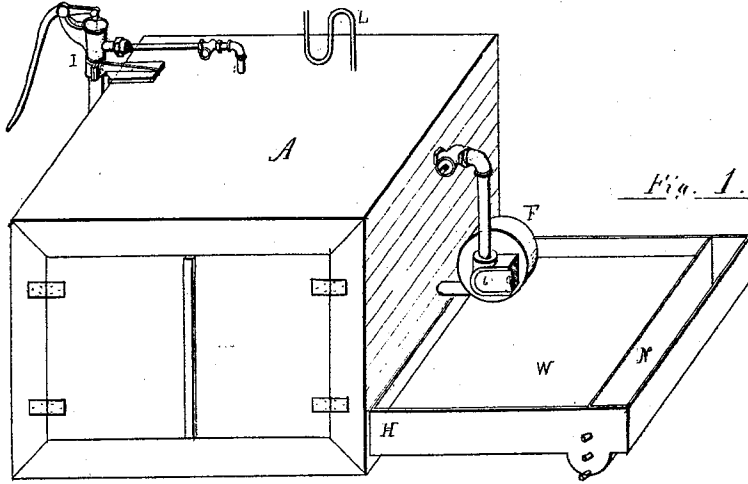


*J. C. Day,*

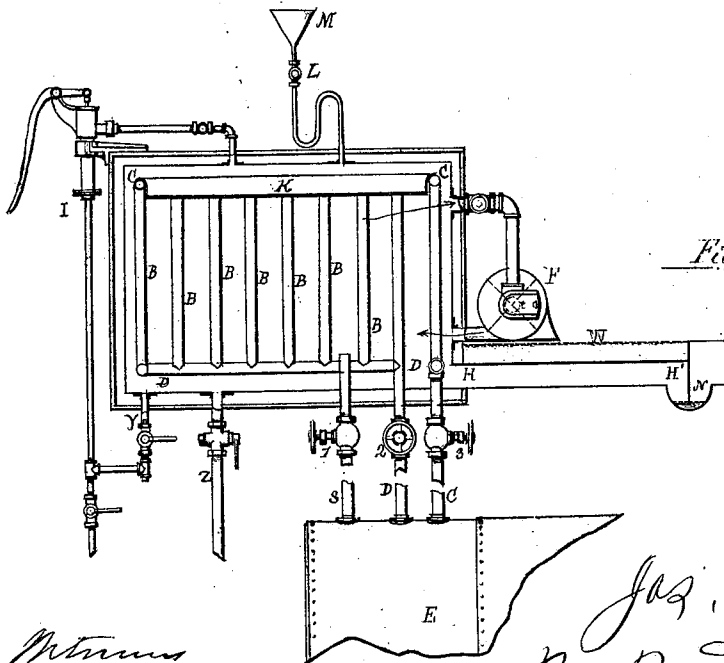
*Preserving Wood.*

*No. 100380*

*Patented Mar. 1. 1870.*



*Fig. 1.*



*Fig. 2.*

*Witness*  
*Wm. S. Merrill*  
*Henry M. Lyggett*

*Jas. C. Day*  
*Per Boyd Eliot*  
*Atty for Inventor*

# United States Patent Office.

J. C. DAY, OF HACKETTSTOWN, NEW JERSEY.

Letters Patent No. 100,380, dated March 1, 1870.

## IMPROVEMENT IN SEASONING AND PRESERVING WOOD.

The Schedule referred to in these Letters Patent and making part of the same.

I, J. C. DAY, of Hackettstown, county of Warren, and State of New Jersey, have invented certain Improvements in Kilns for Seasoning and Preserving Wood, of which the following is a specification.

### *Nature and Object.*

The first part of my invention relates to the apparatus for expelling all deleterious substances from the wood, and so thoroughly heating it, without in any manner checking or injuring its fiber, that when it is taken from the kiln it will possess all the properties of thoroughly-seasoned lumber.

