July 12, 1955 P. FECHT 2,712,699

DEVICE FOR PREVENTING BUCKLING AND CRACKING WHEN DRYING VENEERS

Filed April 26, 1951

3 Sheets-Sheet 1

Fig. 1

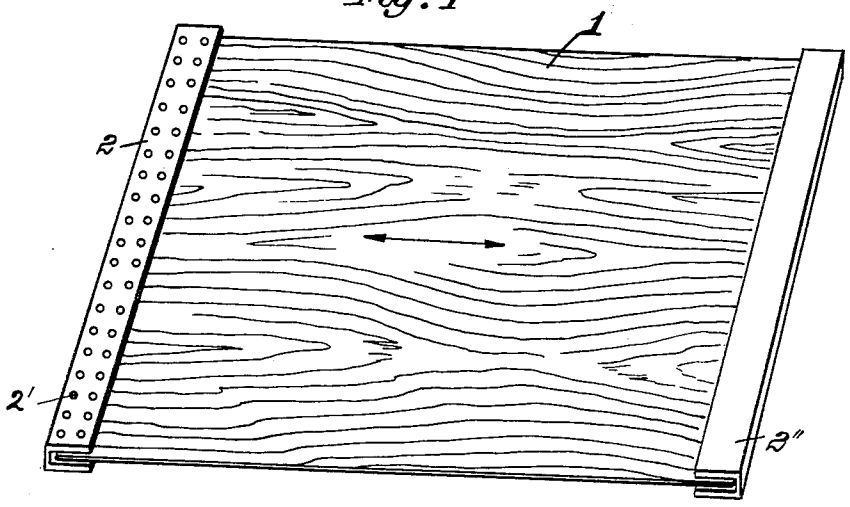


Fig. 2

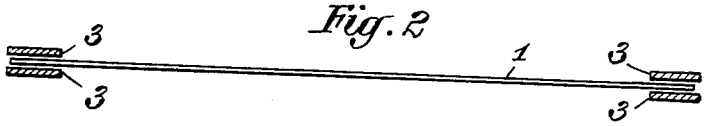


Fig. 3

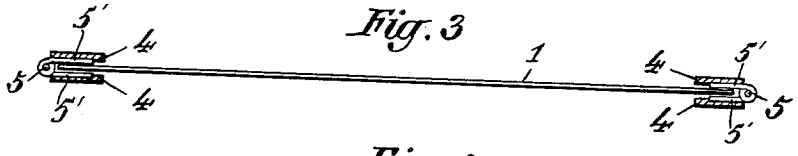


Fig. 4

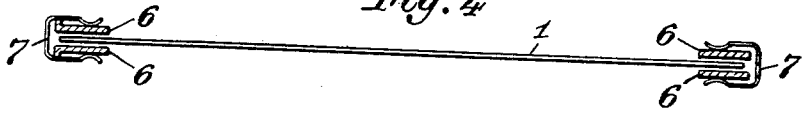
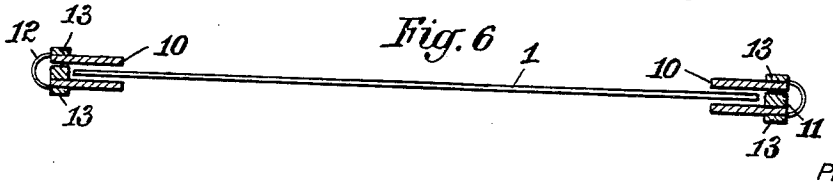


