

R. C. FICKETT, DEC'D.
H. F. W. FICKETT, EXECUTRIX.
LUMBER DRYING KILN.
APPLICATION FILED OCT. 15, 1910.

1,048,448.

Patented Dec. 24, 1912.

4 SHEETS-SHEET 1.

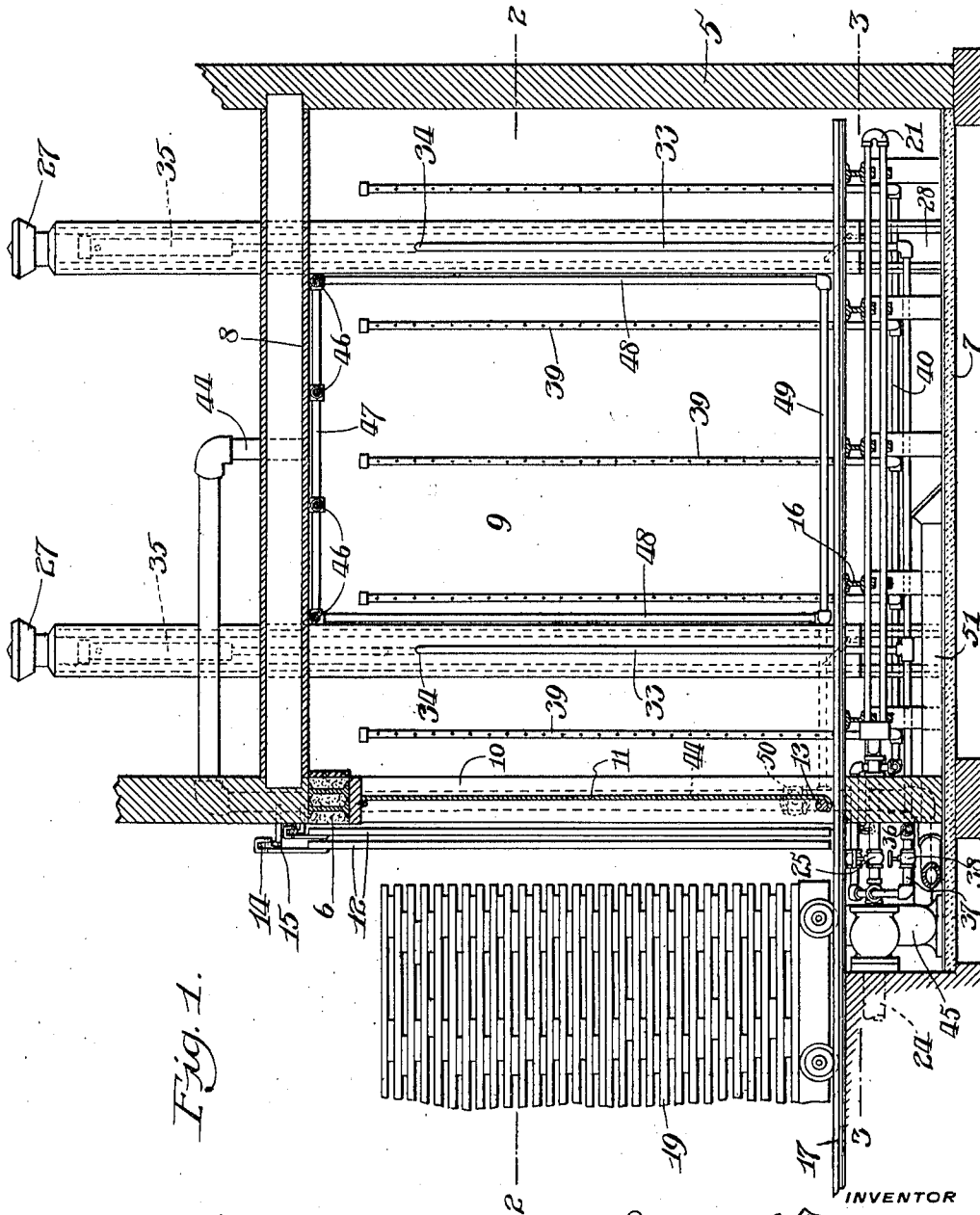


Fig. 1.

