

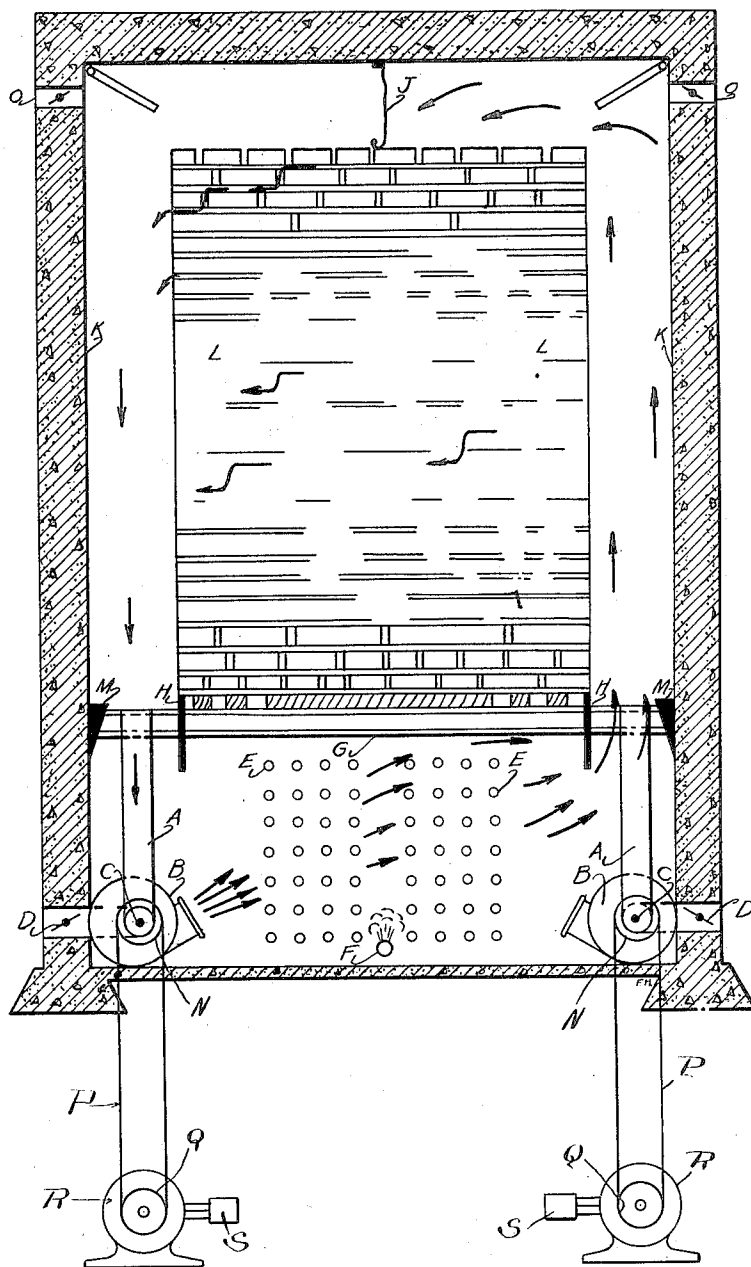
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H. D. TIEMANN ET AL

REVERSING BLOWER KILN

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REVERSING BLOWER KILN.

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(FILED UNDER THE ACT OF MARCH 3, 1883, 22 STAT. L., 625.)

To all whom it may concern:

Be it known that we, HARRY D. TIEMANN and ROLF THELEN, citizens of the United States of America, and employees of the Department of Agriculture, residing in Madison, Wisconsin, whose post-office address is Madison, Wisconsin, have jointly invented a new and Improved Reversing Blower Kiln.

This application is made under the act of March 3, 1883, chapter 143 (22 Stat., 625), and the invention herein described and claimed may be used by the Government of the United States, its officers and employees, and by any person in the United States without payment to us of any royalty thereon.

Our invention consists in an improvement in the design of blower or forced circulation kilns or chambers for drying and conditioning lumber or similar material; however, its use is not limited to wood exclusively. It consists of peculiar means for producing unique internal circulation of the air and vapor combined with the production and regulation of heat and humidity within a suitable chamber in which the material to be dried or conditioned is stacked.

The apparatus is shown in Figure 1, which represents a cross-sectional elevation of the kiln.

In the drawings the housing has been broken away to show the fans or blowers. The principal features which we claim as novel and an improvement over existing kilns are:—A peculiar arrangement of the fans or blowers within the kiln so that the movement of the air and vapor through the pile of lumber is uniform, and reversible in direction during the drying. This causes drying or conditioning to take place uniformly in all portions of the pile and eliminates the "lag" which occurs in other positive circulation kilns and in ventilated kilns, between the two sides of the pile. This permits not only more uniform but also quicker drying of the pile as a whole. The placing of one or more series of blowers or fans within the kiln, each series consisting of a number of blowers or fans spaced at regular intervals lengthwise of the kiln, and within the drying chamber, thus assuring a more positive and equal air movement throughout the length of the kiln than is ob-

tainable with distributing ducts, combined with the attachment of each of the blowers of a series upon a single line shaft, propelled preferably by a motor at one point on the shaft. One series of blowers may be placed on either side, not to be used jointly, but alternately for reversing the circulation. In wide kilns, a multiplicity of shafts may be used, a row of blowers mounted on each shaft.

