UNITED STATES PATENT OFFICE.

WILLIAM ROBERT JOHNSON, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, AND GEORGE NICHOLS, OF LEICESTER, ENGLAND.

PROCESS OF REVIVIFYING OLD PLASTER-OF-PARIS.

SPECIFICATION forming part of Letters Patent No. 661,247, dated November 6, 1900.

Application filed July 12, 1898. Serial No. 685,751. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM ROBERT JOHNSON, a subject of the Queen of Great Britain, residing in the borough of Manhattan, in the city and State of New York, have invented a certain new and useful Improvement in Processes of Revivifying Old Plaster-of-Paris, of which the following is a specification.

The invention is intended mainly for re-treating plaster, and I will describe it as thus applied.

In the manufacture of plaster images it is common to make molds of the same or different material and in a sufficient number of parts so that they may be applied together to produce the requisite cavity, and after these parts have been applied together and the cavity filled with fine plastic composition of the proper whiteness or other qualities to make the required statuette, architectural ornament, or the like and allowed to remain until the soft composition has become well set the parts of the mold are separated and the molded article is removed for use, and the parts of the mold are again applied together for reuse. When the molds become defective through wear or other cause, they are thrown aside and fresh ones produced.

A principal object of my invention is to utilize the great quantity of material locked up in those worn-out molds.

I succeed in giving all the fineness of molding qualities and all the hardness of original plaster; but so far as my experiments have yet proceeded I have not been able to overcome the gradual darkening of the color.

To carry out my invention, I burn (calcine) the old plaster, which is most advantageously in lumps—say about the size of ordinary hens' eggs—at a moderate temperature—say at a dull-red heat—for an hour, the effect of which calcination is to drive off practically all of the water. The so-dehydrated old plaster I wet with water containing sulfuric acid—say eight per cent. of sulfuric acid of 66° Baumé—at such low temperature as will allow a rehydration to take place. I find it an advantage and a special improvement to apply the acidified water to the dehydrated old plaster while this is at a temperature so far above the boiling-point of water as that on wetting the hot plaster evaporation of a considerable portion of the applied water promptly takes place. I find that this previous high temperature of the plaster facilitates the penetration of the acidified water to all parts of the plaster (probably by the action thereon of the steam generated) and accelerates the chemical reaction between the same and the calcium sulfate, while it also expedites the drying operation. For wetting I use such an amount of water as that a part only will be evaporated by the heat of the plaster, so that sufficient remains for rehydration. I recommend that the hot plaster should have a temperature of about 600° Fahrenheit and that a weight of water about equal to that of the plaster should be applied thereto. The water may be at atmospheric temperature.

It is a special economy to utilize the heat which has been imparted to the plaster in the before-mentioned calcining operation. To effect this, I allow the dehydrated old plaster to cool down to the desired extent from the temperature of the calcination and then pour the acidulated water over the still hot plaster. When evaporation ceases, the plaster is exposed freely to the air until it is thoroughly dried, and when dry it is ground.

The dried and ground plaster, previously acidulated and rehydrated by application of the acidulated water to the hot plaster, will set on mixing it with water in the usual way; but it is a poor modeling material, as it will not set hard. To make it a good modeling material, I subject it to what may be termed a "boiling." That is to say, I heat the plaster in powder (under constant stirring) in shallow pans to a temperature suitably above the boiling-point of water to produce a sort of frying or sputtering effect, due to the ebullition, which will be active at first, and gradually becomes less. I continue the heat until the ebullition shall have practically ceased, whereupon I allow the plaster to cool and then store for use. By this boiling I partially dehydrate the rehydrated plaster. In accordance with my invention, therefore, it will be perceived that I subject the old plaster to two heatings, the first effecting a more complete dehydration than is attained by the second, and that

between these two heatings I rehydrate and acidulate the plaster by means of water containing sulfuric acid. Further, as a special improvement I apply the acidulated water to the plaster while this is heated above the boiling-point of water, more water being applied than will be evaporated by the hot plaster, and as a still further improvement I apply the acidulated water to plaster while it retains the heat of the first heating, (burning or calcination,) thereby saving the time which would otherwise be consumed in cooling and reheating, as well as the fuel which would be required to reheat.

Still another improvement consists in effecting the first heating (burning or calcination) and the rehydration and acidulation while the plaster is in lumps and grinding said lumps preparatory to the second heating, (boiling,) because the plaster is more easily burned in lumps and also because the so-dehydrated plaster in lump form when wet with the acidulated water is less apt to set than it would be if in powder when wet, whereas the partial dehydration after the rehydration (the boiling in other words) is more effectively and readily performed with the plaster in the form of powder.

My plaster may be worked in the same manner as ordinary plaster-of-paris and is similar in its general qualities, but is slower to set and sets harder. The darker color is an objection for some uses, but not for molds.

My process gives a hard strong plaster, differing only slightly in color from the best new plaster and under ordinary conditions at less than half the cost of new of the same quality.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Instead of plain water with sulfuric acid I can use a corresponding solution of alum, the free acid in the alum being relied upon mainly as the useful element.

I claim as my invention—

1. The method of revivifying plaster-of-paris by subjecting the same to two heatings and an intermediate wetting with acidulated water, the first heating effecting a more complete removal of water than the second, while the intermediate wetting serves to rehydrate the burnt plaster, substantially as described.

2. The method of revivifying old plaster-of-paris, by burning the same, wetting the burnt plaster with acidulated water, and then heating the so-treated plaster in powdered form until cessation of ebullition, whereby the old plaster is first dehydrated, then rehydrated and acidulated, and then partially dehydrated, substantially as described.

3. In revivifying old plaster, the improvement consisting in burning the same, and applying acidulated water to the burnt old plaster when this is in the form of lumps, and afterward grinding the said lumps and heating the powdered material until cessation of ebullition, substantially as described.

4. The method of revivifying old plaster-of-paris by subjecting the same to a heating, a subsequent wetting with acidulated water, a grinding operation, and a second heating, the first heating and the wetting being performed with the plaster in lumps and the second heating after the said plaster has been reduced to powder, substantially as described.

5. In revivifying old plaster, the improvement consisting in burning the same, and applying acidulated water to the burnt old plaster when this is in the form of lumps and at a temperature above the boiling-point of water so as promptly to evaporate a part of the applied water, and afterward grinding the said lumps and heating the powdered material until cessation of ebullition, substantially as described.

6. The method of revivifying old plaster-of-paris, by subjecting the same to a heating, a subsequent wetting with acidulated water, a grinding operation, and a second heating, the first heating being performed with the plaster in lumps and effecting a more complete removal of water than the second which is performed with the plaster in powder, and the lumps from the first heating being wet with the acidulated water while still hot from the calcining operation so as promptly to evaporate a part of the applied water, substantially as described.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WILLIAM ROBERT JOHNSON.

Witnesses:
J. B. CLAUTICE,
THOMAS DREW STETSON.