Feb. 18, 1958 MASATSUGU MINAMI 2,823,467

APPARATUS FOR THE DRYING OF THIN WOOD SHEET

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Fig. 1

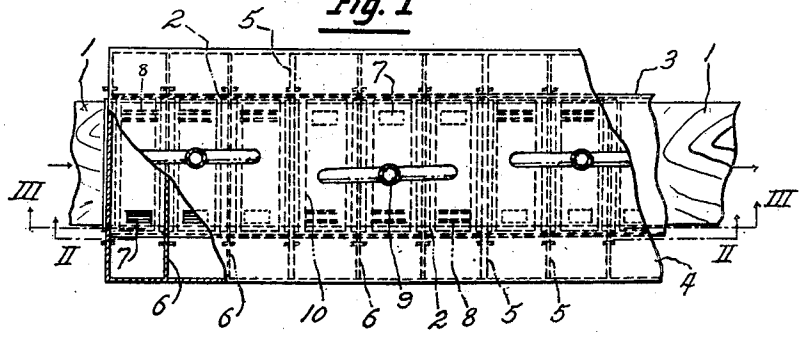
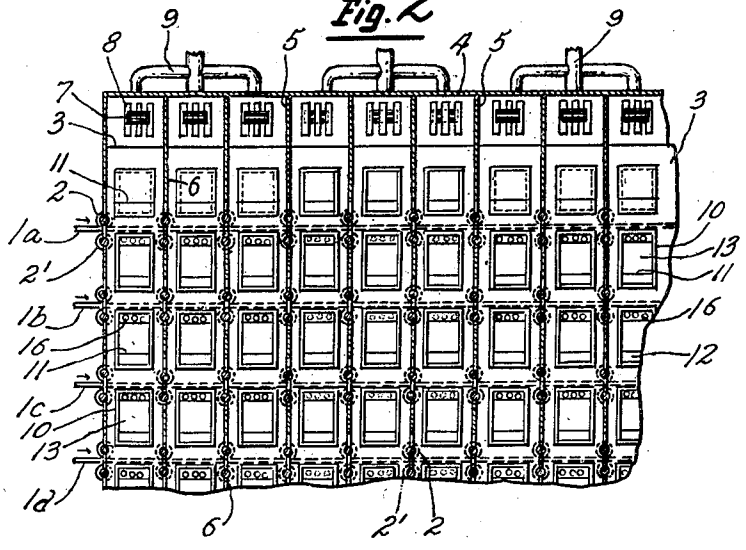


Fig. 2



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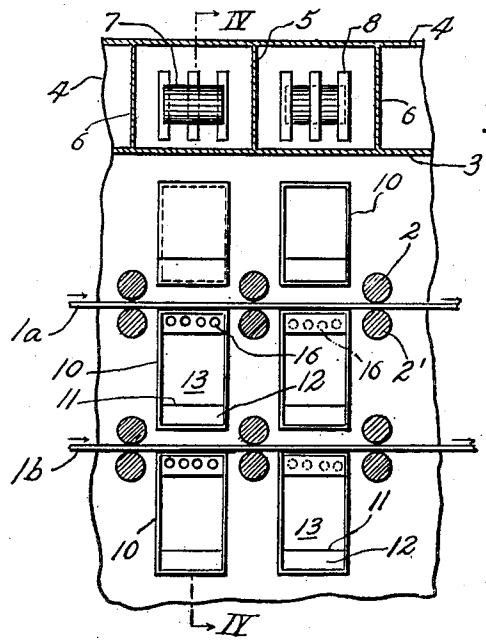
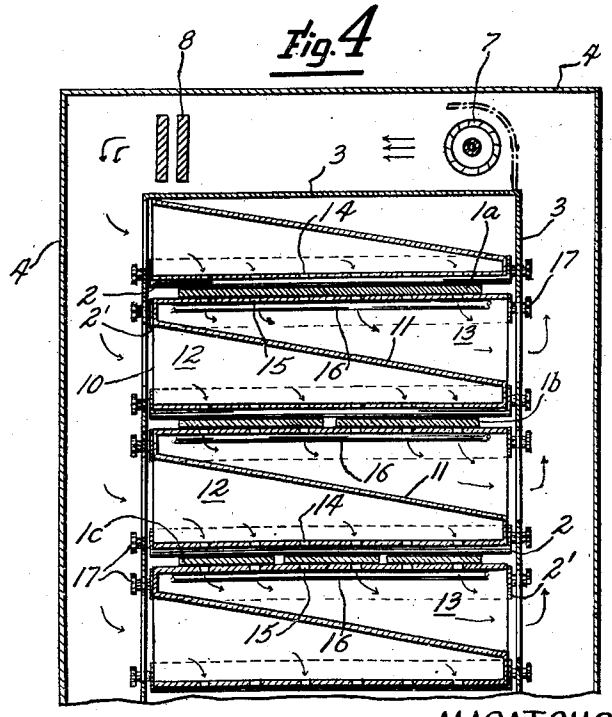


