

# UNITED STATES PATENT OFFICE.

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## METHOD OF IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 580,488, dated April 13, 1897.

Application filed November 21, 1896. Serial No. 612,998. (No specimens.) Patented in England February 11, 1896, No. 3,131, and in France February 11, 1896, No. 253,850.

*To all whom it may concern:*

Be it known that I, FRITZ HASSELMANN, a citizen of Bavaria, residing at Rapfelberg, Bavaria, Germany, have invented certain new and useful Improvements in Methods of Impregnating Wood, (patented in Great Britain February 11, 1896, No. 3,131, and in France February 11, 1896, No. 253,850,) of which the following is a specification.

This invention relates to the art of impregnating fibrous materials or materials composed of cellulose and other vegetable matter for the purpose of rendering them more durable and indestructible.

The same is designed to provide means for impregnating materials, as wood and peat, so as to render them proof against atmospheric influences, as well as the action of chemicals and fungi or mold, so that the wood or other material composed in great part of cellulose thereby becomes unaffected by decay, and incombustible, or, at least, combustible only with difficulty, so that a spreading of the flames is rendered impossible.

This invention may be considered as an artificial petrification of the wood, the impregnating substance completely penetrating every portion of the wood or ligneous substance, the chemical mixtures introduced serving to cement the fibers insolubly, a result not attained in any of the customary methods of impregnating hitherto employed.

With the above objects in view my invention consists in the features, methods, and steps now to be described, and then to be pointed out in the claims.

The wood or cellular material is successively subjected to the action of two solutions or liquids whose effect is increased by boiling the wood in the same. The wood is first boiled in a solution of sulfate of iron and sulfate of aluminium in water, the sulfate of iron and sulfate of aluminium being each dissolved in water in the proportions of one to thirty. It is then similarly treated—that is, boiled in a one-fiftieth solution of calcium chlorid with an addition of a one-fortieth solution of caustic lime. By boiling the caustic lime along with the chlorid of calcium I attain the advantage that the treated wood, &c., dries very rapidly and remains in this condition,

while in the case of employing the calcium chlorid alone the wood would remain hygroscopic.

The process thus indicated may be carried out after the wood has been dipped into a caustic liquid or otherwise suitably treated in such a manner as to free it from the substances filling up the cells, (the protoplasm.) For this purpose it is found necessary to boil the same in the alkaline or caustic liquids, such as lye, under atmospheric pressure. This preliminary treatment of the wood, although preferable, may, however, be entirely omitted, in which case the air-pressure is not necessary and the apparatus used for this purpose is not required.

It is advisable whenever the conditions admit of it to immerse the wood for an extended period of time in the first bath or solution of sulfate of iron, the said solution being then in a cold state. The solution is thereby enabled to be absorbed by and to penetrate into the wood, and the boiling process is thereby reduced to from two to two and one-half hours, instead of taking from three to four hours for each bath or solution when boiled at once. The duration of the boiling process cannot in general be positively fixed, since it depends on the character of the wood treated and differs for various kinds of wood. However, a shorter period may be taken for wood from foliate trees, and in particular beech, birch, alder, &c., and a longer period for that from coniferous trees.

The wood treated according to the above process is thoroughly impregnated and filled with liquids which combine to form solid compounds within its pores, thereby petrifying the same in a measure without, however, essentially detracting from its capacity to be sawed, planed, cut, and nailed and otherwise worked in the arts. The wood is rendered incombustible by this process and gains in strength and resistance to strains. At the same time it is rendered proof against the formation of mold and fungus, the ravages of insects, and decay. This is due to the fact that the substances which promote decay, the filling or contents of the cells, are either eliminated or are so changed chemically by boiling in the presence of the metal salts or combined

with such salts to a solid compound that the conditions necessary for the growth of fungi and the promotion of decay are no more present.

5 What I claim, and desire to secure by Letters Patent, is—

1. The process of impregnating fibrous material, such as wood, peat, &c., which consists in applying to the same a solution containing  
10 sulfate of iron and sulfate of aluminium and then in a solution of calcium chlorid to which is added caustic lime, whereby the cell-walls, and the contents of the cells are impregnated and cemented in the manner, substantially as  
15 set forth.

2. The process of impregnating fibrous material, such as wood, peat, &c., which consists in boiling the same in a solution containing sulfate of iron and sulfate of aluminium and  
20 then in a solution of calcium chlorid to which is added caustic lime, whereby the cell-walls and the contents of the cells are impregnated and cemented in the manner, substantially as set forth.

3. The process which consists in first im- 25 mersing the wood or other fibrous material in a bath consisting of a mixture of a solution of sulfate of iron and of sulfate of aluminium and allowing it to remain in such bath for a period of time, then boiling it in said bath and 30 then boiling it in a bath consisting of a solution of calcium chlorid to which caustic lime is added.

4. The process which consists in first acting upon the wood or other fibrous material to be 35 treated with an alkaline solution, then treating it in a bath consisting of a solution of iron sulfate mixed with a solution of sulfate of aluminium and then treating it in a bath consisting of a solution of calcium chlorid to which 40 caustic lime is added.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

FRITZ HASSELMANN.

Witnesses:

EMIL HENZEL,  
J. M. CINSURLY.