V. G. GILBREATH.

LUMBER DRYING KILN.

APPLICATION FILED NOV. 2, 1920.

1,437,839.

Patented Dec. 5, 1922.

2 SHEETS—SHEET 1.

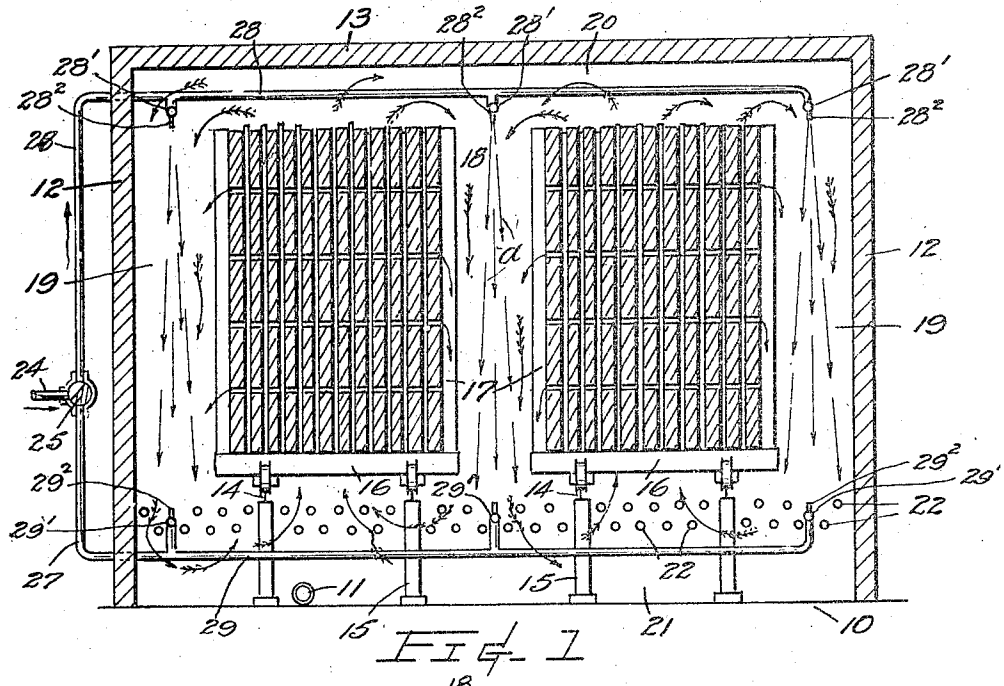


FIG. 1

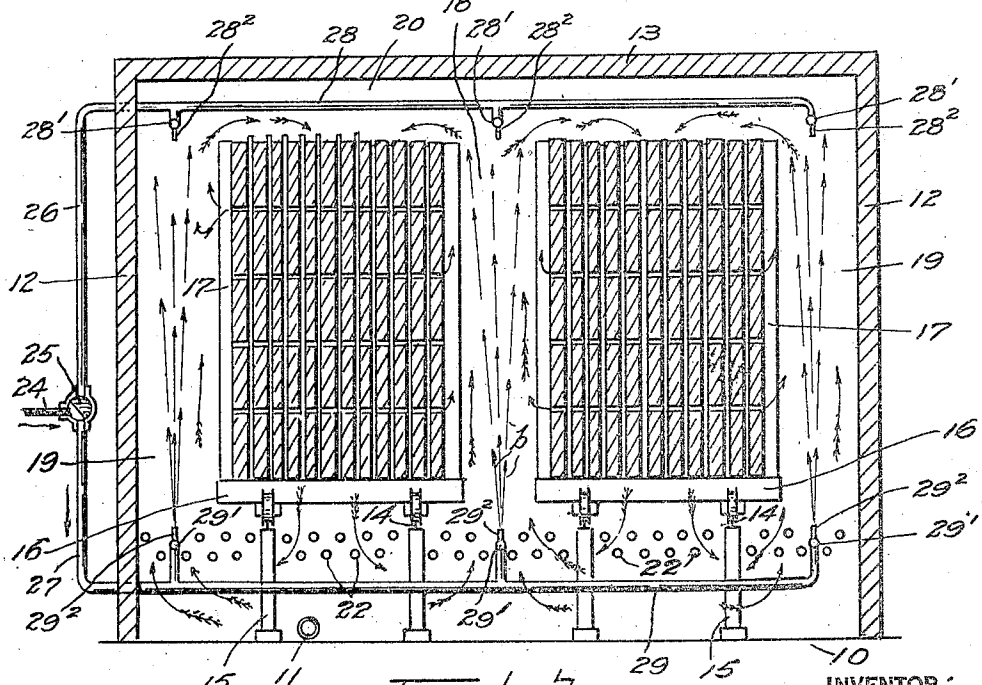


FIG. 2

INVENTOR:
Victor G. Gilbreath
BY
Pierce Barnes
ATTORNEY

V. G. GILBREATH.

LUMBER DRYING KILN.

