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LIGNO-CELLULOSIC ARTICLE AND METHOD OF MANUFACTURE

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Fig. 1

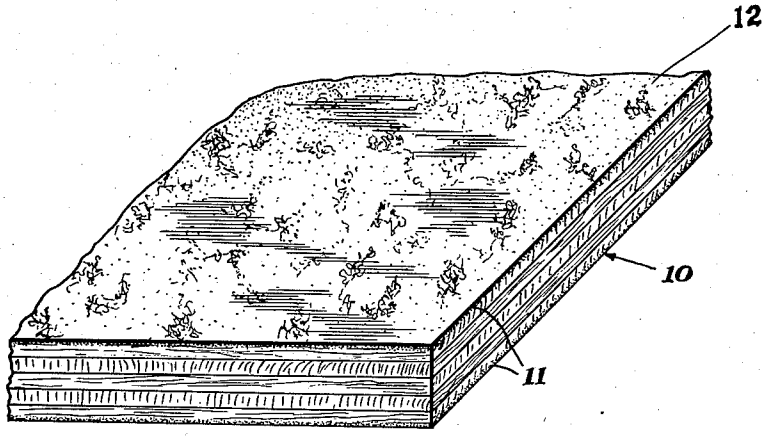
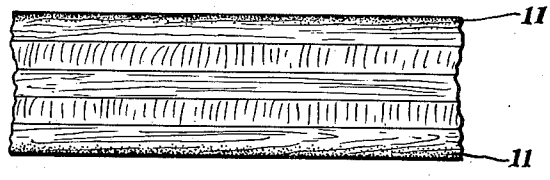


Fig. 2



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LIGNOCELLULOSIC ARTICLE AND METHOD OF MANUFACTURE

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12 Claims. (Cl. 117—65)

This invention relates to the treatment of woods and other ligno-cellulosic substances to render them, especially at their surfaces, fireproof, water-proof and denser and harder than the normal state of such substances. It likewise makes possible in a finished article a variety of structural design of beauty and a finish which eliminates the usual finishing costs incurred by painting or other treatment. It is applicable for use in all kinds of panel construction, floors, table tops and almost all wooden articles requiring or being benefited by such treatment.

The foregoing and other objects which will appear as the nature of the invention is better understood, may be accomplished by a construction and process such as is disclosed by the drawing and specification. The nature of the invention is such as to render it susceptible to various changes and modifications, and, therefore, I am not to be limited to said disclosures; but am entitled to all such changes therefrom as fall within the scope of my claims.

In the drawing:

Figure 1 is a perspective view of a finished article made in accordance with my invention.

Figure 2 is an enlarged elevational edge view of a portion of said finished article.

My process may be best illustrated by the treatment of a piece of three or five ply fir paneling 10 commonly used in house construction. This is relatively soft wood with a great variation in the hardness and density of the spring and summer wood making it difficult to successfully glue or successfully finish. It wears ribby because of this variable in density of the wood cells.

I mix a certain amount of pulverized asbestos or fine asbestos fibers, as described with a certain proportion of an adhesive such as standard urea formaldehyde glue with the proper amount of any well known catalyst for curing used in the usual cold press resin glues. This mix I spread on the surface of the fir panel and sprinkle a small amount of dry pulverized asbestos or the like as a top coating to give to the finish product a more attractive mottled appearance (much like a mosaic floor finish) and increase the insulating qualities of the coating. The said glue alone could be applied first and the asbestos sprinkled on it instead of making the mixture aforesaid.

The panel is now lightly pressed between iron plates (soaped so as not to stick) so that the surface material may be pressed smooth and so as to establish some capillary attraction of said mixture with the epidermal cells. The chemical action of the asbestos greatly retards if not completely retards the usual curing effect of the catalyst with urea formaldehyde; but apparently what does take place is an intermolecular reaction of the asbestos with the urea formaldehyde and the surface cells. However, this is greatly hastened by heat, so after a certain period of slight pressure above mentioned, the plates are heated to approximately 250 degrees F. or until the composite treated mass becomes more plastic and then the pressure is increased to approximately 100 to 200 lbs. per square inch. (High pressure common in so-called compregnated wood treatments is to be avoided, as this will crush and thus collapse the untreated internal cells of the ply-wood panel which will adversely modify the physical properties of the finished product.) The pressure used, which takes but a few minutes, is sufficient to force the plastic material 11 into the intercellular spaces of the epidermal cells and the heat condenses the coating 12 into a hard, irreversible, water-proof, fireproof, electrical and heat and cold insulating material. It renders the plywood panel smoother of surface and nearly as hard as glass or steel, but it is not a conductor of heat or cold like steel or glass or other known fireproof substances applied to surfaces of wood. The product can be worked like any plywood panel, thus being unlike compregnated wood which is too dense. Electrical insulating qualities of the panel are greatly increased and the insulating qualities both against cold and heat likewise are much improved. The thin hard coatings on both surfaces renders the plywood stiffer and stronger than it was originally, and the variability of the mosaic designs of great beauty thus made possible greatly increases the field of use of plywood panels.

