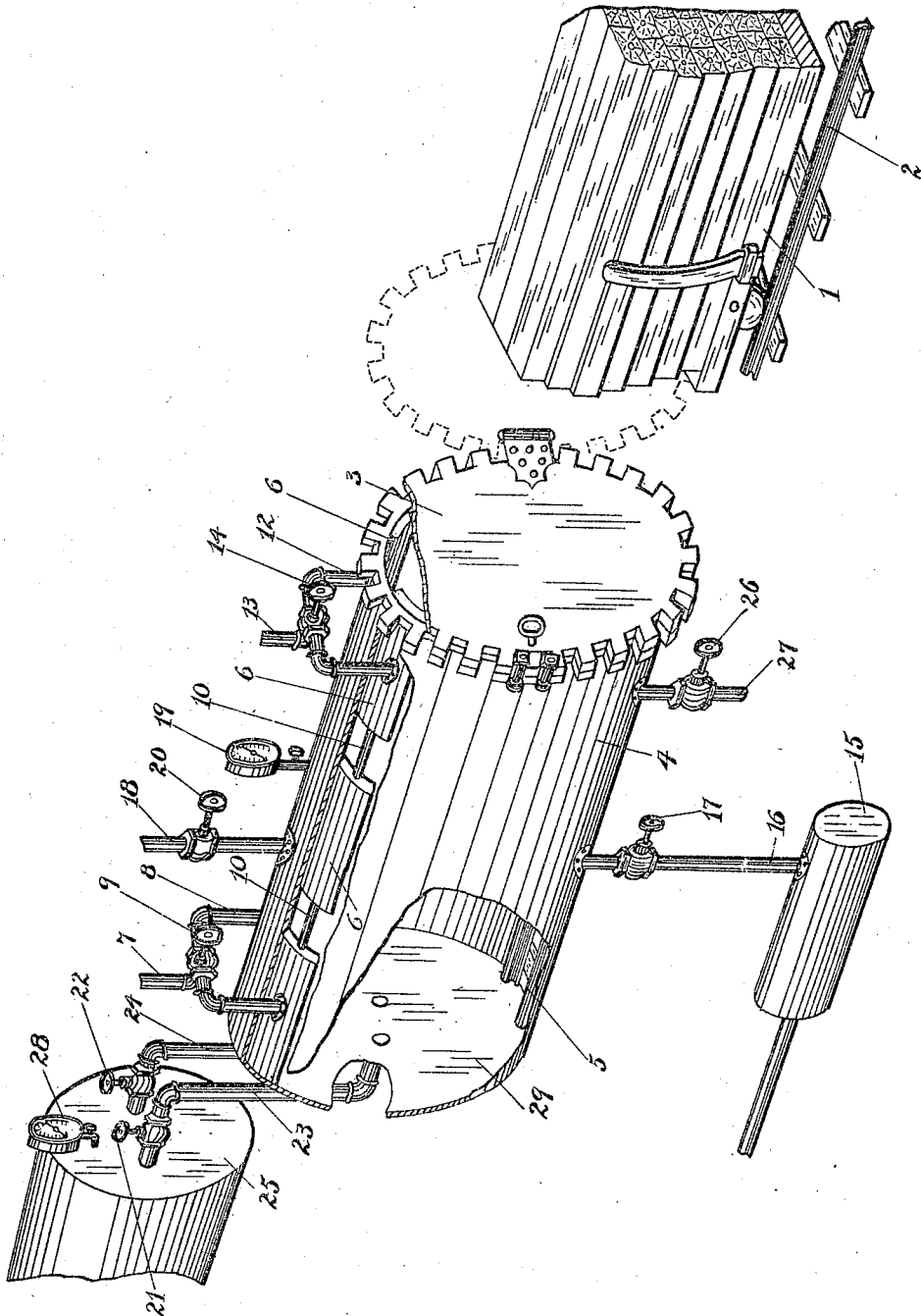


A. F. BARRY.
 PROCESS OF PRESERVING HARD WOOD.
 APPLICATION FILED JUNE 29, 1907.

1,006,713.

Patented Oct. 24, 1911.



Witnesses.

S. L. Hasson
Nathan F. Carter

Inventor.

Angus F. Barry
 By *Richard Manning*
 Attorney.

UNITED STATES PATENT OFFICE.

ANGUS F. BARRY, OF KANSAS CITY, MISSOURI.

