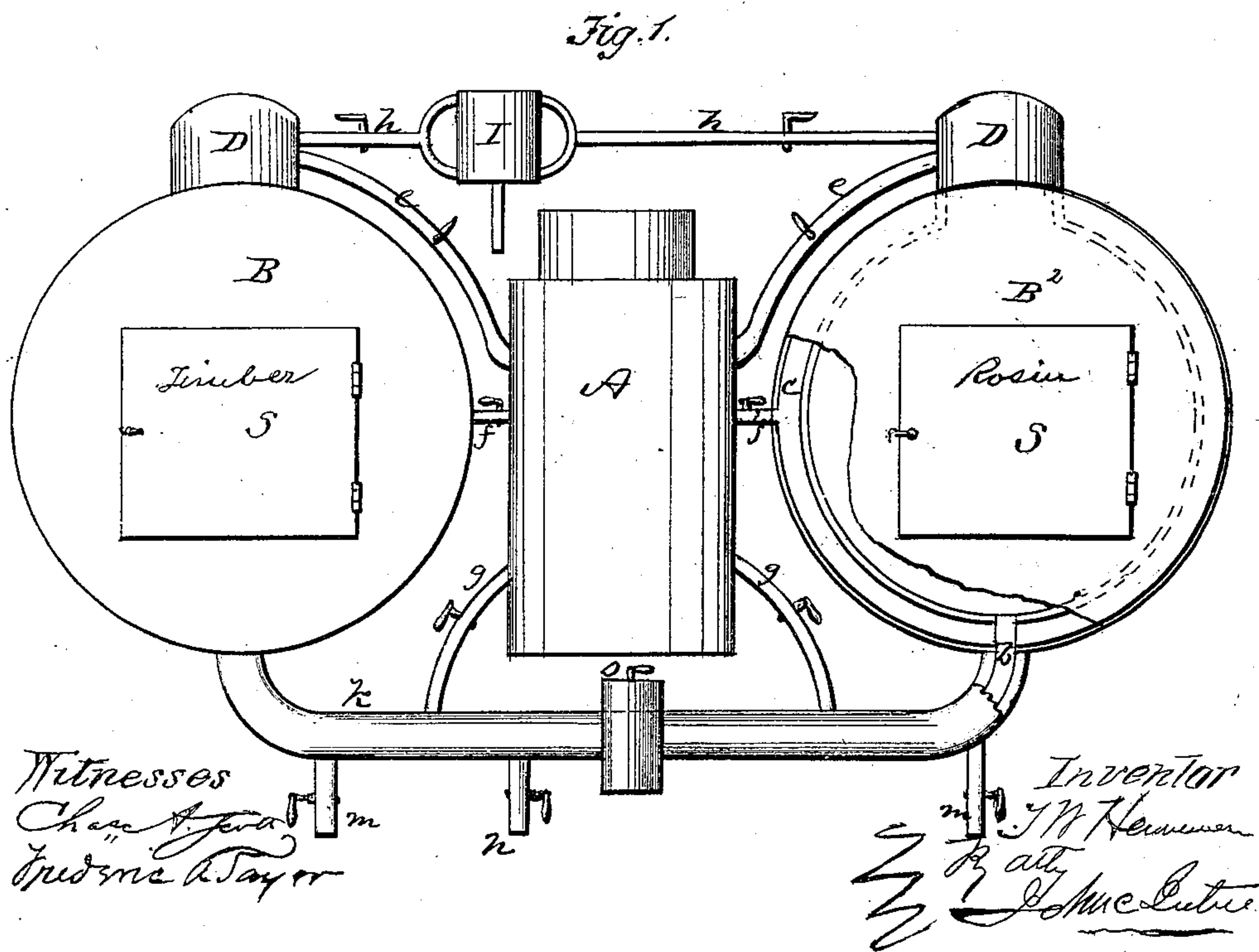
