Patented July 31, 1951

2,562,859

UNITED STATES PATENT OFFICE

2,562,859

PLASTERBOARD

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No Drawing. Application January 10, 1947, Serial No. 721,468

4 Claims. (Cl. 154—45.9)

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The present invention relates to an improved type of a plaster-receiving base, and to the method of making the same. More particularly it refers to the manufacture of a plaster-receiving base of a sheet-like type which contains within its surface plies a reagent to enhance the suction of said base for the liquid components of the thereto applied plaster.

In building a wall or a ceiling, the craftsmen first erect, in the necessary places, proper supports to which the plaster-receiving bases are nailed or otherwise fastened. There are many types of plaster-receiving bases, including metal lath, wood lath, etc., which are useful, and have been employed to a great extent. However, the greatest percentage of material used as a plaster-receiving base is of the plasterboard type, and is known as a "plasterboard lath." This plasterboard lath consists of a core of plaster confined within fibrous liners, which during the course of manufacture are intimately bonded to the core.

Various conditions affect the suction of the plaster-receiving base. Thus, the amount of size which is necessarily introduced into the fiber liner to produce the plaster-receiving base has a marked effect upon the absorption or adsorption of the water in the plastic composition at the interface of the plaster-receiving base and the plaster. This is particularly true of the outer surface plies of the sheet, which are in contact with the plaster. Other complicating factors, such as the amount of drying heat, duration of the drying cycle, various mechanical factors, such as rolls, handling, etc., all exert an effect upon the final product. Obviously, in view of these numerous variables, the suction at the interface between the applied plaster composition and the plaster-receiving base is affected.

It, therefore, is the object of this invention to provide a means by which the suction of the plaster-receiving base for the plaster can be improved.

A further object of the invention is to remove a portion of the size from the contacting paper sheet so that said sheet will exhibit a greater suction when plaster is applied thereto.

These and other objects, adaptations, variations, modifications, and extensions thereof will become readily apparent to one skilled in this art, particularly in the light of the further description and examples set forth hereinbelow.

However, before a detailed description of the process and of the manufacture of the improved type of a plasterboard is given, it is desirable that the terms used herein shall be defined in

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order to have this specification clear and definite. The term broadly used herein as "plaster-receiving base" is directed to any sheet-like material of the paper-covered, gypsum-core type and having substantially a continuous surface which may or may not be perforated or otherwise indented. It is likewise applicable to a sheet of wood pulp sufficiently thick and rigid to act as a plaster-receiving base, even if devoid of a gypsum core.

The conventional process of making a plasterboard of the gypsum-core type consists of spreading a plastic composition containing principally gypsum and various modifiers onto a sheet of fibrous materials, such as kraft paper or especially developed papers used in the manufacture of plasterboard. The plastic mass on the sheet passes under a master roll which simultaneously applies thereto a top cover sheet, and the two sheets are cemented together by means of an adhesive along their edges to form an envelope and confine the plastic mass therein. The plastic mass while being encased within the fibrous liners is spread by the master roll to the desired degree of thickness. The resulting composite lamination is permitted to move forward undisturbed in the form of a continuous ribbon until the plastic mass has reached an initial hardening. At this stage it is cut to pre-selected lengths. The cut lengths are passed through a dryer to remove substantially all of the free water. After drying, the lengths are assembled into bundles, packaged and stored for future shipment.

The cover sheets of such a plasterboard have of course been sized, as with rosin size, to prevent them from becoming too limp during the manufacture of the plasterboard. Such sizing limits their absorption of water. Such absorption is, however, very desirable when the plasterboard is in use for its intended purpose. As in some parts of our country it has become the custom to apply quite heavy layers of plaster, say about ½ to ⅝ inch in thickness, it becomes essential, in order to prevent sliding of the plaster, that it stiffen sufficiently to prevent such sliding. If the plasterboard has enough suction, satisfactory stiffening will take place. Accordingly, some of the size in the paper on the plasterboard is rendered innocuous by treating it with a potential solvent, such as an alkali, which, by saponifying the rosin, destroys its sizing action.

Thus, in making the improved plasterboard of the present invention, a solution of an alkali carbonate, such as potassium carbonate, is prepared by dissolving the requisite amount thereof in water. The resulting solution is applied to the surface of the plasterboard or other plaster-receiving base at any convenient place in the processing flow of making said base. In practice, a suitable coating applicator, such as a roll or brush arrangement, coats the surface with the solution which penetrates into the plies of the liner of the plaster-receiving base, whereafter it is allowed to dry. The coated continuous plaster-base ribbon is now ready for cutting.

