

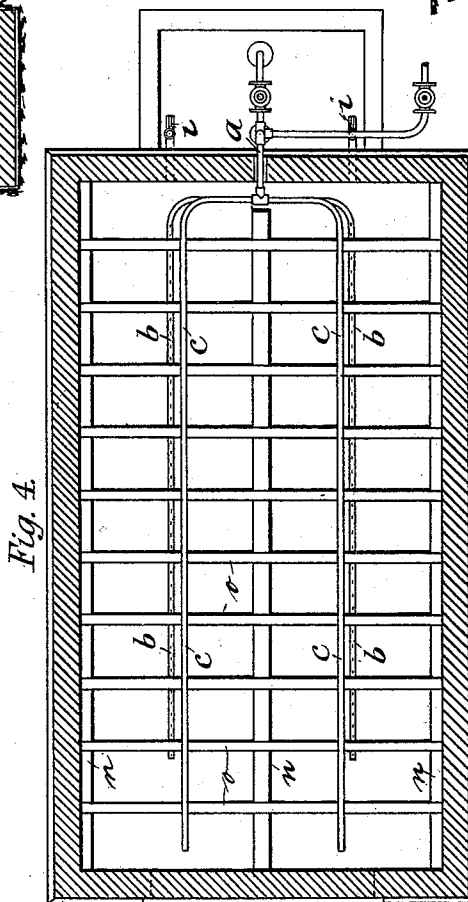
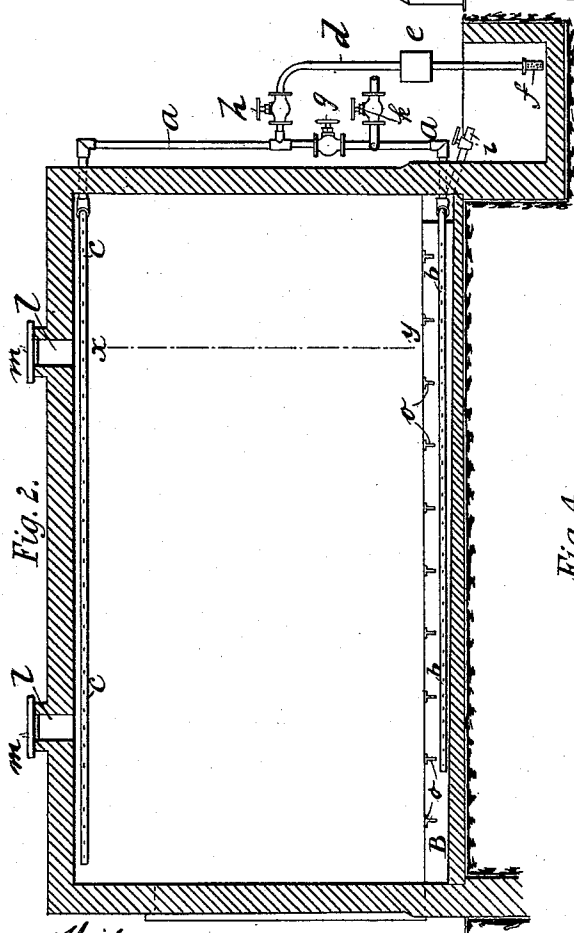
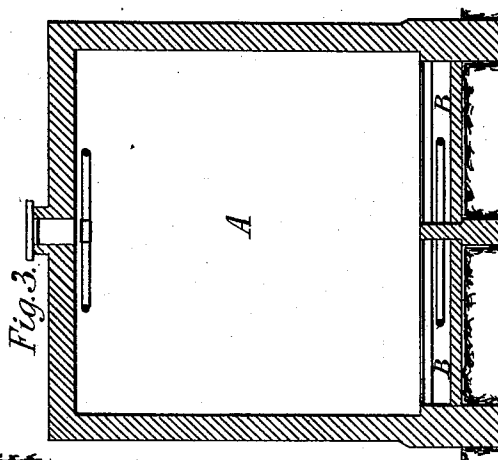
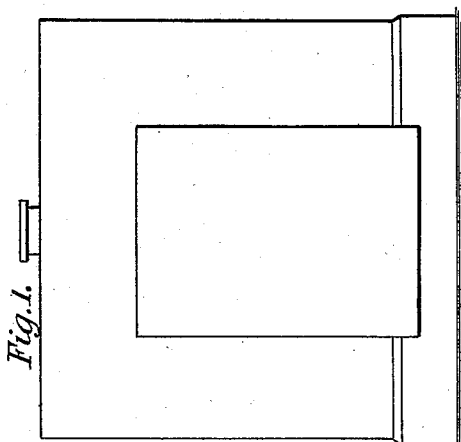
(No Model.)

