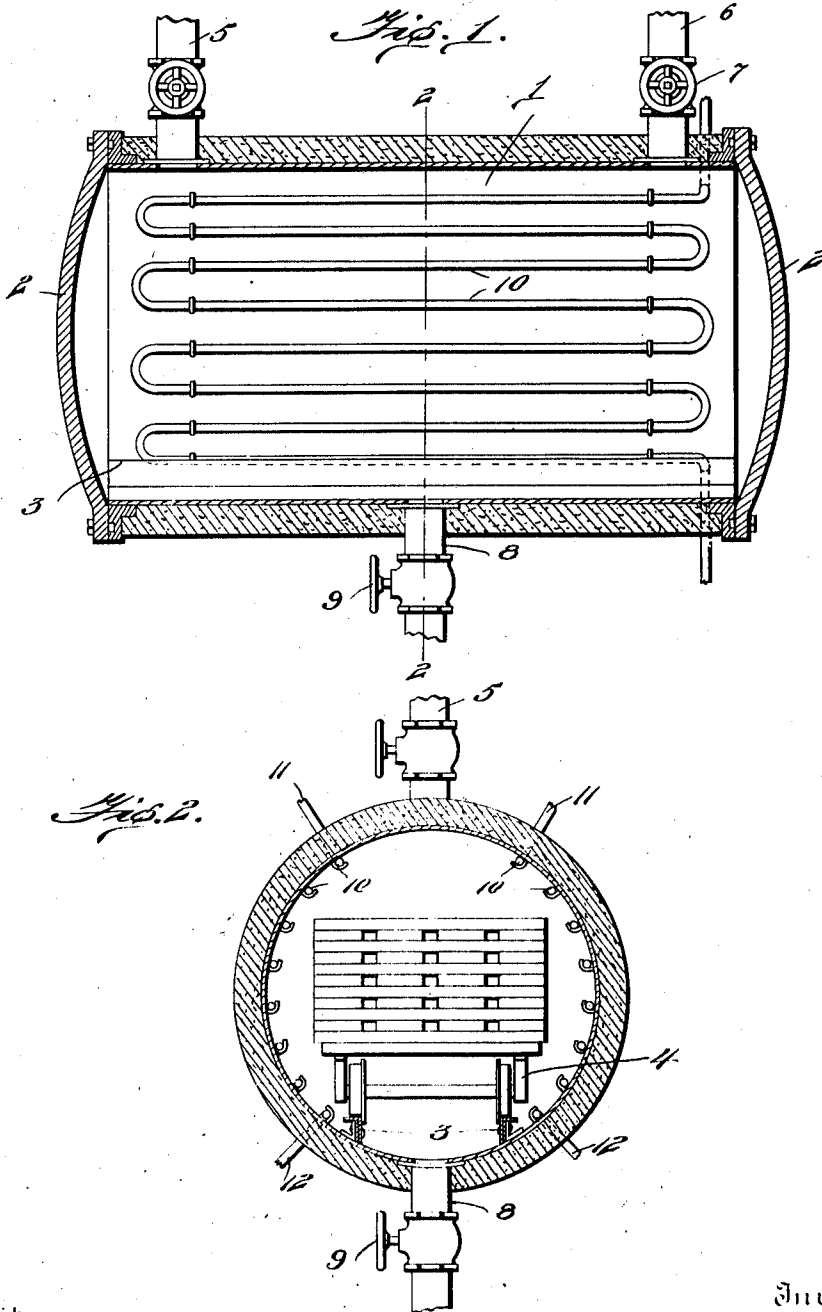


C. HOWARD.
PROCESS OF VULCANIZING WOOD.
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1,004,168.

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PROCESS OF VULCANIZING WOOD.

1,004,168.

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To all whom it may concern:

Be it known that I, CHARLES HOWARD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Processes for Treating Wood; of which the following is a specification.

My invention relates to an improved process for treating wood, and it consists in the steps and processes herein described and claimed.

An object of my invention is to provide an improved process whereby a thorough drying and vulcanization can be obtained uniformly throughout the entire thickness of wood of any size.

A further object of my invention is to provide an improved process of vulcanizing wood, which eliminates all danger of disrupting the fibers, and furnishes a product of maximum strength and uniformity of condition throughout.

A further object of my invention is to provide an improved process by which the wood will be deprived of pyroligneous acid and the resins deposited in an undecomposed form uniformly throughout the entire mass; thereby providing an improved vulcanized wood adapted to receive a high polish, and which will remain practically unchanged through long and severe use.

In the accompanying drawings, forming a part of this application and in which similar reference numerals indicate corresponding parts in the several views: Figure 1 is a central vertical section, illustrating one means for carrying out my invention, and Fig. 2 is a section on the line 2—2 of Fig. 1, with a carload of lumber within the retort for treatment.

