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DRY KILN

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Fig. 1.

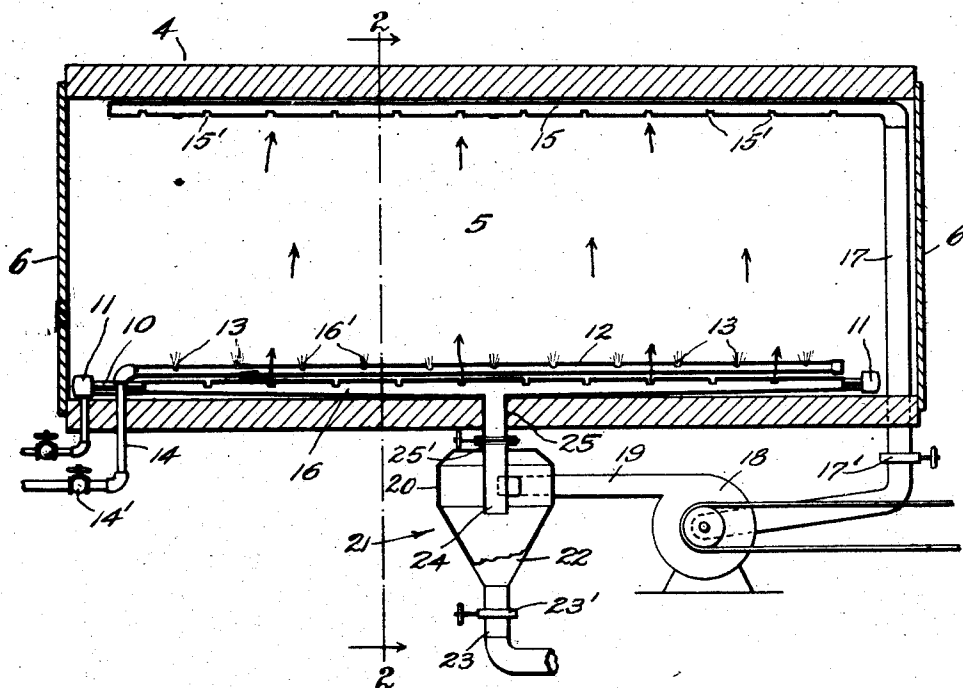
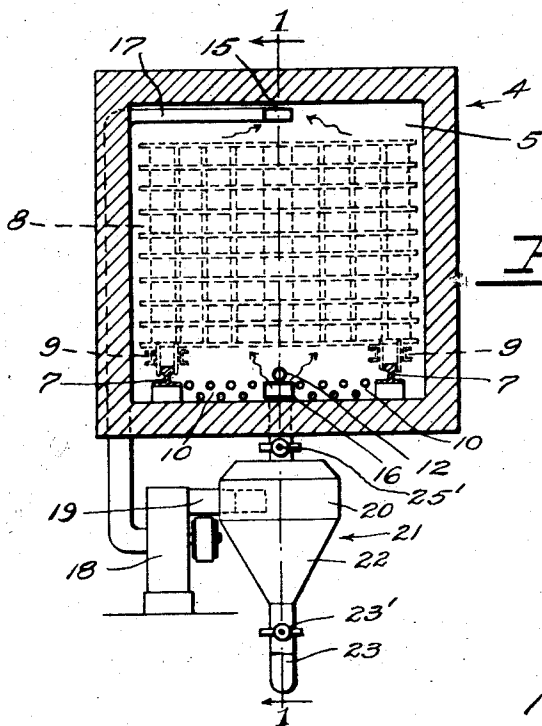


Fig. 2.

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DRY KILN.

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This invention relates to kilns such as used for drying sawmill products such as lumber and shingles.

tirely shut off by means of a manually controlled valve 14¹. 55

The above referred to parts are or may be such as are now employed in dry kiln practice.

The present invention comprises an air changing and circulating system which co-operates with said heating coils and with the steam discharged into the kiln chamber through said humidifying pipe 12. To such ends, I provide for the kiln a conduit 15 for the withdrawal of the heating medium therefrom, said conduit being located desirably in the upper portion of the chamber; and with a conduit 16 for the return of the heating medium into said chamber, said return conduit being located desirably in the lower portion of the chamber. 60 65 70

As shown, said conduits are disposed longitudinally of the kiln and are apertured as at 15¹ and 16¹ to afford direct communication with the interior of the chamber 5 in spaced apart relations lengthwise of the respective conduits. The draw-off conduit 15 is connected by a pipe 17 with the suction opening of an air blower 18, the delivery of the latter being through a pipe 19 which is connected tangentially with the cylindrical upper portion 20 of a centrifugal separator 21 having a funnel shaped lower portion 22 with an exhaust outlet pipe 23 at its lower end. Extending axially into the upper portion of said separator to below the elevation of the outlet of pipe 19 is a cylindrical tube 24 which is open at its lower end and has its upper end above the separator connected by a pipe 25 with the return air conduit 16 within the kiln chamber. 75 80 85 90

