

July 16, 1940.

J. A. WIENER

2,208,236

METHOD OF MAKING SHEET PRODUCTS

Filed Dec. 16, 1936

Fig. 1.

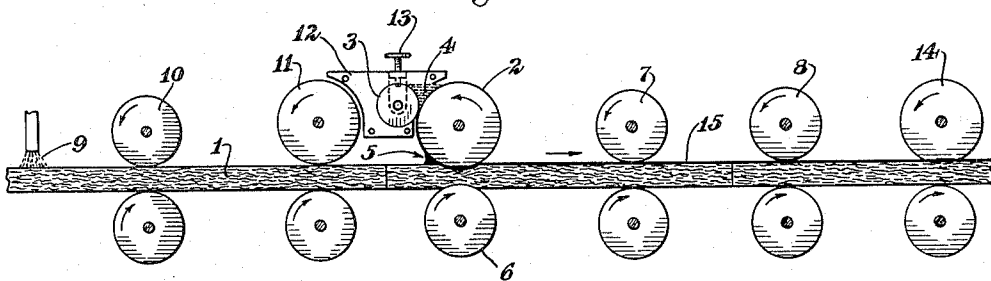


Fig. 2.

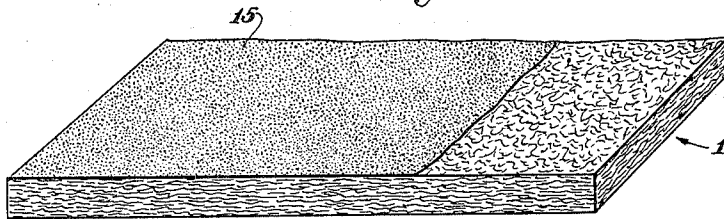
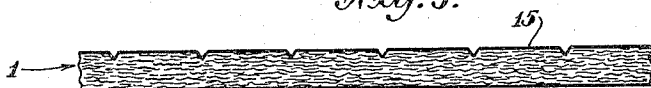


Fig. 3.



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2,208,236

METHOD OF MAKING SHEET PRODUCTS

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Application December 16, 1936, Serial No. 116,141

2 Claims. (Cl. 91-70)

This invention relates to a sheet product and the method and apparatus for making the same. It relates, more particularly, to a wall board provided with a composition forming a smooth surface over a face thereof and being thoroughly footed in the portion of the wallboard adjacent to the said face or integrally united to a material extending throughout the board.

Special difficulties arise when it is attempted to apply a smooth, firmly adhered surface coating over a thick insulating fibre board or the like.

It is an object of the invention to overcome these difficulties and to produce a new and improved wall board or sheet that is stiff, durable, and adapted to be painted satisfactorily with a minimum penetration of paint and requirement thereof.

The invention is illustrated in the drawing and will be described, for the purpose of exemplification, in connection therewith.

Fig. 1 shows, diagrammatically, a side view of apparatus that may be used in making the improved wall board.

Fig. 2 is a perspective view of the product, on a scale that is somewhat enlarged as compared to the scale used in Fig. 1.

Fig. 3 is a similar view of a modification of my improved product that is embossed during manufacture.

In making my product, there is provided the thick felted fibrous sheet that is to be surfaced. The hardenable surfacing composition, in fluent form, is applied to a face thereof and forced in part thereinto. The said composition is then smoothed (ironed) and hardened.

Thus, there may be provided a sheet 1 that is appreciably resiliently compressible, as, for example, one of wood or bagasse fibres constituting an insulating wall board and containing, suitably, a solid, fusible material, such as a rosin size, a fusible resin or the like well distributed throughout the sheet. This sheet may be passed under and in contact with the surface of a coating roller 2, coating with a companion roller 3, and supporting a supply of the surfacing composition 4 in the bight between the rollers.

The roller 2 supplies over a face of the wall board an excess of the surfacing composition above that required to close and extend over the irregularities of surface (pores or upstanding fibres) of the surface portion of the said sheet and above that which may pass under the roller 2. This excess collects as a mass 5 just in advance of the position of passage of the sheet under the latter roller. Furthermore, this roller preferably compresses the sheet appreciably and exerts pressure upon the composition applied thereto. This compression and pressure serve the function of forcing a part of the composition into the sheet, so as to provide adequate footing

and to reduce momentarily the thickness of the sheet to such an extent as to permit reexpansion and drawing of the composition into the sheet, after the pressure is released by the emergence of the sheet from the space between the roller 2 and the rigid bed or opposed lower roller 6 of the coating machine. After being thus coated, the sheet is passed under one or more ironing rolls, such as those shown at 7 and 8 in the figure. These rolls, at their smooth surfaces in contact with the coated sheet, move at a speed (in this case, peripheral) that is preferably exactly the same as that at which the sheet is being advanced. In this way ridging of the coating is prevented and the smoothing of the coating is satisfactory.

These rollers are maintained at an elevated temperature, say at about 500-700° F. at their exterior surfaces. They serve to soften any material in the board or ingredient of the surfacing composition that is fusible at the temperature to which the said material or ingredient is raised by the rolls and/or to harden the composition, as by the evaporation of water or other volatile solvent or extender when the composition is one made fluent thereby, or by curing or vulcanization when the surfacing composition includes a heat-hardenable ingredient.

After passage from the machine, the sheet is cooled so that any fused, normally solid material therein is thus hardened.

Particularly desirable results are obtained and the amount of surfacing composition required to produce a given smoothness is reduced, when the fibre sheet that is to be coated is subjected to an ironing action previous to being coated. Thus, a fibre board in dried condition, so as to be resistant to excessive decrease in thickness on compression, is moistened over its face as by a spray of steam or water 9 applied just in advance of the preliminary smoothing step. The moistened sheet is then passed under the pressure ironing roller 10, as illustrated.

