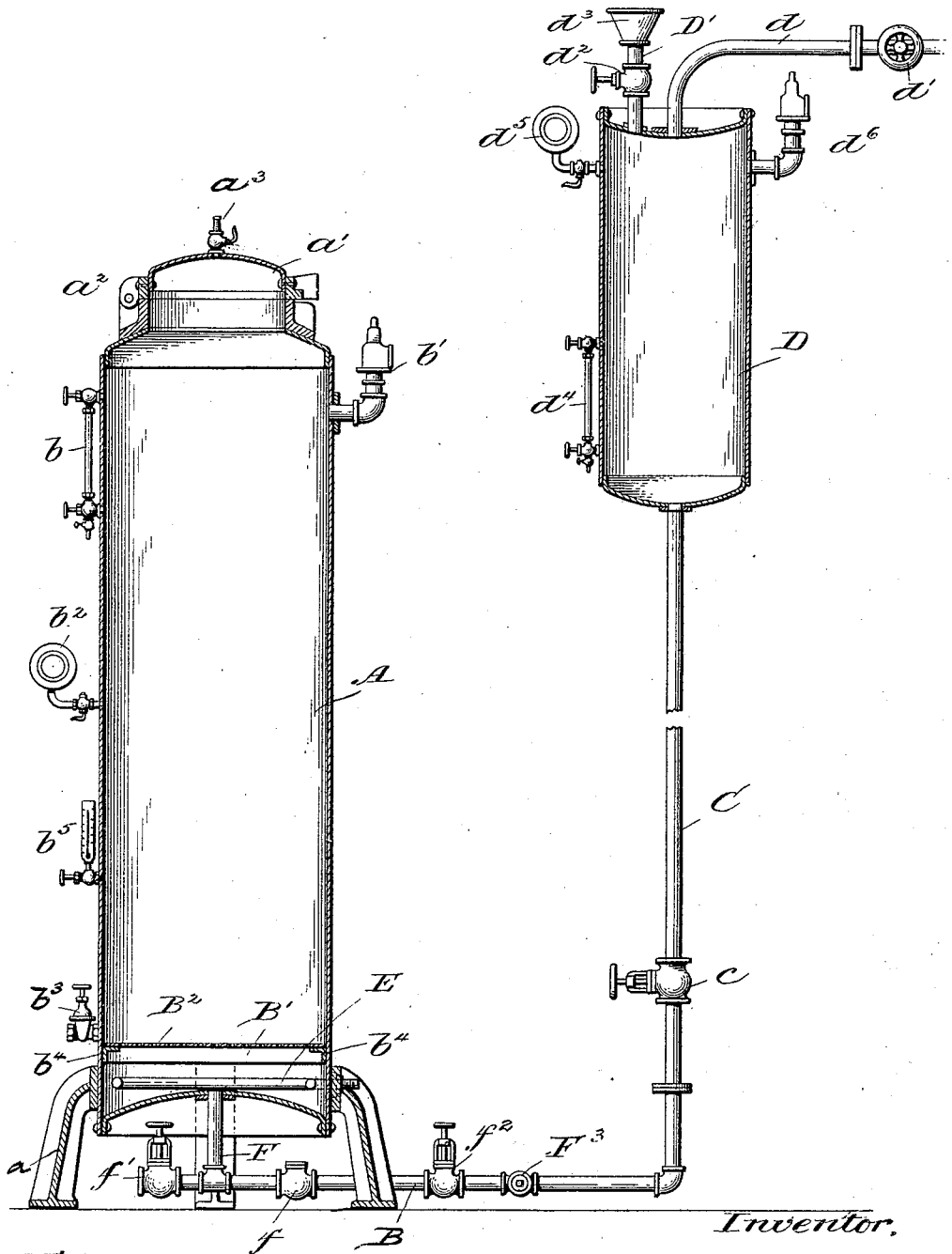
No. 645,793. Patented Mar. 20, 1900.