Fig. 3.

Fig. 4



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APPARATUS FOR THE DRYING OF THIN WOOD SHEET

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Application July 28, 1954, Serial No. 446,240

2 Claims. (Cl. 34—155)

This invention is concerned with improvements in or relating to apparatus for the drying of thin wood, e. g. plywood.

It is an object of the present invention to provide drying apparatus for wood sheet which is of high efficiency and in which warm air is substantially evenly directed onto the surface of the wood sheet and moist air is drawn away therefrom, the air being circulated at high speed.

According to the present invention, there is provided apparatus for the drying of thin wood sheet, e. g., plywood, which comprises a double walled casing through which a wood sheet is fed, the space between the double walls of the casing being partitioned into sections by a plurality of spaced partitions disposed transversely to the direction of the feed of the wood sheet so as to provide a series of air circuits, each circuit being associated with air distribution chambers adapted to distribute air substantially evenly over the surface of the wood sheet and means in each air circuit for producing a current of hot air.

Preferably each of the sections in between the double walls of the casing is further divided into a number of smaller compartments, each compartment being provided with a fan and electric heater so as to provide the required hot air, the circulation of the air in each section of smaller compartments being oppositely directed.

Suitably the casing is adapted to dry simultaneously a number of wood sheets which are passed horizontally through the casing in a vertically spaced manner. The sheets of wood are fed through the casing by means of pairs of rollers adapted to be rotated in opposite directions and arranged at intervals along the length of the casing. Suitably the air distribution chambers are arranged in vertical tiers and in the horizontal direction are located between each pair of rollers.

A very convenient form of air distribution chamber for use in accordance with the present invention comprises a hollow rectangular member which is divided into two cuneiform or wedge-shaped chambers by means of a substantially diagonally disposed dividing wall which stretches from one end of the rectangular member to the other, the dividing wall sloping downwards in the direction of the air admitted through one end of the member. The upper and lower walls of an air distribution chamber are provided with a plurality of vents or apertures adapted to facilitate even distribution of hot air entering the air distribution chamber and subsequently directed onto a wood sheet. Conveniently steam piping is provided in the upper portion of an air distribution chamber for the purpose of heating the under-surface of a wood sheet passed through the drying casing. The upper cuneiform chamber of the air distributor is used as an exhaust passage of moist air, the lower chamber being used as a passage for the introduction of the hot air.

A specific embodiment of drying apparatus in accordance with the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a plan of the drier with a partly sectional view,

Figure 2 is a sectional elevation through the line II—II of Figure 1,

Figure 3 is a detailed elevational view taken on the line III—III of Figure 1 showing the relative position of the air distribution chambers, feeding rollers and wood sheets, and

Figure 4 is a sectional view of the air distribution chambers through the line IV—IV of Figure 3.

