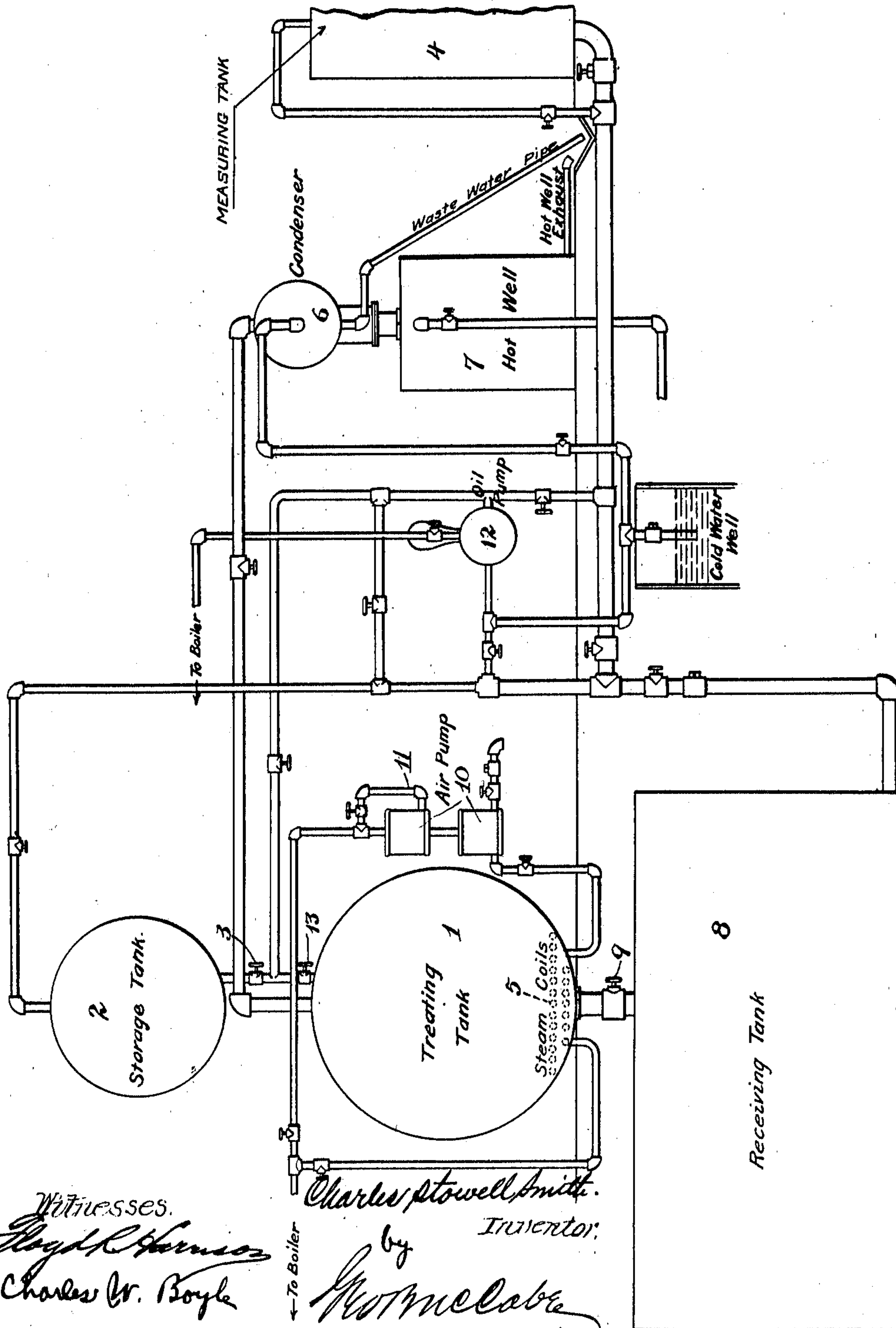


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 PROCESS OF IMPREGNATING WOOD.
 APPLICATION FILED JAN. 11, 1911.

992,918.

Patented May 23, 1911.



Witnesses.
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UNITED STATES PATENT OFFICE.

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PROCESS OF IMPREGNATING WOOD.

992,918.

Specification of Letters Patent.

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(DEDICATED TO THE PUBLIC.)

To all whom it may concern:

Be it known that I, CHARLES STOWELL SMITH, an employee of the Department of Agriculture of the United States of America, residing at Berkeley, in the county of Alameda, State of California, whose post-office address is Berkeley, California, have invented a certain new and useful Improvement in Wood Impregnation.

This application is made under the act of March 3, 1883, chapter 143 (22 Stat., 625), and the invention herein described and claimed may be used by the Government of the United States or any of its officers or employees, or any person in the United States, without payment to me of any royalty thereon.

The object of this invention is to enable open-grained timbers, especially railroad-ties, to be impregnated with creosote or other preservative substances to the desired depth and at the same time reduce the cost of such treatment.

