F. K. FISH, JR.

PROCESS OF DRYING LUMBER.

APPLICATION FILED DEC. 17, 1919.

1,328,662.

Patented Jan. 20, 1920.

3 SHEETS—SHEET 1.

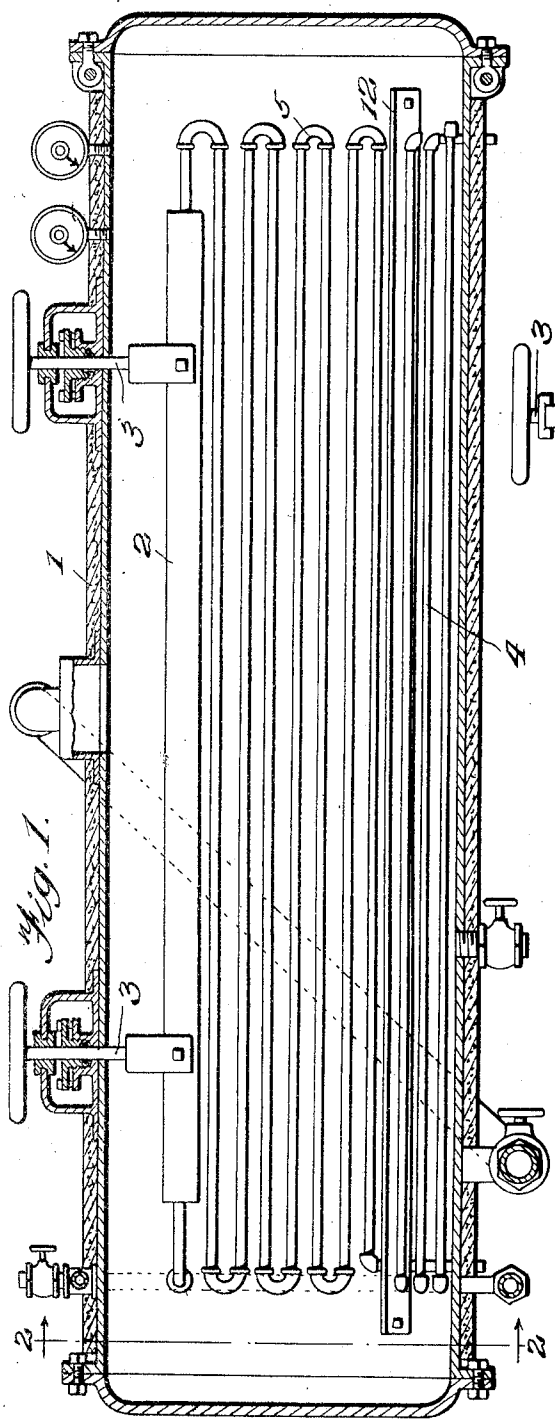


Fig. 1.

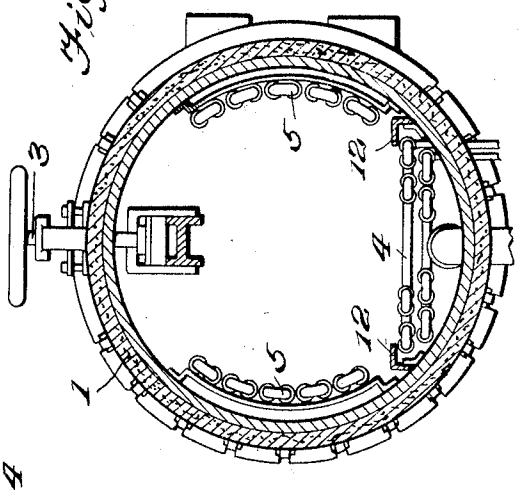


Fig. 2.