# C. J. DOYLE.

## APPARATUS FOR PRESERVING WOOD.

(Application filed June 3, 1899.)

(No Model.)




Witnesses.
Jno. T. Cross.
J. Henderson.

Inventor.
Christopher J. Doyle.
by Howe Peters
his Attorney.

# UNITED STATES PATENT OFFICE.

CHRISTOPHER J. DOYLE, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR PRESERVING WOOD.

SPECIFICATION forming part of Letters Patent No. 645,793, dated March 20, 1900.

Application filed June 3, 1899. Serial No. 719,327. (No model.)

*To all whom it may concern:*

Be it known that I, CHRISTOPHER J. DOYLE, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Treating Wood, &c., with Fireproofing Material, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention has relation to certain improvements in an apparatus for treating wood and other cellular substances with fireproofing material, and has for one object to provide a simple and inexpensive form of apparatus by means of which the liquid material may be forced through the wood or other substance with an even pressure and without any jarring, thereby preventing any fracture or injury to the fiber.

Another object of my invention is to provide an apparatus of this character having one or more receiving-tanks for the material to be treated and a supply-tank for the fireproofing liquid connecting the same in such a manner as to feed one or all of such receivers in a uniform manner; also, in providing means for exerting pressure in the supply-tank, so that the liquid may be forced up through the material in the receiver under a high but uniform pressure.

A still further object of my invention is to provide an apparatus so constructed that the wood or other substance being treated can be withdrawn from the receivers and recharged without removing the fireproofing liquid therefrom; also, in providing means for regulating the pressure of the liquid and the degree of heat to be maintained in the receiving-tanks.

The various uses and advantages arising from my improved construction will be more readily apparent by referring to the accompanying drawings in connection with the detailed description herewith submitted.

In the said drawings, which illustrate my invention in sectional elevation, A designates the receiving-tank, which is substantially cylindrical in form and stands in an upright position, being provided at its lower end with suitable supporting-legs *a*. The receiver A may be single or a number may be employed, in which latter case they would be arranged side by side, each having a feed-pipe, as B, connected by a T with the main supply-pipe C.

The supply tank or reservoir D is substantially cylindrical in form and is arranged, preferably, at an elevation above the receiver A and is supported by the pipe C, which enters its bottom, together with such other structure as may be found necessary. In the upper end of the tank D is a pipe *d*, connecting with a compressed-air reservoir. (Not shown.) A suitable cut-off valve *d'* is provided in this pipe for controlling the admission of the compressed air.

To one side of the pipe *d* is a supply-pipe D', provided with a valve $d^2$ and a funnel-shaped top $d^3$ for feeding the supply-tank D with the fireproofing liquid. The lower part of the tank D is provided with a sight-gage $d^4$ for the purpose of showing the height of the liquid in the tank, while the upper portion of the said tank is provided with a pressure-gage $d^5$ for registering the pressure applied in the tank and safety-valve $d^6$. In the pipe C, I provide a cut-off valve *c* for controlling the supply of the liquid from the tank D to the receivers A.

The receiver A is provided at its upper end with an air-tight cap *a'*, which may be hinged at one side, as at $a^2$, and provided upon its other side with a suitable locking device. An air-cock $a^3$ is located in the central part of this cap for letting the air out of the receiver A when the liquid is admitted under pressure. A sight-gage *b* is provided in the upper end of the receiver A for showing the height of the liquid, and on the opposite side I provide a safety-valve *b'*. A pressure-gage $b^2$ is also provided for this cylinder for registering the amount of pressure exerted in the receiver. This should of course register with the gage $d^5$ on the supply-tank D, as the pressure in both chambers would be about the same. In the lower part of the receiver A, I provide a thermometer $b^5$, of any well-known construction, for showing the temperature of the liquid in the said receiver. A drain-cock $b^3$ is provided in the lower part of the receiver.

In the lower part of the receiver A, I provide a perforated partition $B^3$, supported on

suitable flanges $b^4$, the said partition forming a supporting-base upon which the timbers or other substances to be treated rest. In the chamber B′, formed below the partition $B^2$, I provide a coil of pipe E, which is connected with a source of steam-supply and is adapted to heat the liquid as it enters the chamber B′.