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To all whom it may concern:

Be it known that I, ANGUS F. BARRY, a citizen of the United States of America, residing at 1606 Paseo, in Kansas City, in the county of Jackson and State of Missouri, lumberman, have invented certain new and useful Improvements in the Process of Treating and Preserving Wood, of which the following is a specification.

10 The invention relates more particularly to a process of saturating and preserving hardwoods, such as oak, gum and like varieties of timber, and in which the sap and moisture within the sap channels resist the penetration of a preservative, and it has for its object the elimination of the moisture and the complete penetration of the preservative.

15 The accompanying drawing shows, in perspective, the form of apparatus with which my process may be performed.

20 The hardwood to be treated is stacked upon a flat bottom car 1, mounted upon the track rails 2, terminating adjacent to the door 3, of an air-tight cylinder or retort 4, which retort is of suitable dimensions to admit of the reception of a large quantity of lumber for treatment. The hinged door 3, closing one end of the cylinder being opened, the car with its load of lumber is moved within the retort upon the track rails 5, in the bottom of the retort, and the door closed and secured by the clamping bolts, hermetically sealing the retort.

35 In the preliminary steps of my process the hardwood within the retort is subjected to a process of sweating, in which process radiant heat is employed, emanating from a series of steam-circulating chambers 6, located in the upper portion or top of the retort, to which dry steam is admitted from a steam supply pipe 7, supplying steam from any suitable source through branch pipes 8. This supply of steam is regulated and cut off by a valve 9, in the steam-conducting pipe 7, the steam escapes through the separate pipes 10, and through the intercommunicating discharge pipes 12, to pipe 13, controlled by the exhaust valve 14. The air within the top of the retort is heated by the steam to approximately 115° Fahrenheit. The heated air, to produce the sweating of the hardwood, originates and is drawn downward through the wood charge from the top of the chamber or retort, in order to produce the results which are the novel feature of my invention, and which

will be disclosed in the description of the steps employed.

When the air in the retort or chamber becomes heated to the degrees stated, the exhaust valve 17 is partially opened, and a suction is produced within the retort upon the air, gradually, by the suction pump 15, which has an induction pipe 16 connected with the lower portion of the retort, and at a point intermediate the ends of said retort, the action of the suction pump gradually creating a vacuum within the retort sufficient to distribute the heated air and moisture evaporated from the wood throughout the retort, and drawing the heated air and moisture downwardly through the wood, which lies horizontally upon the car, causing the lumber to sweat rapidly and release the sap from the sap channels, and the saps are removed through the pores of the wood, leaving the sap channels fully open.

The opening of the exhaust valve 17 is gradually increased during the action of the suction pump, producing the vacuum. The sap and moisture now being gradually eliminated from the wood are removed by the suction pump from the retort. The sweating of the hardwood, and the elimination of the saps and moisture, and the withdrawal of same from the retort as fast as produced, prevents an accumulation of liquids by condensation in the bottom of the retort, and also prevents the saturation of the wood charge by re-absorption of the liquid.

The sweating process opens up the sap channels and exhausts all the moisture, and the glutinous scale which has formed on the walls has time to vaporize and pass out in a volatile condition, with the sap, allowing the preservative (when applied later on) to enter the lumber. A quick high vacuum, with high temperature, would crystallize the gums and would prevent thorough drying of the lumber, and also would cause checking.

It will be observed that the vacuum is not produced rapidly by a strong suction. Upon the other hand, a slow and progressively increasing vacuum is employed, so as to gradually increase the volume of heated air drawn from the top of the retort. The heated air is drawn downward by the suction of the pump through the wood charge to produce a humid atmosphere within the retort. The moisture in the bottom of the

retort is prevented from rising as vapor to the top of the retort, by the suction of the vacuum pump.

The amount of suction upon the heated air required for green wood is less than that required for dry wood. Green wood contains moisture throughout its body, but the sap wood or surface portion contains more moisture than does the heart-wood. The heated air is therefore controlled in volume, according to the condition of the charge within the retort, by a suction of greater or less force upon the heated air in the top of the retort.

Upon the completion of the sweating of the hardwood, which is ascertained by the cessation of the flow of fluid from the suction pump, the steam is cut off from chambers 6, and the vacuum in the retort is increased by the suction pump to twenty-five inches or more, which vacuum is held approximately forty or fifty minutes, simultaneously drawing off any fog that may remain from evaporation of the moisture from the wood, after which time the valve 17, leading to the pump 15, is closed. Creosote oil, at about 190 to 200° Fahrenheit, is then introduced into the retort, under pressure through the pipe 18, leading into the upper portion of the retort by opening of valve 20. The hot oil enters the retort with rapidity, destroying the vacuum and filling the retort completely. Pressure is then further applied to the oil within the retort, to produce a pressure of 140 or more pounds. The pressure of the oil within the retort is indicated by the gage 19.

