UNITED STATES PATENT OFFICE.

JOHANN POLIFKA AND BERTALAN HACKER, OF BUDAPEST, AUSTRIA-HUNGARY, ASSIGNORS TO THE FIRM OF "IMPRAGNATOR" IMPREGNATING COMPANY LIMITED, OF BUDAPEST, AUSTRIA-HUNGARY.

IMPREGNATION OF WOOD.


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To all whom it may concern:

Be it known that we, JOHANN POLIFKA and BERTALAN HACKER, subjects of the King of Hungary, and residents of Budapest, in the Empire of Austria-Hungary, have invented new and useful Improvements in or Relating to the Impregnation of Wood, of which the following is a full, clear, and exact description.

The present invention relates to a process for impregnating wood to preserve the same. According to this process, the wood to be treated is placed in vacuo and there subjected to the effects of a hot impregnating liquid. After a certain time the liquid is drawn off and the receptacle in which the wood has been treated is again evacuated so that all the air and vapors which may have remained in the pores of the wood will be drawn off by suction. After this has taken place the hot impregnating liquid is again fed into the receptacle and placed under pressure by which means the impregnating liquid will be forced well into all the pores of the wood.

In the accompanying drawing a plant is illustrated by means of which the present process may be carried out.

Figure 1 is a sectional plan of the plant, Fig. 2 a sectional front elevation and Fig. 3 a sectional side elevation.

Two cylinders $b$ are provided for the reception of the wood to be impregnated, each of said cylinders being provided with a steam collecting receptacle $c$ and being provided at one end with a removable cover $c'$. Transverse rails $a$ run along the ends of the two cylinders for the accommodation of the truck by means of which the wood is brought up to the cylinders. A series of receptacles $d$ mounted outside the building are provided for holding the raw materials employed to form the impregnating liquid. These receptacles are advantageously provided with heating coils $d'$. For mixing and measuring up the proper quantities of the raw materials for making the impregnating liquid receptacles $e$, $f$, are provided. All the holders $d$ are connected up by a pipe $d''$ the branches $d''$ of which are provided with stop-cocks. A branch pipe $d''$ from the pipe $d''$ leads to a pump $d''$, which serves to force the constituent parts of the impregnating liquid through pipes $e'$ or $f'$ to the receptacles $e$ and $f$. The heating coils in the receptacles $d$ are for the purpose of preventing the raw materials from freezing in winter. Beneath the cylinders $b$ a pit $g$ having advantageously rectangular cross section (Fig. 2) is provided for the reception of the impregnating liquid. The latter is heated in vertically disposed cylinders $i$, while the air and vapors may be cooled down in two vertical condensers $k$, $k$.

Two circulating pumps $h$, $h'$, effect the transportation of the impregnating liquid from the cylinders $b$ into the cylinders $i$ and then back again to $b$. Pipes $i''$ are provided to connect up the lower parts of the cylinders $b$ to the pumps $h$ and from these pumps, pipes $i''$ lead to the lower part of the heating cylinders $i$. Pipes $i''$ lead from the upper part of the latter to pumps $h$ and from these pipes $h''$ connect to the steam collectors $c$. A steam boiler $m$ is provided which serves to drive the steam pump $l$.

The wood to be impregnated is placed on the trucks and run up on the rails to the cylinders $b$.

The raw materials are drawn from the receptacles $e$ and $f$ by means of a mixing pump $p$ and forced through the heating device $o$ and through a pipe $o'$ into the pit $g$. A steam pump $r$ draws the impregnating liquid by suction through a pipe $r'$ and then forces the same through pipes $r''$ and $r''$ to whichever of the cylinders $b$ is in use at the time. After the wood has been run into the cylinder $b$ and the cover $c'$ securely closed, the cylinder is filled with the heated impregnating liquid by means of the pump $r$. The cylinder $b$ is then evacuated by means of the air pump $s$ to produce a vacuum of 15–20 ctm. mercury column. The vapors which during this evacuation will be extracted from the wood and rising from the impregnating liquid will pass into the steam collectors $c$, and then through pipes $k''$ into the condensers $k$ where they will be condensed. The vacuum pump $o$ is connected with the condensers $k$ by means of pipe $s'$. As soon as sufficient impregnating liquid has entered the cylinder $b$ to cover the wood the feed of the liquid is stopped and the pump $h$ is started to pump the liquid which has been cooled by the wood into the heat-
ing cylinders 1 and subsequently back again into the cylinder b. The initial temperature of the impregnating liquid is about 110° to 130° centigrade, i.e. slightly above the boiling point of water so that any water which may be in the wood will be converted to steam. It is advantageous to maintain a vacuum in the heating cylinders until equal to that in the cylinders b. From the results of condensation in the condensers k the amount of water which has been extracted from the wood may be determined. The duration of this process is about from 3–3½ hours. As soon as as much moisture as possible has been taken out of the wood the impregnating liquid is drawn off from the cylinders b at atmospheric pressure and subsequently the wood in the cylinder is subjected to as high a vacuum as possible (65–72 cm. mercury column) for about one hour which will have the effect of withdrawing any warm air or moisture which may still be left in the wood and opening the pores of the latter. The air and vapors thus drawn off are conducted to the condensers as above described. As soon as no more vapors are observable the cylinders b are again entirely filled with the same hot impregnating liquid and by still continuing to force in liquid by means of a pressure pump a pressure is generated in the cylinder of from 8–10 atmospheres the effect of which is to force the liquid well into the open pores of the wood. The pressure is continued for about one hour. As soon as the wood has taken up a sufficient quantity of impregnating liquid the pressure pump is stopped and the liquid gradually let off whereupon the wood may be taken from the cylinders.

If the wood should have taken up too much of the liquid it may be again subjected to the effect of the vacuum process.

The impregnating liquid, can, of course, be caused to circulate from the cylinders into the heating cylinders and back to the impregnating cylinders.

The impregnating liquid consists advantageously of a mixture of tar-oil containing an antiseptic substance with the distillate of a heavy mineral oil i.e. having a high boiling point.

Wood tar oil containing 40–70 per cent. of crescote or coal tar oil containing carbolic acid has proved to be particularly advantageous for the present process. Blue oil, a secondary product obtained from crude oil and which remains as residue on the distillation of the more volatile constituent parts of crude oil after separating out benzin and other light constituent parts as also some of the heavier ones is also well suited for the present process. This oil has the property of dissolving the antiseptically operating substances of the impregnating liquid so that the latter will be perfectly evenly distributed in the wood. It is necessary that this so called blue oil should be a perfectly pure mineral oil and free of foreign bodies. Its flash point should be above 100° centigrade and should not distil at 125°.

We claim as our invention:

A process of impregnating wood, which consists in first treating the wood in a bath of heated oil in a partial vacuum, drawing off the oil, again creating a vacuum, forcing in the impregnating medium and again impregnating under pressure, drawing off the superfluous impregnating medium and recreating the vacuum.

In testimony whereof we affix our signatures in the presence of two witnesses.

JOHANN POLIFKA.
BERTALAN HACKER.

Witnesses:
ERNST MELLER,
MICHAEL WARNOR.