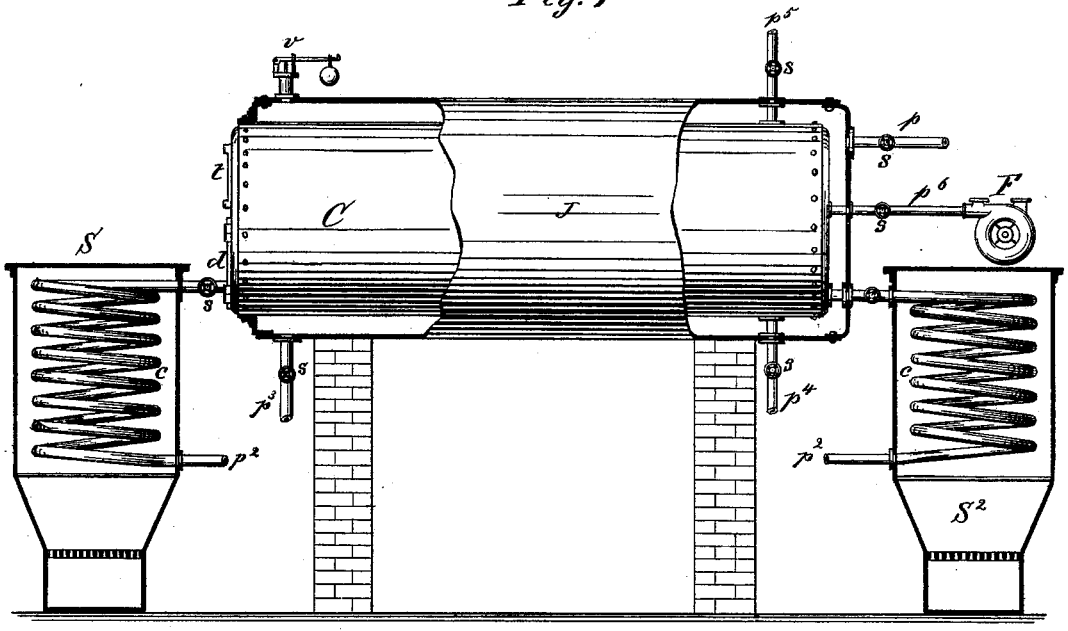
A. B. TRIPLER.

The Art of Preserving Wood.

No. 208,649. Patented Oct. 1, 1878.

Fig: 1



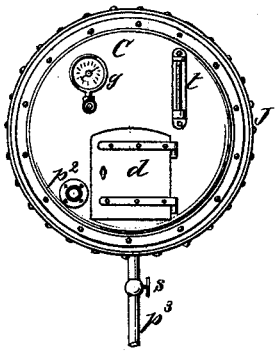


Fig: 2.

Witnesses:

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ARCHIBALD B. TRIPLER, OF NEW YORK, N. Y.

IMPROVEMENT IN THE ART OF PRESERVING WOOD.

Specification forming part of Letters Patent No. **208,649**, dated October 1, 1878; application filed March 16, 1878.

To all whom it may concern:

Be it known that I, ARCHIBALD B. TRIPLER, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in the Art of Preserving Wood, of which the following is a specification:

This invention relates to the curing and drying of wood under pressure by means of heat.

Wood has thus been dried in heated molds, and it has been proposed to create and maintain the required pressure by means of air or gas pumped into the drying-chamber, while the required heat is obtained by means of steam-coils.

In my varied experience with air and steam, as employed in different arts, I have observed the superiority of the latter as a vehicle for heat, especially as regards the retention of heat and its uniform diffusion, and as a medium of pressure, owing to its less elasticity, &c. These observations, together with my experience in seasoning and preserving wood, and discoveries touching the latter, have led me to devise my present process and apparatus for curing and drying wood under pressure by means of superheated steam, as an improvement on that description of wood-preserving process and apparatus in which air or gas is employed as the vehicle of heat.

My said invention consists more particularly, first, in curing and drying wood under pressure in a cylinder, or its equivalent, by subjecting the wood to a current of superheated steam kept at sufficient pressure and temperature by the continued introduction of superheated steam, while a sufficient discharge is permitted to carry off any moisture which may result from evaporation or partial condensation; secondly, in a preliminary application of heat by means of a steam-jacket to prepare the cylinder and wood for the superheated steam, and a concluding current of air or superheated steam through the body of wood to carry off all surface humidity therefrom, in combination with the said application of superheated steam; thirdly, in the combination of apparatus hereinafter described for curing and drying wood by this or an analogous process.

Besides the specific effects above enumerated, I am enabled by my said invention to accomplish a great simplification of the operation, and a material reduction of the first cost and running expenses of the apparatus as compared with others now in use, while the wood is perfectly protected against checking and warping, and the albuminous, gummy, and resinous portions of the sap are diffused and solidified in the pores, so as to render the dried wood very solid, and to destroy the fermentative cause of decay in the most rapid and efficient manner.

Figure 1 of the accompanying drawings represents a side elevation of my said apparatus, partly in vertical section. Fig. 2 is an end view or front elevation of the cylinder in which the wood is treated.

The improved apparatus for preserving wood consists, as shown, of a horizontal cylinder, C, adapted to receive the wood and sustain the required pressure, a steam-jacket, J, for heating the cylinder and its contents, preliminarily and supplementarily, one or more superheaters, S S^2, through which steam may be passed to the interior of the cylinder, and a rotary fan, F, discharging into the rear end of the cylinder, with their connections and appurtenances, as hereinafter mentioned.