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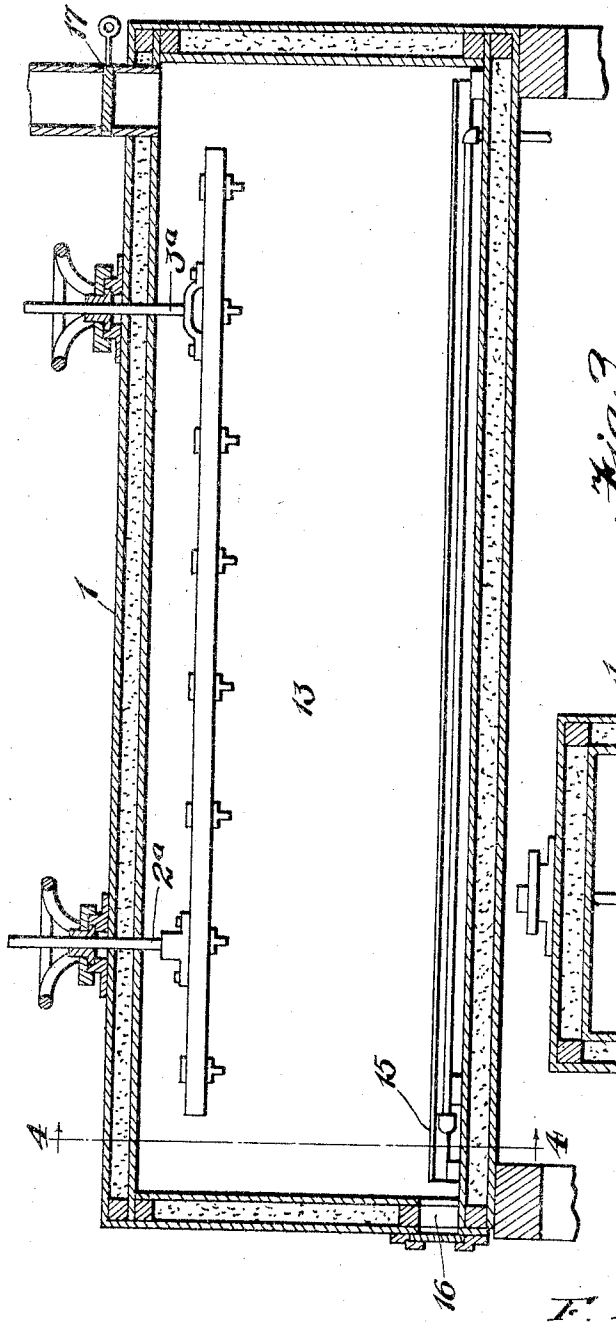


Fig. 3.

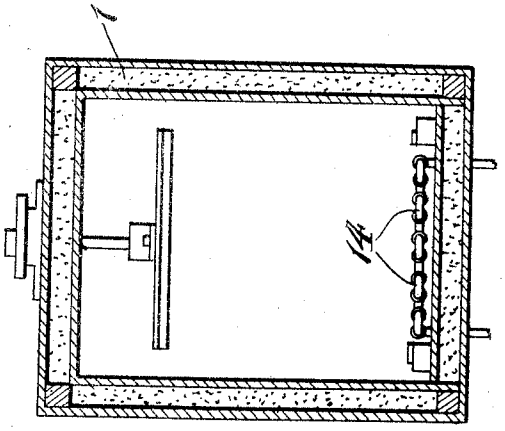


Fig. 4.

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3 SHEETS—SHEET 3.

