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2,516,280

METHOD OF AND APPARATUS FOR EDGE-GLUING VENEER SHEETS

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Fig. 1.

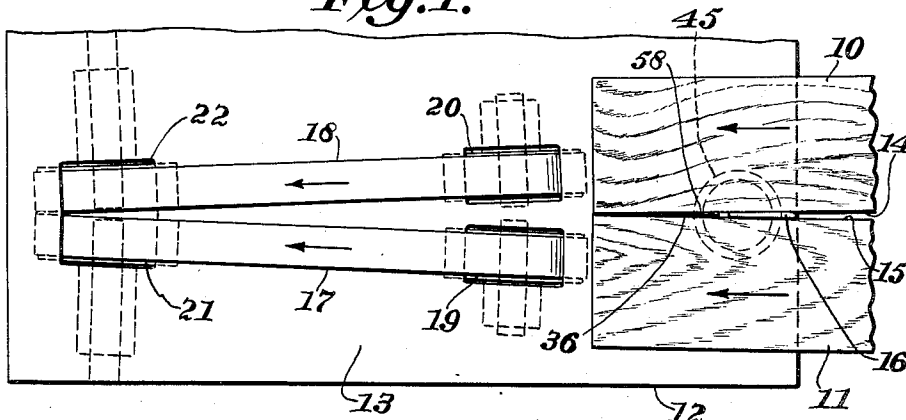


Fig. 2.

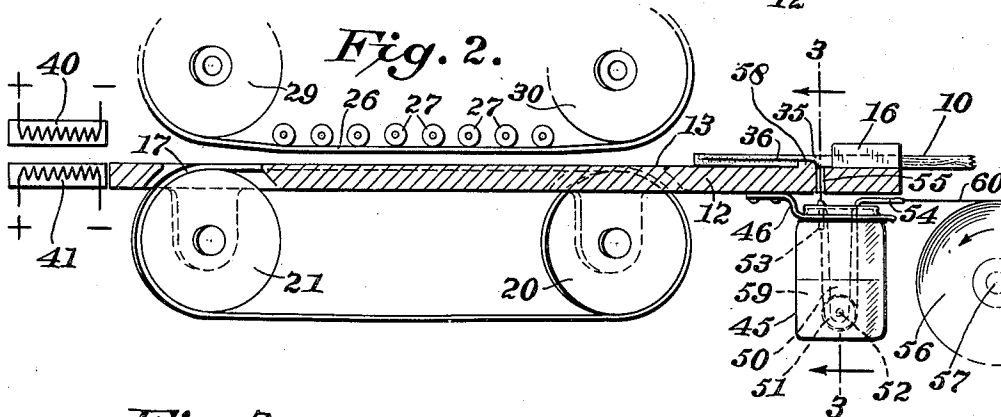


Fig. 3.

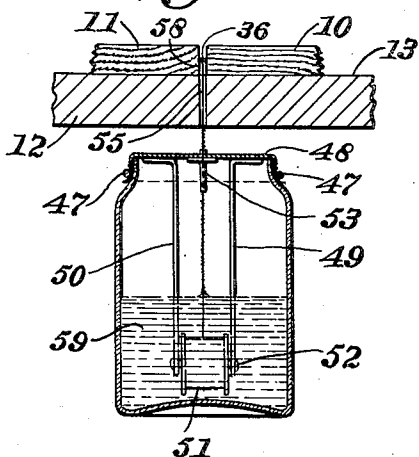


Fig. 4.

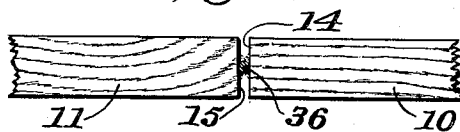
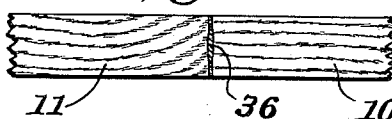


Fig. 5.



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METHOD OF AND APPARATUS FOR EDGE-
GLUING VENEER SHEETS

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10 Claims. (Cl. 154—116)

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The present invention relates to the plywood art and, more particularly, to an improved method of and apparatus for edge-gluing wood plies or veneer strips or sheets. In the manufacture of plywood under present day conditions, it is seldom, if ever, possible to procure unblemished face plies of the full width of the panels which it is desired to produce. It is a common practice, to cut from larger sheets, or the elongated ribbon peeled from the log, those portions which are defective, for instance, because of the presence of knots, pitch pockets, checks, cracks or the like. The intermediate, non-defective portions are of varying width and are assembled to provide face plies, or face and back plies, by edge-gluing the strips or sheets, to build up veneer plies of the proper width. The individual strips or sheets, in some cases, are patched or otherwise treated, before or after edge gluing, to remove minor defects, but the gluing of the edges of the individual strips has always been a laborious, time-consuming and expensive procedure.

