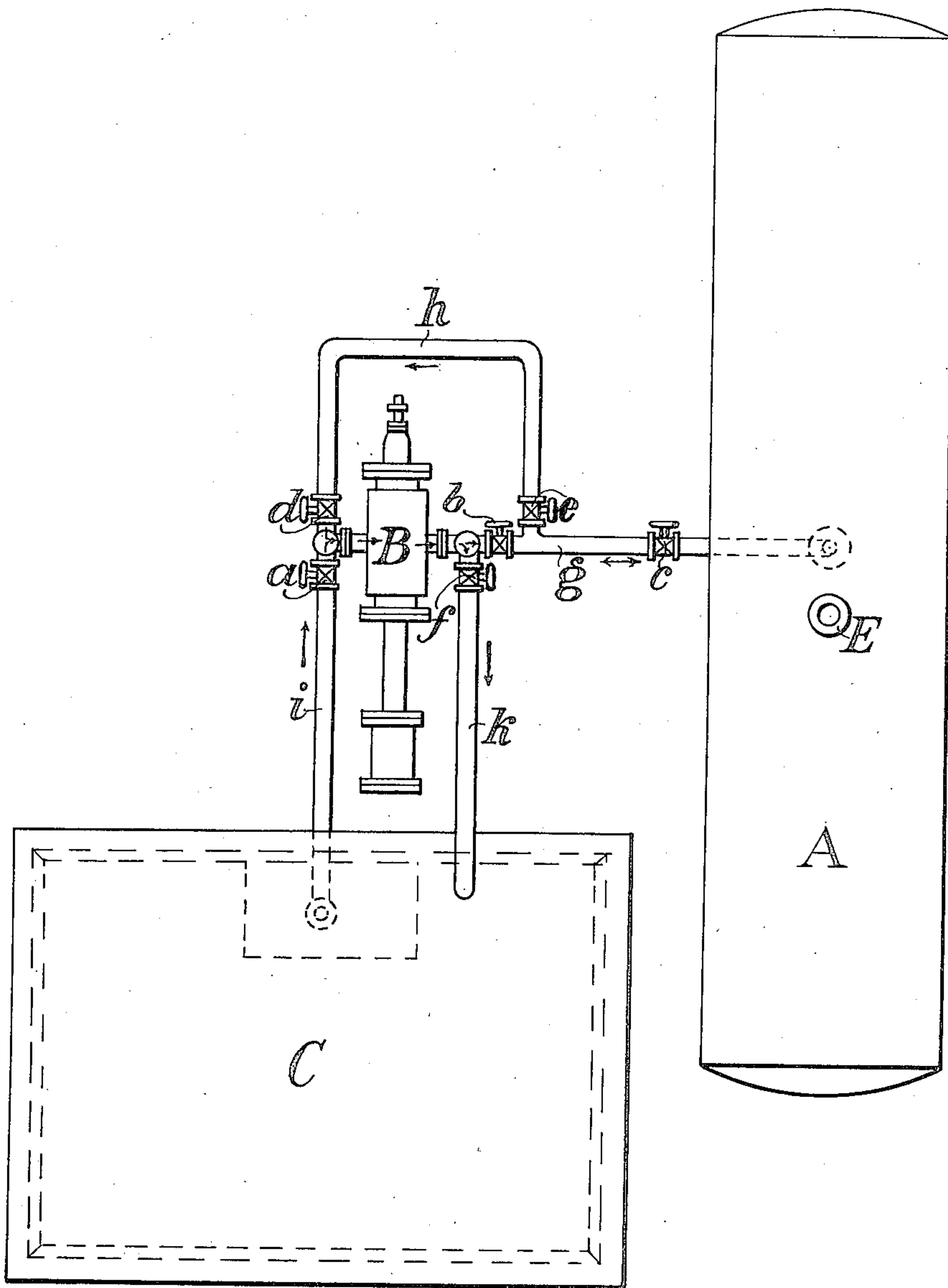


B. DIAMAND.
PRESERVING WOOD AND THE LIKE.
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917,265.

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Witnesses

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UNITED STATES PATENT OFFICE.