WITNESSES

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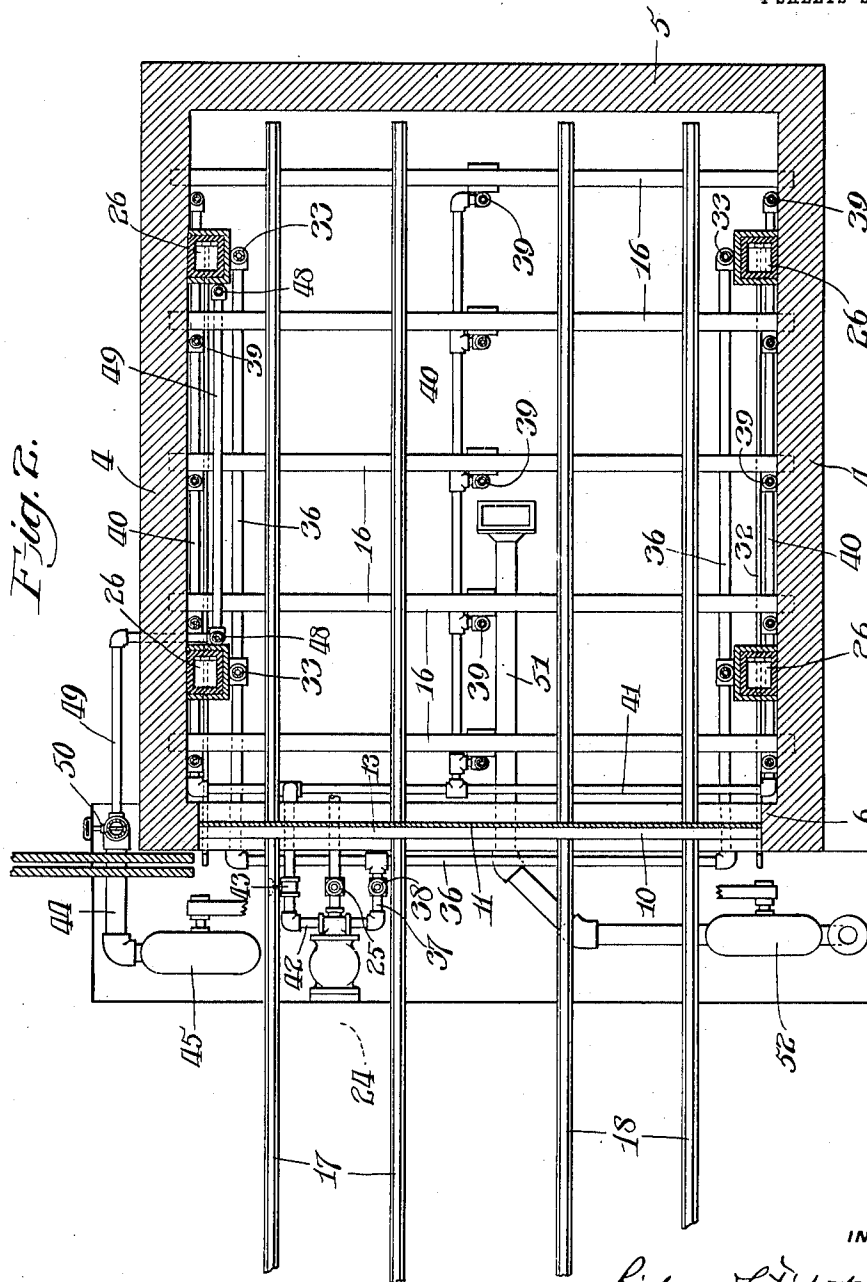


Fig. 2.

