

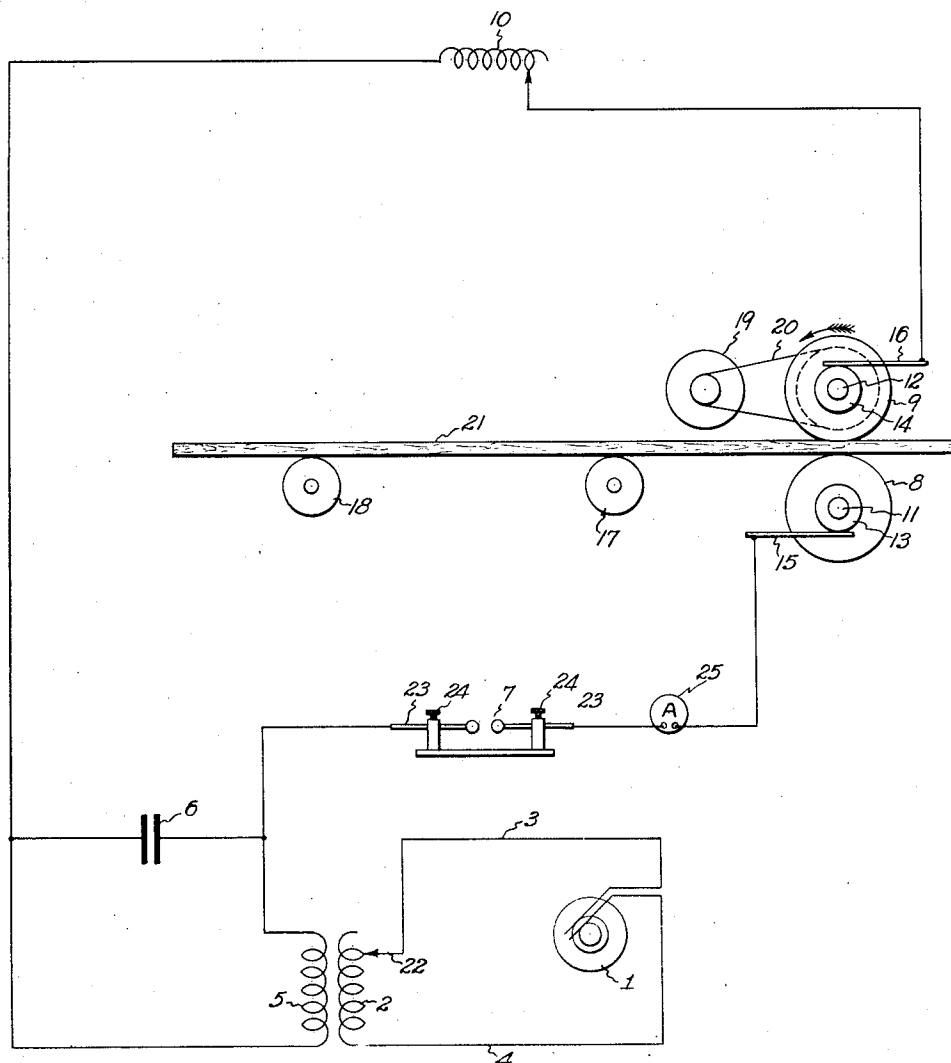
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METHOD FOR DRYING LUMBER

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METHOD FOR DRYING LUMBER

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Continuation of application Serial No. 27,568,
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5 Claims. (Cl. 34-24)

My invention relates to a method and apparatus for drying lumber, and more particularly to an apparatus employing a high frequency current and a method of drying lumber employing a high frequency current.

This application is a continuation of my co-pending application Serial No. 27,568, for a "Process or art of extracting moisture from green or virgin timber or water-soaked woods or like substances", filed June 20, 1935.

Heretofore, lumber has been dried by heat or by weathering, permitting moisture contained in the wood to be evaporated through the processes of nature. In those methods employing heat, the surface dries first, leaving the center of the lumber moist. Furthermore, in drying kilns, the thickness of lumber which can be dried is limited. In the weathering process, a large stock of lumber lies dormant, and drying yards must cover large areas. This represents not only a large capital investment, but a danger of fire is always present. Then, too, the time required for drying is long, usually taking from three to four months, depending upon weather conditions. The reason that so long a time period is required is that moisture is contained in the vascular bundles of the wood, and can only be evaporated by passing by diosmosis through the xylem portion. The wood cells also contain moisture which does not evaporate readily.

In its simplest aspect, my invention contemplates the puncturing of vascular bundles and wood cells by the use of a high frequency current, thus permitting a more ready dissemination of moisture so that it may reach the surface rapidly for evaporation.

One object of my invention is to provide a method of drying lumber in which the process is accelerated by freeing moisture from the cells or tubules of the lumber and permitting it to escape for ready evaporation.

Other and further objects of my invention will appear from the following description.

The accompanying drawing which forms a part of the instant specification and which is to be read in conjunction therewith is a schematic view of one form of apparatus embodying the structure of and capable of carrying out the method of my invention.