Fig. 5



Fig. 6



Inventor

PETER FECHT

by

K. A. Mayr

Attorney

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Fig. 7

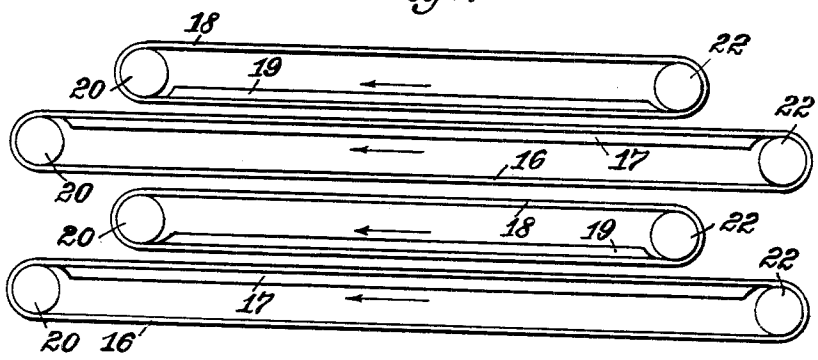
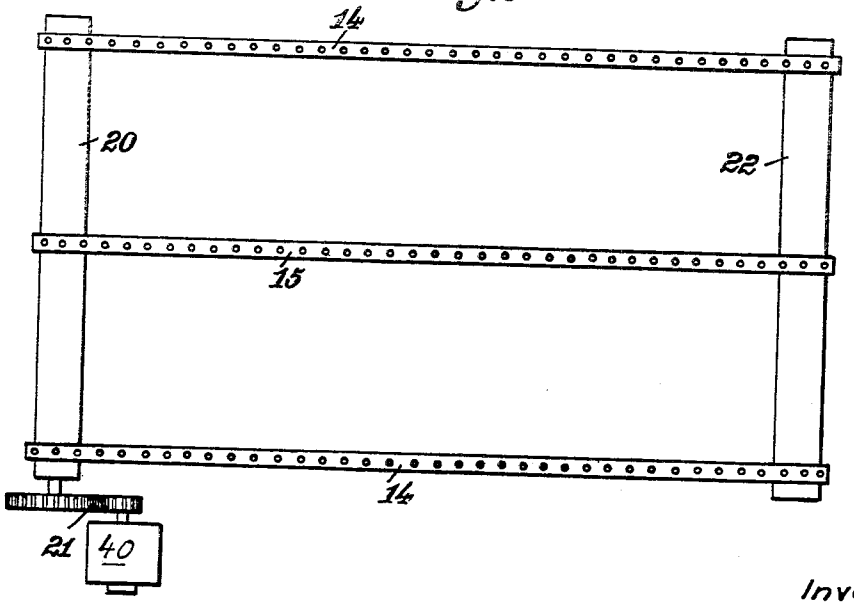


Fig. 8



Inventor
PETER FECHT

by

K. A. Mayr.

Attorney

July 12, 1955 P. FECHT 2,712,699

DEVICE FOR PREVENTING BUCKLING AND CRACKING WHEN DRYING VENEERS

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Fig. 9

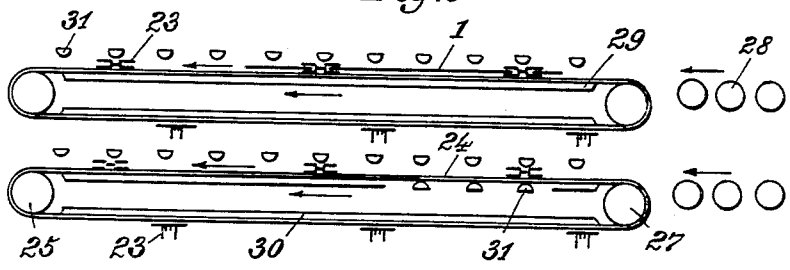


Fig. 10

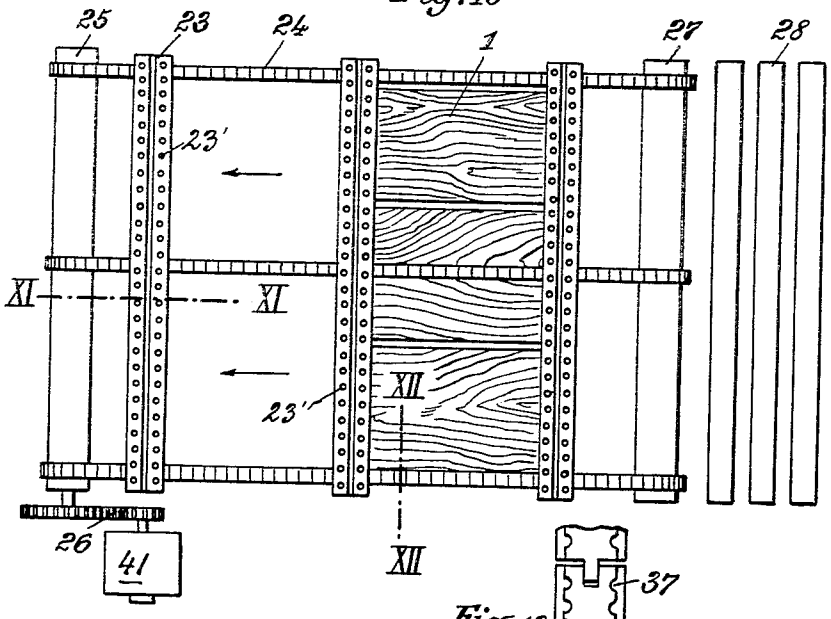


Fig. 11

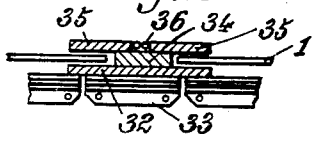


Fig. 13

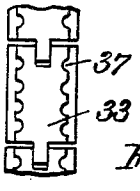
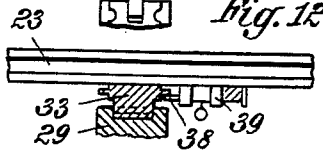