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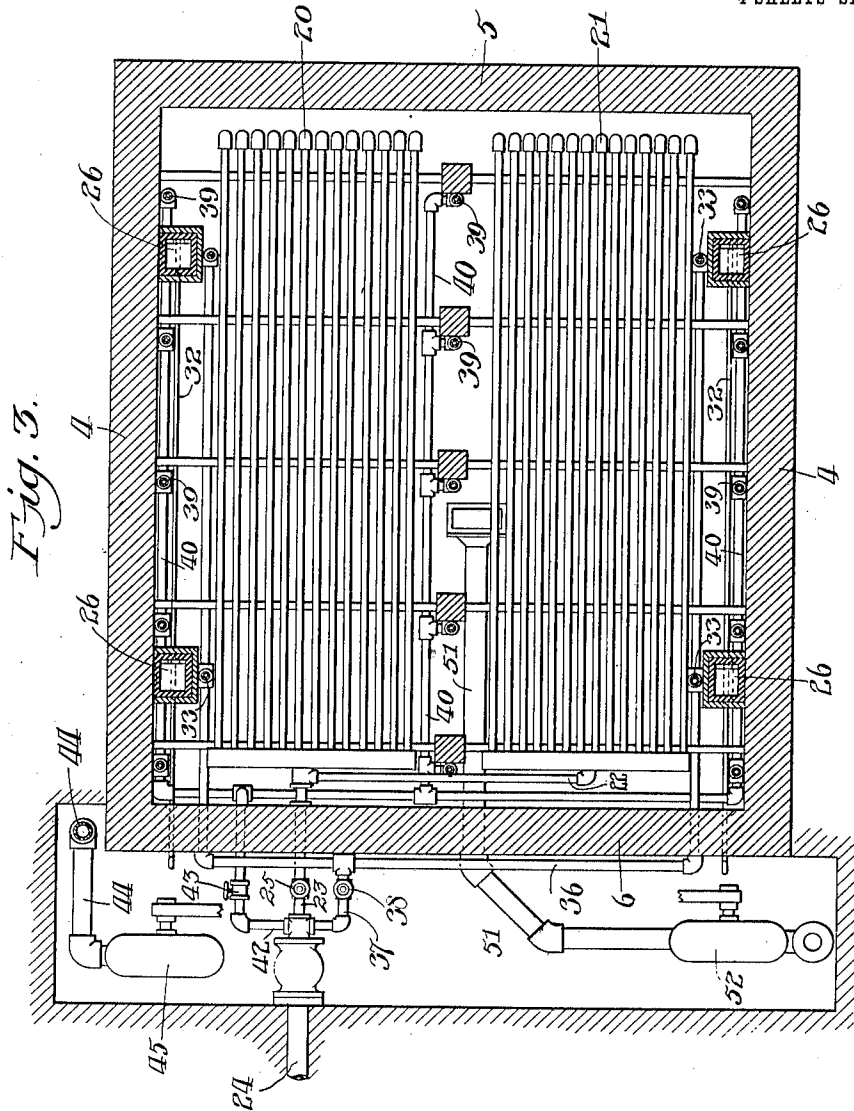
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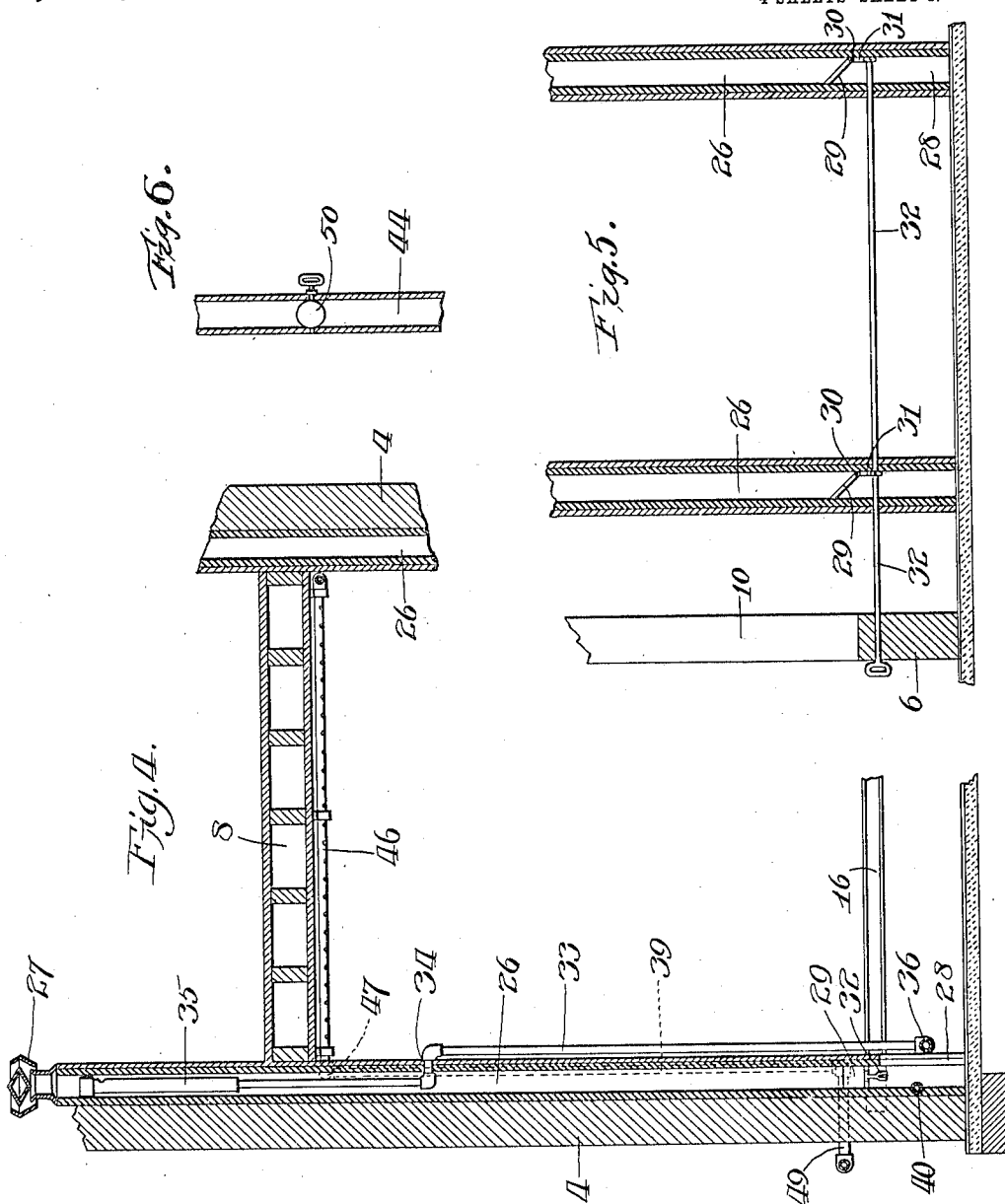
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UNITED STATES PATENT OFFICE.

