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# UNITED STATES PATENT OFFICE

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## PROCESS FOR PRESERVING WOOD

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The preserving of wood with water-soluble impregnating substances is well known to involve the drawback that the protective substances introduced into the wood and soluble in water may be washed out of the wood by the entry of moisture, atmospheric deposits, soil water and the like. To avoid this disadvantage it has already been proposed to impregnate wood with solutions from which difficultly soluble compounds are precipitated when the water is evaporated. Similarly it has already been proposed to impregnate the wood successively with two solutions, which are intended to react in the wood to form difficultly soluble protective substances. The known proposals of this kind have not proved satisfactory in practice. The solutions used in the first method were as a rule too unstable and readily decomposed more especially at an increased temperature. In the case of the successive impregnation with two solutions in the manner above described, there was the difficulty that the reaction of the substances contained in the solutions only took place incompletely in the wood, so that the object aimed at could not be attained.

It has been found that it is possible to reduce the capacity of the water soluble protectives introduced into the wood, for being leached out, if the wood is impregnated successively with two solutions, the constitutents of which do not form insoluble or difficulty soluble compounds, but one solution contains substances which reduce the solubility in water of the substances contained in the other solution. For carrying out the invention for instance the wood is first of all treated with an approximately 2.0% solution of sodium fluosilicate and subsequently impregnated with a 4.0% solution of common salt. When the wood is dried, a mixture of sodium fluosilicate and common salt remains therein. If the wood now comes into contact with water, the common salt which is readily soluble in water, passes into solution and thus makes the leaching out of the sodium fluosilicate difficult, as this salt is much more difficultly soluble in a solution of sodium chloride than in water alone. In a similar manner the wood can first of all be impregnated with an aqueous solution of sodium $\beta$-naphthalene sulphonate and then with a solution of common salt or for carrying out the double impregnation use may be made of any other solutions desired. The same must behave in the manner indicated above, viz the constituents contained in one solution reduce the solubility of the substances dissolved in the other solution, which are to be rendered difficult to wash out.

As a rule it will be advisable first of all to introduce into the wood the substances which serve to protect the wood and which are to be rendered difficult to leach out by the introduction of the other solution. This first solution is preferably introduced by an empty cell process, so that during the first impregnation as far as possible only the cell walls of the wood are uniformly soaked in all penetrable portions. This is then followed by the introduction of the second solution preferably by the full cell process. As empty cell process use may be made for instance of the Rüping process described in German Patent No. 138933, but any other empty cell process can also be used. The second solution instead of being introduced into the wood by the full cell process can also be introduced by the immersion process (by steeping the wood in the liquor in open receptacles). This method is particularly advisable when the constituents of the second solution attack iron.

The wood can also be treated in the reverse order, that is to say the solution which makes it difficult to leach out the preservatives can be introduced into the wood first, and the latter impregnated subsequently with the solution of these protective substances. The proportions of the substances contained in

the two solutions are chosen from case to case according to the properties of the substances used; for instance the substances concerned can be used in approximately equivalent proportions or preferably in excess one with respect to the other. The proportions are preferably chosen such that the tendency of the preservatives to be leached out is diminished as much as possible. Consequently as much as possible of the substances which make it difficult for the preservatives to be leached out, will be introduced into the wood.

*Example*

The wood contained in an iron steeping vat is first of all exposed to an air pressure of 3 atms. and then while maintaining this air pressure a 2% solution of sodium fluosilicate is forced at a temperature of 70° C. under a liquid pressure of 8 atms. into the vat. This liquid pressure is maintained for an hour, then the liquid is drained off and the vat exhausted. The amount of liquor thus extracted from the wood is drained out of the vat. It is then exhausted again. After a quarter of an hour's vacuum of at least 60 cms. a 4.0% solution of common salt is introduced into the vat, and this solution is forced into the vat until the pressure reaches 8 atms. This pressure is maintained for 2 hours, whereupon the liquor is drained off and the steeping of the wood is finished. The solution of common salt is also preferably used in a hot state at a temperature of 70° C.

For the purpose of preventing leaching out, use may be made, as already mentioned, of any compounds which are capable of reducing the solubility of the protective substances. Preferably however for this purpose use will be made of salts, which in themselves also have a protective action on wood, for instance zinc salts or substances having the property of reducing the inflammability of wood, such as for instance ammonium salts, boron compounds etc.

My invention is not limited either to the use of the said substances or to the use of the methods described. On the contrary it relates broadly to preventing or making difficult the leaching out of the preservatives introduced into the wood by successive impregnation with substances having the properties described above. By preservatives I mean in my application broadly all organic or inorganic substances capable of protecting wood against the attack of destructive fungi or insects such as for instance termites or against catching fire easily.

What I claim is:—

1. A process for making it difficult to wash out the water-soluble protective substances introduced into wood, consisting in introducing a solution of protective substances into wood and also introducing a separate solution of substances which do not form difficultly soluble compounds with the protective substances, but reduce their solubility in water, as set forth.

2. A process for making it difficult to wash out the water-soluble protective substances introduced into wood, consisting in introducing a solution of protective substances into wood and also introducing a separate solution of substances which do not form difficultly soluble compounds with the protective substances, but reduce their solubility in water, and have a protective action against organisms and other destructive influences, such as fire, as set forth.

3. A process as claimed in claim 2 and in which the first solution is introduced into the wood according to an empty cell process, as set forth.

4. A process as claimed in claim 2 and in which the first solution is introduced into the wood according to an empty cell process and the second solution according to the full cell process, as set forth.

In testimony whereof I have signed my name to this specification.

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