

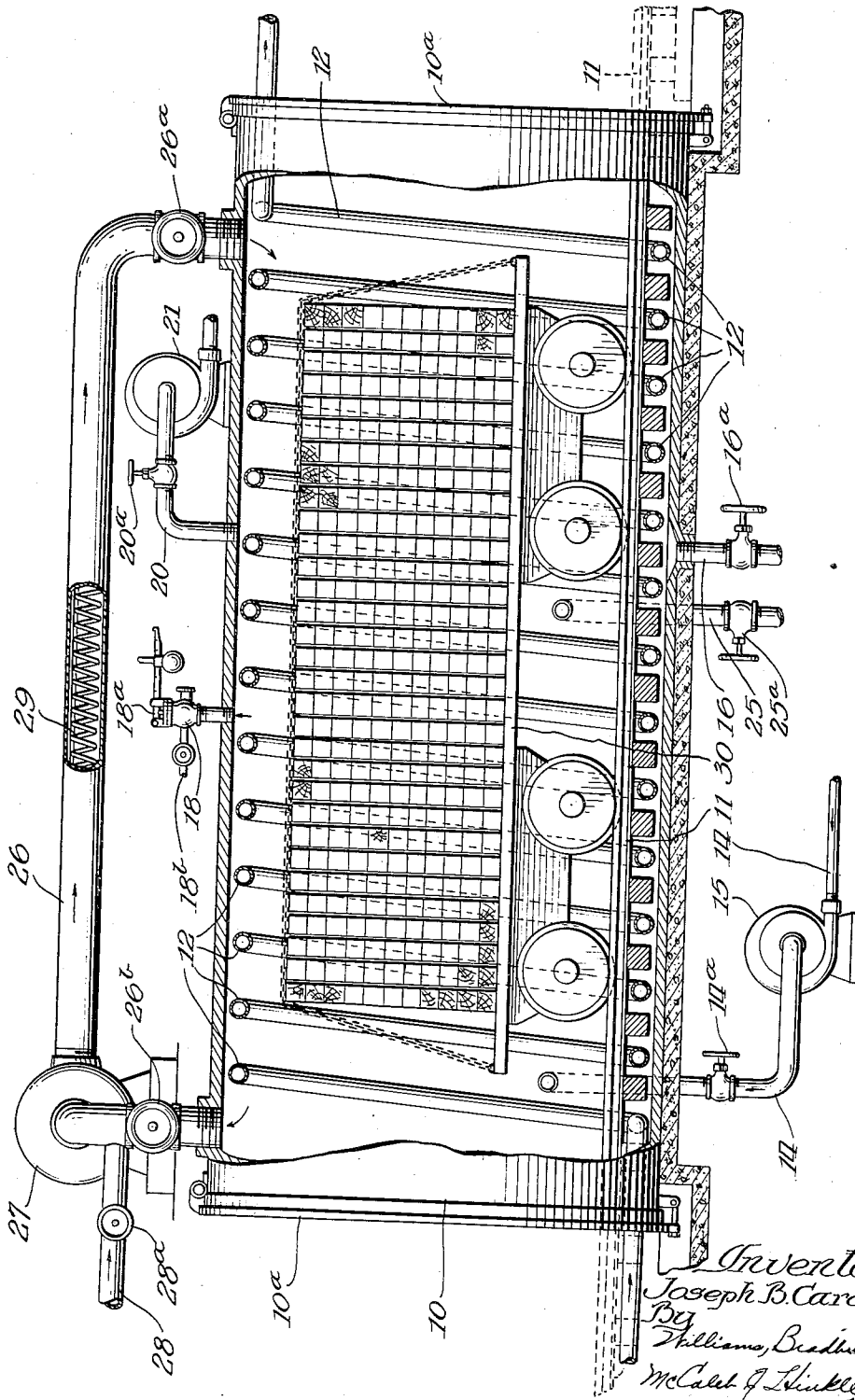
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WOOD TREATING PROCESS

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WOOD TREATING PROCESS

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2 Claims. (Cl. 21—24)

This application is a continuation in part of my co-pending application, Ser. No. 603,060, filed April 4, 1932.

My invention relates to improvements in wood treating processes and has for an object to provide a process by means of which green or partially seasoned ties or other wooden articles may be seasoned and thereafter subjected to an impregnation or preserving treatment, if desired.

