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METHOD AND APPARATUS FOR JOINING VENEERS

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Fig. 1.

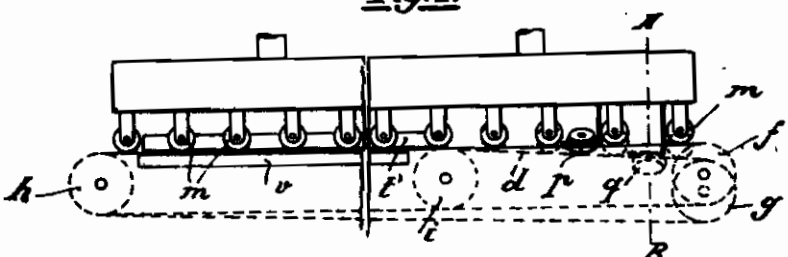


Fig. 2.

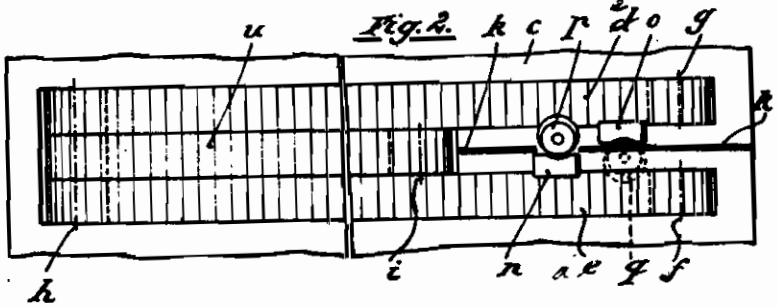
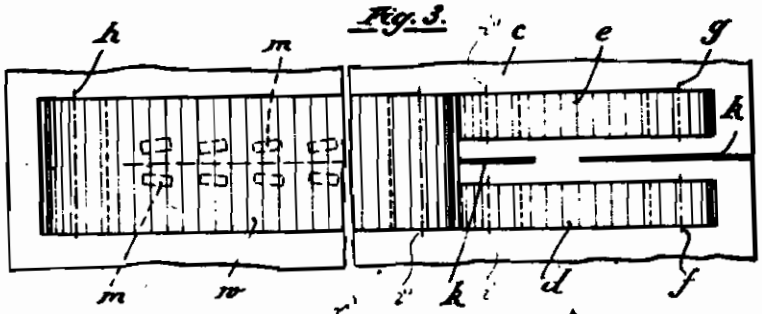


Fig. 3.



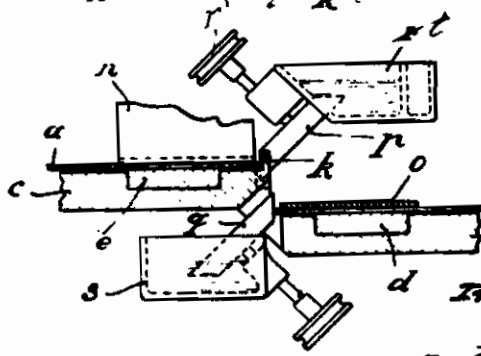


Fig. 4.

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METHOD AND APPARATUS FOR JOINING VENEERS

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This invention relates in general to the art of joining or mounting veneers, and is particularly concerned with a veneer-joining machine built and operated along novel principles resulting in a new and improved joining or mounting method.

The machine forming the subject matter of this invention belongs to the type wherein the veneers are moved by or along a suitable conveyor, past a device which attaches to their edges a suitable binder, glue or the like, whereupon the veneer pieces are laterally pressed together with their glued edges to form a single piece.

A wholly secure and unobjectionable direct bond between such veneer pieces can only be obtained if both joining edges are provided with the binder prior to joining. It is difficult to apply the binder to the edges of the veneers in the same machine which takes care of the joining, because the edges to be joined must lie in the same plane. It has been suggested to use a thin disk between the veneers for applying the binder simultaneously to both edges thereof. This method is not very successful. The binder, instead of being applied to the veneer edges, is largely wiped off. It is practically impossible with this method to apply the binder uniformly, evenly and steadily.

