May 4, 1926.

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J. W. QUISGAARD

KILN FOR TREATING WOOD

Filed August 6, 1925

2 Sheets-Sheet 1

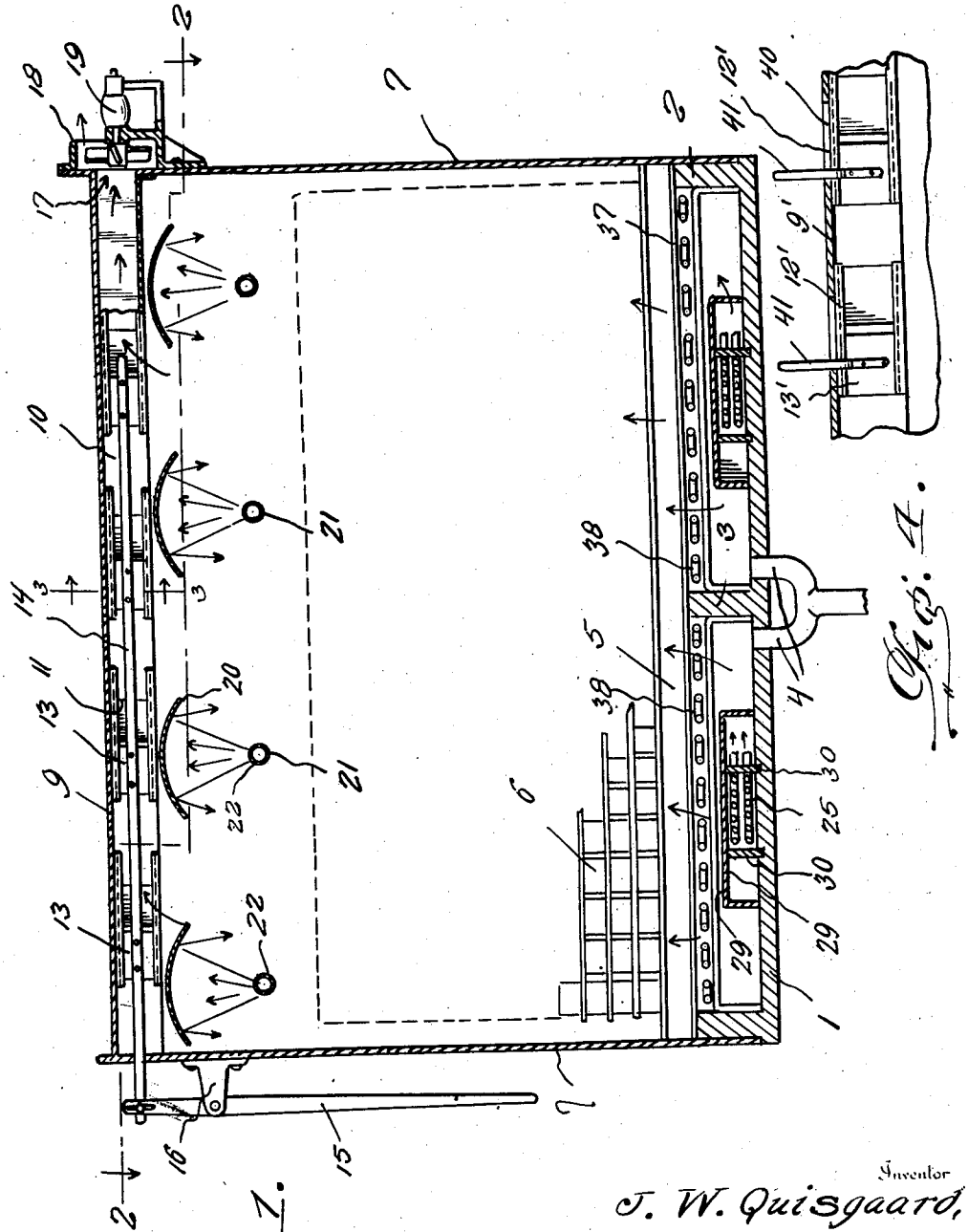


Fig. 1.