BERNARD DIAMAND, OF IDAWEICHE, OBERSCHLESIE, GERMANY.

PRESERVING WOOD AND THE LIKE.

No. 917,265.

Specification of Letters Patent.

Patented April 6, 1909.

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To all whom it may concern:

Be it known that I, BERNARD DIAMAND, chemist, a subject of the King of Prussia, residing at Idaweiche, Oberschlesien, Germany, have invented certain new and useful Improvements in Preserving Wood and the Like, of which the following is a specification.

Impregnating wood with preserving substances is carried out both in open tanks and in closed vessels, according as it is desired to have the said substances impregnate only the outer layers or to saturate the whole porous mass of the wood.

Saturating the whole mass of wood, although it may appear in the first instance more expensive and difficult, conduces far more to the preserving of the same than does superficial impregnating or painting.

Obviously, the complete impregnation ought not to be obtained at the cost of decreasing the stability of the wood, as is the case with many of the usual impregnating processes. For instance, treating wood by means of steam before impregnating, or cooking the same at elevated temperatures is absolutely objectionable, because such proceeding would cause deterioration of the wood fiber. If an impregnating agent cannot be incorporated with the wood unless steam is employed or the impregnation be carried out at an elevated temperature, then other substances more adapted to that purpose, of which a great many exist, should be substituted therefor.

The object of the present invention is to provide a process and an apparatus for economically impregnating wood and other porous materials, which process and apparatus are of the greatest simplicity, cheapness, and efficiency for the purpose intended.

In carrying out the process, the materials to be treated are introduced into the impregnating tank or vessel, which is then closed and completely filled with the impregnating solution while the air-outlet is open. Thereupon the air-outlet is closed and the impregnating solution is drawn off from the vessel by means of a suction pump. By such proceeding a vacuum is produced in the vessel, and air and (in the case of wood) sap components are extracted, whereby the material under treatment is made fit for absorbing the impregnating solution. By a suitable change in the position of the valves the vessel is again filled by the same pump by

means of which it was emptied. By subjecting to over-pressure, according as the circumstances may require it, a thorough penetration of the material to be impregnated may be obtained.

If the quantity of air escaping from the materials under treatment owing to the rarefaction of the air should be so considerable as to deteriorate the vacuum, it is advisable to remove such air through the air-outlet valve by again filling the vessel and by again drawing off the liquid to restore the vacuum.

The heretofore described process may be carried out by the employment of apparatus much more simple than is necessary for carrying out the usual combined vacuum and pressure process. Only one pump for liquids is needed and the whole apparatus including the vessel may be made transportable so that the process may be carried out in a convenient and inexpensive way.

In order that my invention may be more clearly understood, I will now proceed to describe the same with the aid of the accompanying drawing which represents in plan schematically and by way of example an apparatus adopted for carrying into effect my process.

A is a closed vessel of suitable form and size into which the material to be treated is introduced by any suitable means, after which the vessel is tightly closed. An air-cock or other suitable air-outlet E is provided in the upper portion of the vessel A.

B is a fluid suction and force pump made of refractory material to resist the action of the fluid employed, the suction-valve being placed on the left side and the compression-valve on the right side of the figure. The pump B is connected by the pipes *g, h*, to the vessel A, and by pipes *i, k* to another vessel or tank C in which the impregnating solution may be stored. Stop cocks *a, b, c, d, e, f* are provided at each end of the pipes *g, h* and at one end of each of the pipes *i, k*, to make the necessary connections between the vessel A, the tank C and the pump B. It may be remarked that the vessel A is preferably placed at a higher level than the tank C so as to enable the fluid to run voluntarily from the impregnating vessel back to the reservoir.