By the practice of my process I am enabled to dispense with or greatly shorten the period of natural seasoning or air drying which is relied upon in the present day manufacture of railway ties, timbers and the like, thus eliminating or greatly decreasing the expense of treatment.

In the accompanying drawing I have illustrated more or less diagrammatically, apparatus which is suitable for the practice of my process, although it is to be understood that I do not restrict myself in the practice of my process to the use of any particular apparatus.

In the drawing, 10 indicates generally a cylindrical container or retort having tracks 11 leading thereinto and provided with sealing enclosures 10a which may be locked in closed position hermetically to seal the retort. Located within and adjacent the inner periphery of the container 10 are heating coils 12 connected with any suitable source of heat, as, for example, a supply of live steam. A preservative line comprising pipes 14 and the interposed pump 15 extends between a suitable source of supply of fluid preservative (such as zinc chloride, creosote or the like), and the retort or container 10. A manually controlled valve 14a is also inserted in the line.

A drain pipe 16 leads from the bottom of the container 10 and is controlled by a suitable valve 16a. This pipe leads to a suitable collection receptacle (not shown) for the oil or preservative.

A blow-off pipe 18 is provided, having a regulable valve 18a and a manual control valve 18b. Valve 18a may be of any suitable construction providing an adjusted resistance which will permit blow-off when a definite pressure is exceeded in the container 10. Valve 18b may be opened to permit free exhaust of gases under pressure in container 10.

Communicating with the interior of the container 10 is the pipe 20 leading to suction pump 21, which exhausts into the atmosphere or in a condensing receptacle (not shown), if so desired. This line 20 is also provided with a shut-off valve 20a.

A steam pipe 25 communicates with the interior of the container or retort 10 at any suitable

point, and is provided with a shut-off and control valve 25a, its purpose being to admit steam to the interior of the container for humidification. It will be apparent that the line 14 with or without operation of the pump 15 may be used for the same purpose by connection to a source of steam, if so desired.

A circulating line 26 communicates with the interior of the container 10 at two points, preferably located adjacent the extremities of the container, 10 as illustrated in the drawing. An air blower or fan 27 is interposed in the line 26. A shut-off valve 26a is inserted in the line 26 and a branch duct 28 also communicates therewith, the same being provided with a shut-off valve 28a. I find it desirable also to locate in the line 26 heating coils 29 connected with any suitable source of heat or any suitable heating means for a purpose hereinafter described.

Suitable temperature indicating means, as a thermometer, and moisture indicating means, as a hygrometer, or the like (neither of which is shown), may be supplied where desired for the convenience of the operator and for accurate operation.

For the treatment of certain kinds of wooden objects, particularly those of relatively small size, I may take the green or partially seasoned articles, move them into the container 10 upon the truck 30, and then seal said container by closure of the ends 10a. The valves 26a, 26b are then opened and the blower 27 set in operation to force hot dry air (heated, if necessary, by the heating unit 29) into and through the container 10, circulation being maintained through the duct 26 and container 10, as will be apparent.

Steam is then admitted to the interior of the container as through the pipe 25, this steam serving not only to raise the temperature in the container, but also to increase the humidity, to 60% for example.

The blower 21 is set in operation and the valve 20a opened, permitting withdrawal of air, gas and/or vapor (which I term generically, "gases") from the interior of the container, and to discharge either into the atmosphere or elsewhere, as may be desired.

The valve 28a is preferably open sufficiently to permit the introduction of sufficient air to compensate for the air or gases withdrawn by the pump 21. By proper control of the valves 20a and 28a and by proper selection of a pump 21 with respect to capacity, a negative pressure may be obtained in the container 10 which will vary from slightly below atmospheric to substantially

below atmospheric. It is my belief and opinion that the maintenance of such a negative pressure in the container will enhance and expedite the discharge of moisture or vapor from the wooden articles being treated.

During this treatment, as stated, the circulation of the air or gases is maintained through duct 26 and the container, so that there is a constant movement around and through the wooden articles, while a portion of the moisture laden air is being removed and a corresponding amount of dry air heated and admitted. At the same time, the desired temperature may be maintained through the medium of the heating coil 29. The operator of the apparatus will know from experience and from testing samples what rate of exhaustion of the air or gas is desirable and what humidity is best. He can then readily maintain substantial uniform humidity or vary it as may be desired, by control of the heat application from means 29, or elsewhere, by control of the air admitted through valve 28a and by control of air discharged past valve 20a. Some adjustment of the steam admission valve 25a may be necessary, but this is a simple matter.

