No. 624,709. Patented May 9, 1899.

F. P. VAN HOOK.

METHOD OF PRODUCING PLASTER PRODUCTS.

(Application filed Oct. 25, 1895.)

(No Model.)

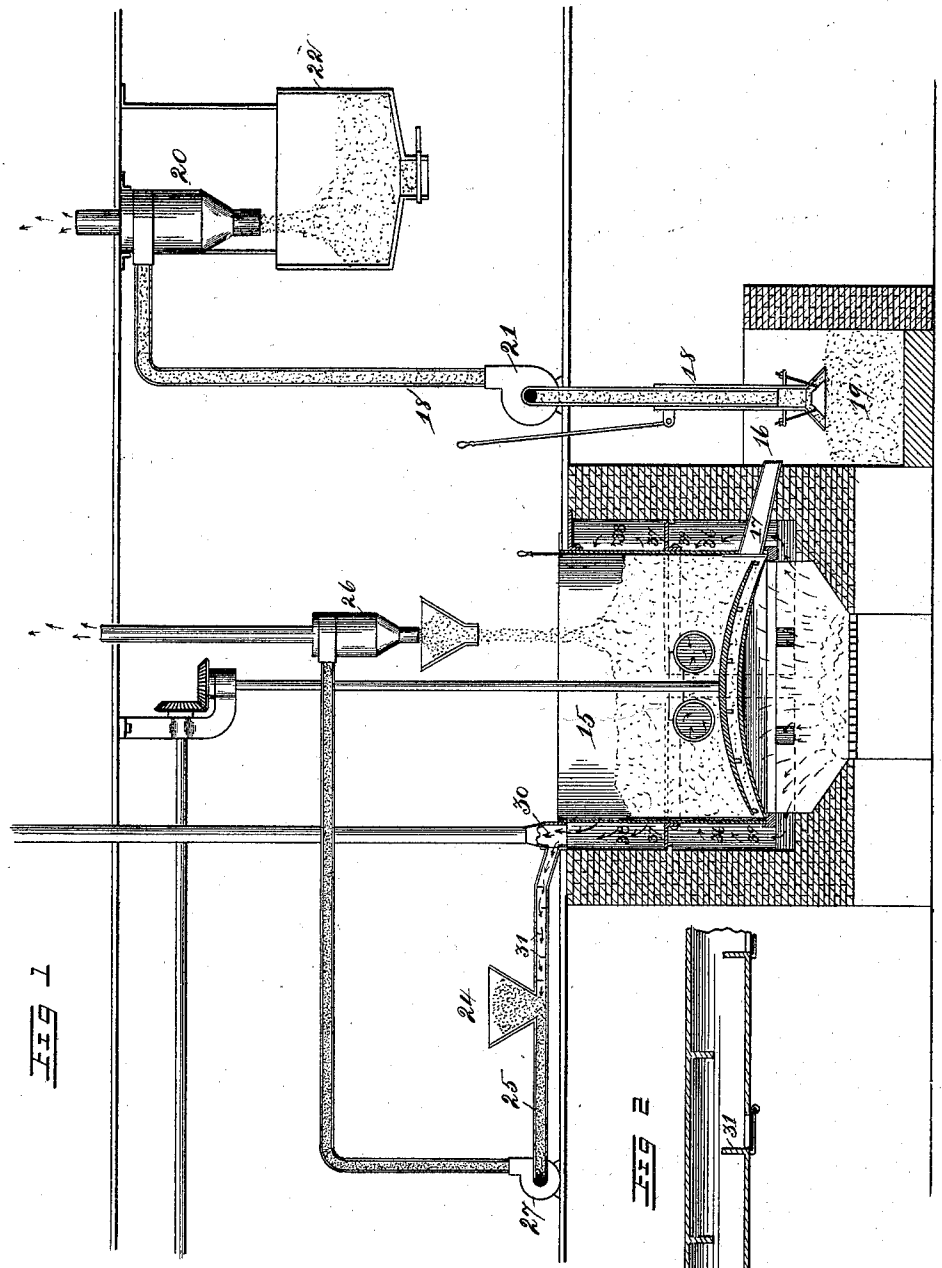


FIG 1

FIG 2

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METHOD OF PRODUCING PLASTER PRODUCTS.