Upon sufficient penetration of the preservative into the wood, the valve 20, in the pipe 18, is closed. Suitable check valves 21 and 22, on the separate pipes or conductors 23 and 24, leading from the compressed air storage and cooling tank 25 to the end of the retort, are then opened to admit the compressed air cooled by expansion to a temperature of 30 to 60° Fahrenheit, into the retort, at a pressure of approximately eighty to one hundred pounds per square inch, indicated by the gage 28. The outlet valve 26, in the discharge pipe 27, at the other end of the retort, is then opened to a small extent, to reduce the pressure now on the oil, of 140 pounds or more, until the pressure of the oil on the valves 21 and 22, and the air-pressure becomes equalized and is maintained. The retort being filled completely with oil, and the discharge of the oil under pressure, through outlet valve 26, at 80 to 100 pounds pressure the air enters through valves 21 and 22, at an equal pressure of 80 to 100 pounds. Upon the decrease of volume of the oil body, caused by the discharge through the outlet valve 26, the pressure of the cooled, compressed air from the end of the retort on the oil forces the oil body in the direction

of valve 26, which is opened sufficiently to permit the oil to be discharged in a restricted quantity, while still holding the air pressure at 80 to 100 pounds upon the hot oil within the retort, this pressure being indicated by the gages 19 and 28. The wood charge being placed longitudinally, upon the air and the volume of the oil body being decreased and the volume of the cooled, compressed air being increased, the wood is cooled and contracted; also the oil is made viscid in the sap channels, by the cool, compressed air, as it passes through the wood charge and toward the outlet valve 26.

The hot oil expands the wood and penetrates the sap channels the full length of the timber, and then the cold compressed air, cools and contracts the wood and sap channels, and also makes the oil preservative viscid within the sap channels. The hot oil and cold air, respectively, heat and cool the wood equally, so that the fiber structure is not injured or disturbed, and the sap channels are sealed by the preservative so that before exposure to the atmosphere the lumber is cooled and is not checked. This cooling within the retort saves time and expense, the wood being fully treated, any excess oil is blown out by the air by fully opening outlet valve 26, the cool air passing, dries the wood in the retort.

At the completion of the process, the valves 21, 22 are closed. The door 3, to the retort, is opened, and the preserved lumber removed from the retort. The results of my process are: The viscosity of the oil effectively prevents breaking down of the walls of the sap channels, a thorough penetration of the hardwood lumber is obtained, thus increasing the longevity of the hardwood. In my process the lumber is preserved without reducing its former tensile strength, and being in a treated condition, fungus growth is prevented, and will better resist rot and decay. The lumber is firm, and the oil in a viscous condition, not being volatile by heat prevents oozing when taken from the retort.

Having fully described my invention, what I now claim as new and desire to secure by Letters Patent is:

1. The herein described process of preserving hardwood, consisting in heating the air above the wood being treated in a retort, applying suction at the bottom of the retort to create a vacuum, thereby drawing off the heated air and moisture gradually from the bottom of the retort downwardly through the hardwood to cause sweating of the wood, then subjecting the wood to hot preserving oil under pressure thereby destroying the vacuum, then allowing the pressure to drop somewhat by allowing oil to escape from the retort, then admitting compressed air under expansion and at a low temperature to one end of the retort in con-

suction with the hot oil to displace the hot oil through the wood to be treated thereby contracting the wood and viscifying the oil in the sap channels.

- 5 2. The herein described process of preserving hardwood, consisting in heating the air above the wood being treated within a retort, applying suction at the bottom of the retort to create a vacuum within the retort
10 and to draw the heated air and moisture evaporated from the wood downwardly through the wood gradually and cause sweating of the wood, increasing the suction and vacuum to remove the remaining mois-
15 ture in the wood, and then introducing hot

preserving oil under pressure, and then admitting compressed air cooled by expansion to a low temperature to one end of the retort while allowing the unabsorbed oil to flow very gradually from the bottom of the 20 retort, whereby the cold compressed air in conjunction with the hot oil displaces the hot oil gradually from the wood, thereby contracting the wood and viscifying the preservative in the sap channels by the cold 25 compressed air.

ANGUS F. BARRY.

Witnesses:

JENNIE SAMPSON,
A. C. STOWELL.