Fig. 4.

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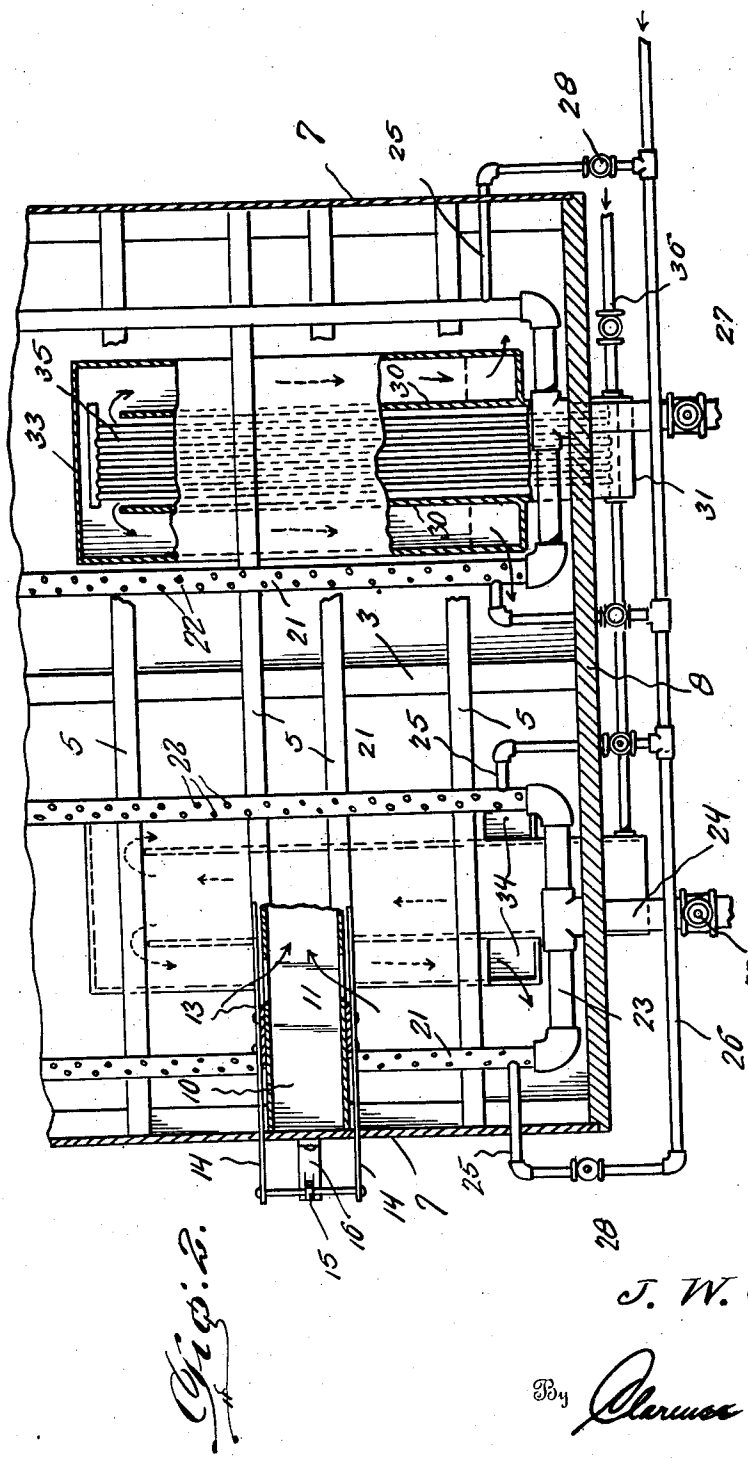


Fig: 2.

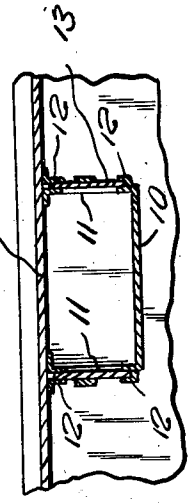


Fig: 3.