The operator will be able also to determine from his experience, or from test, when the articles have been sufficiently dried or seasoned in this manner.

If it then be desired to impregnate these articles with a preservative, such as creosote or zinc chloride, any suitable process may be employed for that purpose, although I recommend as desirable that described at the end of this specification.

In the practice of my process as applied to railway ties, or large objects, for example, I take the ties either green or partially seasoned. I have found it more satisfactory from the standpoint of economy, however, to utilize ties which have been partially seasoned by air drying, for example, for several months. These ties are mounted upon a suitable truck 30, movable upon the tracks 11, and are placed in the container 10, which is then sealed by closure of the ends 10a.

Preserving fluid, such as zinc chloride or creosote, is pumped into the container by means of pump 15 after proper manipulation of the valve 14a. This oil may be permitted to flow in without setting up substantial pressure in the retort by proper setting of the valve 18b, or any desired pressure may be set up by closing the valve 18b, whereupon the confined air or gas will gradually be compressed as the preservative is pumped in increasing the pressure upon the preservative, and consequently the pressure of the preservative upon the wood. I have found it satisfactory, however, in treating some ties to dispense with any substantial pressure in this step of my process, and I contemplate as a modification of my process the setting up of a negative pressure during this step of my process in the retort or container 10, as may readily be done by proper actuation of the exhaust pump 21. In short, except as the appended claims are so limited, I do not wish to be restricted as to pressure, either positive, negative or atmospheric, in the container during this step. The oil is preferably at a temperature of 150° F. to 200° F. when introduced, and is raised to 220° F., the ties or other objects being retained in submerged condition for from three to five hours, at the end of which the oil is drained off or blown off. This operation has resulted in coating the objects with the preserva-

tive, and in forcing the same at least slightly beneath the surface. This coating acts as a lubricant to prevent case-hardening or checking during the subsequent operations. Similarly, the application of the heated preservative has acted to expand and vaporize the confined moisture or gases in the cells of the wood. I prefer to utilize creosote or a mixture of creosote and other non-moisture containing oils for the coating step in my process, i. e., to use an oil or coating fluid which does not add moisture to the content of the timbers or other objects being treated during the seasoning thereof.

The circulating pump or fan 27 is next set in operation, valves 26a and 26b being opened. Exhaust pump 21 is also set in operation after opening of valve 20a, and valve 28a is opened sufficiently to permit inflow of outside air in sufficient quantity to compensate for the gases extracted from the container by the pump 21. By proper use of the heating means 29, a desired temperature of the circulating gases may be maintained. I have found in the neighborhood of 220° F. to be satisfactory in some operation. As previously described, a negative pressure may be set up and maintained in the container by adjustment of the valves 20a and 28a, and this negative pressure I am able to maintain at from slightly below atmospheric to substantially below, as for example 10 pounds per square inch absolute, or even lower.

By continuously removing a portion of the confined gases and supplying what I term "scavenging" air from the outside to compensate, I am enabled to remove the moisture from the cells of the wood, and the continuous circulation at high temperature of the hot gases about and around the wooden ties or other objects, enables me to obtain a moisture removal far in excess of what has been possible by prior art processes; also the time factor is greatly reduced.

When the objects have been brought to the desired condition, which may be determined by a well known test or which the operator will recognize as existent in view of his past experience, the pumps 21 and 27 are shut off.

If it now be desired to impregnate the ties or other objects with preservative, such as creosote, zinc chloride, or the like, the same may be pumped into a container to submerge the ties, and a pressure of from 150 pounds to 200 pounds per square inch set up. In such a treatment I find it desirable to maintain a temperature of from 190° F. to 200° F., the treatment being continued for from four to five hours, in a typical operation.

In this impregnation treatment, if the so-called "full cell" treatment is desired, I proceed as just described.

If an "empty cell" treatment is desired, I first blow in air at a pressure, for example, of from 50 to 60 pounds, and maintain this pressure for from ten to fifteen minutes before pumping in the preservative, which is forced into the container against the air pressure. It is my understanding that in this latter impregnation, a pre-aeration of the cells of the wood occurs, i. e., the air under pressure finds its way into the cells and when the preservative is later pumped in, such confined air resists the entrance of the preservative into the cells to the extent that they are not filled with the preservative, but are coated about their interior.

