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APPARATUS FOR COOLING VENEER PANELS

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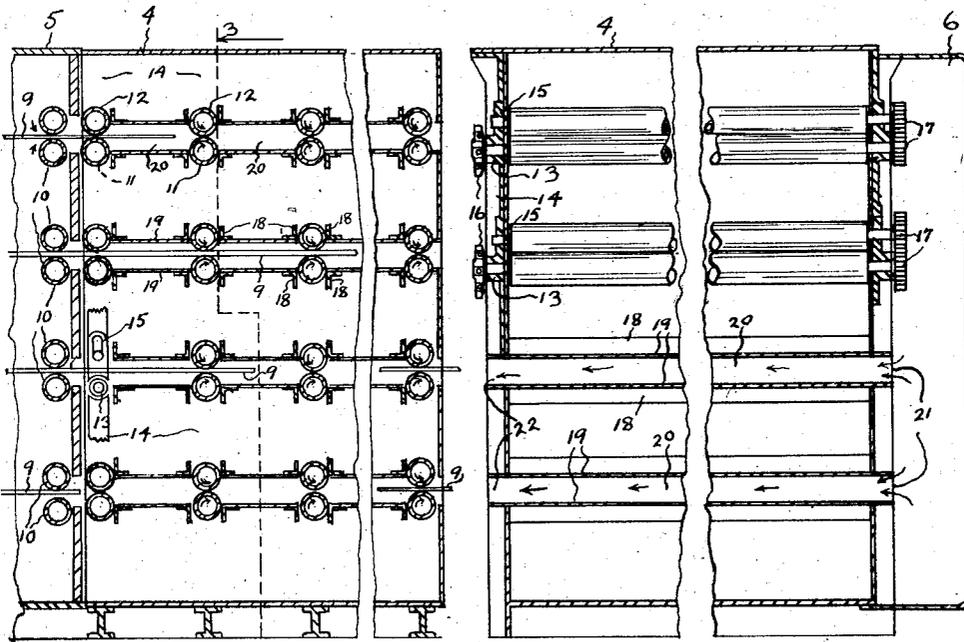
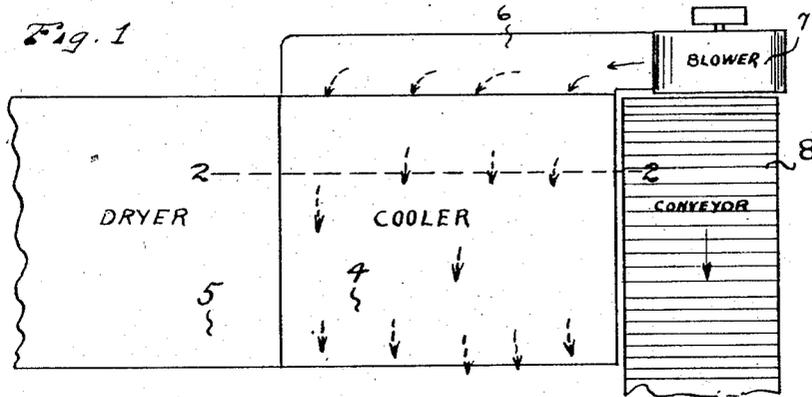


Fig. 2

Fig 3

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APPARATUS FOR COOLING VENEER PANELS

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My invention relates to an apparatus for cooling panels of veneer stock for plywood as they come from the dryer.

A primary object of my invention is to provide apparatus of this nature which will cool the veneer panels very rapidly and without damage to said panels, thus making the panels ready for the glue machines within a very short time after they come out of the dryer,—heat in the panels having a deleterious effect upon the glue composition.

A further primary object of my invention is to provide panels of veneer, to be used in the manufacture of plywood, of uniform character as to temperature and moisture content to the end of obtaining a uniform gluing result.

