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PROCESS OF SHRINKING WOOD

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1 Claim. (Cl. 144—309)

The present invention is based on the discovery that in shrinking or compressing wood, it is unnecessary to treat the wood with any agent which itself will solidify in the fibers of the wood or which mixed with the fibers or cellular contents of the wood will solidify.

The object of my invention is to produce shrunk wood in a simple economical and practical manner without pre-boiling or steaming, and by which the wood may be compressed either longitudinally or transversely of the length of its fibers. By dispensing with pre-boiling or pre-steaming the wood in water and avoiding the use of chemicals which digest or dissolve the wood tissues and cellular contents, I am enabled to produce a product in which the wood fibers are not destroyed, but are compressed or collapsed together. Since my process makes it possible to compress the wood both with and across the grain, I am enabled to produce for any given use a piece of compressed wood most suitable for the purpose intended and required.

The solidified or compressed wood produced by the process hereinafter described does not shrink, swell or warp with changes in atmospheric conditions. Neither does it splinter nor split. It may be worked and polished. The processed wood finds use in tools, as bearings and as lining in machinery where metal cannot work or is dangerous to use as in oil pumps or in other machinery or equipment handling oil, gas, or explosives. Since it does not split or rough on the cross grain, the processed wood is well adapted for use as gears or as loom shuttles. It also makes desirable flooring. For this purpose while the wood is in a semi-plastic state during the process, as later described, it may be shaped in hexagonal or other shaped dies and cut the proper thickness to simulate tile or mosaic flooring.

In the preferred manner of practicing my invention, I take a block of natural hard or soft wood and immerse it in raw or boiled linseed oil. As a precaution, the linseed oil is prepared by cleansing it of solid matter and of sediment by mixing it with 3% or thereabouts in volume of carbolic acid or other suitable cleansing agent and allowing the solids, sediment, and acid to settle to the bottom of the container. The cleansed linseed oil may then be mixed with 1% in weight of sodium chloride. The wood is soaked to saturation in the oil. To hasten the process of saturation the oil is warmed, care being taken to prevent boiling. Experiments have shown that sodium chloride renders the oil more resistant to heat; consequently the treated oil may be heated to a higher temperature without boiling during the step of saturation of the wood, thereby hastening such step. Likewise, higher temperatures may be employed while the oil-saturated wood is under heat and pressure, as hereinafter explained. From three to thirty-six hours are required to saturate the wood depending upon the size of the piece and its character. In some cases it may be desirable to force the oil in the wood by pressure or by other known ways.

I prefer the use of linseed oil as a softening agent and as a conductor for the heat later applied because of its penetrating properties; and because, since it does not solidify except in extremely low temperatures and no opportunity is given for oxidation, it may be expressed from the wood by pressure, leaving a hard homogeneous cellulose mass. Any oil possessing similar characteristics may be used.

The saturated piece of wood after removal from the oil bath is put in a heated press or mold and pressure applied. The temperature of the mold or press is kept below the point at which the oil in the wood will vaporize. The oil acts as a conductor of the heat from the press or mold and from the surface of the wood to the interior of the wood. During the heating and pressing, the wood is in a semi-plastic state. The pressure applied is sufficient to compress the wood to a solid state so that there are no spaces between the fibers, and so that the cell walls are collapsed.

In shrinking the wood lengthwise of its fibers or grain, the moving pressure is applied transversely of the grain, the press or mold simultaneously exerting a confining pressure at right angles to the applied pressure. In this case, a piece of black walnut loses 55% of its original thickness; red cedar, 75%; willow and elm 80%. To shrink the wood at right angles to the grain, a funnel-shaped mold is employed with pressure applied from above to force the semi-plastic mass into a narrower compass. The wood may thus be reduced to two-thirds or less of its original diameter.

After cooling the solidified and shrunk wood may be removed from the mold without mechanical assistance. Wood processed as I have described possesses great strength and durability. Black walnut so processed withstands an end thrust or crush test of 17,000 pounds per square inch; elm, 24,000 pounds. The tensile strength is also increased. The weight, however, of a

piece of treated wood is about the same as in its original state.

I claim:—

The process of shrinking wood comprising the following steps: saturating the wood by immersion in a bath of hot but not boiling linseed oil containing sodium chloride; thereafter expressing the oil from the wood and collapsing its fibers by the simultaneous application of heat and of pressure applied both transversely and longitudinally of the grain of the wood; removing the heat and continuing the application of such pressure until the wood is cool; thereafter removing the wood from the pressure applying means.

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