Also, it is convenient to support the roller 3 upon the rollers 2 and 11, as by the cradle 12 which rides at either side upon one of the said rollers and supports the smaller roller 3 in predetermined position with respect to the roller 2. In this manner, the width of opening between the rollers 2 and 3 is made subject to variation by the adjustment 13 including a screw bolt at either end of the small roller and serving to permit shifting of the axis of the said roller upwardly or downwardly within the ends of the cradle.

In another modification of the invention, an embossing roller 14 may impress a desired pattern, such, for example, as that illustrated in edge view in Fig. 3, upon the fibre sheet and surfacing composition applied thereover. The con-

figuration of the surface roller 14 is that selected to give the desired pattern of embossing. The roller 14 may be maintained at an elevated temperature and thus caused to emboss and simultaneously heat the surfacing composition, either to soften it, as in the case of a heat-softenable surfacing composition, or to harden it, as in the case of a composition that is hardened at elevated temperature.

- 10 The coating composition, somewhat exaggerated in thickness, is indicated in the drawing by the reference character 15.

Means for advancing the sheet or rotating the several rollers, in the direction shown by the 15 arrows, are not illustrated, inasmuch as they may be conventional.

Various surfacing compositions may be used. Thus, the composition 4 may include an adhesive or binder ingredient, a finely divided solid or 20 filler that may be a pigmentary substance, and, for some purposes, a wetting agent to promote penetration of the composition as applied to the board.

A composition that may be used is one comprising finely divided pigmentary substance, say 25 finely divided calcium carbonate of the grade known as whiting, in the proportion of 75 parts by weight, an adhesive, as, for example, 20 parts by weight of starch, casein, or glue, and an additional binder that is incombustible, say 5 parts 30 of soluble sodium silicate, all made into a fluent paste or mixture for application by the use of water, as the extender, in suitable proportion.

When the adhesive is water-soluble, there is 35 preferably incorporated into the said mixture a rosin size and then alum, to cause the precipitation of a waterproofing agent.

The coating composition should be viscous to ensure smoothness of coating, say of time of out- 40 flow from a given 100 cc. pipes of about 27 to 40 seconds as compared to 22 seconds for water.

Also, there may be used a similar formula in which the silicate of soda and/or the said adhesive is replaced by a rubber composition. In 45 this case the extender may be water, as in latex, gasoline, or benzol.

The proportions of components of the surfacing composition and/or its qualitative composition may be varied in accordance with the 50 properties desired in any particular surface coating. For instance, there has been used to advantage a composition including 66 parts of whiting, one part of starch, and one part of a rubber latex composition commonly known as Paracol. Also, 55 there may be used a surfacing composition, made into proper consistency for application by the roller 2, including whiting, lithopone, starch as the adhesive, iron oxide pigment, and a wetting agent.

60 The wetting agent may be used in connection with any of the compositions described above. The proportion of the wetting agent being usually small, say not in excess of 2 or 3 parts to 100 parts of the composition.

65 Wetting agents that may be used include Turkey red oil, an ethanolamine, and a diphenol hydroxide (Dowicide) and/or a sulfonated oil such as Twitchell's reagent.

70 There may be used to advantage a surfacing composition including a heat-softenable and then hardenable ingredient, as, for example, a

resinous ingredient or a rubber compound that softens under heating and then hardens by vulcanization. As an example of the resinous ingredient, there may be used rosin, a rosin size, ester gum (the substantially neutral reaction 5 product of glycerine and rosin) or dammar resin, suitably in the presence of admixed alum or other multivalent metal compound adapted to form an insoluble salt with the acidic component of a resin such as rosin or dammar. The resinous in- 10 gredient is preferably fusible at the temperature of the surface of the ironing roll or rolls and miscible (soluble) with the fusible material of the size in the wall board, is maintained in molten condition while the coating composition is being 15 smoothed, and then is hardened. When the said ingredient and material are miscible, these agents will be integral at their positions of intimate contact in the finished product, the surfacing composition being thus firmly secured to 20 the sizing material of the wall board.

In the product made as described, the coating composition conceals all the fuzziness and porosity of surface that would otherwise be apparent, 25 is practically smooth on its exposed surface, and, because of the thickness and attendant stiffness of the base sheet, maintains its planeness of surface. Furthermore, paint applied over the surfacing composition does not sink into the base sheet, the film of surfacing composition consti- 30 tuting a barrier to the penetration of paint into the wall board. Less paint is therefore required than would be the case if the sheet were not surfaced. Also, the paint coating is particularly smooth when applied over the surfacing 35 composition and allowed to dry in a usual manner.

The details given are for the purpose of illustration, not restriction, and variations made within the spirit of the invention are intended 40 to be included in the scope of the appended claims.

What I claim is:

1. The method of treating a dry, thick, and resiliently compressible insulating wall board sheet composed of felted and adhesively bonded 45 fibres which comprises applying moisture to the thick sheet followed by smoothing and ironing of the moist sheet, rolling a layer of a fluid surfacing composition, including an adhesive, a finely divided solid filler material and a volatile extender, on said wall board, in excess of that required to close and extend over the irregularities of the surface, while compressing the coated sheet to momentarily reduce the thickness of the 50 coated sheet, allowing the compressed sheet to re-expand while the applied composition is still fluid to permit part of said composition to be drawn into the interior of the sheet and subsequently contacting the coated sheet with smooth and heated ironing means adapted to smooth 55 and heat the outer surface of the applied composition, thereby eliminating the volatile extender and producing a smooth hard coating.

2. The method of treating a dry, thick, and resiliently compressible insulating wall board sheet composed of felted and adhesively bonded 65 fibres, as described in claim 1, in which said ironing means is heated above 500° F.