well characterized physical properties, as plasticity, consistency, easy handling and working and far-spreading qualities.

In producing my improved finishing lime the limestone is burned just as its chemical composition requires, care being taken that said limestone is not over burned. The powdered limestone is then hydrated with 1/2 per cent emulsion of colloidal clay and earth in water. When the fresh hydrated lime has cooled to about 100° F. a 3 per cent mixture of dry colloidal clay and earth (300 mesh fine) is added thereto, after which the lime is cooled, dried, milled and blended.

In cases where the limestone is poor in alumina and iron oxide traces of urea are added as a protecting colloid.

By my method herein described I utilize all the types of limestones which could not previously be used for making finishing lime, and by so doing I produce a high

plastic finishing lime of even a higher grade of plasticity and workability than the high magnesium finishing limes which are now exclusively on the market. All the finishing limes made by my process can be used immediately after being thoroughly wetted. It is not necessary to soak them as is the case with the present high magnesium finishing lime. At the option of the workman if he so prefers the finishing lime made according to my process can be soaked in the customary manner.

I claim:

1. The method of making a high plastic finishing lime which comprises burning the limestone, hydrating the powdered limestone with an emulsion of colloidal clay and earth in water and adding to the fresh hydrated lime when cooled an amount of a dry mixture of colloidal clay and earth.

2. The method of making a high plastic finishing lime which comprises burning the limestone hydrating the powdered limestone with a 1/2 per cent emulsion of colloidal clay and earth in water and adding to the fresh hydrated lime when cooled to about 100° F. a 3 per cent dry mixture of colloidal clay and earth.

3. The method of making a high plastic finishing lime which comprises burning the limestone, hydrating the powdered limestone with a 1/2 per cent emulsion of colloidal clay and earth in water adding to the fresh hydrated lime when cooled to about 100° F. a 3 per cent dry mixture of colloidal clay and earth, and adding a protecting colloid.

4. The method of making a high plastic finishing lime which comprises burning the limestone, hydrating the powdered limestone with a 1/2 per cent emulsion of colloidal clay and earth in water, adding to the fresh hydrated lime when cooled to about 100° F. a 3 per cent dry mixture of colloidal clay and earth, and adding traces of urea as a protecting colloid.

In testimony that I claim the foregoing I hereunto affix my signature.

ERNEST O. SCHNELL.