UNITED STATES PATENT OFFICE.

JAMES SICKLER, OF SALINA, KANSAS, ASSIGNOR OF ONE-HALF TO LORIN G. HAMILTON, OF SAME PLACE.

PROCESS OF CALCINING GYPSUM.

SPECIFICATION forming part of Letters Patent No. 437,140, dated September 23, 1890.

Application filed May 23, 1890. Serial No. 352,947. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES SICKLER, of Salina, in the county of Saline and State of Kansas, have invented a new and useful Improvement in the Process of Calcining Gypsum, of which the following is a specification.

In the manufacture of plastic compounds whose base is plaster-of-paris or calcined gypsum it has been a great desideratum to retard the setting of the composition after the water is added to it, so as to enable the workmen to have sufficient time to apply it and fashion it into the desired forms or shapes. When gypsum (mineral sulphate of lime) is calcined, a portion of its water of crystallization is driven off and the gypsum passes into an amorphous form as a dry powder known as "plaster-of-paris," which, when water is added, hardens again by reabsorbing a portion of the water which it had previously lost. So rapid is the process of reabsorption and hardening that it is difficult to work either plaster-of-paris or compounds containing a large proportion of the same, and many attempts have been made to form a compound which will not harden so quickly, and yet will ultimately set firmly and solid. Among these attempts may be mentioned the mixing with the plaster-of-paris a proportion of glue-water; but it is not possible to get this glue-water thoroughly and homogeneously incorporated before the hardening takes place, and if more water is added to facilitate the stirring and mixing the material in a measure loses its setting qualities. My invention is designed to prepare the calcined gypsum in such form that it requires only the addition of water, and while it sets slowly, so as to enable the workmen to properly manipulate it, there is no deterioration in the strength or setting qualities of the same.

My invention consists, first, in the process of calcining the gypsum in the presence of a solution of glue or equivalent material, as hereinafter described, whereby the glue is intimately and homogeneously incorporated with the amorphous powder without having to depend upon the water (which is added when the plaster is used) as a vehicle for carrying the glue into the plaster-of-paris.

In carrying out my invention the mineral gypsum ($CaSO_4 2H_2O$,) which is in a crystalline state, is crushed and ground and then placed in a kettle and subjected to a temperature of 250° to 300°. The ordinary effect of this heat is to cause the mass to fuse and become soluble in its water of composition, which water is allowed to gradually boil away until about two-thirds of the water has been eliminated, when the mass turns to a dry powder. While it is in a molten condition or before it becomes a dry powder I add a solution of glue in water, about ten pounds of glue dissolved in twenty quarts of water being about the quantity for each ton of gypsum. This solution of glue fully penetrates the fluid mass of boiling plaster and becomes intimately and uniformly mixed therewith until the glue is homogeneously incorporated with the calcining plaster, which gradually turns to a dry powder, having the glue thoroughly incorporated therewith, and yet possessing full setting properties by reason of the loss of water, so that when the user mixes water with this calcined plaster the affinity of the partially anhydrous sulphate of lime for the water is not diminished, but the presence of the intimately-mixed glue prevents the water and lime from uniting so rapidly, the glue having first to become dissolved by the water, which causes a retardation of the union between the water and sulphate of lime, and thus delays the setting of the plaster. While the plaster sets slowly so that it can be worked, it sets hard, however, for the affinity between the sulphate of lime and the water is ultimately satisfied, and the glue itself when incorporated in this way adds to the solidity and stability of the compound by forming a cement when hard.

The addition of the glue-water to the gypsum while being calcined or boiled not only makes the product very much better by reason of the results above described, but the presence of the glue in the boiling gypsum prevents the water from being expelled to too great an extent in calcining, for it is well known that if too much of the water is driven off from the gypsum in calcining the product loses its ability to reabsorb the water, and hence its setting qualities.

In carrying out my invention I do not

confine myself to the use of glue alone, as I find that a variety of substances of a gelatinous or albuminous consistency can be used with a like result when added during calcining. Thus, for instance, good results can be obtained with gelatine, soap, albumen, starch, or dextrine, gums, and animal, vegetable, and mineral oils, the function of any of these substances when incorporated during the calcining or boiling of the gypsum being to retard the reabsorption of water and delay the setting without interfering with the final result of hardness.

In connection with the glue I may use a small proportion (say a half pound) of either chloride of lime or sulphate of zinc, or both, which also have a tendency to retard the setting and harden the compound; but this is not a necessary part of my invention and may be dispensed with. To cause a greater retardation of the setting of the plaster, a larger proportion of the glue than that named may be used.

Instead of adding the retarding agent to hot molten gypsum during calcining, it may be added to and incorporated with the gypsum just before it is calcined.

Having thus described my invention, what I claim as new is—

The process of retarding the setting of plaster-of-paris, which consists in incorporating a retarding agent, substantially as described, in the plaster prior to the complete calcining, whereby said retarding agent is uniformly and homogeneously mixed with the finished plaster without deterioration to its final setting qualities, substantially as set forth.

JAMES SICKLER.

Witnesses:
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