After a sufficient period of curing, which may be 5 to 30 minutes, the product is preferably allowed to cool off before removing from the press, although this is not absolutely necessary.

As a preliminary step in certain kinds of wood articles I first impregnate the article, preferably by a well-known vacuum system, with an aqueous solution of urea formaldehyde or the like of a proportion of two parts water to one part solid by weight, although it is possible to use a concentrated glue mix of one part solid to 0.65 part water by weight without, however, adding the usual condensing catalytic agent. This is to prevent premature curing and to lengthen the period of penetration before curing. If the diluted impregnate is used the water of dilution should be evaporated by any suitable method of drying after

the penetrating period is complete. Thereafter I follow the steps previously described. In this process, in the finished article the urea formaldehyde penetrates deeper than said mixture, thus providing an interior backing of fire resisting material in said article 10 and ensuring a stronger bond with the treated wood.

This process is not limited to the use of urea formaldehyde glue as other well known adhesives are suitable so long as they will chemically react with asbestos when heat is applied.

What I claim is:

1. A method of manufacture comprising applying a mixture of urea formaldehyde glue with a catalyst and asbestos to a surface of a ligno-cellulosic substance, applying pressure to said substance sufficiently to establish capillary attraction between said substance and said mixture, and applying heat and increased pressure to said substance until said mixture and latter-mentioned asbestos chemically react and harden and are integrally united to said substance.

2. A method of manufacture comprising applying a mixture of urea formaldehyde glue with a catalyst and asbestos to a surface of a ligno-cellulosic substance, then sprinkling some particles of asbestos on top thereof, applying pressure to said substance sufficiently to establish capillary attraction between said substance and said mixture, and applying heat and pressure to said substance until said mixture and latter-mentioned asbestos chemically react and harden and are integrally united to said substance.

3. An article of manufacture comprising a ligno-cellulosic substance, a surface portion of which embodies the chemical reaction product of asbestos and urea formaldehyde in said substance in hardened condition.

4. An article of manufacture comprising a ligno-cellulosic substance having a surface portion which is impregnated with urea formaldehyde, said surface portion also embodying the chemical reaction product in hardened condition of asbestos and urea formaldehyde extending from an outside surface to a lesser depth than said urea formaldehyde.

5. An article of manufacture comprising a ligno-cellulosic substance having a surface portion which is impregnated with urea formaldehyde, said surface portion also embodying the chemical reaction product in hardened condition of asbestos and urea formaldehyde extending from an outside surface to a lesser depth than said urea formaldehyde.

6. A method of manufacture comprising applying urea formaldehyde glue and then asbestos to a surface of a ligno-cellulosic substance, and applying pressure and heat to said substance until said urea formaldehyde glue and asbestos chemically react and are integrally united to said substance.

7. A method of manufacture comprising applying urea formaldehyde glue and then asbestos to a surface of a ligno-cellulosic substance, applying pressure, and heat of at least 200 degrees F., to said substance until said urea formaldehyde glue and asbestos chemically react and harden and are integrally united to said substance.

8. A method of manufacture comprising applying urea formaldehyde glue and asbestos to a surface of a ligno-cellulosic substance, applying pressure to said surface, and then applying heat and increased pressure of at least 100 pounds per square inch to said surface until said urea formaldehyde glue and asbestos chemically react and are integrally united to said substance.

9. A method of manufacture comprising applying urea formaldehyde glue and then asbestos to a surface of a ligno-cellulosic substance, applying pressure to said substance sufficiently to establish capillary attraction between said substance and said applied materials, and then applying heat and increased pressure to said substance and continuing said heat and pressure until said urea formaldehyde glue and asbestos chemically react with and are integrally united to said substance.

10. A method of manufacture comprising impregnating the surface portion of a ligno-cellulosic substance with urea formaldehyde that penetrates the interior somewhat, applying urea formaldehyde glue and asbestos thereafter to said surface, and applying pressure and heat to said substance until said urea formaldehyde glue and asbestos chemically react and harden and are integrally united to said substance.

11. A method of manufacture comprising impregnating the surface portion of a ligno-cellulosic substance with an aqueous solution of urea formaldehyde that penetrates the interior somewhat, then applying urea formaldehyde glue to said surface and then asbestos, and applying pressure and heat to said substance until said urea formaldehyde glue and asbestos chemically react and harden and are integrally united to said substance.

12. A method of manufacture comprising applying urea formaldehyde glue and then applying asbestos to a surface of a ligno-cellulosic substance, and applying pressure, and then heat and more pressure to said piece until said urea formaldehyde glue and asbestos chemically react and harden and are integrally united to said substance.

HORACE W. HALL.