In the preparation of wood for making veneer it is customary to soften the wood by the action of heat and moisture, as by steaming, then to cut the softened wood into thin panels or sheets, then to dry these panels by the application of heat usually by passing them through a dryer heated to a high temperature by means of steam pipe coils. When these thin panels of wood come from the dryer they are very hot and it is necessary to cool these panels before they can be coated with glue. It has heretofore been common practice to allow these panels to stand in the open air for a long enough period to allow them to cool. This usually requires from twenty to thirty minutes, and often results in loss of time of the operators in the veneer mill due to waiting for the panels to cool. This also makes it necessary to set aside sufficient storage space in the mill to take care of the maximum output of the dryer for the maximum time required for cooling purposes. In a mill of large capacity this means that a relatively large space must be used for storage purposes and that labor and machinery must be employed to move the hot panels away from the dryer to where they are to be cooled and then to transport the cooled panels to the glue machines, which are ordinarily located at a distance from the dryer.

In accordance with my invention I provide cooling apparatus which may be connected directly with the end of the dryer so

as to receive the panels directly therefrom, which apparatus will cool said panels in a very short period of time, in order that they may be delivered directly to the glue machines without previously being stored to permit cooling, thus saving much space in the mill, and saving much labor and preventing the accumulation of a large volume of panels between the dryer and the glue machines and making it possible to locate the glue machines adjacent the cooler so that the panels may be fed directly from the cooler to the glue machine.

In general and briefly stated, in carrying out my invention, I subject the panels of veneer to a blast of air at relatively high velocity. The veneer panels are often very thin so that provision must be made to protect them against vibration or whipping movement which would induce cracking or weakening of the stock if they are to be cooled by subjecting them to a blast of air at high velocity. My invention makes such provision and this is in conjunction with means to confine the blast of cooling air within defined channels. I support the panels against whipping, and at the same time move said panels at a uniform predetermined rate of speed by passing them between driven rollers located at frequent intervals. These rollers perform a further function of dividing or separating the space within the cooler into a plurality of passageways or compartments extending crosswise of the direction of movement of the panels, so that a uniform cooling of the panels will take place as they move through the cooling apparatus, the volume and velocity of the air being dependent on the length of the cooler and the rate of travel of the panels. The passing of air over the panels also serves to remove any moisture that may be left thereon.

It can be readily seen that if these panels are stacked for drying and cooling one on top of another, those on the inside of the pile will cool and dry slower than those on the top. Even if spacers in the form of blocks are provided, the heat and sweating moisture of the panels near the center of the pile is not the same as that on the panels near the outside of

the pipe. After the panels are cooled according to the storage methods as heretofore practiced, the only check that they have been subjected to the same degree of cooling and drying is by the touch and feel of the glue, which is manifestly uncertain. If a uniformly cooled panel can be provided in synchronism with the output of the dryer, labor and storage space in the mill are economized and a better product is obtained because of the uniform glue bond established.

The above mentioned general objects of my invention, together with others inherent in the same, are attained by the device illustrated in the following drawings, the same being a preferred exemplary form of embodiment of my invention, throughout which drawings like reference numerals indicate like parts.

Figure 1 is a somewhat diagrammatic plan view of cooling apparatus constructed in accordance with my invention showing the same positioned at the discharge end of a dryer;

Fig. 2 is a fragmentary sectional view, on a larger scale, of the cooler substantially on dotted line 2—2 of Fig. 1; and,

Fig. 3 is another sectional view substantially on broken line 3—3 of Fig. 2, parts being shown in elevation.

Referring to the drawings, the numeral 4 designates the external walls or housing of a veneer cooler constructed in accordance with my invention, 5 designates a dryer with which the cooler is connected, 6 designates a manifold or housing through which air may be supplied to the cooler, as by a blower 7, and 8 designates a conveyor onto which cooled veneer panels from the cooler may discharge.