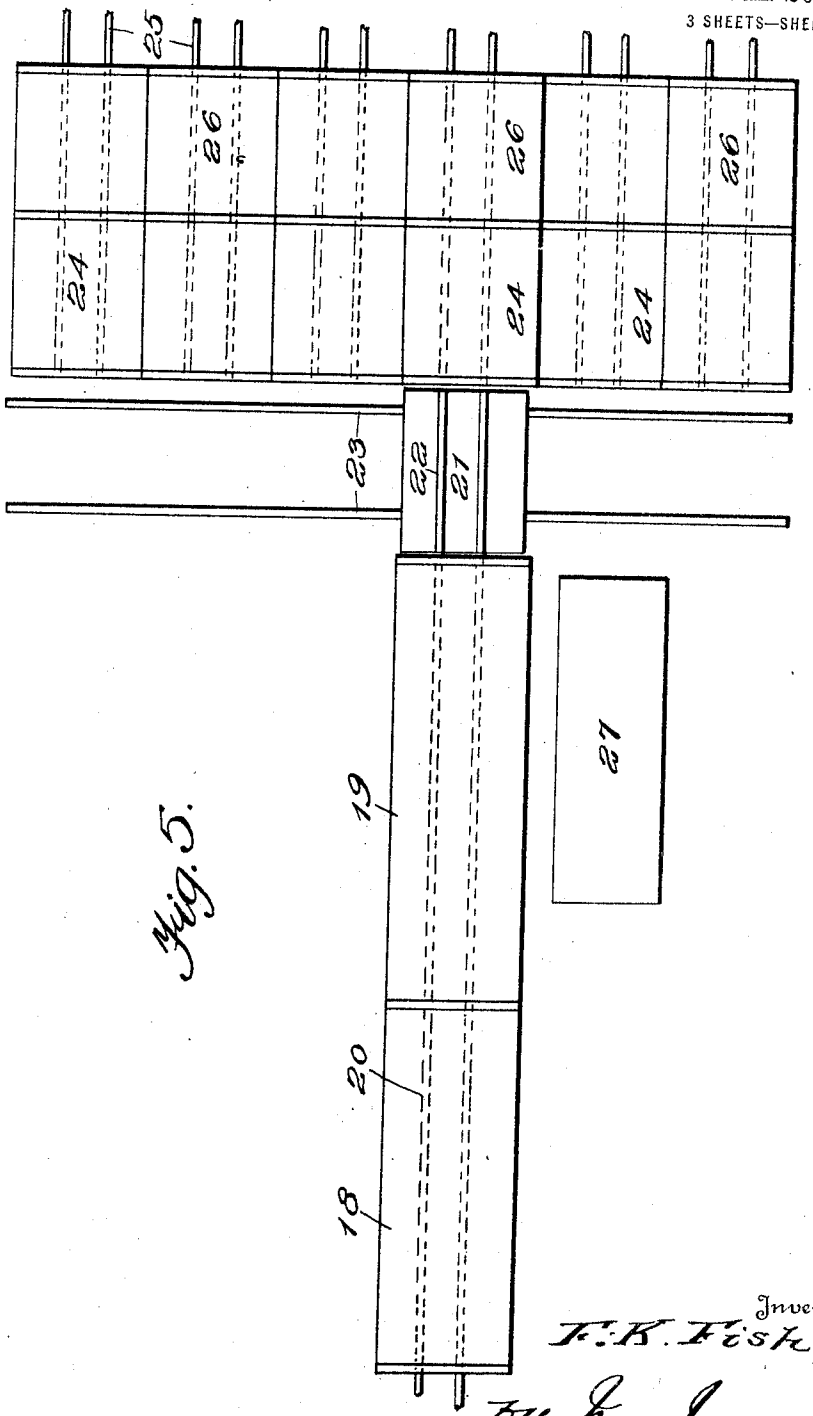


Fig. 5.

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UNITED STATES PATENT OFFICE.

FREDERICK K. FISH, JR., OF NEW YORK, N. Y.

PROCESS OF DRYING LUMBER.

1,328,662. Specification of Letters Patent. Patented Jan. 20, 1920.

Application filed December 17, 1919. Serial No. 345,601.

To all whom it may concern:

Be it known that I, FREDERICK K. FISH, Jr., a citizen of the United States of America, residing at 2 Stone street, New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Processes of Drying Lumber, of which the following is a specification.

The present invention is based upon a proper recognition of the physical characteristics of wood structure, the chemical constituency of its fluid content, and the possibility of converting into an agency for preservation, certain of its contained elements, which, under natural conditions, would form the basis of its deterioration or destruction.

Structurally, wood consists of a skeleton of cellulose intermingled with other organic substances, collectively designated as lignin, together with a minor proportion of mineral matter or ash. Lignin, while not fully understood chemically, is closely allied to the cellulose element of the wood, and since it forms a part of the permanent structure of the wood, it may, for purposes of the present invention, be regarded identical with the cellulose.

To utilize the natural bases of resin, acetic acid and tannic acid, existing in wood, as preservatives of the wood, it is necessary that they be dislodged from their cellular confinement, separated from their aqueous solvent or vehicle, converted by oxidation and properly distributed through or deposited upon the cellular and the fibrous structure of the wood.

The release and conversion of these properties, especially the most important of them, namely, the volatile oils which, when oxidized, form resin, is accomplished, according to my invention, by first sweating the wood; then submitting the green wood to a bath of free steam under pressure; preferably of about twenty pounds, for a sufficient period of time, to thoroughly open up the pores of the wood, dissolve its gummy sap matters that line its cellular tissues and put it into good physical condition to readily give up its aqueous content, without checking or other physical deterioration of the wood piece. This steam bath causes the aqueous content of the wood to evaporate, without taking with it, the values of the sap, such as resin or resin-producing oil. Next, the wood is subjected to artificial heat, which consists in maintaining around it, an atmosphere at a temperature sufficient to cause continuous evaporation of moisture throughout the mass of wood; finally the wood is dried in a moderately heated, moist atmosphere.

And all these conditions are attained without checking, warping, case hardening or other deterioration of the physical characteristics of the wood.

By way of teaching the invention more in detail, one approved method of practising the same will be described with reference to the accompanying drawings, in which:—

Figure 1 is a vertical longitudinal section of a sterilizer, suitable for carrying out the first step of the process.

Fig. 2 is a section taken on line 5—5 Fig. 1.

Fig. 3 is a vertical longitudinal section of an equalizing chamber.

Fig. 4 is a section on the line 5—5, Fig. 3.

Fig. 5 is a plan view of the various containers incident to the carrying out of the process showing other means of intercommunication.