It has also been suggested to bend the veneer pieces at the margins so as to lift the edges out of the plane in which they must lie for the joining step and to apply the binder thereto. It was found that such bending is apt to cause longitudinal breakage or marginal cracks in the veneers, especially in the case of relatively thick sheets.

It should also be mentioned here that it is not practically feasible to hold the veneers apart a sufficient distance to permit the use of two separate devices for applying binder to the edges, because such spacing would interfere with moving the edges together directly in back of such devices so as to accomplish the required intimate engagement which is needed for carrying out the joining.

The present invention proposes a method and operation of the joining and mounting machine, which makes the application of binder means to both joining edges feasible in a simple and efficient manner.

This principal object is accomplished by disposing the guide or conveyor surface for one of the two veneers to be joined, at the place where the binder is applied to the edges, in a plane disposed at an angle to the plane of the guide or conveyor surface for the other piece of veneer. In other words, the machine is provided at its binder-applying section, with two conveyor means running parallel to each other, one for each of the two veneer pieces, and one of these conveyor means is inclined at an angle to the other, thus feeding the corresponding veneer sheet along a different angularly inclined level. Both guide and conveyor surfaces join again in a common plane at the point between the place where the binder is applied and where the joining or bonding is actually carried out, and remain in this common plane throughout the entire bonding section of the machine. The edge of one veneer piece is thus held at a different level and spaced from the edge of the other veneer, for the binder-applying section, giving sufficient space for the use of two separate suitably formed devices for applying the binder to the joining edges. These devices may be disposed at different levels and may also be spaced longitudinally, that is, in the direction of the feeding or conveyor motion of the veneers. Identical or different binder means may be applied by the two devices. For example, one device may apply a suitable glue to the edge of one veneer, while the other applies to the edge of the other veneer a hardening, solidifying, binding, or bonding substance for coaction with the glue applied to the edge of the first veneer sheet.

The term "binder" as used herein is intended to refer, unless otherwise stated or modified, to binder material in general, including substances such as glue, hardening, bonding or solidifying materials and the like.

Another object of the invention is realized by the provision of an elastic or yieldable means, for example, simple leaf springs, for holding down the veneer edges upon their guides or conveyor surfaces at the places where the binder material is applied. Uneven or insufficient application of the binder in case of longitudinally waved or warped edges is thus prevented.

Still another object is concerned with the provision of heating means at the place where the actual joining or bonding of the veneers is carried out. Such heating means may be applied to the bonding seam from above or from below. In the latter case I propose to use a heated conveyor section extending over the corresponding portion of the machine.

The machine for carrying out the new method is characterized by its shortness, saving considerable space, and also by its speedy operation. The veneers can be run through the machine at relatively great speed, saving time and yet furnishing a dependable bond with certainty and dispatch.

The invention will now be described in detail with reference to the embodiments shown in the accompanying drawings. In these drawings—

Fig. 1 represents a schematic side view of the machine with all non-essential or well known parts omitted;

Fig. 2 is a schematic plane view of the embodiment shown in Fig. 1;

Fig. 3 is a plane view analogous to the showing of Fig. 2, of a further embodiment; and

Fig. 4 shows, on a larger scale, a section along the lines A—B of Fig. 1.

The veneers to be joined are not shown in Figs. 1–3, but are indicated in the sectional view, Fig. 4. Like parts are indicated by like reference characters throughout the drawings.

The pieces of veneer *a* and *b* (Fig. 4), which are to be joined at their edges, are moved along a table by means, such as endless belt conveyors or chain conveyors *d* and *e*, which may be disposed within suitable guide grooves in the table c.

In the embodiment according to Figs. 1 and 2, these chain or belt conveyors operate from the drums *f* and *g*, at one end of the table to the drums *h* at the other end thereof. In other words, there are two separate oppositely disposed conveyors *e* and *d* extending substantially throughout the table, as indicated in Figs. 1 and 2. An additional conveyor *u* is disposed between the drums *i* and *h* only for that section of the machine along which the actual joining or bonding of the veneer pieces is accomplished. The purpose of this additional conveyor section will be subsequently described more in detail.