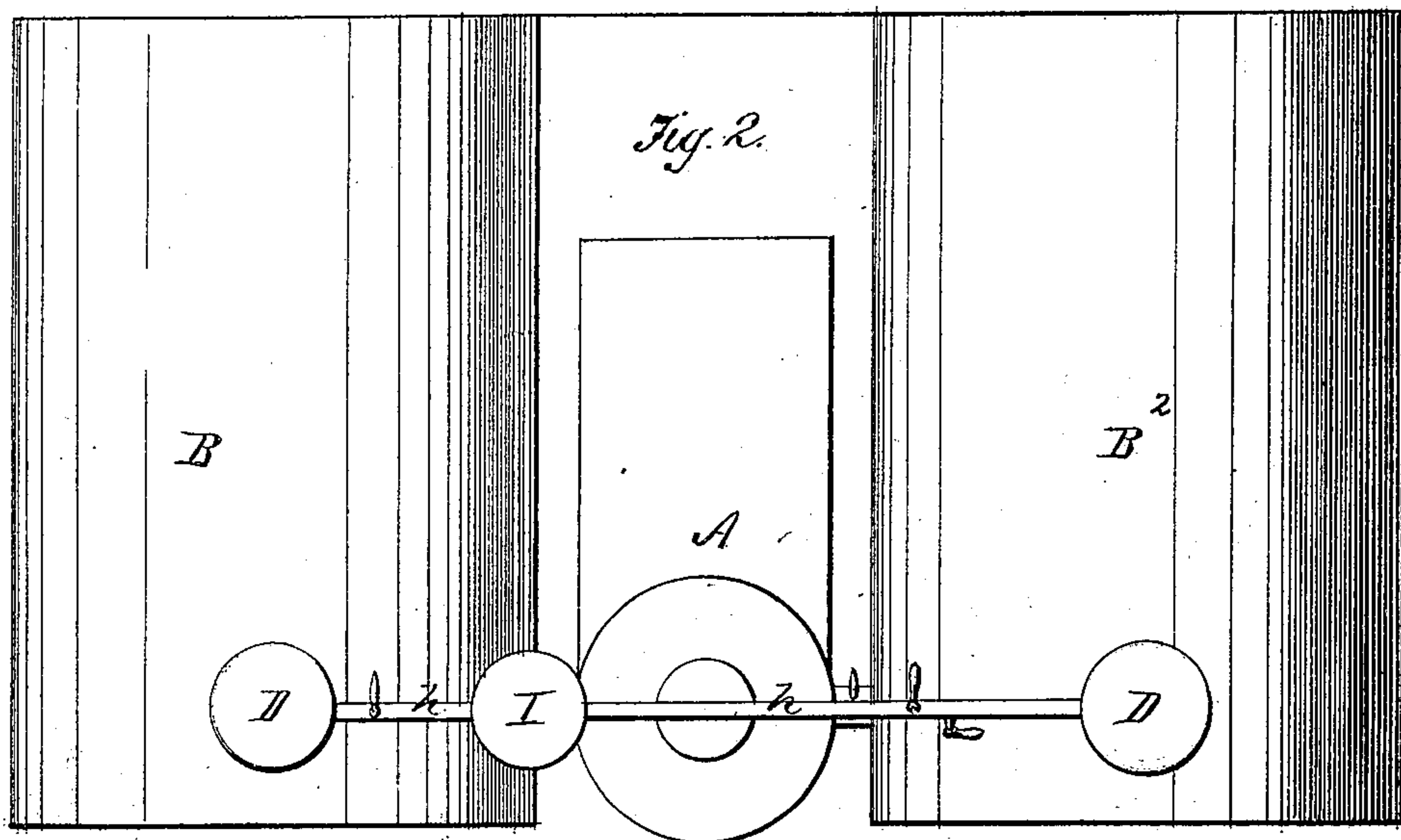