APPLICATION FILED NOV. 2, 1920.

1,437,839.

Patented Dec. 5, 1922.

2 SHEETS—SHEET 2.

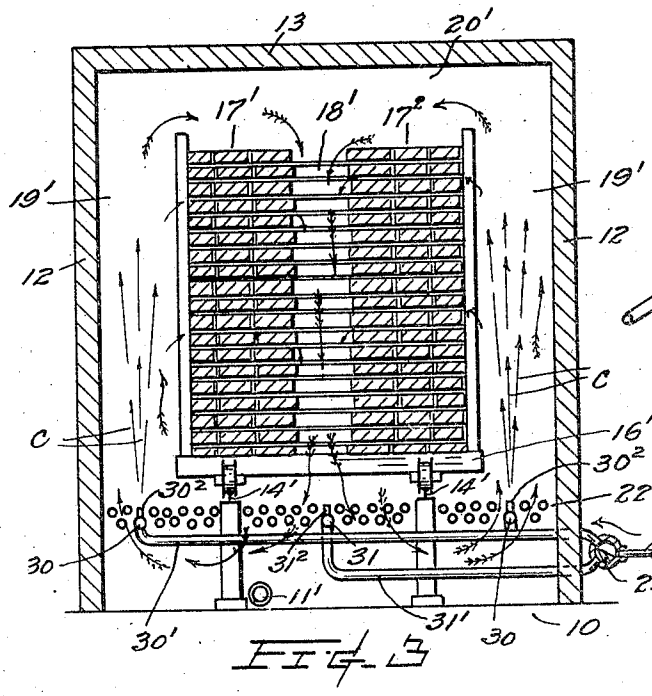


FIG. 3

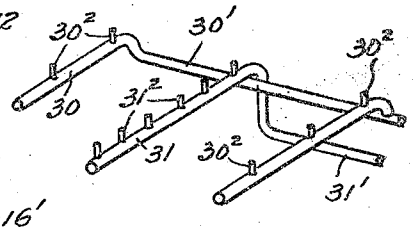


FIG. 5

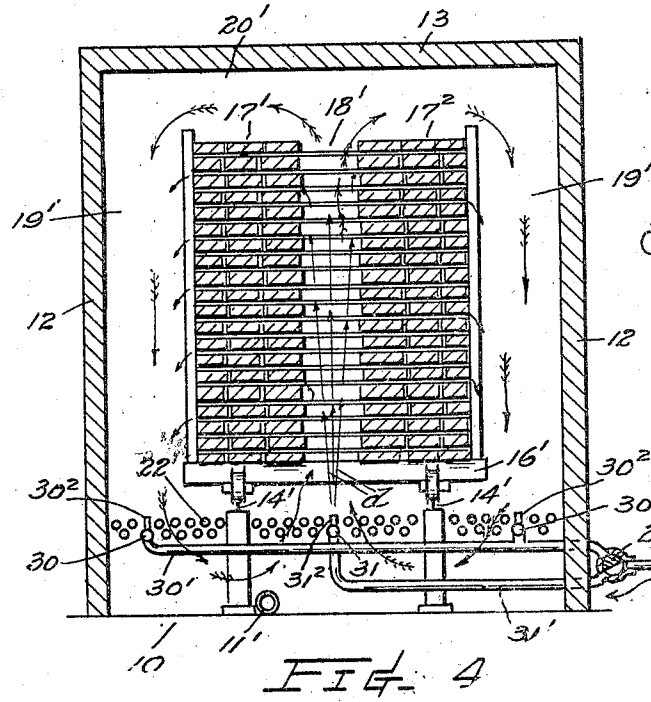


FIG. 4

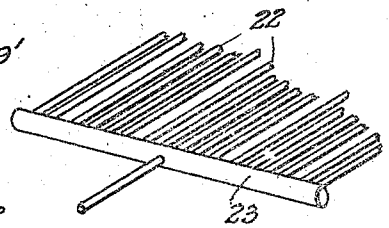


FIG. 6

INVENTOR:

Victor G. Gilbreath

BY

Pierre Garner

ATTORNEY

Patented Dec. 5, 1922. 1,437,839

UNITED STATES PATENT OFFICE.

