

Oct. 7, 1969

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3,470,623

CONTINUOUS DRYER ESPECIALLY FOR LUMBER

Filed Sept. 12, 1967

FIG. 1.

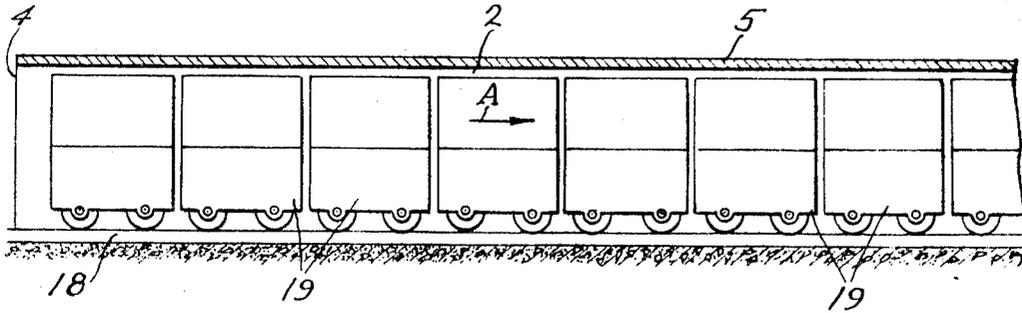
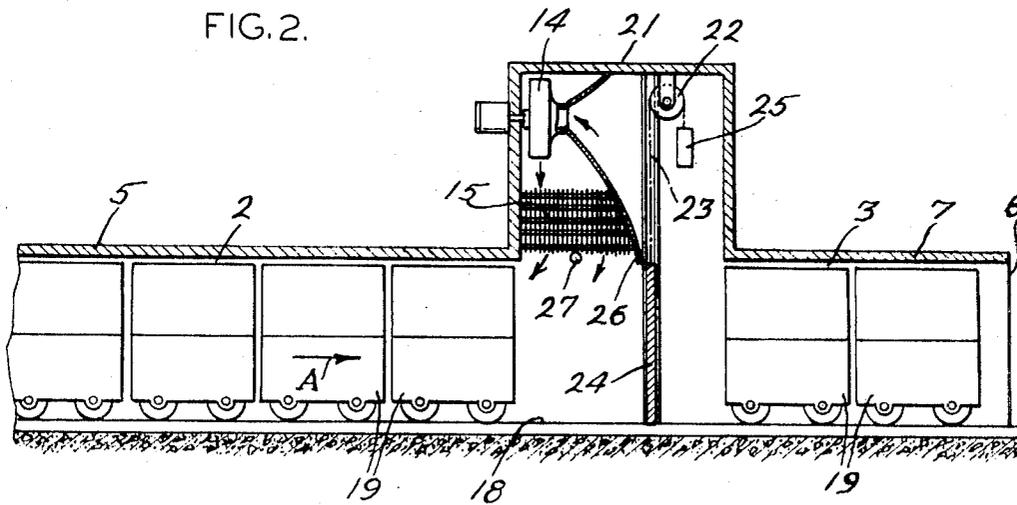


FIG. 2.



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**CONTINUOUS DRYER ESPECIALLY FOR LUMBER**

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Filed Sept. 12, 1967, Ser. No. 667,267

Claims priority, application Germany, Sept. 13, 1966,  
H 60,494

Int. Cl. F26b 7/00, 25/06

U.S. Cl. 34—13.4

4 Claims

**ABSTRACT OF THE DISCLOSURE**

A continuous drying tunnel having a lifting door positioned intermediate its ends to divide the tunnel into a drying section and a cooling section. The opposite ends of the tunnel are continuously open for the admission and exhaust of the treating air. A fan chamber overlies the lifting door so that the door may be lifted into the chamber, and a fan is mounted in the chamber to draw fresh air through the open exit end of the tunnel, over the goods in the cooling section to both cool the goods and heat the air therein. The continuous current of preheated air from the cooling section is then blown through a heater into the drying section and is caused to flow throughout the drying section countercurrent to the goods for discharge through the feed end of the tunnel.