1 represents a sterilizer of construction suitable for containing steam under pressure. It is preferably provided with a presser plate 2 with adjusting screws 3, through means of which the charge of lumber may be kept under pressure while being treated. It is also provided with heating coils 4, by which the temperature of the atmosphere or steam within the sterilizer may be heated to the desired degree; and with coils 5 which may be perforated for the purpose of supplying free steam within the sterilizer when desired. 12 represents tracks to receive the car or truck upon which the lumber is loaded for introduction into the sterilizer.

Referring to Figs. 3 and 4, 13 represents the equalizing chamber which is preferably provided with a pressure device 2^a, 3^a, similar in principle to that employed in the sterilizer, with heating pipes 14 preferably loaded at the bottom, an air inlet or damper 16, and an air outlet or damper 17. This equalizing chamber is further provided with tracks 15 for convenient introduction of the charge of lumber, and its walls are preferably constructed so as to have a high coefficient of heat insulation for the sake of economy in operation.

Referring to Fig. 5, 18 represents a sweating chamber adapted to hold one or more truck loads of lumber; 19 is a sterilizer; 20 is a track which passes through sweat chamber 18 and sterilizer 19 for the convenient introduction thereinto of a load of lumber; 21 is a transfer platform having insulated walls adapted to completely surround the load of lumber when withdrawn from sterilizer 19 and is provided with track 22 for the reception of the truck load of lumber, and is adapted to travel on track 23 for introduction into either of the equalizing chambers 24, which chambers are provided with tracks 25 leading from said chamber into cooling chamber 26 for the transferring of the truck load of lumber; 27 is a boiler for supplying heat incident to the various steps of the process.

In carrying out the process with the apparatus above described, a suitable charge of lumber loaded on a truck, is introduced into the sweating chamber 18 for a period of time and is then transferred into sterilizer 1, which is then hermetically closed and steam supplied through the spray pipes 5.

To create the next step, the sterilizer 1 is opened and the load of lumber is removed therefrom and transferred as rapidly as possible to the equalizing chamber 13, the load being covered to minimize the loss of heat during the transfer. Sterilizer 1 is now ready to repeat the second step of the process while the equalizing step is being carried on in the equalizing chamber 13, said chamber already heated is closed upon the load of lumber, the heating pipes 14 are operated sufficiently to keep up a temperature favorable to continuous evaporation of moisture from the lumber, and the damper 16 at the base and 17 in the stack are opened periodically to create a draft or current of air for carrying off the moisture as it accumulates or may be kept open continuously for this purpose. After the desired amount of moisture has been withdrawn from the wood and the resins have thoroughly permeated the cellular structure thereof, the lumber is transferred into cooling chamber 26 upon track 25 in which chamber there has been previously created a moderately heated, moist atmosphere.

From the foregoing, it will be seen that the first essential condition to be produced is the thorough softening and opening up of the wood structure and the dissolving of its gummy sap matters and freeing them from their confinement, which condition is obtained by subjecting the wood to a steam bath, or moist atmosphere under pressure; the final step brings about complete drying under conditions that evaporate the remaining moisture at atmospheric pressure in a sufficiently gradual manner to avoid taking the resin away from the wood structure.

I claim:—

1. The process of drying wood, which consists in sweating the wood; then creating around it a body of steam under pressure; then subjecting the wood to dry heat; finally drying in a moderately heated, moist atmosphere.

2. The process of drying wood, which consists in subjecting the wood to a moderately heated, moist atmosphere; then surrounding it with a body of steam under pressure; then subjecting it to dry heat; finally subjecting it to a moderately heated, moist atmosphere, the wood being kept under mechanical pressure during these steps.

3. The process of drying wood, which consists in placing the wood in a sweat chamber, creating in said chamber a moderately heated, moist atmosphere; then placing the wood in a sterilizer and producing therein a body of steam under pressure then placing the wood in an equalizing chamber and subjecting it to dry heat; finally placing it in a cooling chamber and creating therein a moderately heated, moist atmosphere.

4. The process of drying wood, which consists in sweating the wood; then placing the wood in a sterilizer and injecting therein steam under pressure; then subjecting the wood to dry heat; finally drying in the presence of a moderately heated, moist atmosphere.

5. The process of drying wood, which consists in first sweating the wood; then placing it in a sterilizer and producing around it a body of steam under pressure to open up its pores and soften its structure; then subjecting it to dry heat; then creating around the wood a body of moderately heated, moist atmosphere until the internal temperature of the wood and the surrounding atmosphere have been harmonized.

In testimony whereof I affix my signature.

FREDERICK K. FISH, JR.