VICTOR G. GILBREATH, OF SEATTLE, WASHINGTON, ASSIGNOR TO NORTH COAST DRY-KILN COMPANY, OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

LUMBER-DRYING KILN.

Application filed November 2, 1920. Serial No. 421,255.

To all whom it may concern:

Be it known that I, VICTOR G. GILBREATH, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Lumber-Drying Kilns, of which the following is a specification.

This invention relates to lumber drying kilns and its object is the perfecting of apparatus of this character.

In kiln drying lumber, best results are obtained by subjecting the material to a drying medium of suitable humidity and temperature which is circulated about and through the material in such a manner to assure a definite relation being maintained between the transmission of moisture within the boards and the surface evaporation.

The invention is illustrated in the accompanying drawings, in which,—

Figure 1 is a transverse vertical section of a dry kiln embodying my improvements. Fig. 2 is a smaller view with the circulatory devices for the drying medium represented as acting reversely to what is shown in Fig. 1. Figs. 3 and 4 are transverse vertical sectional views of a kiln showing a modified form of the invention with circulatory systems thereof represented as acting reversely to each other in the respective views. Fig. 5 is a fragmentary perspective view of the complementary steam supply pipes shown in Figs. 3 and 4. Fig. 6 is a perspective view of a portion of a steam-heating coil.

In carrying out my invention I provide a kiln structure comprising one or more chambers, as 10, and in which steam serves as the lumber-drying medium. Communication is had between said chamber and the external atmosphere, as by means of a pipe 11, whereby the pressure within the kiln is retained at approximately atmospheric pressure and providing an outlet for excess water vapor. Said communication is located at or near the bottom of a compartment so as not to interfere with the circulation of the lumber drying medium and also to obviate loss of heat by the escape of the latter from the kiln as would occur if such opening was disposed at a higher elevation.

The kiln structure consists of side walls 12; a rear wall, not shown; a roof 13, and has an opening in the front which is closed by suitable doors when the kiln is to be operated.

Extending through such doorway into the kiln chamber is a track or tracks consisting of rails 14 supported by posts 15.

In Figs. 1 and 2, two tracks are shown in such spaced relations that the cars or trucks 16 mounted thereon will support the loads 17 of lumber to be dried in relations to serve, in effect, as partitions which will afford a central vertical passage 18 between the loads, and vertical wing passages 19 between each load and the adjacent side wall 12. These passages communicate with spaces 20 and 21 occupying the entire width of the chamber at the top and bottom of the same.

Located above the air opening 11 in the lower spaces 21 and distributed throughout the width of the chamber is a system of heating coils comprising, as shown, series of longitudinal pipes 22 connected to manifolds or headers, such as 23 in Fig. 6. Said coils are supplied with steam at a high temperature from any suitable source of supply. Included in the invention are means to introduce steam into the chamber 10 for the purpose of providing the drying medium and also to effect the circulation of such medium to most advantageously treat the lumber.

In order to facilitate and perform the last named function in a manner to season or dry the lumber uniformly, the above mentioned means are adapted to create movements of the drying medium alternately in opposite circulatory directions—say for example, during periods of eight hours uninterruptedly in each direction, and to any number of periods as may be required with various kinds of wood. More specifically, said means as illustrated in Figs. 1 and 2, consists of a supply pipe 24 from which steam is delivered selectively through the medium of a three-way valve 25, or an equivalent, into branches 26 or 27 which are respectively connected to pipes 28 and 29 disposed transversely in the kiln spaces 20 and 21, as shown. The pipes 28 and 29 are connected to longitudinally disposed pipes 28^1 and 29^1 located in vertical planes medially of the widths of the respective passages 18 and 19.

These longitudinal pipes 28^1 and 29^1 are provided at intervals throughout their

lengths with outlet nozzles, such as 28^2 and 29^2 the nozzles of the upper pipes 28^2 are directed downwardly and those of the lower pipes 29^2 are directed upwardly.

The operation of the invention as disclosed in Figs. 1 and 2 is as follows:

Steam supplied through pipes 26 and 28 to the overhead line pipes 28^1 issues from the nozzles 28^2 in downwardly directions through passages 18 and 19 as denoted by darts *a* in Fig. 1 to inductively convey the drying medium from space 20 downwardly among the coil pipes 22 whereby it is heated and thereupon ascends through the interstices between the lumber in the respective loads 17 to the upper space 20. The courses taken by the drying medium with the upper system of pipes are clearly indicated by feathered arrows in Fig. 1.