The invention refers to a continuous dryer, especially for lumber, which has a drying zone, a fan and a heating unit. Besides lumber other material as for example cork which can be stacked in baskets or on trucks to allow air to pass can be dried in this dryer.

With a dryer already known a preheating zone is arranged before the drying zone when viewing it in the direction in which the goods to be dried pass through. Along the drying zone there is a duct for circulating air arranged with a junction for a duct for intake air. From said duct for circulating air the air is blown into the dryer in opposite direction to the goods passing through the zone. Part of the air used for drying must be let out on the opposite side after passing the preheating zone. The drying zone and the preheating zone are located in a common room. Between these two zones there is a junction in the duct for circulating air, and viewed in the direction of the passage of the drying medium there is an adjustable flap for exhaust air located at the end of the preheating zone or at the beginning of the drying zone. By means of this flap the quantity of drying medium passing the preheating zone can be regulated. (Refer to the book: Kollmann "Technologie des Holzes und der Holzwerkstoffe, vol. 2, page 271.)

The invention aims at a continuous dryer in which the drying medium, especially air, passes the goods to be dried only once, that means, the drying medium is taken in on one side of the dryer and let out on the opposite side. According to the invention this aim is reached in that way that viewed in the direction in which the goods pass through the dryer a cooling zone is arranged behind the drying zone, the cooling zone is separated from the drying zone by a lifting gate and the fan and the heating unit are located near the lifting gate, the suction side of the fan facing the cooling zone and the pressure side of the fan facing the drying zone.

The drying medium is taken in and warmed when passing the dried goods which are in the cooling zone and heated up the heating unit arranged behind the cooling zone and is then led into the drying zone where it is cooled down by the goods to be dried and absorbs moisture. The goods to be dried and the drying medium move into opposite directions to each other and the drying

medium is diverted between the cooling and the drying zone. After opening the lift gate the dried goods can pass through to the cooling zone. The heat added to the drying medium will be used to the utmost extent for drying the goods passing through the dryer in cycles. The design of the continuous dryer is very simple.

Another feature of the invention is that, independent from the position of the lift gate, the cooling zone and the drying zone are forming one tunnel by means of a housing covering both zones and are only open on their front sides. The drying medium is only taken in or let out on these two front sides.

A favorable feature of the invention is that the chamber which is within the housing between the drying zone and the cooling zone is about twice as high as the lift gate and encloses the fan, the heating unit, and a lifting device for the lift gate, and serves for the diversion of the drying medium.

The enclosed drawing shows the longitudinal section of a continuous dryer as an example of the object of the invention.

FIGURE 1 shows the inlet of the dryer.

FIGURE 2 shows the outlet of the dryer.

The continuous dryer has a drying zone 2 and a cooling zone 3. The drying zone 2 is only open on its front side 4 and forms a tunnel which has no openings on either side. Between the top 5 of the drying zone 2 and the goods to be dried, e.g. lumber, there is only a small gap. The cooling zone 3 is also open on its front side 6 and has a top 7. Between the top and the goods to be dried there is also only a small gap. Zones 2 and 3 have about the same height.

Between the drying zone 2 and the cooling zone 3 there is a chamber 21 within the housing and arising above the tops 5 and 7 of the adjacent zones and being about twice as high as the two zones which serves for the installation of a return pulley 22 and a lifting rope 23 the one end of which is connected with the lift gate 24 corresponding in its height to the height of the drying zone or the cooling zone 3 and to the other end of which a counterweight 25 is fastened. The closed lift gate separates the drying zone 2 and the cooling zone 3 up to a height corresponding to the height of both of them. A fan 14 and a heating unit 15 are installed in the chamber and arranged near a deflector plate 26 serving for diverting the air and facing the drying zone. The lower edge of the deflector plate 26 reaches down to the upper edge of the lift gate 24 and forms a fan drift for the fan 14. The fan 14 and the heating unit 15 can also be arranged the other way round, for example that they are facing the cooling zone 3.

