UNITED STATES PATENT OFFICE.

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PROCESS OF TREATING WOOD.

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To all whom it may concern:

Be it known that I, HARRY W. BROADY, a citizen of the United States, and a resident of Bayside, in the county of Queens, State of New York, have invented certain new and useful Improvements in Processes of Treating Wood, of which the following is a description in such full, clear, and exact terms as will enable any person skilled in the art to which it pertains to make and use the same.

My invention relates to a process of preserving wood by treating it with a waxy compound which lines or covers the cell walls and cavities thereof.

Heretofore such treatment has been attempted by simply submerging the wood in the heated compound. But this has resulted in incomplete success because the compound thus applied has filled and agglomerated in the cavities at some places and to other places in the wood the compound has not reached at all. The object of my present invention is to overcome these defects and to cause the compound uniformly to enter to the remote recesses of the wood and simply line or coat the walls of such recesses instead of gathering in masses which clog and fill the same.

Any desired wax-like impervious or waterproof material or compound of materials which will spread out in a film on the surfaces treated and which may be softened or rendered fluid by heat may be employed, though I prefer a compound of approximately 25% bitumen and 75% paraffin.

The ingredients of the wax-like, impervious mixture are mixed by melting them together. The temperature required, in the case of bitumen and paraffin is approximately 160° F. to 180° F.

When the hot bath is thus prepared the wood in its normal green state, or if desired in cured or partly cured form, is submerged in the mixture and the temperature raised to approximately 212 to 265°. (These temperatures are deemed best for waterproofing composed of bitumen and paraffin but may be varied if desired or when other materials are used). The result of this submersion of the wood is that the moisture therein is driven off as steam and escapes in bubbles through the bath during and after which the mixture enters the pores and cavities of the wood. The mixture should be fluid so that it readily penetrates the wood deeply.

It is an object of my invention to cause the mixture to spread out in a film or coat along the inner surfaces of the walls of the cavities and not simply to clog or plug up and completely fill these cavities.

I attain this condition by treating the wood to a primary submersion which is preferably carried on until the bubbling ceases, this bubbling being due to the escape of moisture (steam) and gases from the wood. The time required for the primary submersion depends upon the size and kind of wood treated. It drives off part of the moisture and part of the expanded gases from the wood and effects penetration as complete as may be at that time. The bath is now allowed to cool, preferably with the wood therein. The cooling of the bath produces an internal vacuous condition; the internal cavities are filled to a greater or less extent with the liquid which hardens in the wood; after which the bath is again heated and liquefied as before. The second heating should drive out the excess deposited in the vessels and cavities. There is practically no bubbling on the second heating.

The treatment therefore provides a more uniform coating for the cavities in the wood. In this way I secure the principal object of my invention, *i. e.* the uniform coating of the internal cavities and the thorough penetration of the wood. If desired the wood may be withdrawn from the mixture after the first heating and the second heating of the wood carried on in any suitable chamber.

It is my opinion, based on my experiments, that this deep, uniform coating of the wood cavities upon heating, cooling and reheating of the mixture is due largely to the action of the gases in the pores expanding, contracting and condensing under the varying heat degrees. The gases expand under the first treatment and that part not actually vented or driven off at the first heating contracts or condenses on cooling so that a partial vacuum is formed in the innermost parts of the wood cavities which allows the pressure of the atmosphere to force the still soft mixture in greater quantities farther into the wood. Then on reheating, the excess mixture near the surface being liquefied, is driven out by the reheated and expanded interior gases so as to leave on the interior cavities a coating or lining, but without clogging or agglomerating in the cavities. After the wood receives this

double heating in the bath described it is withdrawn while the bath is yet hot, the excess of the composite material is allowed to drain off and that remaining in the wood to cool and harden to form the permanent treatment of the wood.

What I claim is:—

1. The process of treating wood to coat or line its cell walls or cavities, which consists in treating it to penetration by and in a bath of wax-like material heated to fluidity, cooling said bath with the wood therein, heating the wood and the material therein to fluidity of the latter and cooling the wood and said material therein.

2. The process of treating wood to coat or line its cell walls or cavities, which consists in treating it to penetration by and in a bath of wax-like material heated to fluidity, cooling the wood and the material deposited threin, reheating the wood and the material therein to fluidity of the material and again cooling the wood and said material therein.

In testimony whereof I have hereunto signed my name in the presence of two witnesses.

HARRY W. BROADY.

Witnesses:

ISAAC B. OWENS,

PATRICK A. BOLGER.