RICHMOND C. FICKETT, DECEASED, LATE OF PHILADELPHIA, PENNSYLVANIA, BY
HELEN F. WEAVER FICKETT, EXECUTRIX, OF PHILADELPHIA, PENNSYLVANIA.

LUMBER-DRYING KILN.

1,048,448.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed October 15, 1910. Serial No. 587,164.

To all whom it may concern:

Be it known that RICHMOND C. FICKETT, late a citizen of the United States, deceased, late of the city and county of Philadelphia and State of Pennsylvania, and whose last post-office address was No. 1706 Erie avenue, Philadelphia, Pennsylvania, did in his lifetime invent certain new and useful Improvements in Lumber-Drying Kilns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to kilns for drying lumber.

The object of the invention is to provide a kiln of novel, simple and efficient construction, having provision whereby a pile of lumber within the kiln and containing more moisture in some parts than in other parts thereof, may be uniformly steamed to saturate the lumber so that the moisture contained in all parts thereof will be substantially uniform throughout the entire pile preparatory to drying; and whereby the lumber may be substantially uniformly dried, as will be hereinafter fully described and particularly claimed.

In the drawings:—Figure 1 is a vertical section through the improved kiln. Fig. 2 is a horizontal section thereof, on line 2-2 of Fig. 1. Fig. 3 is a horizontal section thereof, on line 3-3 of Fig. 1. Fig. 4 is a vertical section transversely of the kiln through one of the flues and adjuncts. Fig. 5 is a vertical section through the lower portion of the two flues on one side of the kiln, showing the regulating dampers therefor. Fig. 6 is a section through a portion of the large air pipe leading to the top of the kiln, showing the damper in the pipe.