The interior of the dryer 5 is provided with any suitable conveyor means by which panels 9 of thin wooden veneer stock may be carried progressively through said dryer to the discharge end thereof and delivered into the cooler. The discharge end of the dryer ordinarily has pairs of discharge rollers 10 by which the dried panels of veneer stock are fed outwardly. The interior of the cooler is provided with a plurality of horizontal rows of rollers arranged in pairs on a level with those in the dryer each pair comprising a lower roller 11 and an upper roller 12, the number of horizontal rows of rollers in the cooler corresponding to the number of sets of discharge rollers in the dryer, the purpose being to receive the hot panels of veneer stock as they come from the dryer and convey them through the cooler in synchronism with the rate of discharge from the dryer. These pairs of rollers are arranged at frequent intervals to afford adequate support for the panels of veneer so that they will not vibrate and whip when subjected to blasts of air which are directed on both sides of them.

The lower rollers 11 are journaled, at their ends, in bearings 13 in upright frame mem-

ber 14 and the upper rollers 12 are rotatably supported, at their ends, in vertical slots 15 in the frame members 14. A sprocket wheel 16 is provided on one end of each lower roller 11 for driving the same and the two rollers of each pair are interconnected at the other end by gear wheels 17 whereby they will be rotated simultaneously. Sprocket chains, not shown, may be used for driving the lower rollers in synchronism, the speed of which depends upon the rate in the dryer.

Extending crosswise of the cooler adjacent each set of rollers are four angle bars 18 which are secured, at their ends to the upright frame members 14. These angle bars 18 form supports to which horizontal sheet metal partition plates 19 are secured in such a manner as to form transverse air passageways 20 between the respective sets of rollers. The angle bars 18 are set close to the circumferences of the rollers so as to prevent the escape of air around the rollers and leave each compartment 20 substantially air tight. The compartments 20 may be of substantially the same width as the diameter of one of the rollers and the panels of veneer stock will be supported substantially midway between the tops and bottoms of the passageways 20 thus affording ample room for a circulation of air on both sides of the panels. The passageways 20 open into the manifold 6 at one end as indicated at 21 in Fig. 3, or said passageways may be otherwise connected with means through which air may be delivered thereinto. At the discharge end the passageways 20 may be open to the atmosphere as shown at 22 so that air which has passed through said passageways may discharge freely against minimum back pressure.

In the operation of this device the panels of veneer stock passing from intake to discharge end of the cooler between the rollers 11 and 12 are subjected to a continuous blast of cool air blowing over both sides of said panels in such a manner as to carry off the heat very quickly leaving the panels cool and ready for the glue when they discharge from the cooler. The passageways 20 constitute a series of cooling chambers through which the panels of veneer stock must pass successively, the chamber nearest to the dryer being the warmest and each successive chamber being cooler than the preceding one. The partition means which forms the passageways 20 serves to prevent a general mixing of the air in the cooling chamber. In addition to cooling the panels of veneer stock the blast of air which passes over said panels in the cooler removes any surface moisture which may not have been removed in the dryer.

The air passageways 20 are relatively narrow and consequently require the moving of a smaller volume of air than would be required by passageways of greater width.

Obviously, changes may be made in the form, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only a preferred form of embodiment.

I claim:

1. In apparatus for cooling panels of veneer stock, the combination with a dryer from which said panels are discharged in a heated condition, of a cooler housing connected with the discharge end of said dryer; a plurality of pairs of horizontal rollers arranged at frequent intervals in horizontal rows in said cooler housing for moving the panels through the housing and supporting the panels against the vibratory action of air currents to which they are subjected; horizontal partitions cooperating with the rollers to form relatively narrow passageways through which the panels are moved; and means for producing a circulation of air at high velocity through said passageways to cool said panels.

2. In apparatus for cooling panels of veneer stock, the combination with a dryer from which said panels are discharged in a heated condition, of a cooler housing connected with the discharge end of said dryer; a plurality of pairs of horizontal rollers arranged at frequent intervals in horizontal rows in said cooler housing for moving the panels through the housing and supporting the panels against the vibratory action of air currents to which they are subjected; two angle bars extending crosswise within said housing on each side of each of said rollers in close proximity to the rollers; partition plates secured to the angle bars and forming narrow passageways which extend crosswise of the cooler housing and through which the panels are moved; and means for producing a circulation of air through said passageways to cool said panels.

In witness whereof, I hereunto subscribe my name this 31 day of August, 1929.

BERNDT A. OLSON.

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