T. W. HEINEMANN.
 PROCESS OF AND APPARATUS FOR PRESERVING WOOD.
 No. 95,474. Patented Oct. 5, 1869.



UNITED STATES PATENT OFFICE.

T. W. HEINEMANN, OF NEW YORK, N. Y.

IMPROVED PROCESS AND APPARATUS FOR PRESERVING WOOD.

Specification forming part of Letters Patent No. 95,474, dated October 5, 1869.

To all whom it may concern:

Be it known that I, T. W. HEINEMANN, of New York city, of New York county, in the State of New York, have invented a certain new and useful Improved Process and Apparatus for Preserving Wood; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to a new method of treating wood and other porous (vegetable) material so as to effect its preservation.

Previous to my invention several methods or processes of treatment have been practiced to preserve wood, in which processes the sap has been first extracted, and the pores of the wood then filled with liquid rosin, and Letters Patent have been granted to me in which such processes are described; but in the treatment of wood heretofore practiced there has always been more or less liability of the fibers of the wood being injured by becoming charred, of the impregnating material being charred or overheated, and of the wood and rosin being only partially heated in some portions of the charge, while overheated in others.

To overcome all these serious difficulties and provide a process (and apparatus for conducting it) by which the wood may be thoroughly and uniformly (throughout the entire charge) impregnated so as to effect its complete preservation, and by which these objects may be expeditiously and economically attained, is the main object of my present invention, which consists in subjecting the charge of wood, in a close vessel, to the action of an air-pump, by which a vacuum is created and the contained sap all extracted, then subjecting it to the action of radiated heat and injected steam, (of high temperature,) to thoroughly warm the wood and open all its pores, and while in this condition (the steam and air being just exhausted) subjecting the wood to the action of the rosin or other impregnating material in a highly-heated condition; and my invention further consists in a novel arrangement of tanks and other appliances, as hereinafter fully explained, to carry on the said process or method of treatment effectually and with great expedition and economy.

To enable those skilled in the art to understand my invention, I will proceed to describe

it more fully, referring by letters to the accompanying drawings, in which—

Figure 1 is a front elevation, and Fig. 2 a top view, of an apparatus for carrying out my invention.

In the different figures the same letters denote the same parts of the apparatus.

A illustrates a suitable steam-boiler, on each side of which is arranged a tank, B and B², which is formed with a surrounding steam-jacket or space, C, and provided with a suitable door, S. The doors of these tanks or preserving-chambers should be made so that they can be closed steam-tight, and may be arranged to swing open on supporting-casters and curved bearing rails or tracks in a manner well known to constructors of such apparatus.

The tanks B B² may be formed with steam-domes D, and each of them is connected by a pipe, e, with the boiler A, as is also each of the steam-jackets C by a pipe, f. The two tanks are connected through medium of a tube, b, provided with cock at o, by means of which the communication between said tanks may be opened and closed at pleasure, and the said pipe b is surrounded by a larger pipe, K, (forming a jacket to b,) which is supplied with steam at pleasure by pipes g.

From each of the domes D extends a pipe, h, which connects with the air-pump I. The pipes h, e, f, and g are all supplied with suitable cocks to be opened and closed by the operator in working the apparatus and process, as hereinafter explained, and the several steam chambers and jackets are provided with suitable cocks, m n, &c., for the exit of condensed steam.

The tanks, jackets, and boilers should be supplied with the usual pressure-gages and thermometers, and the boiler with safety-valve, and the tanks may be provided with suitable railways and trucks for the convenient putting in and withdrawal of the wood.