The feed-pipe F connects the bottom of the receiver A with the pipe B, which is connected with the main supply-pipe C. A check-valve $f$ is provided in the pipe B for preventing the return of the heated liquid from the receiver A, and a cut-off valve $f'$ is provided in the end of this pipe for drawing off the liquid from the receiver A. A cut-off valve $f^2$ is also provided in the pipe B for regulating the supply of liquid from the main pipe C to the reservoir A. If a series of receiving-tanks, as A, are used, each of said receivers would be provided with a feed-pipe corresponding to B, entering into a T, as $F^3$, which connects with the main supply-pipe C, each of said pipes B being provided with a cut-off valve $f^2$, so that the supply could be shut off from any one of the series of receivers without disturbing the supply of the others.

In operation the wood or other substance to be treated is placed in the receiver A in a vertical position, the lower ends resting upon the partition $B^2$ and completely inclosed therein, the cap $a'$ being closed and locked in its closed position. The supply-tank D is then filled through the medium of its feed-pipe D′ and the valve $c$ in the pipe C opened, also the valve $f^2$ in the pipe B, thus admitting a flow of the fireproofing material from the tank D into the receiver A. After the liquid has risen to a point sufficient to partly immerse the wood or other substances in the receivers A the compressed-air supply is admitted in the supply-tank D through the medium of the pipe $d$, the pressure varying from two to three hundred pounds. As the liquid rises in the receiver under pressure the air in the upper portion of the said receiver is compressed and an air-cushion maintained which prevents the liquid from rising too high in the receiver and admits of the said liquid being forced up through the wood, &c., longitudinally in an even and uniform manner in line with its grain and without any jarring or pumping effect, thereby preventing the fracture of the fiber and insuring the complete saturation of the wood or other material in the receivers. The pressure-gages $d^5$ and $b^2$ will show the amount of pressure both in the supply-tank and the receiver, and the safety-valves $d^6$ and $b'$ prevent too high a pressure being reached. The sight-gages $d^4$ and $b$, provided, respectively, in the supply-tank D and the receiver A, show the height of the liquid in each of these chambers, and the thermometer $b^5$ shows the temperature of the liquid in the receivers, which should be at a point below boiling—say 130°—this temperature of course being regulated by controlling the amount of steam which enters the steam-coil E. After the wood or other material in the receivers has become thoroughly saturated the liquid-supply is cut off by means of the valve $c$ in the pipe C and the cap $a'$ in the top of the receiver unlocked and opened and the wood or other material removed from said receivers. The receiver can then be refilled without drawing off the liquid remaining therein and the valve $c$ turned on and the operation repeated, as heretofore described. The supply-tank D should always contain a sufficient quantity of the liquid to overcome that which is absorbed by the material being treated in the receivers.

I am aware that numerous devices have heretofore been invented and described for forcing fireproofing and other liquids into wood and fibrous material for fireproofing and other purposes and do not claim the same broadly, my invention residing in my improved apparatus for accomplishing the same, as hereinafter particularly claimed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination of a vertically-disposed receiving-tank, an air-tight chamber located in the upper portion of said receiver, an air-cock for said chamber, a removable air-tight cap provided in the top of the receiver, a heating-chamber located in the bottom of the receiver, a perforated partition between the heating-chamber and the receiver proper adapted to support the material to be treated, a steam-coil located in the heating-chamber, a supply-reservoir arranged in close proximity to the receiver, a conduit for compressed air entering the top of said supply-reservoir, a feed-pipe connecting the supply-reservoir with the bottom of the receiver and cut-off valve located in the feed-pipe as and for the purposes specified.

In witness whereof I have hereunto set my hand this 1st day of June, A. D. 1899.

CHRISTOPHER J. DOYLE.

Witnesses:

BENJ. F. PERKINS,

HORACE PETTIT.