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UNITED STATES PATENT OFFICE.

JENS WESTERGAARD QUISGAARD, OF RICHMOND, VIRGINIA.

KILN FOR TREATING WOOD.

Application filed August 6, 1925. Serial No. 48,609.

To all whom it may concern:

Be it known that I, JENS WESTERGAARD QUISGAARD, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in a Kiln for Treating Wood, of which the following is a specification.

This invention relates to improvements in kilns for treating wood, and particularly to an apparatus of this character adapted to artificially season the wood in order to produce well seasoned lumber equal in quality to air seasoned lumber, and in a substantially short period of time.

An object of the invention resides in providing a housing having air inlet members in the bottom portion thereof mounting suitable heating means for the air taken in therethrough, above which are positioned suitable supporting means for the wood to be treated in the housing, while in the top portion is mounted a spraying apparatus for providing the preliminary treatment of the wood through the spraying of a heated liquid and steam over the entire surface thereof, while an air exhaust means is provided in the top portion in order to create an upflow of air through the housing from the inlet member in the final treatment of the wood to properly dry the same.

A further object of the invention resides in providing a structure having the elements above mentioned which are simple in construction, and easily assembled and accessible in order that the interior of the housing may be readily cleaned, or repairs made.

The invention further provides a special method for the treatment of the wood wherein a combination of hot water and steam in a variable mixture is conducted through a housing containing the wood in a down flow for removing the soluble contents of the wood, and thoroughly cleansing the same following which the wood is treated by an upflow of air through the housing created by suction at the top portion in order to remove all of the moisture, which suction is of such a character as to continually introduce fresh heated air into the housing.

The invention comprehends other objects in improving the construction and method of treating the wood within the housing which are more particularly hereinafter described, and set forth in the accompanying claims directed to a preferred form of the invention, it being understood however that various changes in the size, shape, and arrangement of parts may be made for carrying out the essential operation of the wood without departing from the spirit or scope of the invention as herein set forth.

In the drawings forming part of this application:—

Figure 1 is a vertical longitudinal section through an apparatus constructed in accordance with the present invention.

Figure 2 is a sectional view of a portion of the apparatus taken on line 2—2 of Figure 1.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Fig. 4 is a detail sectional view showing a portion of the conduit and top of the housing constructed to provide independent operating means for the valve plate.

A base or foundation for the apparatus is indicated by the numeral 1, which includes a bottom wall, and upwardly extending side walls 2 having a partition wall extending across the central portion as indicated at 3. Suitable drain pipes 4 extend from the bottom wall of the base 1 for draining off the liquid collected therein in the operation of the apparatus. On the upper edges of the side walls 2, and the partition wall 3 are supported a plurality of spaced beams 5, which are adapted to support the pile of wood 6 indicated in dotted lines, which is piled in separated relation in order that the liquid and air flowing through said casing may have contact with all faces, and through the entire portion of the wood pile.

The housing for the wood is mounted on the base or foundation portion 1, and comprises end walls 7, and side walls 8 which carry at the upper edges a top wall 9.

Extending longitudinally across the central portion of the underside of the top of the housing 9 is an exhaust conduit 10, which is secured to the top 9 of said housing. The side portions of this conduit are formed with a plurality of openings 11, and suitable guides 12 are mounted on the sides of the conduit 10 for slidably mounting and guiding the valve plates 13 which are operable to

control the openings 11 in order that the same may be closed or only partially open. Suitable rods 14 are connected to all of these valve plates and have a pin and slot connection with an operating lever 15 pivotally mounted in the bracket member 16 on the end wall 7, and manually operable for controlling the position of the valve plates. One end of the conduit 10 opens through the end wall 7, as illustrated in Figure 1 at 17, and an exhaust fan structure 18 is mounted on the end wall 7 and provided with a pulley 19 for receiving a belt from a suitable driving mechanism in order that it may be driven for creating a suction through the conduit for drawing the air outwardly from the interior of the housing in order to produce an upflow of air through the pile of wood 6, in a manner as will presently appear.