In general, the apparatus of my invention contemplates the provision of an oscillating circuit tuned to a high frequency. A pair of current-carrying rolls is interposed in the circuit in such manner that the wood to be dried may be passed

therethrough and subjected to the flux of the high frequency current, whereby the vascular bundles and wood cells are punctured.

More particularly, referring now to the drawing, and alternating current generator 1 imposes an alternating electro-motor force upon the primary 2 of a transformer by means of conductors 3 and 4. The secondary 5 of the transformer is connected across a condenser 6 which is adapted to store the potential impressed upon it by the secondary of the transformer 5. Connected across the condenser 6 by suitable conductors is a spark gap 7, current-carrying rolls 8 and 9 and an inductance coil 10. The current-carrying rolls are provided with journals 11 and 12 mounted in any suitable insulated bearings (not shown). The current-carrying rolls may be made of any suitable conducting metal, as for example, copper, and are provided with rings 13 and 14 upon which brushes 15 and 16 are adapted to bear. Lumber-supporting rollers 17 and 18 are adapted to support the lumber to be dried, for feeding it through the current-carrying rolls. Any suitable means may be provided for causing the lumber to pass through the current-carrying rolls. In the drawing, a motor 19 drives the current-carrying roll 9 through a belt 20. It is understood, of course, that the distance between current-carrying rolls 8 and 9 may be varied by any suitable adjusting means to accommodate lumber of various thicknesses. The inductance coil 10 is of such construction that the inductance may be varied by suitable taps, as is shown diagrammatically. The value of the capacity 6 and the inductance 10 is such that a high frequency current will be obtained by the discharging of condenser 6. I have found that a tuning giving a frequency in the vicinity of 1,000 kilocycles per second is effective. It is to be understood, of course, that the above frequency is by way of example only, and not by way of limitation.

In operation, the lumber 21 to be dried is placed upon bed rollers 17 and 18, motor 19 is started, roll 9 is driven in the direction of the arrow, and the generator 1 is started. The generator is fitted with a voltage control (not shown) so that the field current of the generator may be varied to produce various voltages. If desired, the voltage of the generator may be kept constant and the voltage to be impressed upon the condenser 6 may be varied by changing the relationship between the primary 2 of the transformer and the secondary 5 thereof by means of adjustable arm 22 contacting a series of taps

shown diagrammatically in the figure. The actual voltage to be impressed upon the lumber is very readily governed by the adjustment of spark gap 7 which governs the voltage at which the condenser 6 will discharge. The spacing of gap members 23 is readily adjusted by sliding them toward or away from each other. Set screws 24 hold the gap members 23 in any set position. The voltage to be impressed upon the lumber will vary, depending upon its thickness and the amount of moisture it contains. This is very easily determined in practice. The greater the amount of moisture, the more readily the lumber will convey current.

At this point I wish to call attention to the fact that it has been attempted in the prior art to dry lumber by passing an electric current there-through. These attempts have been based upon the I²R effect of current passing through a resistance, and have relied upon the heat generated to actually evaporate the water. In my invention the heat generated by the passage of the current is incidental since my method is based upon the puncturing of the walls of the wood cells and vascular bundles to permit the moisture to escape, so that the lumber may be dried in any suitable manner, readily. After being subjected to my process, the lumber may be put in drying kilns or stacked in drying sheds with the result that it will be much more rapidly and uniformly as well as more completely dried.

The generator having been started and the voltage having been adjusted, the piece of lumber 21 to be dried is moved to the right as viewed in the figure until one end thereof is engaged by the current-carrying rolls which also serve as driving rolls, moving the lumber to the right. During its passage through the current-carrying rolls the high frequency current is passed through the lumber, puncturing the vascular bundles and wood cells, as heretofore described. The puncturing is so pronounced that with virgin lumber I have observed water run from the wood. The freeing of this moisture is accompanied by a certain amount of water vapor occasioned by the incidental heating effect of the passing of the high frequency current.

Since I do not rely upon the current value to dry the lumber by heat, in practice I adjust

the spark gap such that the electrical potential is only sufficient to force its way through the wood to be dried. An ammeter 25 placed in the circuit will serve to show the amount of current passing through the wood. In practice, the spark gap 7 is adjusted so that a current of about one-half to one ampere is flowing.

I have dried boards by subjecting them to my process and weathering them for a period of one week which, as can readily be understood by those skilled in the art, is a tremendous advantage over the old weathering process which required from three to four months.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

I claim as my invention:

1. In a method of drying lumber the step of passing a high frequency spark through the lumber to be dried to puncture the vascular bundles of the wood.

2. A method of drying lumber including the steps of passing a high frequency spark through the lumber to puncture the wood cells and then subjecting the lumber to weathering.

3. A method of drying lumber including the steps of passing a high frequency spark through the lumber to puncture the wood cells and then subjecting the lumber to the action of an air current.

4. A method of drying lumber including the steps of passing a high frequency spark through the lumber to puncture the wood cells and then subjecting the lumber to the action of heat.

5. A method of drying lumber including the steps of puncturing the vascular bundles and cells of the wood by the flow of a high frequency current therethrough to allow the escape of moisture, and evaporating the thus released moisture from the wood.

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