4, 4, designates the side walls, 5 the rear wall, 6 the front wall, 7 the bottom, and 8 the top of an inclosed chamber 9 adapted to receive the lumber to be dried.

The front wall 6 of the chamber is provided with an opening 10 therein, through which lumber may be introduced to and removed from the chamber 9. This opening 10 is provided with an inner curtain 11 and a pair of outer doors 12, by means of which the opening 10 may be closed. The top of the curtain 11 is secured to the top wall of the opening 10, and the bottom of the cur-

tain 11 is provided with a suitable roller 13 upon which the curtain 11 may be rolled and raised to afford access to the interior of the chamber 9 through the opening 10; and the doors 12 are hung upon rollers 14 which run upon tracks 15 secured to the front wall 6 of the chamber, whereby the doors 12 may be moved back and forth to afford access to the chamber 9 through the opening 10.

Extending transversely through the chamber 9 above the bottom 7 thereof, are I-beams 16 which support two pairs of rails 17, 17 and 18, 18, which extend longitudinally through the chamber 9. These rails 17, 17 and 18, 18 also extend through the opening 10 to the outside of the chamber 9 and form two tracks upon which two car loads of lumber may be run into the chamber 9 side by side, a portion of a car load of lumber 19 being shown in Fig. 1, upon one of the tracks and in position to enter the chamber 9.

Suitably supported within the chamber 9 below the tracks 17 and 18 and the I-beams supporting the same, are two manifolds of steam pipes 20 and 21 respectively, the forward ends of which are connected together by a steam pipe 22. These manifolds may be supplied with steam through a pipe 23 leading from the main steam supply pipe 24 for the purpose of heating the interior of the chamber 9. The pipe 23 is provided with a suitable valve 25 by means of which the steam from the main steam supply pipe 24 may be opened or closed to the manifolds 20 and 21.

Arranged within the chamber 9 adjacent the two side walls 4, 4, thereof, are walls forming four flues 26, two flues being arranged near the front wall 6 of the chamber, and two flues being arranged near the rear wall of the chamber, as shown. These flues 26 extend upwardly through the chamber 9 from the bottom 7 to and through the top wall 8 thereof, and upwardly some distance above the top wall 8, as shown. The tops of the flues 26 are open, and provided with suitable well known chimney ventilators 27 adapted to permit air to pass outwardly from the upper ends of the flues 26 and to prevent down drafts therein. The lower ends of the flues 26 are open, as at 28, to the interior of the chamber 9 below the tracks 17 and 18, and the lower portion

of each flue 26 may be closed and opened by a suitable damper 29, which is pivoted, as at 30, to the walls of the flue.

Extending downwardly from each damper 29, is an arm 31, the lower end of which is connected to a rod 32. The arms 31 of the dampers 29 of the two flues 26 adjacent one wall 4, are connected to a single rod 32, as shown in Fig. 6 and the dampers of the two flues 26 adjacent the other wall 4 are similarly connected to a single rod. Each rod 32 extends forwardly through and beyond the front wall 6 of the chamber 9, and is adapted to be moved forwardly by hand to operate the dampers 29 to open the flues 26, and rearwardly by hand to operate the dampers 29 to close the flues 26.

The upper portions of the interiors of the flues 26 are heated by steam pipes 33, which extend from below the I-beams 16 upwardly adjacent the outer walls of the flues 26 and then inwardly, as at 34, to the interiors of the flues 26, and then upwardly through the interiors of the flues. The upper end of each pipe 34 is provided with an enlarged drum-like portion 35, the upper end of which is provided with a small perforation to permit steam to escape therefrom. It will thus be seen that when steam is supplied to the pipes 33, the upper portions of the interiors of the flues will be heated, thereby causing the air therein to ascend and draw air from the interior of the lower portion of the chamber 9 into the openings 28 in the flues 26 and expel the same from the tops of the flues.