The drum *g* for the conveyor section *e* is placed at a lower level than the drum *f* for the conveyor section *d*, and therefore the chain or belt conveyor *e* will extend throughout substantially parallel to the horizontal surface of the table c, while part of the conveyor *d* extends at an angle thereto from its terminal drum to the point where the drum *i* is located. At this point the conveyor *d* will again join the plane of the chain or conveyor *e*. As shown in the drawings, the inclination of the chain or conveyor *d* is relatively small. The section of the table c taking the inclined conveyor portion is, of course, inclined in the same manner. A guide rib *k* is arranged between the inclined table surface and the substantially horizontal table surface. This rib is placed between the two conveyor sections *d* and *e* for the purpose of guiding the two veneer pieces *a* and *b* which are to be joined and mounted on the table.

The machine is thus divided into what may be called a "binder-applying section" extending between the drums *g*—*f* at one end and the drum *i*, comprising two separate conveyors which are disposed parallel to each other but move along different levels at an angle to each other, and a "bonding section" extending roughly from the drum *i* to the drum or drums *h* at the other end, this bonding section comprising two conveyors (*d*—*e*) which are disposed parallel to each other and move in the same plane.

Guide and pressure rollers *m* are arranged above the table in the usual manner, exerting preferably yieldable downward pressure upon the veneer sheets. These rollers may be arranged in pairs, as shown in Fig. 3, and may be at an angle converging in the direction of the feeding or conveyor motion. Such guide or pressure rollers are arranged throughout the entire machine, as indicated in Fig. 1, although they have been omitted from Fig. 2 and from the right side of Fig. 3 in order to avoid encumbering the drawings.

Yieldable or elastic holders or pressure members, for example, leaf springs *n* and *o* are arranged at the places where the glue or other binder is to be applied so as to press down the veneer edges to assure uniform and even application of the binder, as previously mentioned.

Two devices are provided for applying the binder to the corresponding edges of the veneers. They comprise the cone-shaped rollers *q* and *r*, for applying binder to the veneers *a* and *b*, respectively. It will be noted that the rollers are so arranged that their rims are disposed perpendicular to the respective veneer edges. The binder is thus applied to the veneer edges in a rolling action instead of a wiping action. These binder rollers are driven by suitable pulleys, indicated at *q'* and *r'*, respectively. Binder is fed to the roller *q* from the container *s* and to the roller *r* from the container *t*. These rollers, together with their corresponding containers, are arranged so that they can yieldably follow the corresponding edges of the moving veneers. The binder applicator *t*, associated with the roller *r*, is preferably arranged at the level above the table c, while the applicator *s*, co-operating with the roller *q*, is arranged below the corresponding table section.

The two pieces of veneer are thus fed from right to left, as seen in Figs. 1 and 2, the edges being guided by the rib *k*. As the veneer edges pass the binder applicators *r* and *q*, the binder is applied in an obvious manner. Near or at the place where the drum *i* is situated, the veneer *b*, which was kept at a lower level, joins the level of the veneer *a*. The binder-carrying edges move into engagement with each other by the action of the converging rollers *m*, and while they are in intimate engagement they are moved along the substantially horizontal stretch of the table of the machine. This stretch or bonding section is dimensioned long enough to warrant completion of the desired bond between the two veneer pieces.

In order to facilitate the bonding operation, I have provided heating means, as indicated at *t'* (Fig. 1), acting upon the seam from above, and, in addition, heating means which acts upon the bonding seam from below. This latter heating device may be made in the form of a heated conveyor section *u* (Fig. 2) which extends only over the bonding section of the machine or one part thereof. This latter heating arrangement is designated at *v* in Fig. 1. It may be separate from the conveyor *u*, or it may be arranged within the conveyor section *u*. An electrical heating arrangement may be used for this purpose.

Instead of using a conveyor section *u*, which is disposed between the conveyor sections *d* and *e*, as shown in Fig. 2, extending only over the bonding section of the machine, a single endless chain or belt conveyor *w* may be used, which extends, as shown in Fig. 3, between the drums *i'* and *h*. The conveyor sections *d* and *e* are separate in this case, the section *d* extending between the drums *i* and *f*, and the section *e* extending between the drums *i''* and *g*. The large left hand conveyor chain or belt *w*, operating substantially throughout the bonding section of the machine, may be heated from below at its central section located underneath the bonding seam of the veneers which are moved by or over it.

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