In some cases the glue has been applied to the edges of the sheets by hand, while in other cases, complicated and expensive machines have been used, all with indifferent success. One well-known type of machine attempts to apply glue to the converging edges of adjacent wood plies moving along a table or other support under the influence of conveyors, by means of a rotating disc which dips into a glue reservoir and carries the glue upwardly by surface tension and applies the glue by a wiping action to one or both edges of the adjacent strips. Trouble has been encountered with machines of this kind, however, because the amount of glue applied varies considerably with varying conditions and an excess of glue tends to build up on the disc with the result that accurate control is impossible. If an excess of glue is applied to the edges, it is squeezed out of the joint under the influence of lateral gluing pressure and the table and conveyors become smeared with glue, with the result that the surfaces of the plies are stained and marred, leaving a coating of glue on the face of the finished product which must be removed by sanding or the like, before the product is salable. If an insufficient amount of glue is applied, the joint will be faulty and the face ply may split or come apart before it is assembled with the core plies, or during final assembly with the result that unsightly cracks and gaps are produced.

The present invention aims to overcome all of the defects of such prior methods and machines. The primary object of the invention is to pro-

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vide a new method of and apparatus for applying to the edges of wood plies an accurately controlled amount of glue which will be evenly distributed throughout the joint and which will not become deposited upon any parts of the machine or smeared upon the surfaces of the finished product.

A further object of the invention is to provide a method of and apparatus for edge-gluing in which a reinforcing element, preferably in the form of a textile thread, is deposited in the joint to form a permanent part thereof.

A further object of the invention is to produce an improved joint by depositing exactly the correct amount of adhesive between the edges to be glued, taking into account the thickness of the plies and, hence, the area to be glued, the nature of the wood, the characteristics of the adhesive and other variable factors.

A further object of the invention is to provide a method of and apparatus for edge-gluing wood plies in accordance with which the time required to produce a tight and permanent joint may be materially reduced.

Other and further objects and advantages of the invention will be apparent to those skilled in the art from a consideration of the specific embodiment of the invention shown for purposes of illustration in the accompanying drawings and described below.

In the drawings,

Figure 1 is a fragmentary plan view of one form of apparatus, with certain parts removed;

Figure 2 is a longitudinal section, with certain parts shown in elevation, of the apparatus of Figure 1;

Figure 3 is a transverse section of Figure 2, taken substantially on line 3—3 thereof.

Figure 4 is an enlarged cross-sectional view through the joint between the wood plies, immediately before final converging pressure is applied and;

Figure 5 is a cross section through the finished joint.

Pairs of veneer strips 10 and 11, of any desired width are adapted to be fed forwardly, toward the left in Figures 1 and 2 over a table or other support 12 having a plane upper surface 13. As in conventional practice, the edges 14 and 15, which are to be adhesively united, are first milled square so that they lie in parallel, vertical planes. The veneer strips or sheets are fed by hand or by suitable conveying means, not shown, along converging lines past a spacer or separator blade 16, positioned above the table, to prevent premature contact of the edges. The strips are fed

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onto the upper surfaces of a pair of converging conveyor belts 17, 18, trained about rear pulleys 19 and 20 and forward pulleys 21, 22, either or both pairs of which may be positively driven by any suitable means, not shown. The belts may be made of any suitable material, such as woven, rubber-surfaced belting of commerce. A similar pair of upper belts, one of which is shown in Figure 2 at 26 may be employed, as hold-down belts and to assist in the advancing and converging of the strips. The upper belts preferably lie directly above the lower ones and are disposed in similar angular relation. As indicated in Figure 2, the belt 26 has its lower, strip engaging run disposed beneath a plurality of guide rollers 27 which may be urged downwardly by spring means or the like, to maintain the belt firmly in contact with the veneer sheets. The forwardly and rearwardly disposed pulleys 29, 30, about which the upper belts are trained are preferably positively driven, although they may be idler pulleys, if desired.

The edges of the strips or sheets of veneer 10, 11 move on converging lines from a spaced-apart point 35, immediately ahead of the spacer blade 16, to a bite 36 and then along a line of edge contact under the influence of advancing and converging pressure applied to the sheets or strips by the lower belts 17, 18 and the upper belts 26. The sheets or strips are relatively thin and have sufficient lateral flexibility to permit this converging of their edges. As the strips or sheets leave the belts, the joint may pass between and in contact with one or more heating elements represented diagrammatically at 40, 41 which may be disposed above and/or below the sheets, in contact therewith, to accelerate the setting of the adhesive applied to the joint, by means now to be described.