The alkali carbonate solution is applied to the surface of the plasterboard or other plaster-receiving base at a rate of approximately one-half to one gallon (or 0.2 to 0.4 pound of potassium carbonate or its equivalent) per thousand square feet of surface area. The solution preferably contains approximately 2.5 to 5 per cent of potassium carbonate, since this concentration has been found to give about the best penetrating action into the surface of the plaster-receiving base. Obviously this percentage may be varied within certain limitations, say within a range of from about 1.5 to 10 per cent, but for economic reasons it is desirable to use approximately the preferred percentage.

The alkaline action of the alkali carbonate solution dissolves, to a limited extent, the rosin size in the surface plies of the fibrous cover sheets. This solubilizing action of the alkali carbonate on the rosin size decreases the waterproofing effect of the size. When plaster is applied over a treated surface, the plaster enters the pores and interstices of the fibrous liner, since the waterproofing action of the size is suspended. An absorbent surface is thus provided for the plaster coat. The crystals of gypsum formed during the setting of the plaster when it is applied, interlace within the pores and interstices of the treated surface of the plaster-receiving base, and a good bond is obtained.

As a specific example, a gypsum-core paper-covered plasterboard may have applied to at least the surface intended to be subsequently plastered, about one gallon per 1000 square feet of said surface of a solution of commercial potassium carbonate made by dissolving 20 pounds thereof in 50 gallons of water. The potassium carbonate is preferably in the form of pearl ash, K_2CO_3, but potassium carbonate containing water of crystallization may be used. The solution as above made will contain about 5 per cent of actual K_2CO_3.

Soluble alkali metal salts, and certain other salts, under moist conditions, such as found in a plaster application job, have a marked tendency to effloresce to the surface during the ensuing dryout. Since the efflorescence is white, it is difficult to see against a light background such as provided by a white plaster finish coat. However, when this surface is decorated, then many unpredictable actions take place, which result in a staining and disfigurement of the decorative finish. Quite unexpectedly it was found that the carbonate of potassium was the only carbonate of the alkali metals that gave no efflorescence when used in accordance with the present invention, and is therefore much to be preferred for the purpose. Other alkali carbonates, except sodium carbonate, are obviously too expensive. The reaction of potassium carbonate with the gypsum was given very careful consideration, and it is believed that the potassium sulfate formed by the metathesis combines with the excess calcium sulfate almost as soon as it is formed to form therewith a relatively stable salt known as syngenite, $CaK_2(SO_4)_2$. Since this latter salt is relatively insoluble in comparison with the salts that cause efflorescence, it is believed that this complex syngenite salt stays wherever it is formed within the plaster composition, and does not migrate to the surface of the plaster. At least no deleterious marring of the finished surface occurs when potassium carbonate is used.

There are a number of modifications that can be made by one skilled in this art not only in proportions but also in the method of application without departing from the spirit of the fundamental aspects underlying this invention as expressed hereinabove and defined in the appended claims. As mentioned previously, the coating solution can be applied at any step during the process of making the plaster-receiving base. Furthermore, the treatment can be included in combination with any phase of the manufacture of the plaster-receiving base or in the manufacture of its components. Likewise, the treatment can be added after the plasterboard has passed through the dryer, the residual heat of the plaster-receiving base being sufficient to evaporate the aqueous portion of the solution. Likewise, it is obvious that the solution can be added to the finished or completed plaster-receiving base and then subsequently dried thereon, either by atmospheric drying or forced drying in a suitable kiln. In addition, if one so desires, the solution may be sprayed onto the plaster-receiving base while in its erected position, followed by application of the plaster composition. All of these modifications and adaptations are within the scope of the fundamental concepts of this invention as expressed in the hereto appended claims.

Having described the invention hereinabove, and given an illustration of the application of its principles which shall not be considered as a limitation except as defined hereinbelow in the appended claims.

Applicant claims:

1. Plasterboard having a surface consisting of fibers carrying sufficient rosin size to render said plasterboard resistant to penetration by water, and a sufficient amount of dry potassium carbonate in the outer portion of said surface potentially to react with said rosin size to render it water-soluble and hence ineffective when an aqueous plastering composition is applied to said plasterboard, whereby said composition is stiffened by the thus enhanced absorption of water from said composition.

2. Plasterboard comprising a cementitious core and fibrous cover-sheets adhering thereto, the fibers of said sheets carrying sufficient rosin size to render said sheets resistant to penetration by water, and a sufficient amount of dry potassium carbonate in the outer surface portions of said cover-sheets potentially to react with said size and render the same water-soluble and hence ineffective when an aqueous plastering composition is applied to said surface portion, whereby said composition is stiffened by the thus enhanced absorption of water from said composition.

3. A plasterboard as defined in claim 1 in which the amount of potassium carbonate is substantially within the range of from about 0.2 to 0.4 pound per 1000 square feet of the surface intended to receive a coating of plaster.

4. A plasterboard as defined in claim 2 in which the amount of potassium carbonate is substan-

tially within the range of from about 0.2 to 0.4 pound per 1000 square feet of the surface intended to receive a coating of plaster.

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