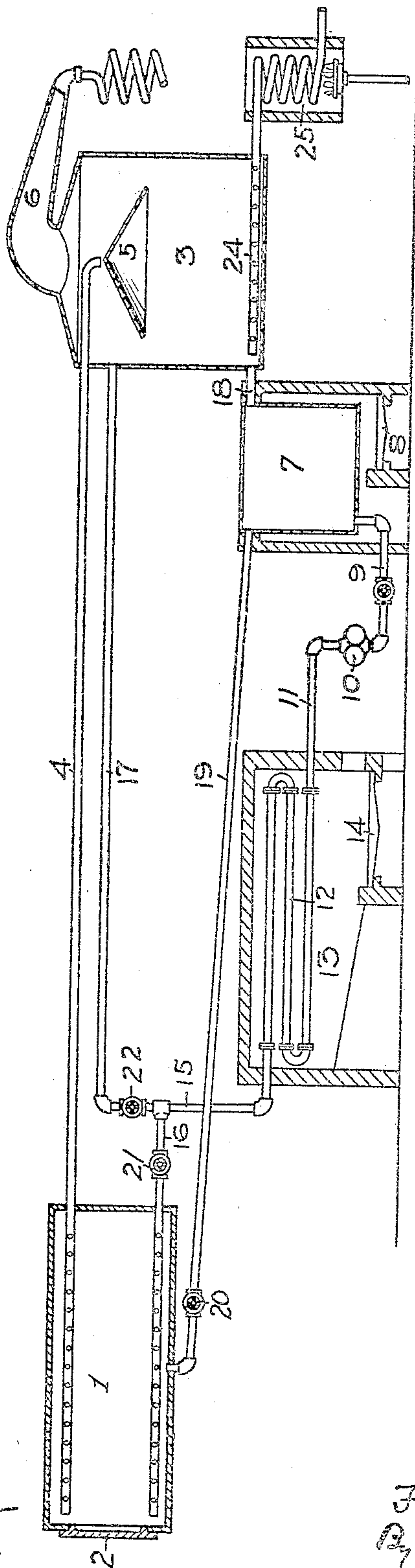


F. POPE.
 PROCESS OF EXTRACTING PRODUCTS FROM WOOD.
 APPLICATION FILED JUNE 6, 1907.

959,599.

Patented May 31, 1910.



WITNESSES.
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PROCESS OF EXTRACTING PRODUCTS FROM WOOD.

959,599.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed June 6, 1907. Serial No. 377,634.

To all whom it may concern:

Be it known that I, FREDERICK POPE, a resident of New York, in the county of New York and State of New York, have invented
5 a new and useful Improvement in Processes of Extracting Products from Wood; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention is an improvement in processes of extracting turpentine, oils, and other products from wood.
10

The object of the invention is to provide a process for this purpose which gives a large yield of products from the wood being
15 treated, and which does not injure the fiber of the wood.

Heretofore, the practice generally followed in the extraction of turpentine, oils, rosin, and similar substances from wood,
20 has consisted in treating the wood with a bath of rosin or similar substance in a vessel which was connected directly to a condenser, and introducing steam directly into said vessel. I have discovered that this is
25 not an advantageous process, as it is very difficult to maintain an absolutely unvarying temperature in the vessel, as the quality of the steam varies and the effect of the steam also varies with the condition of the
30 wood being treated. The variation of the temperature in this vessel has a harmful effect upon the wood, and also if the variation is considerable, say twenty degrees or thereabout, it materially decreases the
35 amount of products obtained from the wood. It has been proposed to treat the wood in one vessel and carry the bath to another vessel where it is subjected to the action of steam to agitate it and liberate the products
40 which were extracted from the wood. The temperature of the bath for the treatment of the wood varies from approximately three hundred and twenty-five to three hundred and seventy-five degrees Fahrenheit, so
45 that ordinary steam has the effect of cooling such bath. I have discovered that such cooling of the bath during agitation materially reduces the quantity of products obtained therefrom, or, in other words, the cooler the
50 bath the more absorbed products will be retained by it. I have also discovered that if the steam is superheated to about the temperature of the bath, and is introduced into a separate chamber from that in which
55 the wood is treated, so that the steam causes

no cooling of the bath but maintains it at substantially a constant temperature, the volatile products extracted from the wood separate much more quickly and completely than if the bath is allowed to cool. My invention is intended to secure the beneficial
60 objects just stated, and it consists in treating the wood with the bath in one chamber and then conducting the bath to another chamber where it is agitated and maintained at a constant temperature, preferably
65 by introducing into the same steam superheated to substantially the temperature of the bath.

The accompanying drawing represents
70 diagrammatically one form of apparatus suitable for carrying out my process.

In the drawing, 1 represents the vessel or retort in which the wood is treated with the bath, said vessel being provided with a
75 door 2 for the insertion and removal of the wood to be treated.