The second part of my invention relates to certain devices so connected with said kiln that when the wood or lumber is thoroughly dried, and just before it is allowed to cool and condense into its last stage of seasoning, certain substances may be readily introduced that will prevent the absorption of any deleterious elements that would tend to the decay of the woody fiber.

### *Description of the Drawings.*

Figure 1 is a perspective view of the kiln, with its condenser, circulating-fan, and lifting-pump.

Figure 2 is a sectional view of the same, but with some of the parts in elevation and a partial view of the boiler.

### *General Description.*

A is a large rectangular chamber or box for receiving the wood to be treated, and as it may be required to endure a considerable degree of pressure, it ought to be made of iron sheets or plates, so firmly riveted together as to form steam or air-tight joints.

To prevent radiation of the internal heat, this box or receiver should be so jacketed with some non-conducting substances that the internal temperature will not be to any appreciable extent affected by the variable external changes of the weather, as it is of the utmost importance that the temperature should be perfectly controlled. This jacket is represented in the drawings as made of plank, and with an air-space between the receiver A and the non-conducting jacket.

One end of said receiver is furnished with doors to admit the wood or material to be treated. Within said receiver, and around its sides and ends, or so much of it as may be desired, is arranged a system of steam-pipes, B B, to radiate heat within the chamber A.

These pipes are connected at both ends with the boiler E by an induction-pipe, C, and a condensing or eduction-pipe, D, the end of the last being carried into the boiler below the lowest water-line, so that all condensed water in the entire system of pipes may return to the boiler when desired. Such an arrangement will of course require that the water-line of the boiler shall

always be below the lowest pipe in the system of radiators, or otherwise a force-pump will be required to return the condensed water in the boiler.

At S is another pipe connecting the steam-space of the boiler with the interior of the chamber A, and each of these three pipes is provided with stop-cocks, as at 1, 2, and 3.

At H, and on a level with the inner floor of the receiving-chamber A, is constructed a rectangular condensing-chamber, which is made of the same material as the chamber A, but without any jacket, and the side or edge where it is joined to the chamber A is left open so that a complete and free communication is made between the two chambers, as indicated at H and H'.

At the outer edge of the condensing-chamber, as at H', a depression or trough is formed in the bottom to receive the liquid that may be condensed in the chambers A and H, and also to hold at all times a certain depth of water, which, reaching to the diaphragm at N, serves to close the otherwise open outer side of the condenser like a water-trap.

Upon the top of said condenser an open shallow pan, W, is formed in any convenient manner to receive water whenever required for increasing the condensation.

Tap-cocks may be inserted in the outer side of the condenser and in the trough at N, to draw off the liquids in the trough, and also to regulate the depth of the water at N, as its depth determines the amount of pressure to be given to the chambers A and H, and also serves as a safety-valve against any expansive pressure that may be generated in the receiving-chamber.

At F, or any convenient side of the receiving-chamber A, and in any convenient manner, a rotary fan is connected to the receiving-chamber by two pipes, as indicated in the drawings.

The object of said fan is twofold: first, to cause a circulation within the chamber A, and, secondly, to introduce air when desired; consequently, one of the pipes, or that leading from the fan to the chamber, as indicated by the arrow, is placed near the bottom of the chamber A, and the other pipe, leading from the chamber to the fan, is connected near the top of the chamber, and leads to the center of the fan-case. This pipe is also furnished with a stop-cock, so that when air from the outside is to be introduced and no circulation is required, a slide at *t* in the end of the fan-case may be removed, and the upper pipe closed.

It may be here remarked that so much of the apparatus as already described is essential to the perfect operation of a kiln for seasoning wood or lumber, and experiment has proved that the combination of these parts alone constitutes an exceedingly useful invention

without the addition of the apparatus for applying deoxidizing or other substances for preserving the wood. Consequently the process of seasoning will here be explained.