The lower ends of the pipes 33 are connected to a U-shaped pipe 36, which in turn is connected by a pipe 37 to the main steam supply pipe 24, whereby steam may be supplied to the pipes 33 and their enlarged portions 35 within the interiors of the upper portions of the flues 26, the supply of steam being controlled by a suitable valve 38 interrupting the pipe 37.

In order to supply steam to the interior of the chamber 9 for the purpose of steaming and moistening the lumber contained therein, I provide three rows of vertically-arranged steam pipes 39, which are perforated to permit steam to escape therefrom, one row being located between the two tracks 17 and 18, one row being located adjacent one side wall 4 outwardly of the track 17, and the other row being located adjacent the other side wall 4 and outwardly of the track 18.

It will thus be seen that when two car loads of lumber are run into the chamber 9 on the two tracks 17 and 18, there will be a row of steam pipes 39 between the car loads of lumber and a row of steam pipes 39 adjacent the outer side of each car load of lumber. The lower ends of the perforated steam pipes 39 of each row are connected

to a horizontally-arranged steam pipe 40 located below the I-beams 16, and connected together by a common pipe 41, which in turn is connected by a pipe 42 to the main steam supply pipe 24. The pipe 42 is provided with a suitable valve 43 to control the introduction of steam into the chamber 9 through the perforated pipes 39.

In order to introduce fresh air to the top of the chamber 9, I provide a pipe 44 having one end extending down through the top 8 of the chamber 9 and opening into the same and having its other end connected to a suitable fan or blower 45 located outside of the chamber 9 and adapted to be operated to blow fresh air into the top of the chamber. In addition to the pipe 44, there are provided spaced horizontal pipes 46, which are perforated and extend transversely across the top of the chamber 9 and are suitably supported therein. These pipes 46 are connected together by a pipe 47, the ends of which are connected to the upper ends of vertical pipes 48. The lower ends of pipes 48 are connected to a horizontal pipe 49, which extends outwardly through one of the side walls 4, and is connected to the air pipe 44 leading from the blower 45.

It will thus be seen that when fresh air is supplied to the top of the chamber 9 through the large pipe 44, fresh air will also be supplied to the top of the chamber 9 through the perforations in the small pipes 46. The pipe 44 is provided with a suitable damper 50 located above the pipe 49, whereby when the damper 50 is closed, the fresh air will be supplied to the top of the chamber 9 only through the perforated pipes 46. The perforated pipes 46 distribute the fresh air throughout the upper portion of the chamber 9, and the damper 50 is opened to permit air to enter the chamber 9 through the pipe 44 only when it is desired to cool the lumber quickly.

In order to draw vapor from the lower portion of the chamber 9 during the drying of the lumber, I provide a pipe 51 extending into the chamber 9 along the bottom 7 thereof and having an inner open end located about the center of the bottom of the chamber. The outer end of the pipe 51 is connected to a suitable fan or blower 52, which is adapted to be operated to draw the vapor from the lower portion of the interior of the chamber.

The operation of the kiln is as follows:—The doors 12 are opened, the curtain 11 is raised and two car loads of lumber are run into the chamber 9 on the tracks 17 and 18, the lumber being piled upon each car to provide spaces between the different boards of the piles of lumber upon the cars. The curtain 11 is then lowered, and the doors are shifted to close the chamber 9.

This being done, the rods 32 are moved inwardly to close the flues 26, and the valve 43 is opened to permit steam to enter the chamber 9 through the three rows of perforated pipes 39 located adjacent the car loads of lumber. The steam thus introduced into the chamber 9 passes through the spaces in the piles of lumber and saturates the lumber with steam until the moisture contained in all parts thereof will be substantially uniform. This steaming operation usually takes about twelve hours, but this of course may be varied in accordance with the different conditions of the lumber to be dried.

After the lumber has been thoroughly steamed, the valve 43 is closed, the rods 32 are gradually moved outwardly to operate the dampers 29 to open the flues 26, and at the same time the valve 25 is gradually opened to introduce steam to the manifolds 20 and 21, and the valve 38 is gradually opened to introduce steam to the enlarged upper ends 35 of the pipes 33. This opening of the dampers 29 and valves 25 and 38 is done very gradually, say during a period of from ten to twelve hours.