3 represents the separating chamber, this being connected with the top of the vessel 1 by means of a pipe 4 which preferably
80 has a perforated section extending into the vessel 1, and in the tank 3 opens above a splay 5. The chamber 3 is connected by a pipe 6 with any suitable condenser, such as the coil shown.
85

7 represents a tank in which the bath, such as rosin, is melted and held ready for use, the melting being effected by any suitable means, such as the grate 8 upon which a fire can be maintained underneath said tank.
90 This tank is connected by a pipe 9 to a pump 10, which in turn is connected by a pipe 11 to a heating coil 12, located in a suitable heating chamber 13 provided with a grate 14, or other means for maintaining a
95 fire underneath the coil. The opposite end of the heating coil has connected thereto a pipe 15 from which leads a branch 16, extending into the bottom of the vessel 1, the portion in the vessel being perforated,
100 as shown. Another branch 17 of the pipe 15 leads to the chamber 3, and from near the bottom of said chamber 3 is an overflow pipe 18 leading to the tank 7. From the bottom of vessel 1 a pipe 19 leads to tank 7.
105 In the last named pipe is a valve 20, while in the branch 16 is a valve 21, and in the branch 17 there is a valve 22.

In order to maintain the bath at a constant temperature while being agitated in
110

the chamber 3, and also to agitate said bath, I make use of a perforated steam pipe 24 extending into said chamber and connected to a superheater 25, by means of which the steam can be raised to a temperature substantially that of the bath entering chamber 3.

In carrying out my process the wood to be treated is piled on cars which are run into the vessel or retort 1. The door 2 is then closed, and the rosin or other substance to be used as a bath, which has been previously melted in the tank 7, is then drawn, by means of pump 10, from the tank 7 and forced through the heating coil 12 and into the vessel 1 to submerge the wood. In the coil 12 the bath is heated to a temperature of from three hundred and twenty-five to three hundred and seventy-five degrees Fahrenheit. During this operation the valves 20 and 22 are closed and the valve 21 open, so that the hot bath enters the vessel 1 through the perforated pipe in its bottom and fills said vessel. The rosin circulates around the wood, and the products contained in said wood are volatilized by the hot bath and extracted from the wood and partly absorbed by the bath. When the vessel 1 is entirely full, the bath passes through pipe 4 into tank 3, spreading out on the splay 5, and the descending stream meets the ascending superheated steam coming through pipe 24, thus agitating said bath and freeing the products which were extracted from the wood, such volatile products, together with the steam, passing over into the condenser. The bath passes through pipe 18 into tank 7, from whence the circulation continues as before.

When the wood in vessel 1 has been thoroughly treated, the valve 21 is closed and valves 20 and 22 are opened. The bath contained in vessel 1 then drains through pipe 19 into tank 7, and as soon as the vessel 1 is entirely emptied, the door 2 is opened, the wood removed therefrom, and a fresh charge of wood placed in said vessel. The pump during this operation is preferably kept in continuous operation in order to maintain the temperature of the melted rosin or other bath, which is forced by the pump through by-pass pipe 17 into the vessel 3, whence it returns to tank 7. As soon as the vessel 1 is recharged and the door 2 closed, the valve 21 is again opened and the valves 20 and 22 are closed, when the circulation heretofore described is again set up.

It is of the utmost importance that throughout the process the temperature of the bath may be as constant as possible. The temperature in the vessel 1 cannot be absolutely uniform, as the purpose of the hot rosin or other bath is to supply heat to vaporize the products contained in the

wood, so that naturally the bath loses part of its temperature in this vessel. The temperature must, however, be kept as constant as possible, for not only will a variation of temperature have a harmful effect on the structure of the wood, making it less valuable for use after treatment, but frequently such variation of temperature also affects the wood so as to make the further yield of products very small.

I am aware that the use of rosin as a bath for extracting products from wood is old, and I do not claim it, but have merely referred to it as one example of the various baths that may be used.

I am also aware that it is not new to use steam for agitating the bath, but I believe that I am the first to discover the advantage of superheating the steam and using it at such temperature as will keep the bath at as constant a temperature as possible throughout the process, and while so using the steam keeping it from contact with the wood, that is, providing a separate chamber for the vaporization and separation of the products.

I am also aware that it has been proposed to use superheated steam as an agent for extracting spirits of turpentine and the like from wood or substances containing the same, but in that case the super-heated steam was used as the agent for extracting the spirits of turpentine from wood or the like and not as a medium for agitating and maintaining the temperature of a hot bath in which spirits of turpentine and other volatile products are absorbed.

What I claim is:

1. The method of extracting products from wood, which consists in circulating over the wood contained in a suitable vessel a hot bath, conducting the bath to a separate chamber and there agitating it while maintaining it at substantially the same temperature as in the absorbing vessel.

2. The method of extracting products from wood, which consists in circulating over the wood while held in a suitable vessel a hot bath, conducting said bath to a separate chamber and there agitating it while maintaining it at substantially the same temperature as in the absorbing vessel, reheating said bath and again conducting it to the chamber containing the wood.

3. The method of extracting products from wood, which consists in circulating over the wood while contained in a suitable chamber a hot bath, continuing the circulation of the bath through a separate chamber, and agitating that portion of the bath which is in the separate chamber without reducing the temperature thereof.

4. The method of extracting products from wood, which consists in circulating over the wood contained in a suitable chamber a hot bath, continuing the circulation of the bath

into a separate chamber and there agitating the same by introducing into said chamber steam superheated to a temperature substantially the same as the bath as it enters said
5 separate chamber.

5. The method of extracting products from wood, which consists in circulating a hot bath over the wood while contained in a closed vessel, conducting the bath and ab-
10 sorbed products to a closed separating cham-

ber, and there agitating the bath while maintaining it at substantially the same temperature as in the absorbing vessel.

In testimony whereof, I the said FREDERICK POPE, have hereunto set my hand.

FREDERICK POPE.

Witnesses:

H. FRANK OSBORN,

H. WITTER BYNNER.