The wood to be treated is placed within the chamber A in layers, with small strips between the several layers, as in the air-drying process at the mills or lumber-yards, and the chamber is closed.

A sufficient quantity of water is introduced in the trough at N, to give whatever back pressure is necessary to resist the pressure of steam now to be introduced into the chamber A through the pipe S.

If the lumber is very green, or has been well saturated with water, as is the case when direct from the raft, but little steam-pressure will be required, and may be dispensed with entirely, as the only object is to heat the wood to such a degree as to expand the moisture within its fibers, and this may be readily done by admitting steam to the radiating pipes B B through the supply-pipe C, and permitting the condensed steam or water to return to the boiler through pipe D.

As a temperature of two hundred and twelve degrees can be produced almost instantly within the chamber by the admission of steam directly upon the lumber through the pipe S, it is best to open the steam-cock at I until the steam begins to escape freely through the water-trap at N. Then shut it off, and gradually raise the temperature in the radiators or pipes B B until the entire mass is thoroughly heated.

The increase of temperature will expel the moisture from the wood, and the pores of the wood will also be expanded thereby, but if the chamber be permitted to cool in such a condition, and while it is filled with expanded moisture, much of the moisture or sap will again return to the wood, and the process will be very imperfectly performed. To overcome this difficulty, the fan and condensing-chamber have been supplied, and while the temperature of chamber A is being gradually increased, the fan is set in operation to circulate the heated vapors expelled from the wood, causing a circulation in the condenser at H, and as the pressure increases an easy escape for them through the trap at N is furnished.

As the operator progresses, it will also be found beneficial to introduce air by the fan through the valve at t to displace the vapors from the chamber, and drive them out through the condenser at N.

After the moisture has been expelled from the wood, and while the pores are all open, and before a sufficient degree of heat has been imparted to the wood to thoroughly season it, or fix by dryness its fibers, as by "baking," is the best time to begin the introduction of any substance to preserve the wood from decay. This I accomplish by means of a funnel, as at M, mounted

upon a curved pipe, L, the lower end of which enters the top of the chamber A, and immediately over a pan, K, of sheet metal, suspended in any convenient manner near the top of the chamber.

Said pan is constructed with a perforated bottom, and as the liquids, such as petroleum, carbolic acid, &c., are introduced through the funnel, they will be distributed over the bottom of the pan K and drip down through the holes or perforations over the dry and porous wood, and as it is permitted to cool the preserving elements will be speedily absorbed thereby.

Whatever surplus of materials not absorbed by the wood will collect in the bottom of the receiver A, and may be drawn off at the pipe Z, or it will be more convenient to have a pump, as at t, to connect with the tanks for holding the preserving liquids, and the upper end with the top of the chamber A and over the distributing-pan K, thereby dispensing with the funnel M and pipe L, and said pump may also be furnished with a branch pipe, as at Y, connected to the bottom of the chamber A, so as to draw off the surplus and return it to the pan K, thereby dispensing with the pipe Z, if desired.

#### Claims.

1. In a kiln for seasoning wood, the combination of the chamber A, boiler E, condenser H, and fan F, when operated together, as described, and for the purposes set forth.

2. The combination of the chamber A, condenser H, and fan F, when their pressures are controlled by the trap or valve, as at N, substantially as described.

3. The combination of the chamber A, boiler E, and fan F, constructed and operated substantially as described.

4. In combination with the chamber A, the distributing-pan K, when constructed and operated substantially as described.

5. In combination with the chamber A and pan K, a circulating-pump, I, and branch pipe Y, so arranged that the liquids dripping to the floor may be returned to the distributor whenever desired.

6. In combination with the condenser H, the cooling-pan W, substantially as described and for the purposes set forth.

7. In combination with the chamber A and pan K, the funnel M and pipe L, when combined and operated as described.

The above specification signed by me this 13th day of December, 1869.

J. C. DAY.

Witnesses:

ABRAHAM R. DAY,  
FRANK G. PENDLETON.