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WOOD PRESERVATION AND MODE OF TREATMENT

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3 Claims. (Cl. 21—45)

This invention relates to the treatment of wood, timber or forest products and aims to provide certain important improvements in the method of treatment set forth in our copending application, Ser. No. 612,379, filed May 19, 1932. The main idea is to utilize vegetable lecithin or phosphatide most effectively in the art of preserving wood so as to insure a substantially uniform and clean product in which bleeding is reduced to a minimum.

Other aims and advantages of the invention will appear in the following description of one illustrative mode of treatment.

Our copending application explains the advantages of treating wood with an oily preservative and a small percentage of phosphatide or a vegetable lecithin, such as that obtained from soya beans. In our aforesaid application, we describe an illustrative mode of treatment of wood by what is known as the empty cell process, wherein the preservative solution or treating liquid is injected into the wood cells. The preferred percentage of phosphatide or vegetable lecithin ranges between 0.25% and 2% by weight dissolved in the carrier liquid or oil. It has been found that 1% of phosphatide used in conjunction with creosote or other preserving oil produces very good results. This application relates to certain important improvements in the mode of treatment to produce more uniform results and to reduce the very objectionable bleeding to an absolute minimum.

We have found that the percentage of moisture in the seasoned timber or lumber, as the case may be, has a very important bearing on the results obtained by the treatment. In accordance with our improved method, we first determine the percentage of moisture based on the dry weight of the wood and, if the moisture content is less than 30%, we have found that it is quite important to raise this content to between 30% and 45%, depending on the quantity of oil to be retained. The greater the quantity of oil required per cubic foot, the greater should be the moisture content.

To raise the moisture content, water is injected under pressure into the wood by the "empty cell" or "full cell" process. While plain water will produce satisfactory results, we have found that water made slightly basic by the addition of an alkali, such as sodium hydroxide or potassium hydroxide, will give better results. After this preliminary treatment or pre-wetting the moisture content is accurately determined by the usual evaporation test on samples taken from the wood.

After the timber to be treated has been properly conditioned by the well known steam conditioning or air drying process, it is subjected to initial air pressure varying between 30 and 80 pounds per square inch in a closed retort for a period of not less than 30 minutes. The preservative solution, consisting of a mixture of a small percentage of phosphatide with the preserving oil, such as creosote, is then introduced into the retort without loss of pressure until the retort is completely filled. Additional preservative solution, containing the phosphatide, is pumped into the timber by means of a pressure pump or any other apparatus which will force the solution into the timber at a hydrostatic pressure of from 125 to 200 pounds per square inch.

When the timber has absorbed a predetermined and sufficient amount of the preservative solution, to insure a correct final net retention, we slowly release the hydrostatic pressure and then empty the retort or cylinder of all free preservative. After this is done, we create in the cylinder a vacuum of from 22 to 27 inches over a period of from thirty minutes to sixty minutes in order to further rid the timber of free and excess oil or solution. This vacuum is then broken and air pressure applied to the timber at from 20 pounds to 100 pounds per square inch. The air is then slowly allowed to escape from the timber and the retort and a second vacuum of from 22 inches to 27 inches is created in the retort for a period of approximately one hour, at the end of which time the vacuum is again broken and the cylinder or retort is drained of all liquid.

After the preserving solution is injected into the timber, as above described, we find it highly desirable to introduce water to which has been added a small quantity of alkali, such as sodium hydroxide, to make the water approximately tenth normal in strength. This water is injected into the timber either by a slight modification of the above described process or by means of a vacuum or Bethell process. Of course, the water may be injected by any other suitable method and, after draining the retort, the timber may or may not be subjected to a final vacuum treatment. Whether or not a final vacuum is drawn will depend upon the amount of water, to which a small quantity of alkali has been added, absorbed by the timber. However, we have found as a general rule that the vacuum, after the water is injected, gives somewhat better results.

The treatment is then complete and the timber may be removed from the retort or cylinder.

To give a concrete example of this improved mode of treatment, we shall assume that yellow pine is to be treated with eight pounds of creosote per cubic foot by either the "empty cell" or "full cell" process. The bone dry weight of this timber is approximately 30 pounds per cubic foot. We have found that the total moisture content of this treated wood should be approximately 13½ pounds per cubic foot to give the best results. The quantity of water to produce fiber saturation is approximately 9 pounds per cubic foot. Therefore, the treated product should contain approximately 4½ pounds of water per cubic foot above the amount of water to produce fiber saturation. In other words, the approximate ratio of oil to water above the saturation point of the wood should be approximately 60% and 40% respectively. That is to say, for every 3 pounds of oil, about 2 pounds of water above the fiber saturation point should be injected or introduced. In the above example, 4½ to 5 pounds of water above fiber saturation is added in the treatment of yellow pine with a net retention of 8 pounds of creosote. We find that it is very much better to pre-wet the air-seasoned timber if its moisture content is below 30% than it is to inject the preserving solution and thereafter introduce all of the water. The improved method seems to produce a better cohesive union of the oil and water throughout the pores of the wood.

Practical application of the method has shown conclusively that the treated timber will not exude the preserving oil throughout the drying-out period, and there is no evidence of bleeding. The surface of poles treated according to the method remains perfectly clean and there is no oil to smear on clothing. Furthermore, by retaining a substantially fixed quantity of oil and water, the poles are not subject to destructive checking and cracking during their drying-out period.

Having thus described one illustrative mode of treatment, without, however, limiting ourselves to a strict conformity therewith, what we claim and desire to secure by Letters Patent is:—

1. That process of treating wood or timber which is characterized by injecting water and a preserving oil containing a small percentage of phosphatide into the wood in such quantities that the ratio of the retained moisture above the fiber saturation point of the wood and the preserving oil is approximately as 2 is to 3.

2. That process of treating wood or timber which comprises pre-wetting the wood when its moisture content is less than 30% of its dry weight by injecting water into the wood so that the moisture content is raised to between 30% and 45% of its dry weight; injecting a preserving oil containing phosphatide into the wood; and, finally, introducing more water into the wood to raise the moisture content of the wood well above the quantity required to produce fiber saturation.

3. That process of treating wood or timber which is characterized by pre-wetting the wood with water containing a small amount of an alkali so that the moisture content ranges between 30 and 45% of the dry weight of the wood; then injecting a preserving oil containing approximately 1% of phosphatide into the wood in the amount required; and thereafter introducing water, also containing a small percentage of an alkali into the wood so as to produce a ratio between the moisture content above the fiber saturation point and the preserving oil of approximately 2 to 3.

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