

# UNITED STATES PATENT OFFICE.

JOHN McLACHLAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO JOHN McLACHLAN  
AND FRANK P. STONE, OF SAME PLACE.

## PROCESS OF SOLIDIFYING WOOD.

SPECIFICATION forming part of Letters Patent No. 575,973, dated January 26, 1897.

Application filed July 9, 1894. Serial No. 517,009. (No specimens.)

*To all whom it may concern:*

Be it known that I, JOHN McLACHLAN, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in the Process of Solidifying Wood, of which the following is a specification.

My object in this invention has been to produce an article of compressed wood which shall be so hard, solid, and firm as not to be readily penetrated, divided, or abraded, which shall be proof against natural decay and moisture, and which may also be made proof against destruction by vermin and by fire. The qualities imparted to the wood by my invention are such as to fit it to be used as a substitute in many places for metal.

The improvement calls not only for such a compression of the wood as will greatly reduce its bulk and solidify its fibers, and thus to produce the degree of hardness required, but it may also include a peculiar treatment adapted to give it the other qualities mentioned.

In the preferred manner of practicing my invention I take natural wood, either hard or soft, and first subject it to the cooking action of a hot fluid either in a liquid or gaseous form, as by water-boiling or steaming it sufficiently to expand it and open its pores, soften the fibers, and dissolve the saps and juices and bring it into favorable condition for the next step in the treatment. Instead of this, however, the wood may be either air or kiln dried, so as to dry up the juices and saps and leave the material in good condition to take up the oil freely and be thoroughly permeated and impregnated therewith. When well seasoned, it can be well impregnated with the oil, though perhaps not so easily or perfectly as when it is boiled or steamed. The cured wood, which has been deprived of its sap or cured by boiling, steaming, or seasoning, is next immersed in oil, using, by preference, for this purpose an oil of a penetrating quality which will harden when it becomes cold. The oil penetrates the wood, and as it does this most efficiently when hot I immerse the wood in oil which is already hot or is heated at some time during the immersion. My preference is to submerge the wood while still hot from

the water or steam treatment in cold oil, and then to heat the latter until it boils gently. By this treatment the albuminous matter in the wood is either dissolved, removed, or so softened as to insure its being squeezed out when the compressing power is applied, and at the same time the fibers are so softened that they readily flatten out under the compression and come into very close and intimate contact with each other, each fiber conforming to its neighbor fibers, and forming a very-close-textured product. I have found cotton-seed oil to be peculiarly well adapted to this use, particularly for its penetrating quality.

After the wood has been sufficiently saturated with oil I subject it while hot to powerful pressure applied to the sides of the fibers, the pressure being sufficient to reduce the thickness or width of the wood from one-half to two-thirds, the press employed for the purpose being previously heated or heat being applied to it, so that it will remain hot during the entire operation and prevent any chill being imparted to the wood before the compression has reached the desired stage. The degree of compression and the length of time during which the pressure is applied vary according to the nature of the wood, its size, the use to which it is to be put, &c. When the product is intended as a substitute for metal, it is compressed to a considerable degree and until it becomes very dense. When it is not to be so used, less compression may be employed. In the case of the softer or less dense woods the reduction in bulk may be carried to a greater extent than in the case of the harder or more dense kinds. The compression squeezes out not only the softened albumen, but also any surplus oil which may have been taken up by the wood.

The wood, after the compression has brought it to the proper degree of solidity, is now cooled without any release of the pressure. This may be done quickly by immersing the press and wood in water. I find it quite important that all the heat be extracted before the pressure is taken off. As soon as the heat has been extracted the pressure may be released, and the product will then remain in its compacted and reduced state with the



fibers set together as if by natural growth and without any tendency by them to expand or resume their original size or form.

The limited quantity of oil which remains  
5 in the wood after the compression adds hardness and toughness to the wood and renders it moisture-proof. It also tends to deprive the fibers of their natural tendency to expand upon the releasing of the pressure. The  
10 product can be used wherever hard durable moisture-proof wood is required. It is capable of taking a fine polish and of being painted, varnished, carved, or otherwise finished or ornamented; but it may in some  
15 cases be desirable to subject it to heat to drive out any possible excess of oil which may remain in it before finishing the surface.

If it is desired to render the product either vermin or fire proof, it may be done by add-  
20 ing well-known ingredients to the water in which the wood is boiled or by otherwise forcing such ingredients into the wood.

In treating the wood with the oil it may be desirable to force the latter into the wood by  
25 pressure in any of the known ways of treating wood with preservatives.

I claim—

1. The art of compressing cured wood which consists in saturating it with an oleaginous  
30 liquid under heat, then subjecting it in a hot state to powerful direct mechanical pressure, exerted in a direction transversely only of its fibers until its bulk in that direction is greatly reduced; then locking it in its so-compressed  
35 condition and subjecting it while so locked

to a cooling operation whereby its fibers become set and fixed in the highly-compressed state.

2. The art of compressing wood which consists in depriving the wood of its sap by sub- 40  
jecting it to the action of a hot fluid, then saturating it with an oleaginous liquid under heat, then subjecting it in a hot state to powerful direct mechanical pressure, exerted in a direction transversely only of its fibers, 45  
until its bulk in that direction is greatly reduced, then locking it in its so-compressed condition and subjecting it while so locked to a cooling operation whereby its fibers become set and fixed in the highly-compressed 50  
state.

3. The process herein described of treating wood, consisting in depriving the wood of its sap, then saturating it with cotton-seed oil, then subjecting it to pressure and dry heat 55  
simultaneously, and finally cooling it while still under pressure.

4. A hard, compressed waterproof wooden block consisting of an integral structure composed of solidified cotton-seed oil and the nat- 60  
urally-united fibers of the wood transversely flattened and compacted and having their natural length and direction, the flattened fibers and their intermixed cotton-seed oil being set, substantially as set forth.

JOHN McLACHLAN.

Witnesses:

H. M. MUNDAY,  
EMMA HACK.