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3,671,299

**METHOD FOR IMPREGNATING WOOD**  
Jackson Herman Barnett, Jr., 84 N. Crest Road,  
Chattanooga, Tenn. 37404  
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5 Claims

## ABSTRACT OF THE DISCLOSURE

Method for impregnating wood with liquid treating solutions such as preservatives, fire retardants, or the like wherein the wood is immersed in a confined pressure vessel, and treating liquid is pumped into the vessel in direct pressure contact with the wood at a rate of flow sufficient within no more than ten minutes to build up a pressure therein in excess of a predetermined pressure within the range from 20 to 700 p.s.i. gauge. The pumping is effected without causing pulsations in excess of 5.0 p.s.i. gauge peak to peak within the pressure vessel. Excess treating liquid is bypassed and recirculated at a predetermined pressure.

## CROSS-REFERENCES TO RELATED APPLICATIONS

Reference is made herein to applicant's co-pending applications as follows:

Ser. No. 877,403, filed Nov. 17, 1969, and  
Ser. No. 16,277, filed Mar. 4, 1970.

## BACKGROUND OF THE INVENTION

### Field of the invention

The present invention is in the field of impregnating wood with a treating solution, using a pump and building up the pressure in the pressure vessel rapidly, maintaining said pressure until an equilibrium condition is reached or the wood accepts predetermined quantities of liquid.

### Description of the prior art

Non-refractory species of wood are commonly impregnated with preservative, fire retardant, and other modifying liquids. Currently, however, wood treating plants are equipped with pressure vessels supplied by pumps which are capable of bringing the pressure in the pressure vessel up to a predetermined treatment pressure over a period of one-half to two hours. This type of treatment is described by MacLean in the U.S. Department of Agriculture Forest Service Agriculture Handbook No. 40, 1952, page 88, entitled "Preservative Treatment of Wood by Pressure Methods." Heretofore, it was common practice to bring up the pressure gradually since it was felt that rapid increases in pressure would cause "blockage" in the wood microstructure, by causing the pit membranes to aspirate and act as check valves.

The prior art of wood treatment also includes numerous disclosures of pretreatment procedures which condition the wood for the reception of the treating agent. For example, in Rueping U.S. Pat. No. 709,799, there is disclosed a method wherein a charge is subject to compressed air at sufficient pressure and for a sufficient time, depending on the species of the wood, to control the retention of preservative or fire retardant liquid to specified limits. Lowry in U.S. Pat. No. 831,540 provided for the use of ambient atmospheric air pressure in the charges. In British Pat. No. 7731 or 1838, Bethell suggested that the charge be subjected to vacuum for a specific period of time, followed by introduction of the treating liquid to displace the vacuum. The Boulton method described in U.S. Pat. No. 247,602 provided for rapid moisture re-

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moval from wet wood by boiling under either atmospheric pressure or under vacuum with oil type preservatives. Hudson in U.S. Pat. Nos. 2,273,059; 2,435,218; and, 2,435,219 suggested a method for exposing green wood to vapors of a high flash solvent naphtha and/or a mixture of organic solvents at an elevated temperature. When the vapor was condensed, water separated and was discharged from the system. The vapor drying cycle was followed by a one or two hour vacuum treatment for recovery of the solvent naphtha and/or the mixture of organic solvents from the wood, and then preservative liquid was introduced to displace the vacuum prior to pressure pumping.

All of the foregoing pretreatment procedures can be utilized in accordance with the present invention which is directed specifically to the final impregnation step with the treating liquid.

## SUMMARY OF THE INVENTION

The present invention provides a method and apparatus for treating wood with an impregnant treating liquid which includes the steps of immersing the wood to be treated in a treating liquid in a confined pressure vessel, pumping treating liquid into the vessel at a rate sufficient to achieve a predetermined pressure within the vessel, the pressure being within the range of 20 to 700 pounds per square inch gauge, and the pressure buildup taking no more than ten minutes. After the pressure has been built up in the vessel, the operation of the pump is continued at a pump discharge rate in excess of that required to maintain the pressure in the vessel until substantial amounts of the treating liquid have been injected into the wood. The excess fluid resulting from the operation of the pump after the predetermined pressure has been reached is bypassed.

In a particularly preferred embodiment of the invention, the initial pressure buildup takes place in three minutes or less, and the pressure maintained in the treating vessel is in the range from 100 to 350 pounds p.s.i. gauge. The pump is selected such that its capacity in gallons per minute at operating pressure is from 0.045 to 0.225 times the total volume of the pressure vessel expressed in cubic feet and preferably from 0.0675 to 0.1575 times the total volume.