The method or process performed with the just-described apparatus may be thus explained: One of the tanks—B, for instance—having been charged with timber, and the other, B², with rosin or some other suitable impregnating material, steam is let into the jacket c (by turning cock in f) to melt the rosin, and the vacuum-pump is set going at I, and while the rosin is being melted in B²

the air is exhausted from B, inducing the sap to flow copiously from the wood. When the sap has been exhausted and drawn off (at *m*) the action of the vacuum-pump is suspended and steam is let into B (through pipe *e*) and then into the jacket of B (through *f*) whereby the timber, with its sap extracted, is warmed thoroughly and its pores penetrated by the hot steam. The supply of steam is cut off from B and the vacuum-pump again put to work to exhaust the said chamber, while the steam is maintained and at an increasing temperature in the jacket of B. When the tank B has been as nearly as possible exhausted, and the temperature of steam in the jacket surrounding B has reached about 320° Fahrenheit, and the rosin in B², which has during this time been melted, has got to about 295° Fahrenheit, the stop-cock at *o* is opened and the liquid rosin allowed to flow into B onto the timber (the vacuum-pump may be kept working during this operation) and a limited supply of steam is allowed to pass into the dome of B² to supply the place of and finally force the flow of the rosin, which should be made to fill the timber-tank B nearly up to the dome. The cock *o* is now closed, and steam of about seventy-five pounds pressure is allowed to flow into the dome of tank B, while heat is maintained in B and its jacket for a shorter or longer time, (according to the length and thickness of the blocks of wood,) until the timber shall have been completely and thoroughly saturated. While this impregnating of the material in B is progressing, the tank B² is allowed to cool off, (the steam having been cut off from its jacket and its door opened,) and is charged with timber ready to be operated upon, as just explained of the charge in B. When B² is charged, however, a supply of rosin (cold) about equal to the amount absorbed by the wood in B is put in, so that the deficiency, when the liquid rosin in B is let into B², will be made up. After the wood in B has become saturated and the sap has been extracted from wood in B², and said wood has been treated as before described of the wood in B, the cock at *o* is opened and the liquid rosin in B forced into B², where it unites with the rosin in B², and the wood therein is saturated, and so on these alternate operations in the two tanks are conducted. The mass of rosin referred to as being put into B², it will be understood, does not impede the operation of exhausting the sap, and so soon as the warming of the wood is commenced the rosin melts, runs down to a liquid level below the mass of wood,

(mounted on the railway in the tank B²,) and does not interfere with the heating of the wood. As the impregnated material is removed from the tanks it should be conveyed to a warm room and allowed to cool gradually, as too sudden change of temperature and rapid cooling is apt to induce a checking and cracking of the timber.

It will be seen that by my new process and apparatus the wood is most thoroughly and rapidly prepared by a complete exhaustion of sap and opening of the pores to receive the impregnating material, and that the latter is forced in, so as to completely penetrate and fill in the pores of the timber; and it is understood that while this process is rapidly and successfully carried on, the material and wood, though thoroughly heated, and heated all over alike, cannot be charred or injured by overheating.

I am aware that the air-pump has been used to effect the exhaustion of sap; also, that wood has been steamed, and that rosin has been used as an impregnating material. I do not therefore wish to be understood as claiming any of these things separately; neither do I wish to be understood as claiming in the apparatus the idea of a surrounding steam-jacket to heat a chamber or tank; but,

Having fully explained my improved process and apparatus for carrying on the same, what I claim as new in the process is—

1. Exhausting the sap from the wood within a suitable tank, and then warming the wood and opening the pores by the application of steam and steam heat, substantially as described.

2. Exhausting the steam (while the heat is maintained) and supplying the melted rosin from an auxiliary chamber to the sap-exhausted and heated wood, substantially as described.

3. The employment, in the apparatus, in connection with a suitable steam-supplier, of a series of jacketed tanks or chambers so connected and provided with the means for exhausting each that the sap-exhausting, wood-heating, rosin-melting, and the saturating operations may be successfully carried on in the manner substantially as hereinbefore explained.

In testimony whereof I have hereunto set my hand and seal this 21st day of July, 1869.

THEO. W. HEINEMANN. [L.S.]

In presence of—

CHAS. A. SCOTT,
FREDERIC A. TAYLOR.