Immediately below the conduit 10 are mounted a plurality of arcuate deflector plates 20 extending in spaced parallel relation transversely across the housing and in centered relation with which are a plurality of spray pipes 21. The spray pipes 21 are also mounted in spaced relation and immediately below the deflector plates 20 and extend transversely through said housing. These spray pipes are provided on the upper sides with a plurality of openings 22 from which a mixture of steam and water may be forced which will impinge against the arcuate deflector plates and be deflected in a downward direction so as to thoroughly spray the whole upper surface of the pile of wood 6 in the housing. This will thus produce a down flow of the mixture through the housing which is designed for treating the wood to remove the dirt and the soluble contents of the wood pile. The ends of the spray pipes 21 are connected in pairs by suitable pipes 23 which in turn have pipe connections 24 extending outwardly from the housing to suitable steam supply source. Water pipe connections 25 are made with each of the pipes 21 adjacent the connections to the pipes 23 thereto which are all connected to a water main 26 outwardly of the housing in order to receive water from a suitable source of supply. Suitable valves 27 control the steam supply to the spray pipes 21, while the valves 28 control the water supply through the pipes 25 in order that a variable mixture of steam and water in each of the spray pipes may be provided for having the desired dissolving effects on the contents of the wood contained in the pile as the spray mixture flows therethrough.

In the bottom portion, or foundation portion 1, of the housing are mounted a pair of air inlet members 29 which have partition walls 30 mounted in spaced relation therein and extending longitudinally through the housing and beyond the side wall 8 thereof. A small air inlet opening is provided at 31 by the partition walls 30 at the end of the air inlet members and during the creation of suction in the housing the air flows through the inlet members through the opposite end thereof where the partition walls 30 terminate short of the end wall of the members indicated by the numeral 33 so that the air may again pass through the air inlet members in the opposite direction and between the side walls and the partition walls in each side thereof to the outlet openings 34. A plurality of heating pipes 35 are mounted in the air inlet members and are supplied from a suitable steam supply pipe 36 so that the air passing between the partition walls 30, and through the inlet members will be heated to a desired temperature for drying the air before admission into the interior of the housing. In the event that further heat is required within the housing, a plurality of heating pipes are mounted on the racks 37 in the base portion, which heating pipes are indicated at 38 and extend transversely throughout the bottom portion of the housing under the supporting beam 5. These supports 37 are of suitable U-shape construction and support the pipes 38 above the air inlet members 29.

In the use of this apparatus portions of the end walls 7 may be suitably removed in order to permit the piling or removal of the pile of wood 6 in the housing. The wood is piled in spaced open relation in order that free circulation is provided through the entire pile, and following the positioning of the wood in the housing to be treated, the same is closed following which a suitable proportion of water and steam is admitted through the spray pipe 21, and thoroughly sprayed over the entire pile of lumber to produce a downflow of heated condensate and liquid through said pile which is maintained at any desired temperature, preferably from 85 to 90 degrees Fahrenheit, for the purpose of thoroughly rinsing the wood, and at the same time removing a large portion of the solvent contents thereof which is drained off through the drain pipes 4 in the bottom 1, from the housing. In the spraying of the steam and water from the pipe 21 through the opening 22, it will be noted that the water and steam are projected upwardly under a substantial force against the deflector plate 20 from which they are deflected in all directions downwardly over the upper surface of the pile of wood, the valve doors 13 are closed for preventing communication between the housing and the interior of the conduits 10.

Referring particularly to Fig. 4 the top of the housing is indicated at 9′ as formed with slots 40 above the guides 12′ for the valve plates 13′, which valve plates are provided with handles 41 projecting through

the top portion of the housing, so that each valve plate may be independently operated. In this way a control for the flow of air through the housing may be effected so that the heated air from the bottom of the housing in passing upwardly may be drawn more to one end of the housing than to the other through closing the valve plate at one end of the opening in the housing for closing the openings 11 into the conduit and allowing the others to remain open.