Any well-known means of heating the air may be used in conjunction with the fans or blowers. When steam pipes are used these may be concentrated towards the center or axis of the kiln, beneath the platform floor, and directly in the air current from either series of blowers, and preferably consist of return bend coils placed edgewise or diagonally, each coil having separate valves for independent control. For the purpose of supplying humidity to the air steam jet lines may be placed in the kiln; or other well-known means of humidifying the air, such as fine sprays of water, may be used in place of the steam jets. While we have described and shown specific means for heating the air and supplying humidity, we do not limit ourselves to the arrangement described but may make use of any other suitable means for accomplishing the same purpose. Fresh air inlets are provided for each blower with suitable dampers, and outlets near the top of the walls, also with suitable dampers. These inlets and outlets are for the sole purpose of reducing the humidity and usually have but little bearing on the circulation, the circulation being mainly internal of the drying chamber.

The platform upon which the lumber pile rests is planked over solid above the steam coils but may have narrow openings for air at each side. Vertical baffles H may be placed at each side of the platform to break up vortex action, and deflect some of the air through the lower layers of lumber. The running boards and deflectors M, are designed to act in a similar manner.

A curtain or curtains J may be dropped from the roof to the pile to prevent air from flowing over and around the pile, and also to cause some air to pass downwards through the top of the pile. Adjustable hinged deflectors or dampers may be placed along the upper corners of the kiln to cause air to

enter the upper layers from the side of the pile in a horizontal direction.

5 The blowers or fans are placed at approximately equal intervals of a few feet apart throughout the length of the kiln and may be designed to deliver approximately 200 cubic feet of air per minute for each foot length of kiln at a low pressure approximat-

10 ing $\frac{1}{4}$ ounce water pressure. The lumber is preferably flat piled lengthwise either on trucks running on rails or directly upon the kiln platform. Horizontal spaces may be left between adjacent boards and the spaces in consecutive layers should

15 be staggered. While the specification describes, and the drawing illustrates, a specific form of flat piled lumber through which the air current passes first in one direction and then in the

20 other, we do not wish to limit the scope of the claim to this particular form, since the improvement is equally applicable to other well-known forms of piling, such as single piles with central chimneys, in which the

25 main air current passes inward toward, or outward from these chimneys; double piling with chimneys in each pile, and in which air current in the space between the piles moves in the same general direction as between the

30 piles and the wall; inclined piling; vertical piling; and other forms.

Referring to the drawing which represents a cross-sectional elevation of the drying chamber, the longitudinal axis being per-

35 pendicular to the plane of the drawing:—K designates the side walls of the drying chamber and L the load of lumber to be dried. The blowers or fans B are located at regular intervals upon the line shafts C. A indi-

40 cates suitable housings for the fans or blowers, arranged so as to draw air downward from the spaces between the lumber and the walls and discharge it beneath the lumber over the heating coils. This is in order that

45 the direction of the air circulation will be reversed when one series of the blowers is stopped and the other series started. It is obvious that the amount and velocity of the

air motion may be controlled at will by controlling the speed of the fans or blowers. D 50 represents dampers in the housings of the fans or blowers communicating with fresh air inlets. E designates the heating coils previously described, F the steam jets for humidifying the air. G is the platform 55 supporting the lumber; H the baffles for overcoming vortex motion; O the moist air outlets, which although shown near the roof, may be placed at any convenient location. J 60 indicates canvas curtains to prevent the air from short circuiting the pile of lumber. M are running boards along the sides of the kiln, which act also as deflectors. In the drawing R represents electric motors adapt-

65 ed to drive the line shafts C by means of pulleys Q and N and belts P. Switches S serve to start and stop the motors. The motors are intended to be operated alternately, each period of operation being several hours or more. Stopping one motor and starting 70 the other has the effect of reversing the direction of the air movement through the lumber.

Having fully described the construction and operation, we claim as original:— 75

In a dry kiln, two series of blowers placed near the base of the kiln and respectively at opposite sides thereof, two shafts on which said series are respectively mounted for rotation, discharge ducts for said blowers, the 80 ducts of each series respectively being adapted to discharge the drying medium upwardly against the opposite side of the kiln, and means for rotating said shafts whereby they may be driven alternately to cause a reversal 85 of the circulation of the drying medium in said kiln.

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

HARRY D. TIEMANN.
ROLF THELEN.

Witnesses:

ARTHUR UPSON,
O. M. TATLER.