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IMPREGNATION OF WOOD

Charles W. Mudge, Cranford, N. J., assignor to
Standard Oil Development Company, a corporation of Delaware

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This invention relates to an improvement in the treatment of wood, compressed fiber boards and the like, with mineral waxes whereby resistance of the products to the action of water is greatly improved.

The impregnation of wood with high melting waxes is now common practice and the various features of this treatment have been described in the patent and other literature. Wood after being thoroughly dried is immersed in a bath of molten high melting wax such as Montan wax with or without the application of pressure and a product of markedly superior properties such as ease of polishing, resistance to warping, cracking, decay and the like, is secured. Montan wax, which is especially suitable for this treatment, is a mineral wax which is usually imported and is produced by extraction of lignite and pyropissite with suitable solvents. Other waxes such as carnauba and candelilla, hardened Montan wax such as Romalin wax, or high melting paraffin waxes from petroleum, may be used in place of the Montan wax. The wax may be used in admixture with suitable solvents and penetrating oils such as cylinder oil, heavy naphtha and the like, with fireproofing agents such as sodium baborate, paradichlorbenzine, and the like, and with toxic agents or preservatives such as creosote, beta naphthol, sodium fluoride, zinc chloride, aluminum sulfate, arsenic compounds, borax and the like. These various agents may also be added to the wood prior to the wax treatment.

While the wax impregnated woods possess highly desirable properties they nevertheless generally possess the disadvantage that white blotches appear on the surface of the wood wherever it has been allowed to come in contact with water for an appreciable length of time. For example, woods impregnated with Montan wax are very desirable for flooring because they do not warp and are easily maintained in a highly polished condition. However, white blotches appear on such flooring wherever water is spilt on it and these blotches can be removed only by very vigorous polishing. I have now found means whereby wax impregnated wood may be rendered resistant to the action of water so that no bleaching or tendency to form blotches is apparent even when water is allowed to stand on the wood for extended periods of time.

In my improved process I first treat the wood with an aqueous solution of an acidic chemical. It is preferable that this chemical be one which does not cause charring or excessive oxidation of the wood during the subsequent drying and wax

impregnating treatment and I have found in general that non-charring acids and acidic salts are satisfactory. Among these may be mentioned acetic acid, hydrochloric acid, oxalic acid, zinc sulfate, potassium alum, aluminum sulfate, and the like or mixtures of the same. Free oxidizing acids such as sulfuric, even when very dilute, cause a marked darkening during the successive wax impregnation, and may be used when a glossy ebony-black surface is desired. For the purpose of this invention I class the dilute oxygen-containing acids, when below a concentration of about 10% in water, with the non-charring acidic chemicals. I distinguish this darkening of the wood from the charring action of stronger agents such as concentrated sulfuric acid, and define charring as an action causing a marked decrease in the physical characteristics of the wood; that is, a partial decomposition of the wood. An object of this invention is to pretreat the wood, so as to render it non-water-spotting after wax impregnation, without substantial decomposition during the pretreating step.

The impregnation of the wood with the acidic chemical need be only slight and it is generally sufficient to immerse the wood for a short time of say about ten minutes to one hour, in a bath consisting of an aqueous solution of the chemical it is desired to use. An aqueous spray may also be used. Very dilute concentrations such as 10% or 5% or even less of the chemical are satisfactory and a concentration of about 1% has been used to advantage. This treatment leaves only a very small trace of the chemical impregnated in the wood and is to be distinguished from pretreating steps for fireproofing or adding preservatives in which higher percentages such as even one third of the weight of the wood are added. Such treatments, in distinction to my own, also generally increase the splotching tendency of the wood.

It is not generally necessary to subject the wood to any special drying process before my treatment as the partially air-dried wood usually available is in satisfactory condition. However, if the wood is wet, or freshly cut and green, it may be preferable to dry or season it for a short time.

Suitable penetrating agents may be added to the aqueous solution used in my process and the time of the treatment may accordingly be shortened. Such penetrating agents are preferably volatile organic substances soluble in the chemical solution, and having no deleterious effects on the wood during its subsequent treatment and use. I have found the lower aliphatic alcohols satisfactory for this use and isopropyl alcohol, popu-

larly known as "Petrohol" is particularly desirable. These penetrating solutions may also be used in very dilute concentrations of below about 10% and I have found a solution containing
5 about 1% of Petrohol and 1% of acetic acid or hydrochloric acid satisfactory.

My process is preferably applied to wood, fiber boards and the like, which have already been shaped for their ultimate use in which case it is
10 necessary to impregnate the wood to only a slight depth below the surface. However, my process may also be applied to wood in the rough and in such cases it is preferable to dry the wood more thoroughly with or without vacuum and to
15 apply the treating solution at elevated pressures.

Elevated temperatures, while not generally necessary, are of advantage in that the time of treatment is materially decreased. For example, an increase in temperature of about 40° F.
20 above normal temperature permits the treatment to be conducted in about half the time normally required. Temperatures even sufficient to vaporize water at the pressure used may be employed, and the treatment may be conducted with
25 a vaporized treating agent, as with a mixture of hydrochloric acid vapor and steam, with or without alcohol vapor or other penetrating agents.

My invention is not to be limited to any theory

of the operation of my process, nor to any illustrative examples, but only to the following claims, in which I wish to claim all novelty insofar as the prior art permits.

I claim:

1. An improvement in the process of impregnating wood, fiber board and the like with compounds in which Montan or a similar wax is the major ingredient, for the purpose of rendering the wax impregnated wood non-bleaching in the
10 presence of water which comprises subjecting the wood to a pretreatment comprising wetting the wood with a solution of hydrogen chloride in a lower aliphatic alcohol and water, said solution containing not more than 10% hydrogen chlo-
15 ride.

2. Process according to claim 1 in which the lower aliphatic alcohol is isopropyl alcohol.

3. An improvement in the process of impregnating wood, fiber board and the like with Montan wax which comprises subjecting the wood
20 to a pretreatment comprising wetting the wood with a dilute aqueous solution of hydrochloric acid.

4. Process according to claim 3 in which the
25 pretreatment solution includes an aqueous solution of an alcohol.

CHARLES W. MUDGE.