

UNITED STATES PATENT OFFICE

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PROCESS FOR TREATING WOOD

No Drawing.

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The present invention relates to the treatment of wood and has particular reference to a process whereby the wood is subject to treatment of a saccharide solution. Attempts have been made heretofore to treat woods with saccharides or solutions containing sugar, dextrine and gum. Difficulty has been encountered, however, in getting a sufficient penetration to completely impregnate the fibres or cells of the wood.

I have determined that by subjecting the wood to pressure while immersed in a saccharide solution, I am able to completely penetrate the most refractory wood.

According to my improved process, I immerse the wood in a saccharide solution such as a monosaccharide, disaccharide or polysaccharide or in a combination of these and subject the same to pressure. The pressure is applied either by the use of steam or air or may be applied hydrostatically. The solution is preferably heated by either direct contact or heat indirectly applied.

The period for which the wood will be subjected to the heat and pressure will vary with different species of wood and also will depend somewhat upon the thickness of wood and the degree of impregnation desired.

In a specific example of my process to which, however, my invention is not limited, I immerse a hickory plank of heart wood approximately two inches thick, eight inches wide and of any desired length in a solution composed of 20% of a monosaccharide and 3% of sodium fluoride, the solvent being water. This solution is held in a closed tank or retort capable of withstanding working pressures of from 100 to upwards of 250 pounds per square inch. I subject the solution and the wood immersed therein to a temperature ranging from 200° to 280° F. and build up a pressure in the retort of from 160 to 180 pounds per square inch. These heat and pressure conditions are maintained for approximately four hours. After this interval, the temperature is reduced to substantially 100° F. and the pressure is relieved or reduced to that of the atmosphere. The wood thus treated when removed from the tank or retort has been completely penetrated

throughout with monosaccharide and sodium fluoride. The latter element renders the wood immune to attack of fungi and insects.

The saccharides are used for improving the wood such as reducing the shrinkage, checking, honeycombing, cupping and warping. Their use also enables a more severe kiln drying schedule. That is to say, the drying time is materially reduced. The presence of the saccharide in the wood also reduces the hygroscopicity or the moisture absorbing tendencies.

I also preferably use fire-resisting salts to make the wood fireproof and in some cases I add a suitable material to the solution as hereinafter specified in order to improve dielectric or insulation qualities of the wood and make it moisture resistant.

In the specific example of the process given I have mentioned sodium fluoride as the agent used to resist an attack of fungi or insects. I am not limited thereto, however, as I may use in place thereof zinc chloride, arsenic or dinitrophenol, or other suitable toxic salts or substances.

For fireproofing the wood, I will preferably add either ammonium sulphate, ammonium phosphate or sodium borate.

For adding to the dielectric qualities and also moisture resistant qualities of the wood, I will use liquid rubber or latex.

I also contemplate the addition to the saccharide of a small quantity of starch, dextrine, gum or colloidal substance in order to assist in hardening the wood or cementing the wood fibres together. In other cases, I will make an addition to the solution of a suitable mineral or vegetable oil to form an emulsion.

The insect-resisting, fire-resisting or electric insulating mediums may be either mixed with the saccharide solutions and the wood subjected to steam or air pressure or the like. Or the wood may be first subjected to treatment under pressure while immersed in the saccharide solution and may be later treated with the insect, fire, or electric current resistant materials.

In some cases, I may also subject the wood

to a vacuum either before or after the heat and pressure treatment, or both before and after this treatment. This vacuum is for the purpose of extracting liquid material contained in the wood before treatment by heat and pressure. Or the vacuum may be applied to extract the surplus solution after the wood has been given the heat and pressure treatment. However, when this vacuum treatment is used it is applied to the wood either before the solution is put in the tank or retort or after the solution has been removed.

In treating some woods, it may be desirable to dispense with the heating of the solution and thus treating the wood under pressure in a comparatively cold state.

This treatment may be carried on either with or without the vacuum treatment.

My improved process also embraces the step of drying the treated wood in a kiln by use of a higher temperature than can be used where the wood has not been subjected to such treatment. In carrying out this drying step, I introduce the wood into a suitable kiln and subject it to temperatures ranging from 140 to 240° F. The air in the kiln is humidified so as not to injure the wood. Either a natural or forced air circulation is maintained in the kiln. The humidifying is accomplished either by steam or spraying water. In some instances the natural moisture extracted from the wood will be sufficient to humidify the kiln atmosphere. The wood which has been initially subjected to the saccharide solution under pressure can be kiln dried in a much shorter time than by any other process of which I am aware.

In the claims where I refer to the saccharide solution, it is to be understood that I may employ either a monosaccharide solution, a disaccharide solution, a polysaccharide solution or any combination of these saccharides. The reference to the pressure in the claims is intended to cover a pressure applied either by steam, air or water.

In some of the solutions herein referred to, I consider it advantageous to add either a mineral or a vegetable oil to form an emulsion.

While I have described certain precise steps and recited specific temperatures, processes and chemical agents, it is not to be construed that I am limited thereto as the examples given are to be viewed more in an illustrative than in a limiting sense since various modifications may be made without departing from the invention as defined in the appended claims.

What I claim is:—

1. The process of treating wood which consists in subjecting it to the action of a saccharide solution under pressure to secure complete penetration by said solution and

adding a mineral or vegetable oil to the solution to form an emulsion.

2. The process of treating wood which consists in subjecting it to the action of a saccharide solution under pressure to secure complete penetration by said solution and in which latex is added to the solution so as to make the wood moisture resistant and to increase its dielectric properties.

In witness whereof, I have hereunto signed my name.

ARTHUR P. ALLEN.

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