In view of the fact that portions of the wood at one point or the other within the housing may dry faster than the remaining portions, this construction is desirable in controlling the air so that the greater quantity of dry air may be caused to pass through the more slowing drying portions of the wood in the housing so that all of the wood treated may be dried completely and substantially uniformly.

Following the preliminary treatment of the wood, the steam and water are shut off, and the same allowed to drain for a period of time immediately after which heat is supplied to the pipes 35 within the air members 29 for heating the air therein, while the valve doors 13 are opened a desired amount, and the exhaust fan mechanism 18 operated to produce a suction and upflow of heated air through the housing. If it is desired to provide more heat within the housing than can be supplied by the heating pipe 35 in heating the air drawn thru the air inlet members, then steam is admitted to the pipes 38 in order that the degree of heat desired to be maintained in the housing which is preferably from 60 to 90 degrees, may be maintained therein a suitable length of time for thoroughly drying the wood, and completing the seasoning treatment thereof in order to produce properly seasoned lumber in a substantially short period of time. In the drying treatment of the wood within the housing, the air inlet members and the exhaust conduit and fan mechanism are of such a size and capacity as to completely change the air within the housing three or four times in every minute, so that fresh air is constantly maintained within the housing of a suitable heated character for effecting the proper drying of the wood being treated, after which the same is fairly dry, and the wood is then removed, and is ready for use for any desired purpose.

It will thus be seen that an apparatus for treating wood in the form of a kiln is provided wherein the preliminary treatment produces a downflow through the wood while the subsequent drying treatment produces an upflow therethrough and in which all the structural elements for producing the flow through the wood and the treatment thereof within the housing are of simple construction, and readily assembled or repaired, and also provide ready access for cleaning and replacement when desired.

Having thus described the invention, what I claim is:—

1. An apparatus for treating wood comprising a housing, means in the housing for supporting wood to be treated in spaced relation above the bottom of the housing, a plurality of spray pipes mounted in the top portion of the housing adapted to produce a spray over the entire interior of the housing and the wood therein, and produce a down flow through said wood, an air conduit extending transversely of the top of the housing having a plurality of openings communicating with said housing, power operated means in said conduit for exhausting the air from the housing in creating an upflow through the wood therein, air inlet members in the bottom of the housing, and heating means in said air inlet members.

2. An apparatus for treating wood comprising a housing, an air conduit extending transversely of the top of the housing having a plurality of openings communicating with the interior of the housing, air exhausting means in said conduit operable to exhaust the air from the housing, air inlets at the bottom of the housing, and manually operable means for controlling the flow of air through said openings into said air conduit.

3. An apparatus for treating wood comprising a housing, an air conduit extending transversely of the top of openings communicating with the interior of the housing, air exhausting means in said conduit operable to exhaust the air from the housing, air inlets at the bottom of the housing, and a plurality of control members slidably mounted on said air conduit, manually operable to reduce the passage for air through the openings and thereby control air circulation through the housing.

4. An apparatus for treating wood, comprising a base member having upwardly extending side walls and a partition wall, a housing mounted on said base member and enclosing said side walls, wood supporting elements mounted on the side walls, an exhausting means in the top of the housing, air inlet members in the base member having portions projecting through the side walls providing entrance openings for air, and outlets inside of said side walls for permitting the air to enter the housing and heating means in said air inlet members for heating the air therein.

5. An apparatus for treating wood, comprising a base member having upwardly extending side walls, and a partition wall, a housing mounted on said base member around said side walls, wood supporting elements on the side walls, air exhausting means in the top of the housing, air inlet

members formed of casings having open bottoms and longitudinally extending spaced partition walls, said members being mounted in the base member with the lower edges seated on said base member, portions of said air inlet members extending through said side walls and forming inlet openings for air, said air inlet members and partitions forming circuitous passages for the air before discharge into the housing, and heating pipes mounted in said air inlet members for heating the air therein.

In testimony whereof I affix my signature.

JENS W. QUISGAARD.