The blowers 45 and 52 are operated after the valve 43 has been closed, while the damper 50 in the pipe 44 remains closed, thus causing the blower 45 to blow fresh air through the perforated pipes 47 into the top of the chamber 9, and causing the blower 52 to draw vapor from the bottom of the central portion of the chamber 9.

The operation of drying the lumber has now started, the heat from the manifolds of steam pipes 20 and 21 heating the lumber and driving the moisture therefrom, which settles to the bottom of the chamber 9 and is drawn off through the pipe 51 and flues 26, while fresh air enters the top of the chamber 9 through the perforated pipes 46. The air heated at the bottom of the chamber 9 by the manifolds 20 and 21, naturally rises to the top of the chamber and is met by the fresh cool air entering the top of the chamber through the perforated pipes 46. This, together with the air being drawn from the sides of the lower portion of the chamber 9 through the flues 26, maintains a substantially uniform temperature throughout that portion of the chamber 9 occupied by the lumber being dried. It will of course be understood that during the drying operation, the dampers 29 may be adjusted to control the amount of air passing from the lower portion of the chamber 9 through the flues 26, the blower 45 may be operated to control the amount of fresh air being introduced to the top of the chamber 9 through the perforated pipes 46, and the blower 52 may be operated to control the amount of air and vapor drawn from the lower central portion of the chamber 9, all to meet the

various requirements of the different conditions of the lumber being dried. It usually takes several days to dry the lumber under these conditions after the same has been steamed; and after the drying operation, the valve 25 is closed to shut off the supply of steam to the manifolds 20 and 21, the damper 50 in the pipe 44 is opened to permit a comparatively large volume of fresh air to be blown into the top of the chamber 9 through the pipe 44 for the purpose of quickly and uniformly cooling the lumber before the doors 12 are opened, and the curtain 11 raised to open the chamber 9 and permit the removal of the car loads of lumber therefrom.

I claim:—

1. In a lumber kiln, walls forming a lumber-receiving chamber, walls forming a flue leading from the bottom of the interior of the chamber to the exterior thereof, means for opening and closing said flue, a pipe leading from the top of the interior to the exterior of the chamber, means for introducing steam to said chamber, and means operative to blow air through said pipe and into said chamber.

2. In a lumber kiln, walls forming a lumber-receiving chamber, a pipe leading from the bottom of the interior to the exterior of the chamber, means for introducing steam to said chamber, means operative to exhaust steam and air from said chamber through said pipe, a second pipe leading from the top of the interior to the exterior of said chamber, and means operative to blow air through the second named pipe and into said chamber.

3. In a lumber kiln, walls forming a lumber-receiving chamber, walls forming an upwardly extending flue having its lower portion open to the interior of the chamber and its upper portion open exteriorly of the chamber, a steam pipe extending through the lower portion of the flue and having an enlargement within the upper portion of the flue, means for introducing steam to said pipe, and means for heating the interior of the chamber.

4. In a lumber kiln, walls forming a lumber-receiving chamber, walls forming an air outlet flue leading from the bottom of the interior of the chamber to the exterior thereof, means for opening and closing said flue, a pipe leading from the top of the interior to the exterior of the chamber, means operative to blow air through said pipe and into said chamber, and means for heating said chamber.

5. In a lumber kiln, walls forming a lumber-receiving chamber, walls forming an air outlet flue leading from the bottom of the interior of the chamber to the exterior thereof, means for opening and closing said flue, a pipe leading from the bottom of the in-

terior to the exterior of the chamber, means
operative to exhaust air from said chamber
through said pipe, a second pipe leading
from the top of the interior to the exterior
5 of said chamber, means operative to blow
air through the second named pipe and into
said chamber, and means for heating said
chamber.

In testimony whereof, I have hereunto af-

fixed my signature this third day of Octo- 10
ber A. D. 1910.

HELEN F. W. FICKETT,
Executrix of the last will of Richmond C.
Fickett, deceased.

Witnesses:

A. M. BIDDLE,
R. A. DUNLAP.