The front end of the cylinder C is preferably not jacketed, but may be insulated, as may also the jacket, by means of asbestus cement, or any preferred non-conductor, to prevent loss of heat by radiation. To this end of the cylinder a door, *d*, a thermometer, *t*, and a pressure-gage, *g*, are applied in suitable manner. A pipe, *p*, connects the interior of the jacket J with a steam-boiler, and steam-pipes p^2 p^2 connect the interior of the cylinder C with the same or another boiler or boilers of the required capacity through the medium of coils *c* in the superheaters. Additional pipes, p^3 p^4, provide for the discharge of water of condensation from the jacket J and from the cylinder C, respectively, and a pipe, p^5, provides for a continuous discharge from the cylinder. Another pipe, p^6, connects the interior of the cylinder with the fan F. All the pipes are provided with suitable valves or stop-cocks, *s*, and the jacket J is provided, further, with a safety-valve, *v*.

The details of the respective parts of the

apparatus form no part of this invention; but they may be of any suitable or approved construction, and mechanical equivalents of the respective parts may be substituted, if preferred.

The escape-pipes p^4 p^5 may be combined, if preferred, a petcock substituted for the pipe p^3, the fan F and its pipe p^5 dispensed with, and other like modifications be made, without departing from the scope of the invention as herein defined.

The proportions and arrangement of the parts are, of course, variable to suit different circumstances and requirements.

The improved process of preserving wood as conducted in this apparatus is as follows: Supposing steam to be up in the boiler or boilers which supply the apparatus, fire started in the superheaters S S^2, the fan F adapted to receive motion, and all the valves *s* closed, a quantity of wood is introduced, on a truck or otherwise, into the cylinder C through the door *d*, and the latter is closed. The valve *s* in the pipe *p* is now opened, and steam is admitted into the jacket J until a pressure of about fifteen pounds to the square inch is attained. The safety-valve *v* may be weighted to determine this pressure, which will be kept up throughout the operation. The principal object is a preliminary elevation of the temperature of the cylinder and the wood therein. This preliminary heating prepares the cylinder and wood for greater heat, and prevents the loss of superheated steam by condensation. After the cylinder and wood are heated up to the heating capacity of the steam in the jacket, as indicated by the thermometer, the valves in the pipes p^2 are opened, and superheated steam is admitted into the cylinder until a temperature of about 300° Fahrenheit and a pressure of about one hundred pounds to the square inch are indicated by the thermometer *t* and gage *g*. The pressure is that in the boiler or boilers, and is guarded by the safety-valves on the latter, and increased or diminished at this point. The temperature is regulated by means of the fires in the superheaters, which also dry the steam, so as to increase its effectiveness as a drying agency. The object of the pressure is to keep the fibers of the wood intact against the tendency to check and warp under the intense heat. The latter, after expelling the gaseous and watery elements of the contents of the pores, diffuses the more solid particles, and finally solidifies the albuminous, gummy, and resinous portions of the sap within the pores, so as to solidify the wood while curing and drying the same. These results are accomplished simultaneously and by the same means, by employing superheated steam as the curing and drying atmosphere. When the said pressure of about one hundred pounds to the square inch is obtained, the valve in the pipe p^5 is opened or partially opened, so as to allow the superheated steam to escape in the same proportion as it is admitted, so as to keep up the same pressure, and at the same time a continuous circulation through the wood to be cured. This carries off any moisture which may result from evaporation, and prevents the steam within the cylinder from becoming moist by condensation or partial condensation, and thus greatly facilitates and hastens the desired result.

The valve in the pipe p^3 may be opened from time to time to discharge water of condensation. The valve in the pipe p^4 will not require to be opened for this purpose after the escape-pipe p^5 is opened.

After a sufficient time has elapsed for the solidifying of the particles in the pores of the wood, which will vary somewhat, and must be determined by experience in treating wood of different kinds, the supply of superheated steam is shut off by closing the valves in the pipes p^2, and that within the cylinder is allowed to escape through the pipe p^5. The door *d* is then opened; but before removing the wood, and while the steam is still held in the jacket, the valve in the pipe p^6 is opened and the fan F is started, so as to cause a current of air to pass through the body of wood in the cylinder. This is kept up until all surface humidity has passed off, after which the steam is shut off from the jacket and the fan is stopped. A blast of superheated steam may be substituted for the air-blast in some cases, and the fan thus dispensed with.

I am aware that wet steam has been commonly used in treating wood, and I disclaim the same. Wet steam or ordinary steam, as thus employed, softens the wood, and is preliminary to drying, whereas the latter is accomplished under pressure by the use of superheated steam, as herein set forth.

It has also been proposed to employ superheated steam in connection with chemical treatment, but never so as to maintain a curing temperature and pressure thereby in the manner herein specified.

I also disclaim drying wood under pressure in an atmosphere of air or gas, the latter being at rest in the cylinder or drying-chamber and heated therein.

The following is what I claim as new and desire to secure by Letters Patent, namely:

1. The curing and drying of wood under pressure by means of an atmosphere of superheated steam introduced into a drying-chamber and discharged therefrom simultaneously after the required pressure is obtained, substantially as specified, so as to keep up the said pressure a sufficient time, and at the same time cause a current through the body of the wood to carry off moisture and prevent condensation, as herein set forth.

2. The process herein described of curing and drying wood in a cylinder or its equivalent, consisting in heating the cylinder and the wood therein by low-pressure steam in a jacket, then introducing superheated steam into the cylinder until a pressure of about one hundred pounds to the square inch is ob-

tained, then permitting the superheated steam to escape in the same proportion as a fresh supply is admitted, and finally discharging the superheated steam, and blowing air or superheated steam through the body of the wood to carry off the surface humidity from the latter, substantially as specified.

3. The combination of the cylinder C, jacket J, and one or more superheaters, $S S^2$, with their appurtenances, substantially as herein shown and described, for curing and drying wood under pressure.

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Witnesses:
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