Fig. 12



Inventor

PETER FECHT

by

K. B. Mayr

Attorney

United States Patent Office

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DEVICE FOR PREVENTING BUCKLING AND CRACKING WHEN DRYING VENEERS

Peter Fecht, Mannheim-Rheinau, Germany

Application April 26, 1951, Serial No. 223,093

Claims priority, application Germany April 28, 1950

4 Claims. (Cl. 34—162)

The present invention relates to a new process and device for preventing buckling and cracking when drying veneers.

An object of the invention is the provision of a process and device by which standard size veneers can be made from woods which, so far, could not be used for the production of veneers because of excessive buckling and cracking during the drying process.

In many instances it is desirable to have one surface of plywood covered with a veneer of conforming grain and color. Veneers for this purpose hitherto had to be obtained almost exclusively from expensive woods, mostly of tropical origin.

When drying cut and, more particularly, peeled veneers made of common type wood and having commercial sizes, say 1 to 2 sq. m. and having a width of up to 2 m., the drying air and heat cause excessive buckling or waving and cracking. This occurs particularly along the sides extending transversely to the grain. Shrinkage is usually more extensive in the center portions of the veneer sheets than on the sides transverse to the grain, so that the sides parallel to the grain must be cut to obtain straight edges. When pressing such veneers to make plywood, the waves or wrinkles form folds and cause additional cracking. These undesired conditions, which are particularly objectionable during further processing of the plywood, are experienced with most hard woods used for making plywood veneers, for example beech, birch, maple, eucalyptus, but also with many soft woods, as for example spruce, poplar, limba. The drying shrinkage of these woods exceeds a certain permissible value and is particularly great with numerous hard woods, especially beech.

To overcome these deficiencies which greatly reduce the value of the veneers, it has been proposed to cut the veneers into strips of 20 to 70 cm. width which remain reasonably free of wrinkles and cracks when dried. The long sides of the dried strips must be cut to form straight edges before they are glued together in the conventional manner. The waste of wood due to cutting the longitudinal sides of the numerous strips is greater than the waste involved when cutting the sides of large sheets. A veneer made up of a plurality of narrow strips is unnaturally grained and colored and the joints remain visible.

Unless the wood is taken exclusively from straightly grown trunks, having uniform grain structure and yielding cylindrical peelings, the aforedescribed undesirable conditions cannot be avoided.

It has been found that nonuniform drying of the veneers is due to the fact that the moisture evaporates from the marginal portions of the veneers at a higher rate than from the inner portions. Removal of moisture is greatest at the marginal portions, particularly those transverse to the grain, at the beginning of the drying operation and is very small at the center of the sheets. Because of the quicker escape of moisture from the marginal portions, the shrinking limit is reached relatively soon thereat, whereby further flow of moisture from the central portions to the marginal portions is reduced, the central portions remaining moist longer and continuing to shrink after shrinking has ceased in the marginal portions. This causes buckling and cracking in the marginal portions, the former condition prevailing when using belt dryers in which the veneers are not closely confined and the latter when using roller dryers in which there is no play for the veneers because of the roller pressure thereon and in which cracks originally present in the wood are enlarged and deformed.

It is an object of the present invention to provide a method and means for drying veneers whereby the sheets are uniformly dried. This is achieved by covering the marginal zones of the veneers which are transverse to the grain so that removal of moisture is slowed thereat. The result is that drying is effected at a uniform rate throughout the sheet and cessation of shrinking is delayed in the marginal portions to the point that it is effected substantially at the same time the central portions of the sheet cease to shrink, i. e. the sheet shrinks uniformly throughout its extension. This eliminates undesired stresses in the wood and buckling and cracking caused thereby. Covering may be effected in different ways. It may be done by placing a slat below and one above the rim of the veneer, the slats preferably being interconnected, for example by brackets, to facilitate handling. The coverings may have a U-shaped transverse section and be suitable to be slid onto the rim. It is of advantage to interconnect the upper and lower slats by hinges or spring clips. This permits escape of the moisture between the hinges or clips. The slats may be provided with one or more rows of holes along their longitudinal extension. In this way, the drying process of the marginal portions can be controlled. The space between the slats is preferably greater than the thickness of the veneer to permit movement of the latter and uniform shrinking, and to eliminate stresses and deformation of the original cracks in the wood.