Other objects, features and advantages of the invention will be readily apparent from the following description of certain preferred embodiments thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure, and in which:

FIG. 1 illustrates somewhat schematically an apparatus for impregnating wood according to the present invention; and

FIG. 2 illustrates the details of the pressure relief valve more particularly.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the drawing, reference numeral 10 indicates generally a closed pressure vessel containing a hinged, gasketed and bolted door 11 for introducing the wood into the pressure vessel.

A liquid treating agent 12 is supplied from a reservoir 13, the amount of fluid being withdrawn being under the control of a valve 14 in a discharge conduit 15. The treating liquid is then passed to a pump 16 which is a high capacity pressure pump and may be a centrifugal pump, a positive displacement pump, or a piston-type pump. In any event, it should have a sufficiently high capacity so that it can bring the pressure within the vessel 10 up to operating pressure within ten minutes or

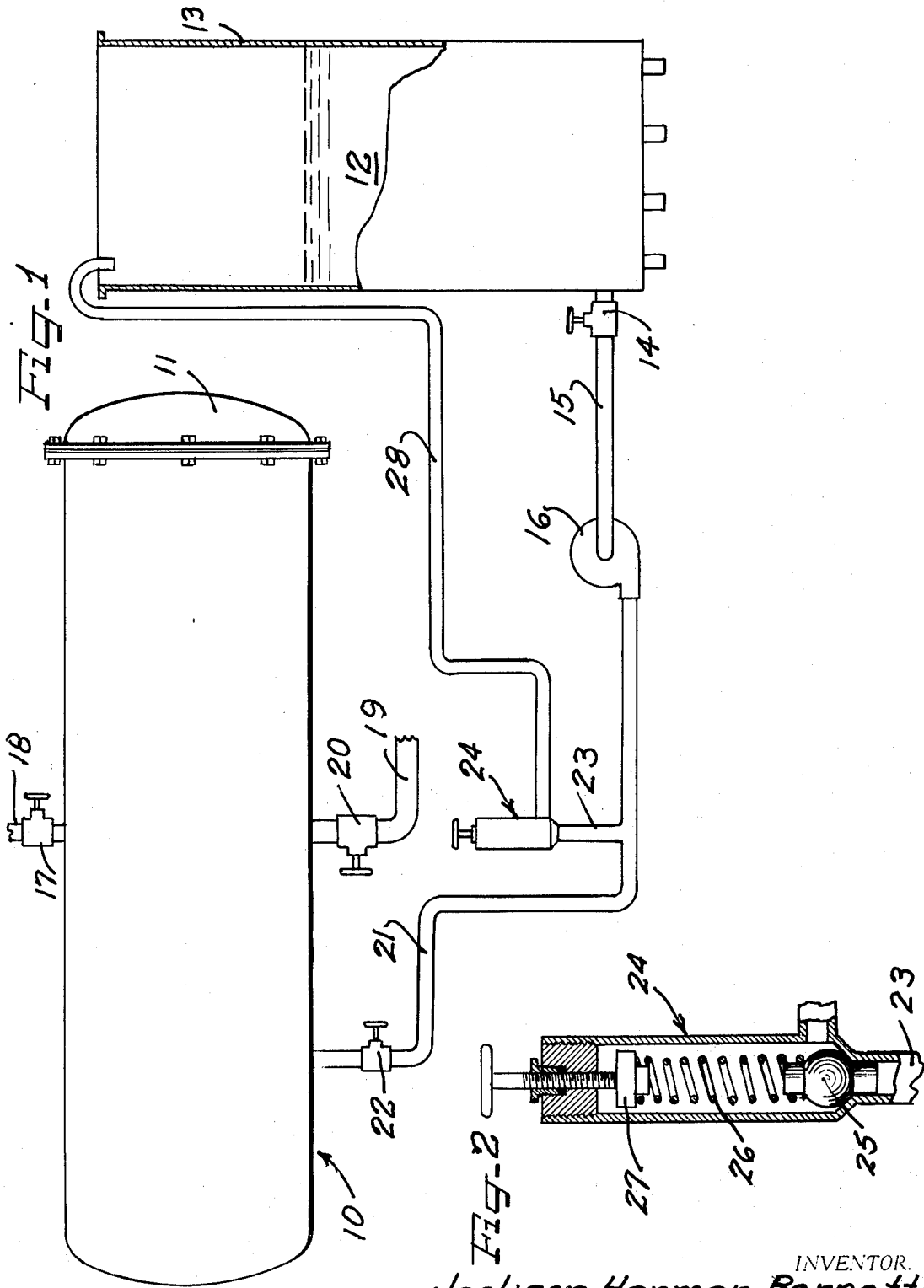
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J. H. BARNETT, JR

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INVENTOR.  
Jackson Herman Barnett, Jr.

BY *Hill, Sherman, Meroni, Cross & Singer* ATTORNEYS