Such circulation is continued for a predetermined time and is then reversed by rendering the upper system of pipes inoperative and employing the lower system of pipes as shown in Fig. 2. When this occurs steam issuing, as denoted by darts *b*, from the lower nozzles 29^2 effects the circulation of the drying medium upwardly through the passages 18 and 19 and downwardly through the lumber, as indicated by feathered arrows in Fig. 2. By thus reversing the currents alternately the material is dried more uniformly than would otherwise obtain.

The reversal of the currents is readily effected in the present embodiment by regulating the valve 25.

Considering the invention as illustrated in Figs. 3 and 4, a single track with rails 14^1 is used to accommodate a car or truck 16^1 upon which is placed a load of lumber substantially as shown to afford two piles 17^1 and 17^2 of lumber with an intermediate space 18^1. This space serves as a passage for the upward or downward flow as the case may be of the drying medium and acts in cooperation with the wing passages 19^1 and the spaces 20^1 and 21^1 above and below the load to constitute circuitous channels for said drying medium.

22^1 represents the steam heating coil pipes and 11^1 represents a pipe for the discharge of surplus vapor from the kiln. With the kiln shown in Figs. 3 and 4, the drying medium is furnished and the circulation of the same is provided for by means of two pipe-systems which in the embodiment of the invention are both located below the load and are supplied by steam from a pipe 24^1 under the control of a regulating valve 25^1. More particularly, one of such pipe systems comprises line pipes 30 disposed longitudinally of the kiln under the respective passages 19^1 and are connected with said valve by a leader 30^1.

The other of said pipe systems comprises a longitudinally disposed line pipe 31 located under the center of the car track and is connected with the valve by a leader 31^1. The line pipes 30 and 31 are moreover, provided with spaced nozzles 30^2 and 31^2 for the discharge of steam in concentrated streams upwardly through the respective passages 19^1 and 18^1. For operation the two pipe systems above referred to are used successively for predetermined lengths of time to afford alternating currents of the drying medium in reverse up and down directions as will be understood from an inspection of Figs. 3 and 4.

In Fig. 3, for instance, the steam issuing as denoted by darts *c* from nozzles 30^2 through passages 19^1 serve to impart motion to the surrounding drying medium to cause the latter to take the courses indicated by feathered arrows in the view. When the nozzles 31^2 are used as represented in Fig. 4, the steam ascends as denoted by darts *d* through the passage 18^1 resulting in circulatory currents being effected as indicated by feathered arrows in Fig. 4.

What I claim, is,—

1. In a dry-kiln of the character described, in combination, a drying chamber wherein lumber is disposed in piles which are arranged to afford a vertical passage between said piles and a vertical passage between the latter and each of the side walls of the chamber, a heating coil provided in the lower portion of said chamber and beneath each of said passages, two series of steam pipes within the chamber and having discharge nozzles directed into the passages, and means whereby the steam may be discharged from the nozzles of one or the other of said series of pipes selectively to effect the circulation of the drying medium in reverse direction through said passages.

2. In a dry-kiln of the character described, in combination, a chamber having an opening in the lower portion thereof with the atmosphere exteriorly of the kiln, a heating coil provided within said chamber at a higher elevation than said opening, cars each adapted to have a pile of lumber supported thereon, track rails for said cars, said rails being disposed to position the cars in such relations to each other that the lumber thereon will serve as partitions which divide the chamber to provide therein a vertical passage between said piles and a vertical passage between each of said piles and the adjacent side walls of the chamber, two sets of steam pipes disposed longitudinally within the chamber and medial of the respective passages, each of said pipes being provided with a plurality of nozzles for discharging steam into the respective passages, and means to supply steam alternately to each set of pipes whereby reversible circulatory currents of the drying medium are afforded alternately in all of the passages.

3. A dry-kiln of the character described provided with an opening for the discharge of surplus vapor from the bottom of the kiln chamber, two sets of pipes disposed longitudinally within the kiln and respectively adjacent to the top and bottom of the same, the pipes of each such set being arranged in correspondingly spaced relations transversely of the kiln, outlet nozzles provided at intervals in each of said pipes, the nozzles of the upper and lower pipes being respectively directed downwardly and upwardly, means to supply steam to both sets of pipes, and means included in the aforesaid means whereby steam is discharged through the nozzles of each set of pipes alternately to inductively impart downward and upward currents to the drying medium within the kiln chamber.

Signed at Seattle Washington, this 22nd day of October 1920.

VICTOR G. GILBREATH.

Witnesses:
PIERRE BARNES,
MARGARET G. SUPPLE.