When used in a belt dryer, the slats may be very thin and made of wood, plastic, metal, or other suitable material whose strength and shape is not affected by the temperature in the dryer. In roller dryers, the coverings consist preferably of two thin plates of metal or plastic, which are separated by spacers that are thicker than the veneers inserted between the plates, so that the veneer is free to move sufficiently to avoid deformation of original cracks in the wood. Two cooperating metal plates are preferably held together by resilient clips facilitating insertion of the veneers between the plates and feeding of the so formed coverings with the inserted veneers into the roller dryer. The outer edges of the coverings are preferably provided with supports placed above and below the spacers, the rollers resting on the supports. This effects proper engagement of the rollers with the coverings without compressing the inner edges and impairing freedom of movement of the veneer.

In belt dryers, both sides of the lateral borders of the veneer may be covered by suitable endless ribbons. The endless ribbons are so spaced that they are above and below the lateral marginal portions of veneers of commercial sizes; additional ribbons may be provided for guiding and supporting the central part of the veneers. The ribbons are preferably laterally displaceable and the upper and lower covering ribbons travel at different speeds, the slower ribbon retarding travel of the veneer and the faster ribbon tending to push the veneer portions adjacent thereto onto the veneer portions adjacent to the slower ribbon thereby counteracting the forces in the wood which produce cracks. Best results are obtained if the lower ribbons travel less fast than the upper ribbons; otherwise the compressing effect may become too great since the veneers rest on the lower ribbons and

adhere thereto. The compressing effect may be increased by roughing the surface of the ribbons or by the provision of little hooks. The ribbons are preferably provided with holes throughout their lengths. The ribbons may also be longitudinally supported, for example by means of guide rails. This improves guiding of the veneers between the ribbons and reliable covering of the borders.

A belt dryer for exclusive use of the new process may also be so constructed that the slats interconnected pairwise for covering the upper and lower side of the marginal portions of the veneer are placed on the dryer belts transversely to their travel direction. This necessitates special cover plates which are permanently connected with the belts. The veneers are inserted longitudinally between neighboring plates. This affords better use of the dryer surface than in conventional dryers, because the whole available space is utilized. Moreover, the whole width of the dryer can be laid out with veneers of different widths.

With a belt dryer of the aforedescribed type, veneers of endless length can be dried. The endless veneers are cut to commercial width after the veneer has been dried.

Other objects will appear from the following description of this invention.

The manner in which the foregoing objects are achieved is shown in the appended drawings, wherein like numerals designate like parts throughout the several views, and in which:

Fig. 1 is a perspective top view of a veneer inserted between lateral coverings;

Fig. 2 is a view looking at the side of a veneer which is parallel to the grain and showing covering slats in transverse section;

Fig. 3 is a side view showing a modified border covering arrangement;

Fig. 4 is a side view illustrating another modification of border covering;

Fig. 5 is a side view illustrating a further modification of border covering;

Fig. 6 is a side view illustrating a fifth modification of border covering;

Fig. 7 is a diagrammatic side view of a belt dryer equipped according to the invention;

Fig. 8 is a top view of a portion of the dryer shown in Fig. 7;

Fig. 9 is a diagrammatic side view of a modified belt dryer according to the invention;

Fig. 10 is a top view of the dryer shown in Fig. 9;

Fig. 11 is an enlarged transverse section at line XI—XI of Fig. 10;

Fig. 12 is an enlarged transverse section at line XII—XII of Fig. 10;

Fig. 13 is a diagrammatic bottom view of a portion of the belt of a dryer according to the invention.

Referring more particularly to Fig. 1 of the drawing, the veneer 1 travels through the dryer, not illustrated, transversely to the direction of the grain which is indicated by an arrow. The marginal portions of the veneer which are transverse to the grain are covered by coverings 2 and 2'' individually consisting of pairs of rigidly connected striplike members or slats as shown in Fig. 1. There may be no connection between the top and bottom slats, as shown in Fig. 2 in which the slats are designated by numeral 3.