Dampers or valves, denoted by 17¹, 23¹ and 25¹, respectively, are provided for the pipes 17, 23 and 25. 95

The operation of the invention is as follows: The lumber or material 8 (Fig. 2) loaded upon trucks 9 are carried by the latter into the kiln chamber 5 and the doors 6 closed. These doors, preferably, do not afford a closure sufficient to prevent the leakage of a small quantity of air from the atmosphere outside of the kiln. Live steam is then admitted to the heating coils 10 and also to the pipe 12 from which steam issues in the form of spray or jets through the pipe perforations 13. 100 105

The steam discharged into the chamber 5

5 The object of the invention, generally stated is the provision of apparatus for use in dry kilns whereby material contained therein will be treated to the action of steam, air and heat in a manner to season and dry the individual pieces of the material more uniformly than is done by other dry kiln systems.

A more specific object of the invention is to provide means whereby the air or drying medium surrounding the material within a dry kiln may be regulated to control the humidity thereof and also the circulation of such air to afford most advantageous results.

The invention consists in the novel construction, adaptation and combination of parts hereinafter described and particularly pointed out in the appended claims.

A dry kiln embodying the invention is illustrated in the accompanying drawing wherein,—

25 Figure 1 is a vertical longitudinal section taken substantially on line 1—1 of Fig. 2; and Fig. 2 is a vertical transverse section taken substantially on line 2—2 of Fig. 1.

30 In said drawing the reference numeral 4 designates as a whole, a dry kiln which may be of any usual or suitable construction. The chamber 5 of said kiln is represented with openings at its ends for which are provided doors 6.

35 The kiln is provided interiorly with track rails 7 for trucks carrying a load of material to be dried or seasoned, said trucks and load being indicated by dotted lines 8 and 9 respectively in Fig. 2. Located in the lower portion of the kiln chamber is a plurality of pipes 10 constituting with headers or manifolds 11 a system of heating coils which is supplied with steam at a high temperature from a steam generator not shown.

45 Also located in the lower portion of said chamber is a pipe 12 into which is supplied steam from the generator, above mentioned, the pipe 12 being provided with perforations 13 through which the steam is delivered into the kiln chamber to humidify the air contained therein during the early stages of the lumber seasoning operation.

50 The steam to the pipe 12 is supplied through a pipe 14 and is regulated or en-

serves to humify the material to season the same preparatory to drying. After the material has been thus treated for a time dependent upon the character and sizes of the pieces of material to be treated, the valve 14¹ is closed to shut off the supply of steam into the air within the kiln chamber.

While the air or heating agent is being thus charged with water in the form of steam, the heating coils 10 are desirably operated.

To dry the material, the moisture is separated from the air by means of the separator 21 to permit the heated air to be used repeatedly, or the humid air may be withdrawn to be replaced by air admitted through leakage at door ways, or otherwise. The blower 18 acts to withdraw the humid air through conduit 15, and the pipe 17, and then delivering it tangentially into the separator 21 to effect circulatory travel of the fluid therein.

By closing the valve 25¹ and opening the valve 23¹ the fluid—air and water—is exhausted through pipe 23 to the external atmosphere.

With the valve 23¹ closed, or nearly so, and the valve 25¹ open, the water is removed by centrifugal force from the air which is returned through pipes 24 and 25 and conduit 12 back into the kiln; the superheated water collecting upon the peripheral wall of the separator 21 gravitates to the bottom of the latter to be discharged through the pipe 23.

From the foregoing it is apparent that the present invention provides apparatus which may be operated and controlled to produce, first, a movement within the kiln of the heating medium from the intake conduit 12 to the discharge conduit; second,

the regulating of the humidity of the heating medium; and, third, the means to replace and change the air within the kiln.

While I have illustrated an embodiment of the invention now preferred by me, I do not confine myself to any arrangement or combination of parts except as limited by the appended claims.

What I claim, is,—

1. In a dry kiln, the combination of air inlet and outlet conduits provided in spaced apart relation within the kiln chamber, pipe connections between the conduits, a blower to effect the circulation of air between said conduits within the chamber and said pipe connections, means to moisten the air within the chamber, a separator associated with said pipe connections for removing moisture from the air passing through the pipe connections, said separator having an exhaust opening into the atmosphere exteriorly of the kiln, and valves for regulating the passage of air through said pipe connections and into the external atmosphere, selectively.

2. In a dry kiln, a means to supply steam into the kiln chamber, an air inlet pipe and an air outlet pipe communicating with the kiln chamber in spaced apart relation, a power-driven blower connected to said outlet pipe, a separator, pipe connections between said blower and the separator and also between the latter and said outlet pipe, said separator having an opening into the atmosphere exteriorly of the kiln, and valves provided in said pipe connections and in the separator opening to regulate the passage of air through said inlet and outlet pipes, and to the external atmosphere, selectively.

Signed at Centralia, Washington, this 31st day of August, 1925.

CARL G. ULLIN.