SPECIFICATION forming part of Letters Patent No. 624,709, dated May 9, 1899.

Application filed October 25, 1895. Serial No. 566,862. (No specimens.)

To all whom it may concern:

Be it known that I, FRANKLIN P. VAN HOOK, a citizen of the United States, residing at Normal, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Methods or Processes of Producing Plaster Products, of which the following is a specification.

My invention relates to an improved method or process whereby plaster or other analogous product is obtained.

The object of the invention is to secure, without caking and the consequent operation of grinding, a plaster product in a finely-divided condition of separation for the whole of its mass, the aging of which is perfected and the character and quality of which are much more uniform throughout than that manufactured by the ordinary methods, the length of time necessary to obtain the perfect product being also greatly shortened.

Heretofore it has been the usual custom to first subject the mass of material to the influence of heat in a suitable calcining-chamber and to then deliver the material, after calcining and while still heated, into a suitable receiving-chamber, where it is sometimes allowed to remain to await further operations. The object of calcination is, as is well known, to drive off the volatile matter and expel the water of crystallization and to reduce the material to a condition suitable for making plaster or cement. Now this material as it comes from the calcining-furnace may be, according to the length of time it is submitted to the calcining-flame, either in clinker form or irregular mass, which must be ground before capable of use, or in the condition of a very fine and intensely-heated powder, which, if it is allowed to pile up and rest in the receptacle, will cool and cake on the surface, while the interior will smolder and burn itself up and "kill" or come out irregular both in strength and in properties. If this fine pulverulent material is taken up by elevator-buckets as fast as it falls into the receptacle and carried away to receiving-bins to undergo other operations, as generally practiced, it will either lump or cake in the buckets, if it has time to cool in its journey, or it will lump or cake and overcalcine or burn up in the bins and must be ground before it can be used. If it is allowed to remain in the calcining-furnace until thoroughly burned and then cooled by air-blasts, it will cake because confined in such manner that the particles cannot be completely separated and isolated from each other, and the blast, acting upon the whole mass of several tons weight, must force channels through it instead of carrying up the whole in a cloud.

In my invention the material is first subjected to calcination in a suitable furnace until reduced to a fine powder or pulverulent condition and is then delivered or discharged therefrom in such a finely-subdivided or pulverulent state and in a highly-heated condition into a receiving-chamber, which prevents its dispersion, and before it can accumulate or settle into a mass it is taken up by a cold blast of air, whereby the particles are maintained by the blast in a separated and individual condition and each particle of a whole given quantity subjected to the cooling influences of the air-current, along with which it is carried until it reaches, in a thoroughly cooled and aged condition, a dust-separator, where it is deposited by the blast and whence it falls into a bin or is discharged into barrels. This procedure results in a plaster product, ready for shipment, of disintegrated or individual grains or particles without recombination of volatile matter and without the agency of intermediate grinding operations, as distinguished from a dense or compacted or lumpy mass which must be ground before it can be put up for shipping.

The invention further embraces the employment of a hot blast in order to assist in the operation of separating and driving off the volatile matter from the material.

For the purpose of explaining the invention it will be described in connection with apparatus suitable for carrying it into practice, shown, for instance, in the accompanying drawings, in which—

Figure 1 is a sectional view showing the arrangement of my improved apparatus. Fig. 2 is a sectional detail view of the hot-blast conductor having the deflectors therein.

The calcining-chamber is designated at 15 and the receiving-chamber at 16, communication being had between these two chambers, a delivery or discharge way 17 being provided