In the embodiment illustrated in Fig. 3, the slats 4 of each covering are interconnected by hinges 5 having flaps 5'. This construction facilitates handling, and the coverings are held in place more firmly.

The individual slats 6, which are like those designated by numeral 3 in Fig. 2, may be held in place by means of clamps or clips 7, as illustrated in Fig. 4, or they may be permanently connected by means of U-shaped springs 9 as are the slats 8 shown in Fig. 5.

The slats may be provided with holes 2' as shown at the left side of Fig. 1.

Fig. 6 illustrates a modification which is particularly suitable for use in roller dryers. The slats 10 are made of metal or plastic. They are spaced from each other by spacers 11 which are thicker than the veneer 1 inserted between the slats to provide the desired clearance and freedom of movement of the veneer. The slats are connected pairwise by means of resilient longitudinal connectors 12 of semicircular cross-section. Instead of continuous connecting members, individual brackets may be provided. The outside borders of the slats are provided with supports 13 above and below the spacers 11. The rollers of the roller dryer, which is not shown, rest on the supports 13.

In the belt dryer shown in Figs. 7 and 8, the belts 14 are so placed that they cover the lateral borders of the veneers traveling through the dryer. Additional belts 15 may be provided between the belts 14 to support the veneers in the middle. The belts may be provided with holes as seen in Fig. 8. The endless belts 14 and 15 travel around a drive roller 20 and an idle roller 22, the former being rotated by a motor 40 through spur gears 21.

As shown in Fig. 7, the portions of lower belts 16 and upper belts 18 between which the veneers to be dried are placed are guided and supported by rails 17 and 19, respectively.

In the belt dryer illustrated in Figs. 9 to 13, coverings 23, which may be provided with ventilating holes 23', are mounted on endless chains 24 and extend transversely to the direction of travel which is indicated by arrows in Fig. 9. Chains 24 are driven by drive rollers 25 which are rotated by a motor 41 through a gearing 26. The chains extend around drive rollers 25 and idle rollers 27. Feed rollers 28 are placed ahead of the idle rollers 27. The upper portions of the chains are guided and supported by rails 29 and the lower portions by rails 30.

Supplemental holding means 31 are provided above and below the upper portions of the chain loops for holding the coverings 23 and the veneers 1 inserted therein in a plane. The holding means 31 may be in the form of rails or rollers.

The coverings 23 each comprise a lower slat 32, which is connected with a chain link 33, and two upper slats 35, which are individually hinged at 36 to the upper side of spacers 34. The upper slats 35 can be folded up for placing and removing the veneers 1. Conventional means may be provided for automatically folding up the upper slats 35 when they reach the position in which they receive veneers from the feed rollers 28. When the coverings 23 travel along the lower part of the chain loop, the slats 35 are folded down automatically by gravity.

The coverings 23 are movably connected with the chains 24 and can be fixed in the desired position. For this purpose, the links 33 of the chains 24 are provided with notches 37 receiving pins 38 laterally projecting from a latch mechanism 39 mounted on the covering 23. This is shown in Figs. 12 and 13.

While the preferred embodiments of this invention are shown and described, modifications other than those disclosed herein may be made without departing from the spirit of the invention, and reference is therefore made to the appended claims for a definition of the scope of this invention.

I claim:

1. A device for drying flat veneer in a continuous drying operation, comprising transport means for transporting the veneer in horizontal position, said transport means including longitudinal striplike members individually disposed parallel and in spaced relation to the surfaces of the marginal portions transverse to the grain of the veneer, and resilient bracket means extending around

the edge of the veneer and pairwise interconnecting said members.

2. A device for drying flat veneer in a continuous drying operation, comprising transport means for transporting the veneer in horizontal position, said transport means including longitudial striplike members individually disposed parallel to and pairwise covering the surfaces of the marginal portions transverse to the grain of the veneer, means separating the members disposed parallel to the surfaces of the same marginal portion wider than the thickness of the marginal portion of the veneer, and support means disposed opposite said separating means and individually connected with the outside surface of the members which cover the surfaces of the same marginal portion.

3. A device for drying flat veneer in a continuous drying operation, comprising transport means for transporting the veneer in horizontal position, said transport means including longitudinal slats individually disposed parallel to and in spaced relation to the surfaces of the marginal portions transverse to the grain of the veneer for slowing removal of moisture thereat, and flexible joining means extending around the edge of the veneer and pairwise interconnecting said slats.

4. A device as defined in claim 3, said flexible joining means being in the form of hinges having flaps connected with said slats.

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