

UNITED STATES PATENT OFFICE

2,350,845

PROCESS OF CONDITIONING WOOD FOR PRESERVATIVE TREATMENT

Joseph A. Vaughan, Atlanta, Ga., assignor to
Southern Wood Preserving Company, Atlanta,
Ga., a corporation of Georgia

No Drawing. Application September 19, 1940,
Serial No. 357,503

3 Claims. (Cl. 117—59)

This invention relates to a process of conditioning forest products for subsequent preservative treatment, more particularly to a preliminary or pre-wetting treatment of partially or fully air-seasoned timber, such as poles, piles and cross-ties to restore to the outer layers and fibers of the wood sufficient moisture, approximating fiber saturation to make it possible to inject large gross quantities of a preservative into the treatable portion of the wood and to promote uniform penetration and distribution of the preservative.

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

Wood in the so called "green" state with a moisture content in excess of fifty percent (dry basis) in the sapwood, is necessarily air-seasoned or artificially conditioned in order that proper penetration of the preservative may be secured. As it tends to dry from the surface inward, a moisture gradient is produced and, whereas the surface layers may have reached a treatable condition, the inner layers, especially those of the sapwood as it approaches the heartwood, may not have reached a treatable condition in a given period. Also, the drying in the same piece or in different pieces of the same age from cutting, may not be uniform, some pieces requiring a greater length of time to reach treatable condition than others.

If timbers, such as poles, piling and the like are partially air-seasoned, the outside layers of the wood frequently take a set, known in the art as "case-hardening" and the fibers of the wood reach a moisture content below their fiber-saturation point which is usually twenty-five to thirty percent. Case-hardening and excessive dryness below fiber-saturation are objectionable; first, because they may seriously retard the flow of preservative, such as coal-tar creosote, into the wood during treatment, thus preventing adequate penetration and uniform distribution of the preservative in the timber; second, even though satisfactory penetration is secured, partial recovery of the gross injection of preservative may be insufficient, thus resulting in net retentions of preservative in excess of that specified, and third, the treated timber may be subject to excessive "bleeding" or "fluid exudation" of the injected preservative.

In addition to the three foregoing objections, there is a further objection encountered in the case of certain processes designed to produce light-colored, non-bleeding creosoted pine poles.

Due to the excess net retention of preservative and to the excessive surface or near surface concentration of the preservative, especially an oily preservative, the resultant product is dark in color and absorbs more heat, thus contributing to a less satisfactory appearance of the treated timber as well as to additional fluid exudation or bleeding.

If the "green" wood is artificially conditioned, by such treatment as the well known steam-and-vacuum process, some advantage may be secured, but, due to the relatively small quantity of water removed by this process, it is usually found that a large percentage of the pieces have failed to reach satisfactory treating conditions and thus fail, in the preservative treatment, to meet specified preservative penetration requirements. In addition, the shipping weight of the timber is high, due to water left in the pieces.

This invention, which is the result of years of study of the surface condition of partially air-seasoned and fully air-seasoned timber, including numerous practical treatments both in a pilot plant and in commercial treating cylinders, provides a method which overcomes the foregoing objections.

In accordance with the invention, the timber or wood is allowed to air-season for a period of say, from sixty to one-hundred and twenty days after cutting or until the average dry basis moisture content of the sapwood has reached a percentage of from thirty percent to fifty percent. The drying period depends upon the seasoning period of the year. The timber is then loaded on trams and conveyed to a treating cylinder or other preparatory chamber for the pre-wetting treatment.

One illustrative procedure is to subject the timber to a short steaming period of, say, three to six hours at a temperature of from 230° F. to 260° F. and this is followed by drawing a vacuum of approximately 23 inches to 27 inches of mercury for a period of from one to three hours. After breaking the vacuum and draining the cylinder or chamber, the timber is subjected to an air pressure of from forty pounds to one-hundred pounds gauge for a period of from thirty minutes to one hour. Without releasing this air-pressure, water is introduced into the chamber to penetrate the sapwood. In some instances, a small portion of metallic base or salt such as sodium hydroxide or zinc chloride is mixed with the water to produce about a tenth normal solution or less. The water or solution is allowed to remain in contact with the timber for from five

minutes to thirty minutes, or until the moisture content of the penetrated sapwood reaches or slightly exceeds that of fiber saturation. The water is then removed from the chamber and, by action of the air confined in the timber, partially removed from the wood. This procedure leaves in the wood sufficient water of solution to wet the wood fibers to a moderate depth and leaves a small portion of free water in the wood cells or voids. The preservative is then injected before further drying takes place.

This pre-wetting method thus restores the outer layers and fibers of the wood to near their fiber-saturation point without introducing an excess of water which usually interferes with injection of the preservative and thus makes possible injection of large gross quantities of the preservative into the treatable portion of the wood, resulting in deep and uniform penetration of preservative. As this procedure leaves only a small quantity of free water in the wood cells, there is little, if any, pick-up of water in the preservative during the subsequent treatment. Furthermore, the pre-wetting treatment facilitates the recovery of any excess preservative above that specified as net retention and leaves the surface of the timber lighter colored, drier, cleaner and freer of "bleeding" or fluid exudation of the preservative.

Obviously, the method is not restricted to particular steps herein described.

What is claimed is:

1. That method of conditioning partially air-seasoned timber for immediate preservative treatment which comprises subjecting it to a steam and vacuum treatment; then to air under pressure to trap air in and fill the cells of the dry sapwood; maintaining the pressure and also introducing water into the sapwood cells; re-

leasing the pressure to permit the confined air to entrain and expel free moisture from the cell voids; and finally introducing the preservative before the retained fiber saturating moisture dries out.

2. That method of conditioning air-seasoned timber for preservative treatment which comprises first subjecting it to a steam and vacuum treatment; then to air pressure to fill the voids in the dry sapwood; then injecting water under pressure into the air laden cells of the sapwood only; then releasing the pressure so that the confined air will remove the excess water from the voids and leave the sapwood fibers saturated; and finally introducing an oily preservative before the retained moisture dries out.

3. That method of conditioning air seasoned timber for preservative treatment which comprises placing the timber in a closed chamber; steaming the timber for a period of from three to six hours at a temperature between 230° F. and 260° F.; drawing a vacuum of approximately 23 to 27 inches of mercury for a period of from one to three hours; breaking the vacuum and draining water from the chamber; injecting air into the timber at a pressure of from 40# to 100#, gauge, for a period of thirty minutes to one hour; introducing water into the chamber to penetrate the sapwood of the timber without releasing the air pressure and permitting the water to remain in contact with the timber until the moisture content of the penetrated sapwood slightly exceeds that of fiber saturation; draining the water from the chamber and permitting the trapped air in the sapwood of the timber to entrain and remove some of the free moisture; and immediately following the treatment by injecting an oily wood preservative.

JOSEPH A. VAUGHAN.