for conveying the material from the calcining-chamber 15 to said receiving-chamber 16. I provide a conducting wind-trunk 18, opening into the receiving-chamber 16, over the mass of material therein designated at 19, which trunk extends from the said receiving-chamber to the dust-separator 20 of usual construction. Intermediately interposed in the said conducting-trunk 18 is a suction-blast fan 21, which creates a strong suction-pressure throughout that portion of the length of the conducting wind-trunk 18 below the fan, and thus acts upon the mass of the material falling from the discharge-way into the receiving-chamber, drawing it in individual particles through said wind-trunk to the fan and through the fan and then driving these particles through the upper portion of the wind-trunk into the dust-separator, from whence it is delivered into the bin 22, or it may be discharged directly in a pulverulent state into barrels or sacks ready for shipment. It is manifest, therefore, that I first subject the material to the operation of calcining in the chamber 15 and then withdraw the material into the receiving-chamber 16. I then rapidly cool the material by subjecting each particle to the influence of the cold blast in the wind-conductor trunk 18 from the fan 21, each particle of the material being individually and separately cooled under the influence of said blast, which maintains the particles separated and prevents the formation of these particles together into a dense mass. The result of this treatment is that the material is rapidly cooled uniformly and evenly throughout its mass and a plaster product produced which is uniform in quality throughout and of a finely divided or separated character, free from all lumps or chunks, which retains its maximum slaking properties, and the whole of which product is capable of uniformly and evenly setting when being prepared for use and of evenly and uniformly spreading when applied upon a surface.

In ordinary methods much time is consumed in the process of cooling and expensive machinery must be employed, and it is evident that the material being held in a compact mass and subjected to a slow cooling influence sets unevenly, producing a mass of material which is not uniform throughout, whereas with my improved method it is evident that I am enabled to prevent the setting of the material during cooling by reason of the suspension and separation of the particles under the influence of the blast, thereby obtaining a uniform quality of finely-divided or pulverulent material throughout, which will set evenly and uniformly when being prepared for use. It is also apparent that the material while being cooled by the blast is also elevated and delivered thereby and when discharged from the dust-separator is already cooled and in readiness to be packed for shipment.

Referring now to the method of and means for assisting or expediting the operation of calcining the material, I first preliminarily treat the same with a hot blast which, as shown, is obtained from the calcining-kettle 15, and in the accomplishment of this end I provide a hopper 24, into which the material is first deposited, which opens into a wind-trunk conductor 25, leading from the calcining-furnace 15 to the dust-separator 26, a blast suction-fan or blower 27 being interposed in the line of the wind-trunk conductor 25. The material is discharged from the dust-separator 26 into a hopper 29 and from this hopper fed into the calcining-kettle 15. It will be observed that communication between the wind-trunk conductor 25 and the calcining-kettle 15 is established through the smoke-flue 30. Interposed in the wind-trunk conductor 25 is a series of deflectors 31, which arrest the products of combustion from the calcining-chamber 15.

It is evident from the foregoing that by first subjecting the material to a hot blast in the wind-trunk conductor 25 I greatly facilitate the final and completing operation of calcining, as I subject the material throughout said wind-trunk conductor to the calcining influence of heat, which accomplishes the purpose of preliminarily drying out the material.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The method or process of manufacturing plaster product and the like, consisting in first submitting suitable material to the operation of calcining until reduced to a finely-subdivided or pulverulent condition, then immediately subjecting said material, while in its intensely-heated and pulverulent condition, to the influence of a current of cold air in rapid motion and of such strength that the particles are taken up and carried in suspension separately and individually, and rapidly cooled.

2. The method or process of manufacturing plaster product and the like, consisting in first submitting suitable material to calcination until reduced to a finely-subdivided pulverulent mass, then taking it up immediately in such pulverulent condition, and carrying it through confining-passages, which hold it from dispersion, by means of a cold-air blast of such intensity that the individual particles of material are held in suspension until said particles are separately and completely cooled.

3. The method or process of manufacturing plaster product and the like, consisting in first submitting suitable material to calcination until reduced to a finely-subdivided mass, then taking it up immediately in such pulverulent condition, and carrying it through confining-passages, which hold it from dispersion, by means of a cold-air blast of such intensity that the individual particles of material are held in suspension and separately

cooled, and finally depositing it in a thoroughly dried and cooled condition and subdivided character in a dust-separator.

4. The method or process of producing plaster product and the like, consisting in first subjecting suitable material to the action of a hot blast in order to dry out the same preliminary to calcination, then submitting the material to calcining heat until it is reduced to a finely-subdivided and pulverulent condition, then subjecting it while still in a heated, loose and finely-subdivided state, to the influence of currents of cold air of such strength and intensity and so confined that the individual particles of calcined material are taken up and carried along in suspension and separately and rapidly aerated and cooled.

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

FRANKLIN P. VAN HOOK.

Witnesses:
CHAS. C. BULKLEY,
L. W. BULKLEY.