Following the impregnation treatment, the oil or preservative is drained off and the ties allowed to drain before removal from the container.

In the practice of my process as applied to larger wooden objects, such as ties, I have found it desirable in some instances to precede the coating step described above by pre-aeration, effected by pumping air into the closed container by means of the fan or blower 27 (valve 26b being closed during this operation and valve 28a being open) until a pressure of from 50 to 60 pounds, for example, is obtained. This pressure is maintained for a suitable period of time. I have found ten to fifteen minutes to be sufficient in actual practice.

It is believed, as stated above, that this aeration results in the forcing of air into the cells of the wood, and if the preservative then be pumped in without lowering the pressure obtained in the container and without release of the air therefrom, the air which is in the cells is prevented from escape, and it serves, in my opinion, not only to resist entrance of the coating preservative a substantial distance below the surface of the ties, but also to pick up vapor or moisture from the cells as it becomes heated during immersion in the heated preservative. When it is then allowed to escape, it acts as a vehicle for the moisture content of the wood cells.

However, as indicated, I have been enabled to dispense with the pre-aeration step with satisfactory results in some of my operations. Therefore, I do not wish to be restricted to its use except as certain of the appended claims are so limited.

In the conduct of the coating step described above, I have found it desirable to introduce the oil at 175°, after which I have raised the temperature of the oil gradually by means of the heating coils 12, to a temperature of approximately 220° Fahrenheit. This operation is carried on for from three to five hours, the time varying as is the case of all other pressure, temperature and time conditions, according to the quality and character of the wood being treated. At the same time the air and vapor in the timbers preclude penetration of the preserving fluid very much below the surface of the timbers. It does, however, coat and lubricate the outer portions so as to prevent case-hardening, cracking, checking or splitting during the drying operation.

It will be understood that preferably the ties or timbers are so arranged as to provide circulation spaces between and around them while in the container.

While I have specified to some extent temperatures, times and pressures to be used in the practice of my invention, it will be understood that these factors may be varied to meet different conditions presented by different kinds and conditions of wood, it being a simple matter for the

skilled operator to determine the most desirable or best operation for the wood which he is handling after familiarizing himself with the process, and I do not wish to be restricted to the specified times, pressures and conditions or fluids used except as I may be restricted thereto in the claims properly interpreted with due consideration of the prior art.

What I claim is:

1. The process of producing seasoned and preservative-impregnated timber from green or partially seasoned timber, which comprises placing said timber within an enclosure, subjecting said timber to a gaseous pressure of from 50 to 60 lbs. per sq. in. gauge, introducing hot creosote into said enclosure without release of said pressure and gradually raising the temperature of said creosote to substantially the vapor point of the moisture contained in said timber, maintaining said temperature, then drawing off said creosote and releasing said gaseous pressure, then circulating a humid atmosphere having a temperature not exceeding 220 degrees F. and at a pressure in excess of 10 lbs. per sq. in. absolute through said enclosure until moisture is removed from said timber to the desired degree, then introducing hot creosote under pressure until said timber is immersed, heating said creosote to a temperature of 190 to 200° F., and maintaining said temperature and pressure, and finally relieving the pressure and drawing off said creosote.

2. The process of producing seasoned and preservative-impregnated timber from green or partially seasoned timber, which comprises placing said timber within an enclosure, subjecting said timber to a gaseous pressure of from 50 to 60 lbs. per sq. in. gauge, introducing hot creosote into said enclosure without release of said pressure and gradually raising the temperature of said creosote to substantially the vapor point of the moisture contained in said timber, maintaining said temperature for from three to five hours, then drawing off said creosote and releasing said gaseous pressure, then circulating a humid atmosphere having a temperature not exceeding 220 degrees F. and at a pressure in excess of 10 lbs. per sq. in. absolute through said enclosure until moisture is removed from said timber to the desired degree, then producing a gaseous pressure within said enclosure of about 50 to 60 lbs. per sq. in. gauge and without relieving said pressure introducing hot creosote until said timber is immersed, heating said creosote to a temperature of 190 to 200 degrees F., and maintaining said temperature for from four to five hours, and finally relieving the pressure and a drawing off said creosote.

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