In the drying zone 2 and the adjacent cooling zone 7 there is a pair of rails 18 serving for moving the goods to be dried, for example lumber stacked on trucks 19, in the direction shown by arrow A in a certain cycle.

For moving the goods from the drying zone 2 to the cooling zone 3 the lift gate will be opened.

By the fan 14 air is taken in via the cooling zone 3. The air is warmed while passing the dried warm goods which are in the cooling zone 3. The warm air flows from the cooling zone 3 into the chamber 21 and is pressed by the fan 14 through the heating unit 15 and heated up. A thermostat 27 installed behind the heating unit 15 can either influence the heating capacity of the heating unit and/or control a throttle valve which is not shown in the drawing. The heated up drying medium flows into the drying zone 2 for drying the goods and after passing the drying zone it comes out damp and cooled down on the open front side 4.

The total length of the dryer for lumber is about 36 m., the length of the drying zone 2 being about 28 m., that of the chamber 21 being about 3 m., and that of the

cooling zone 3 being about 5 m. There are three dried stacks for cooling down in the cooling zone whereas there are eighteen stacks to be dried in the drying zone. The goods to be dried are moved through the zones in cycles of about 3 hours.

The lengths of the different zones depend on the species of wood to be dried, on the moisture content of the wood to be reduced during the drying process, etc.

It is also possible to put stacks or trucks next to each other through the continuous dryer.

I claim:

1. An elongated tunnel dryer having open feed and discharge ends for feeding and discharging goods for intermittent advance through said dryer from said feed end to said discharge end, a single fan chamber intermediate the ends of said tunnel disposed above the path of travel of the goods through the tunnel and separating said tunnel into a drying zone in advance of said chamber and a cooling zone subsequent to said chamber, a lifting door mounted in said tunnel in registry with said chamber for displacement between a closed position in the path of said goods during lulls in said intermittent advance thereof and an open position within said chamber during the advancing movement of said goods, said door in its closed position constituting a dividing wall between said drying zone and said cooling zone, a fan mounted in said chamber an indirect heater in said chamber and means cooperable with said door in its closed position to connect the inlet side of said fan directly to said cooling zone adjacent said door so as to draw air inwardly only through said open discharge end of the tunnel, and over all of the goods in said cooling zone to thereby preheat the room air admitted to said inlet side, the exhaust side of said fan being connected to said drying zone through said heater so that the preheated air from the cooling zone is caused to flow from said exhaust side of the fan through said heater, into said drying zone adjacent said closed door over all of the goods within said drying zone and out of the tunnel through said open feed end whereby said heated air is cooled by the goods prior to discharge from the tunnel.

2. A dryer according to claim 1 wherein said fan chamber is open into said tunnel along the full length of said chamber, said heater being positioned in said chamber opening to extend from the end of the fan chamber adjacent the feed end of the tunnel forwardly to

said lifting door, said fan being positioned in said chamber above said heater to exhaust directly through said heater into said drying zone of the tunnel.

3. A dryer according to claim 1 wherein said means cooperable with said door comprises a deflector plate extending from the inlet of said fan angularly downward to the upper edge of the lifting door when in its closed position out of the path of travel of the goods there-through, said door when in its open position operable to throttle the flow through said fan during the advancing movement of the goods through the tunnel.

4. A method of drying lumber in a continuous drying tunnel having open ends at its feed end and at its discharge end and having a single fan for effecting air circulation countercurrent to the goods in said tunnel, comprising the steps of positioning said fan intermediate the ends of the tunnel to establish a first drying zone and a subsequent cooling zone for the lumber respectively in advance and subsequent to said fan, providing a movable door in said tunnel in registry with said fan operable in a closed position in said tunnel to cause said fan to draw all of its air through said open discharge end of the tunnel, over all of the goods in the cooling zone thereof and into the inlet of said fan, thus effecting the heating of said air, further heating said preheated air discharged from said fan and directing the entire quantity of air discharged from said fan longitudinally through said drying zone, around the goods therein, and out of said tunnel through said open feed end, the drying goods in the drying zone cooling said heated air prior to its discharge from the tunnel.

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