

# UNITED STATES PATENT OFFICE.

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## METHOD OF IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 626,538, dated June 6, 1899.

Application filed December 12, 1898. Serial No. 699,021. (No specimens.)

*To all whom it may concern:*

Be it known that I, FRITZ HASSELMANN, a subject of the Emperor of Germany, residing at Munich-Nymphenburg, in the Kingdom of Bavaria and Empire of Germany, have invented certain new and useful Improvements in Processes of Treating Wood and other Vegetable Fibrous Substances, of which the following is a specification.

In United States Patent No. 580,488, issued to me on April 13, 1897, a process for the impregnation of wood and other vegetable fibrous substances is described, said process being based upon the treatment of the wood first with solutions of sulfate of alumina and sulfate of iron oxyhydrate and afterward in a similar manner with solutions of calcium chloride and caustic lime. This process thus consists of two consecutive boilings, which have the effect of rendering the wood so treated firmer and more resistant to and free from the attacks of fungus and rot. At the same time, however, the natural color of the wood is more or less changed, which for some purposes—as, for instance, joinery—is desirable for the attainment of certain color effects, but in general is prejudicial to the use of the wood. Another inconvenience of this otherwise successful process is the somewhat awkward and expensive double boiling. By the improved process forming the subject-matter of this invention, however, the wood prepared retains its natural color, and the second boiling is dispensed with without sacrificing any of the advantages of the process of the patent referred to.

My invention consists in the process herein described of impregnating wood and other vegetable fibrous substances, according to which they are boiled under pressure with a solution of double vitriol, aluminum sulfate, and kainit for several hours.

The process is carried out as follows: The wood is subjected in a suitable apparatus to the action of an aqueous solution of a crystallized mixture of ferric sulfate with from five per cent. to fifteen per cent. of cupric sulfate and aluminum sulfate. As soon as a heat of 105° centigrade is obtained an aqueous solution of kainit in the proportion of one to forty is added in such quantity as is suitable

for the particular purpose and the nature of the wood. The boiling is then continued under a pressure of from two and one-half to three atmospheres and at a heat of 135° to 140° centigrade, the period of boiling varying from two to four hours, according to the kind of wood to be treated, for conifer woods the time being longer than for others. By this treatment a chemical change takes place in the sappy constituents of the wood and both the cell-walls of the wood and any contents present in them enter into permanent chemical combination with the impregnating substances. As the cavities, scientifically known as “lumina,” of the wood-cells, however, are not affected by the treatment, the wood, although gaining essentially in firmness, loses none of its elasticity.

The chemistry of the new process is as follows: As in the United States patent referred to, so in this case, iron and aluminum salts are precipitated and, remaining as such, color the wood fiber to a very slight extent. Moreover, and this is the main point of the process, the potassium of the kainit combines with the lignine of the wood to form a new and hitherto unknown substance, which imparts to the impregnated wood a horny character. If, for instance, wood or similar substances be boiled with concentrated solutions of chloride of zinc at a temperature of about 135° centigrade, these substances change to a tough gelatinous transparent mass, in which the metal, being chemically combined, is no longer to be detected by the ordinary reagents. This tough gelatinous mass becomes horn-like in water and is indifferent to acids. The potassium chloride of the kainit displays the same characteristics as chloride of zinc or chloride of magnesium, and the chemical processes with weak solutions under high pressure are the same as with strong solutions without pressure. From this the important and hitherto-unknown fact is ascertained—*i. e.*, that a constituent of the wood enters into chemical combination with the potassium chloride of the kainit used for the impregnation and, moreover, that this chemical combination is insoluble—*i. e.*, cannot be lixiviated by water. It may also be remarked that the potassium present in the wood and which remains



behind as potash when the wood is burned also combines in a similar manner, since it likewise can only be lixiviated to a very slight extent.

5 The wood treated by the process described above is considerably harder than wood which has not been treated and is consequently very suitable for polished work. It is tougher than before impregnation and is insensible  
10 to the effects of the atmosphere, of rot, and of fungi. It retains its natural color and is consequently applicable for all purposes, even for such as those for which wood treated by the process before referred to could not be  
15 used, and if a sufficient quantity of kainit be used the wood becomes practically incombustible.

The advantages of this new process may be summed up as follows: First, that only one  
20 boiling is necessary, and therefore about half the cost is saved over the process of the patent cited; second, that the natural color of the wood is retained; third, the inflammability of wood treated by the new process is much  
25 less than that treated by the process named.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. The process herein described of impregnating wood and other vegetable fibrous substances, which consists in boiling them under pressure with a solution of crystallized mixture of ferric sulfate and cupric sulfate, aluminum sulfate and kainit, for several hours, substantially as set forth. 30

2. The process herein described of impregnating wood and other vegetable fibrous substances, which consists in subjecting them to the action of a solution of crystallized mixture of ferric sulfate and cupric sulfate, aluminum sulfate and kainit for several hours at a temperature of from 135° to 140° centigrade and at a pressure of from two to four atmospheres, substantially as set forth. 35

In witness whereof I have hereunto signed  
45 my name, this 28th day of November, 1898, in the presence of two subscribing witnesses.

FRITZ HASSELMANN.

Witnesses:

EMIN L. GOLDSCHMIDT,  
HENRY HASPER.