P. JAEGER.

METHOD OF AND APPARATUS FOR IMPREGNATING AND DYEING WOOD.

No. 578,516.

Patented Mar. 9, 1897.



Witnesses:-  
L. C. Hills  
L. D. Kingberg.

Inventor  
Paul Jaeger  
By Wm. E. Boulter  
attorney

# UNITED STATES PATENT OFFICE.

PAUL JAEGER, OF ESSLINGEN, GERMANY, ASSIGNOR OF ONE-HALF TO  
FREDERICK CIRKEL, OF OTTAWA, CANADA.

## METHOD OF AND APPARATUS FOR IMPREGNATING AND DYEING WOOD.

SPECIFICATION forming part of Letters Patent No. 578,516, dated March 9, 1897.

Application filed January 10, 1896. Serial No. 574,945. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL JAEGER, a subject of the King of Württemberg, residing at Esslingen, Kingdom of Württemberg, Empire of Germany, have invented certain new and useful Improvements in Dyeing and Impregnating Wood; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention is intended to render it possible not only to simply impregnate and color wood in large quantities and of any dimensions, such as boards, trunks, or blocks, but to give it a specially effective impregnation or a proper and perfect color, as desired, by chemical combinations and effects wrought in or upon the very fiber or filaments of the wood as it is done in dyeing stuffs.

The invention is carried into effect in the following manner:

In accordance with the nature and qualities of the wood to be treated—*i. e.*, whether it be soft or hard, weak or strong wood—steam must be used at a lower or higher pressure, and either a metal boiler or a kiln of firmly-built masonry or brickwork is employed; but in either case the construction and the process are the same.

In the accompanying drawings, Figure 1 is a front elevation of the apparatus. Fig. 2 is a longitudinal vertical section. Fig. 3 is a vertical cross-section on the line *x y* in Fig. 2, and Fig. 4 is a plan.

A is the kiln, in which the lumber has to be piled up.

B is a reservoir for the condensed water or which serves to contain any required impregnating fluid or mordant.

The steam is introduced into the kiln by the admission-pipe *a* and through the distributing-pipes *b b* and *c c*, which are perforated laterally and closed at their ends, so that the steam must escape into the chamber A through such lateral openings.

The lower pipes *b b* are intended solely for the introduction of steam, while the upper pipes *c c* also serve to sprinkle the wood in the kiln with any fluids whatever, which are pumped into A by means of the suction pipe or rose *f*, pump *e*, (which may be of any well-

known construction,) and delivery-pipe *d*, the stop-valve *g* having been first closed and stop-valve *h* opened and the pump set in operation for the purpose.

The short pipes *i i* serve to run off the water of condensation and can be closed by cocks.

The stop-valve *k* serves to cut off the steam for the purpose of emptying and filling the kiln.

Openings *l l* are provided in the top or cover of the kiln A, which, after the completion of the process, allow the steam to be exhausted more quickly, and *m m* are covers to correspond, which are tightly screwed down with a proper joint on the top of the said openings and serve to close and open the same.

*n n* are small walls or suitable projections, which, with the aid of the beams or supporting-pieces *o o*, made of T-iron, serve to form a bed or support to carry the lumber to be treated.

The working of the process is as follows: After having first laid upon the traverses a layer of freshly-squared wooden planks or boards placed closely together side by side a second layer of similar wood is laid upon the first row, but placed in such a manner that between each board or piece of wood vacant spaces may be left of about ten to twenty centimeters in width, according to the thickness of the layer of wood—that is to say, that the thicker the pieces of wood the wider must be the spaces or intervals between these pieces. These vacant spaces are then to be filled in with a dry mixture, which in accordance with the nature of the contemplated operation—*i. e.*, whether the wood is to be dyed only or impregnated only or whether it is at the same time to be both impregnated and also dyed—must contain one or more of such substances as will serve the purpose in view. These are to be mixed so as to obtain a mechanically regular mixture with any suitable and appropriate material, such as, for instance, chaff or shavings from a lathe or shaping-machine in the proportions of, say, about 1 to 5 parts.