For carrying into practice my invention I first introduce the timber or the like to be treated into the vessel A, tightly close the

same, and then fill it with the impregnating solution by means of the pump B, the cocks E, *a*, *b* and *c* being opened and the cocks *d*, *e*, and *f* being closed. After the vessel A has
5 been completely filled with the solution, the air-cock E and the cocks *a* and *b* are closed, and the cocks *d*, *e* and *f* opened, and the pump is again set in motion. In this way, a vacuum is produced in the vessel A and oc-
10 cluded air and (when wood is treated) sap are extracted from the material treated. This being done, the cocks *d*, *e* and *f* are again closed and the cocks *a* and *b* are opened, and the impregnating solution is again pumped
15 from the reservoir C to the vessel A, until the desired pressure is obtained.

After having completely impregnated the material under treatment, I may merely run the spent solution into the tank C by opening
20 the air outlet E, and the cock *f*, or I may draw off the solution from the vessel A and return it to the tank C by means of the pump after having closed the cocks *a*, *b* and opened the cocks *c*, *d*, *e*, *f*, the air outlet E
25 remaining closed. In the latter case, the air is again rarefied in the impregnating vessel A and the excess of impregnating solution contained in the pores of the material treated is regained for re-use, in which manner a so-
30 called "economizing process" is established.

The quantity of the solution consumed for impregnating may be regulated by varying the pressure or the vacuum employed, whereby the control of the impregnating
35 process is considerably facilitated.

In carrying out my process I may use any impregnating solution which is adapted for preserving wood and the like porous materials, but I prefer to use a solution of metallic
40 sulfates combined with suitable additions, for instance a solution which consists of ferrous sulfate, aluminum sulfate, sodium fluorid and sodium silico-fluorid as substantially described in my and K. H. Wolman's U. S.
45 A. application Ser. No. 419,597, or I may make use of a solution which I obtain in the following way. I dissolve 32.5 kilograms of ferrous sulfate and 7.5 kilograms of aluminum sulfate in about 1000 liters of water. On
50 the other hand I treat 150 kilograms of the so-called light oil (being the second product of the fractional distillation of brown-coal) with 7.5 kilograms of caustic soda lye containing 40 per cent. of sodium hydroxid. The aque-
55 ous alkaline solution is then separated and added to the aforesaid solution of inorganic salts.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In the process of impregnating wood and the like, the steps which consist of filling a vessel with the wood and impregnating fluid to displace the air therein, partially withdrawing the fluid while preventing the
65 admission of air to produce a vacuum, and then reintroducing the fluid.

2. In the process of impregnating wood and the like, the steps which consist of filling a vessel with the wood and impregnating fluid
70 to displace the air therein, partially withdrawing the fluid while preventing the admission of air to produce a vacuum, and then reintroducing the fluid while permitting any oc-
75 cluded gases given off by the wood to escape, again partially withdrawing the fluid while preventing the admission of air, and then reintroducing the fluid.

3. In the process of impregnating wood and the like, the steps which consist of filling
80 a vessel with the wood and impregnating fluid to displace the air therein, partially withdrawing the fluid while preventing the admission of air to produce a vacuum, and then reintroducing the fluid under pressure.
85

4. The process of impregnating wood and the like, which consists in filling a vessel with the wood and impregnating fluid to displace the air therein, partially withdrawing the
90 fluid while preventing the admission of air to produce a vacuum, and then reintroducing the fluid while permitting any occluded gases given off by the wood to escape, partially withdrawing the fluid while preventing the
95 admission of air, and then reintroducing the fluid, and maintaining the same under pressure for a time, and then forcibly withdrawing the fluid.

5. In the process of impregnating wood and the like, the steps which consist of filling
100 a vessel with the wood and the impregnating fluid to displace the air therein, withdrawing more or less of the fluid while preventing the admission of air to produce a vacuum, and then reintroducing the fluid while permitting
105 any occluded gases given off by the wood to escape.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BERNARD DIAMAND.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.