A wood sheet **1** is advanced in the direction of the arrow (Figure 1) within the inner wall **3** of a double-walled rectangular iron casing by means of a plurality of pairs of feeding rollers **2**, **2'** (see Figure 2). The rollers **2**, **2'** of each pair are rotated in opposite directions by means of gears **17** (Figure 4) driven by means of an endless chain belt (not shown). The space between the inner wall **3** and the outer wall **4** of the casing is divided into several large sections at equal intervals by partitions **5** which are disposed perpendicularly to the direction of feed of the wood sheet. Each section is then further divided into three smaller compartments by means of partitions **6**, a fan **7** and an electric heater **8** being arranged in each compartment so as to direct current of hot air in the same direction in each compartment. However, in adjacent sections of three compartments each, the fan **7** and heater **8** are arranged in opposite directions for the purpose of drying the wood sheet evenly. A regulating ventilator **9** is provided on the top of each compartment and a plurality of air distribution chambers **10** are provided within the inner wall **3** of the casing. The air distribution chambers **10** are rectangular in shape and are located in the horizontal direction between the pairs of feeding rollers **2**, **2'** and provide air passages from one side of the inner wall **3** to the other, there being no other air passages within the inner wall **3**. As shown in Figure 4 each air distribution chamber **10** is divided into cuneiform or wedge-shaped chambers by a partition **11** substantially diagonally disposed and inclined downwards in the direction of the introduced air. The bottom wall of the lower wedge-shaped chamber **12** and the top wall of the upper wedge-shaped chamber **13** are provided respectively with a plurality of vents **14** and **15** and the upper chamber **13** is provided with steam piping **16** in contact with the undersurface of the top wall of the chamber **13**. The several vertically spaced wood sheets **1***a*, **1***b*, **1***c*, **1***d*, etc. pass through the drying apparatus in contact with the upper surface of an air distribution chamber the lower surface of said chamber being located at a short distance from the wood sheet passing therebeneath.

In operation, hot air produced by means of fans **7** and heater **8** is blown in the direction of the arrows as shown in Figure 4 and thus enters into a lower cuneiform chamber **12** and since this is of tapering form the air runs downwardly through vents **14** of the bottom wall at substantially equal speed and is directed perpendicularly against the wood sheets **1***a*, **1***b*, **1***c*, **1***d*, etc. and dries them. In the upper cuneiform chamber **13**, the lower surface of the wood sheets is dried by the heat from steam pipes **16** and the moist air produced is sucked out through the vents **15** of the top wall. With regard to the suction of the air, the suction capacity of each vent **15** is also substantially equal since the section of chamber **13** tapers towards the left as shown in Figure 4 and thus the suction of the moist air is effected substantially evenly in every part of the wood sheet. This circulation of hot air is carried out at a high speed due to the difference of atmospheric pressure which is high in front of the fan and low in the rear of the fan. Moreover, since the hot air circulation is effected alternately in opposite directions in adjacent sections between each dividing partition **5** the

drying of both ends of the sheet is substantially equally effected.

It will thus be seen that with a drier, according to the present invention, a current of hot air is directed perpendicularly against the wood sheet at a substantially equal velocity all round and at the same time moist air from the lower surface of each is sucked away whereby the drying is carried out quickly and completely with a very satisfactory high drying efficiency without any disadvantage of, for example, floating the sheet which has hitherto inconvenienced the operator. Experiments with the apparatus in accordance with the present invention indicate that a complete drying can be effected in about one third of the time required when using driers which are not provided with the hot air distribution chambers in accordance with the present invention.

I claim:

1. Apparatus for drying thin wood sheets, comprising a cubical casing having spaced apart inner and outer walls, a plurality of substantially parallel spaced apart partitions extending across and within the inner wall of said casing, opposing inner walls and outer walls of said casing and said partitions having slots therethrough extending in line for the passage of the sheets to be dried, a plurality of rollers rotatably carried by said casing opposing inner walls and said partitions each on a side of one of said slots, means for rotating the rollers of each slot in a direction opposite to one another, means for drawing air from one side of the remaining inner walls of said casing and blowing and heating air to the other side of said remaining inner walls, said drawing and blowing and heating means being positioned between said casing inner and outer walls, a plurality of series of superimposed alternating inlet and outlet chambers extending laterally of said casing between said partitions with each of the inlet chambers having an end opening for receiving said heated air on a side opposite to a similar end opening in each of said outlet chambers, the remaining inner walls of said casing having openings corresponding to and in line with said chamber openings for feeding air to said inlet chambers and drawing air from said outlet chambers, said chambers of each series being spaced apart for the passage of the sheets to be dried and having openings provided in opposing sides thereof and heating means provided in each outlet chamber adjacent the side openings of said chambers.

2. Apparatus for drying thin wood sheets as claimed in claim 1 wherein each of said inlet and outlet chambers has a wedge configuration tapering inwardly from the end having said opening therein and with the opposing sides of said chambers extending substantially parallel and with said side openings positioned for directing heated air substantially perpendicular to the sheet being dried.

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