All organic as well as inorganic substances and materials may be employed as necessary, such as have up to the present time been used

or introduced into the processes for dyeing woven fabrics or for coloring generally or such as have hitherto been used for the purpose of the impregnation of wood, the only indispensable condition being that all these substances must be soluble in water. Subsequently to the preparation of these first layers the succeeding layers must be laid one by one, care being taken that each board or piece of wood must cover the interstitial space of the antecedent layer, and vice versa, so that the wood and interstitial spaces alternate vertically throughout the heap. Upon the top layer there is laid a layer of the dyeing or other mixture to a depth of about five centimeters, which is also covered with a layer of fine sawdust of about ten centimeters in depth. Thereupon the steam is turned on and admitted at the same time at the top and at the bottom of the kiln A, and the wood is left to be steamed at a temperature which must not exceed 100° centigrade (Celsius) for a period of from five to six days. In addition to this and in case of necessity—that is to say, if the wood is of an exceptional thickness or is of a kind which absorbs the dyeing or impregnating liquids very slowly and with great difficulty—the operation must be further carried on under increased pressure, while at the same time and indeed in all cases the condensed water, which passes off and is accumulated in the reservoir B, must with or without any further addition of dyeing or impregnating materials be pumped on the top repeatedly at intervals and sprinkled over the wood, so as to bring about a complete and perfect solution of the dyeing or impregnating materials or of both, which having been placed in the kiln and being thus dissolved are readily taken up by the wood or forced into the heart of the fibers of the same by the pressure to which the contents of the kiln are subjected. If the wood, however, after its impregnation, is intended to be further dyed, or after being dyed is intended to be impregnated, or in case a process of dyeing based upon any chemical compound or effect, and especially if such process be one of great difficulty, has to be carried out, it becomes necessary to carry out further steps in the following manner.

The short pipes *z z* must be closed and the further work carried on under steam-pressure after the reservoir B has been filled with a liquid containing in solution such chemicals as will bring about the desired chemical reaction. This solution is constantly and repeatedly to be pumped up and sprinkled over the contents of the kiln, while the liquid escaping from the kiln is allowed to run away at intervals until the wood has become completely penetrated and saturated with the

chemicals, which must be determined by experience.

If it be necessary to bring about a double or even manifold chemical reaction or reactions, this process may be further carried on in equal repetitions by the application of other solutions in like manner, and so on until the desired dyeing effect or degree of impregnation, or both, have been attained. Nevertheless the wood must not be permitted to remain without interruption under steam for a longer period than four weeks.

Under certain circumstances, such as, for instance, if the dye or color of the wood has not become dark enough, the wood may be also on the completion of the principal process taken out of the chamber, turned round, and then relaid in the kiln with an entirely new mixture, and so remain for another period of about ten days, but for dyes not desired to be so deep one single operation should suffice.

I claim—

1. In an apparatus for treating wood as described, the combination with a closed fluid-tight kiln or receptacle, of a steam-pipe having cocks *g k* branch pipes *b b* and *c c* communicating with the steam-pipe and arranged at the bottom and top respectively of the receptacle, a pipe *d* in communication with the steam-pipe and having a cock, and a pump in communication with the pipe *d* and a drain for the receptacle, as described.

2. The herein-described process of treating wood which consists in placing the wood in a fluid-tight receptacle in superposed layers, as described, filling the spaces between the pieces of each layer with dry material such as specified containing a chemical substance soluble in water, and then admitting steam at a temperature not exceeding 100° Celsius, into the receptacle.

3. The herein-described process of treating wood which consists in placing the wood in a fluid-tight receptacle in superposed layers as described, filling the spaces between the pieces of each layer with dry material such as specified containing a chemical substance soluble in water, admitting steam at a temperature not exceeding 100° Celsius into the receptacle, and then admitting steam under increased pressure and simultaneously admitting fluid containing dissolved chemical substance.

In testimony that I claim the foregoing as my invention I have hereunto set my hand in the presence of two witnesses.

PAUL JAEGER.

Witnesses:

RICH. JAEGER,  
C. AUG. HAAS.