My invention will be more readily understood by the following description, read in connection with the accompanying drawing which illustrates the method by which my invention may be practiced:

In describing my process, I shall especially refer to the treatment of railroad ties, but it will be understood that green or partly seasoned or dried timber generally may be treated in a similar manner.

The drawing shows an elevation of a suitable apparatus for carrying out my process.

The ties, etc., are run into the retort or cylinder 1, preferably on cars or trucks, not shown, and thereupon the doors of the cylinder are closed to make the latter air tight. Liquid, *e. g.*, creosote, crude oil, asphalt or other liquid having a boiling point considerably above that of water is then introduced from this storage tank 2 by opening valves 3 and 13. This liquid is then heated by admitting steam to the coils 5, to a temperature slightly above the boiling point of water, 220° F. having been found to be a suitable temperature. The heat is maintained for sufficient time to drive out most of the water and sap contained in the wood, one to two hours generally being sufficient. The evaporated water, sap, and any of the oil carried over are condensed in the condenser 6, and flow into the vessel 7 from whence they can be drawn off for subsequent

purification and use, as may be desired. When most of the water has been driven from the wood, the oil is withdrawn from the retort 1 to the tank 8, by opening valve 9. Air under pressure then enters retort 1 from air pump 10 until an air pressure of 50 lbs. per square inch is obtained within the retort which pressure is maintained until the pores of the wood are filled with air at substantially that pressure. The time necessary varies with the condition of the wood at this stage, one hour, more or less, generally being sufficient. Steam is then shut off from the coils 5. During this time or later the oil is pumped up from tank 8 to the tank 2, to leave the tank 8 empty. Creosote oil, or other preservative liquid, at a temperature of about 120° F. from the tank 4 (provided with a gage board) is then pumped into the cylinder (without any reduction of the air pressure) by the pump 12, to fill the cylinder, and the action of the pump continued until the pressure of the oil is raised to 157 pounds within the retort until any desired amount of absorption is secured. The oil remaining in the cylinder 1 which has not been taken up by the wood is then allowed to flow into the receiving tank 8, by opening the valve 9. The compressed air within the cells of the wood, then expands to drive out a large amount of the oil taken up by the wood, which also runs into the tank 8. A vacuum may then be applied, if desired, which will have the effect of removing a further quantity of the preservative oil from the wood. This may be done by changing the valves in the pipes 11 leading to the air pump, so that this will work as a vacuum pump.

The relatively cold preservative (120 degrees F.) assisted by the second pressure (157 pounds) when it comes in contact with the relatively hot wood, will cause a partial contraction of the compressed air contained within the wood cells and readily and thoroughly fill the cells to a depth determined by an equalization of the contained and applied pressure. Upon the release of the pressure the free preservative contained within the wood cells will be expelled with the exception of a small amount which adheres to the cell walls. This action can be assisted by the application of a vacuum. Cresote is preferred as a preservative, although other oils and soluble salts may be

used. By the addition of a lowering of temperature to the increase in pressure, much lower pressures need be utilized to obtain equal results. For example: A change in temperature of 100 degrees F. (from 220 degrees to 120 degrees) will in itself result in a 20 per cent. reduction of volume. This corresponds to 43 pounds pressure. Consequently a pressure of 153 pounds accompanied by a drop of 100 degrees in temperature will give the same result as a 200 pound pressure without the temperature change. At the completion of the process there will be absorbed from 4 to 8 pounds of preservative per cubic foot of timber.

By means of my invention I am enabled to effect a saturation of the fibers to the desired depth, with the use of a comparatively small quantity of preservative, thus reducing greatly the cost of wood impregnation.

Having thus described my invention, I claim—

1. The herein described process of preserving wood which consists in introducing the wood into an air tight cylinder, subjecting the wood in said cylinder to the action of the bath of oil at approximately 220 degrees F. for a length of time sufficient to heat up the wood and thereby vaporize most of the water contained in the wood, then drawing off the oil and applying an air pressure of about 50 pounds per square inch, introducing a preservative oil at approxi-

mately 120 degrees F. and raising the pressure to about 157 pounds per square inch, for a length of time sufficient to insure the desired impregnation, then relieving the pressure and simultaneously drawing off the unabsorbed oil.

2. The herein described process of preserving wood which consists in introducing the wood into an air tight cylinder, subjecting the wood in said cylinder to the action of the bath of oil at approximately 220 degrees F. for a length of time sufficient to heat up the wood and thereby vaporize most of the water contained in the wood, then drawing off the oil and applying an air pressure of about 50 pounds per square inch, introducing a preservative oil at approximately 120 degrees F. and raising the pressure to about 157 pounds per square inch, for a length of time sufficient to insure the desired impregnation, then relieving the pressure and simultaneously drawing off the unabsorbed oil and then subjecting the wood to a vacuum for the purpose of drawing out a portion of the oil from the cell cavities.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES STOWELL SMITH.

Witnesses:

COERE DU BOIS,
F. E. OLMSTED.