Referring to the drawings, 1 indicates a cylindrical retort closed at its respective ends by steam-tight doors 2 and provided with a track 3 for cars 4 to support the wood under treatment. The retort is provided with a valved pipe 5 leading to a source of steam supply, and with a conduit 6 provided with a valve 7 for connecting said retort to any suitable vacuum or exhaustor; a discharge, or drip, pipe 8 is shown leading from the bottom of the retort and provided with a valve 9. Pipe coils 10 are supported within the retort and provided with inlets 11 and outlets 12 for the circulation of steam, or

other heating medium, through said coils to provide a dry heat within the retort.

In the preferable operation of my invention, the wood to be treated is placed in an unheated condition in any suitable receptacle, such as the retort 1, and the valve 7 opened to subject the wood to a vacuum of approximately 20" to 28" for a sufficient time for evaporating any water which may have been absorbed by the wood and also the readily volatile aqueous matters which will pass off as vapor under the reduction of pressure. A heating medium is then circulated through the pipe coils 10, and the wood subjected to a gradually increasing temperature in the presence of a vacuum to remove a further portion of the aqueous constituents of the wood and place the latter in condition for the efficient action of the steam employed in the next step; the temperature being gradually raised to a maximum preferably below 250° F. This step of heating the wood in a vacuum preliminary to its treatment by the steam constitutes an important part of my process, since it places the fibers in condition for an efficient uniform absorption of the steam, and obviates condensation of the steam in the outer layers of the wood where the condensed water would act to prevent a complete penetration of the steam throughout the mass of the wood. Steam, preferably below 230° F., is then admitted through the pipe 5 into the retort and maintained in contact with the wood for a sufficient time to thoroughly penetrate the latter and moisten and soften the fibers thereof; the wood being brought uniformly to the temperature of the steam. This step permits a further portion of the aqueous constituents of the wood to freely escape from the moistened and heated fibers; the resins being melted, and a portion of the pyroligneous acid removed by the steam. The steam supply through the pipe 5 is then shut off, a heating medium circulated through the pipe coils 10, and the valve 7 opened, thereby subjecting the wood to the combined action of a vacuum and of an increased degree of dry heat, preferably below 380° F., for a sufficient time to drive off the steam absorbed in the preceding step together with the remaining pyroligneous acid, and to distribute the resins without decomposition thereof uniformly throughout the mass of the wood. During the subjection of

the wood to an increased heat, premature hardening of the outer layers is prevented by the escape outwardly therethrough of the steam previously absorbed throughout the entire mass of the wood; thereby producing a progressive drying from the interior outward and permitting the penetration and distribution of the undecomposed resins uniformly throughout the entire mass of the wood.

I have described a preferred and satisfactory process, but changes could be made within the spirit and scope of my invention.

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

1. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to the combined action of a vacuum and a progressively increased temperature, then treating the heated wood with moist heat, and then subjecting the moist wood to an increased temperature in the presence of a vacuum.

2. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to the combined action of a vacuum and a progressively increased temperature, then treating the wood with moist heat at a temperature below that to which it had been previously raised, and then subjecting the moist wood to an increased temperature in the presence of a vacuum.

3. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to the combined action of a vacuum and a progressively increased temperature raised gradually to a maximum below 250° F., then treating the heated wood with moist heat at a temperature below that to which it had been previously raised, and then subjecting the moist wood to an increased temperature in the presence of a vacuum.

4. The herein described process of vulcan-

izing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to the combined action of a vacuum and a progressively increased temperature raised gradually to a maximum below 250° F., then treating the heated wood with moist heat at a temperature below that to which it had been previously raised, and then subjecting the moist heated wood to a temperature above 250° F.

5. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to the combined action of a vacuum and a progressively increased temperature raised gradually to a maximum below 250° F., then treating the heated wood with moist heat at a temperature below 230° F., and then subjecting the moist wood to a temperature of approximately 380° F.

6. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum for removing all absorbed moisture therefrom, then progressively increasing the temperature of the wood in the presence of a vacuum, then subjecting the wood to the action of saturated steam at a lower temperature than that of the previously heated wood, and then subjecting the moist wood to a dry heat, substantially as described.

7. The herein described process of vulcanizing wood, which consists in subjecting the unheated wood to a vacuum, then subjecting the wood to a progressively increasing temperature in the presence of a vacuum, then subjecting the wood to the action of saturated steam at a lower temperature than that of the previously heated wood, then exhausting the steam from the wood, and then subjecting the wood to a dry heat.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES HOWARD.

Witnesses:

C. A. BAKER,

G. AYRES.