Beneath the table 12 and substantially in vertical alignment with the spacer blade 16, there is an adhesive reservoir 45, supported in any suitable manner, as, for instance, by a bracket 46 secured to the under surface of the table and having arms 47 adapted to engage the closure 48 for the receptacle. The closure may carry a pair of depending arms 49, 50, upon which there is mounted a roller 51 by means of a transverse pin or shaft 52. The cover is also fitted with a delivery guide tube 53 and an entrance tube 54, the former being aligned with an opening 55 in the table, just ahead of the spacer blade 16 and the latter being turned rearwardly toward a source of supply of thread or the like, which may conveniently be in the form of a spool or "cheese" 56 mounted for rotation on a spindle 57. The guide tube 53 may extend upwardly through the hole 55 to a point about $\frac{1}{2}$ of an inch above the surface 13 of the table 12, or a projection 58 having a groove in its upper surface may be employed to lay the thread midway between the upper and lower faces of the veneer strips.

The thread 60 may be of any suitable type, so long as it is capable of performing its intended function. A relatively light cotton textile thread serves well and may be obtained at a reasonable price from any source. Such a thread, unwound from the spool 56 is guided through the tube 54, beneath the surface of the glue 59 in the pot 45, under the roller 51 and upwardly through the discharge tube 53 and through the opening 55 in the table. The leading end of the thread is placed in the bite between the converging edges of the veneer strips 10 and 11. The thread, after passing through the adhesive in the pot carries

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with it an accurately predetermined amount of adhesive, depending upon the thickness of the thread, its absorptive properties and the viscosity of the adhesive. The delivery tube 53 may be selected from a plurality of tubes of different sizes, if desired, further to control the amount of adhesive adhering to the thread. Thus, the tube may be employed to wipe or squeeze off an excess of adhesive, although in most cases, this action is unnecessary. The thread and the adhesive are laid nicely in the joint between the edges, as the edges converge and move forwardly. The thread is continuously drawn upwardly and applied to the edges and advances with the forwardly moving and converging strips and becomes a permanent part of the joint. The heaters 40, 41 sufficiently set the adhesive to prevent accidental separation of the plies. Final setting may occur under atmospheric temperatures and without the application of further lateral pressure, but in some cases, as, for instance, when fast-setting adhesives, such as urea-formaldehyde resins are used, final conversion of the resins and, hence, final setting of the adhesive may occur under the influence of the heat applied by the heaters 40, 41.

Figures 4 and 5 indicate the action of the converging pressure, tending to flatten the thread and to squeeze the glue throughout substantially the entire area of the joint.

If it is desired in some cases to re-use the thread, it may be pulled out of the joint, after a predetermined amount of lateral converging pressure has been applied to the veneer strips. In this case, the major portion of the glue will have been transferred to the edge faces by the squeezing action, and the thread may be continuously withdrawn as the veneer sheets move along. The thread may be treated to remove the residue of adhesive, as by washing or cleaning, and then wound up for re-use, or, if desired, it may be led directly to the glue pot for passage therethrough and for re-insertion into the joint then moving above the table. If the latter procedure is followed, it is more satisfactory to use an endless metallic wire of thin section and to lead the wire directly back to the glue pot, where it picks up a new supply of glue and then to re-insert the wire into the joint, and so on.

However, in most cases it is preferred to leave the thread in the joint as a permanent part thereof, to act as a reinforcing element and as means to effectively distribute the glue over the surfaces to be joined, assisting in compensating for irregularities in the edge faces and the like.

The term "thread" in the accompanying claims is used in its broadest sense and is intended to cover any and all relatively long strands, such as yarn, filaments, cords, string, strips, tapes, lines, wires and the like.

It must be understood that the invention is not limited to the details of construction of the apparatus shown in the accompanying drawings and described above, nor to the precise method steps indicated as preferred, but contemplates such changes and modifications as will occur to those skilled in the art from a consideration of this specification. All such changes as come within the scope of the appended claims and their equivalents are intended to be included.

I claim:

1. The method of edge-gluing wood plies which comprises continuously feeding the plies with their edges to be glued juxtaposed in side by side relation, continuously and progressively deliver-

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ing an adhesively coated thread between said edges, progressively pressing the edges together with the thread therebetween and thereby transferring the adhesive to the edges to adhesively unite the same.

2. The method of edge-gluing wood plies which comprises simultaneously moving the adjacent edges of a pair of plies on converging paths from a spaced-apart point to a bite and a continuing line of contact, feeding an adhesively treated thread into the bite and continuously depositing the same therebetween as the edges move along said line of contact, transferring the adhesive to the edges, and continuously and progressively setting the adhesive to unite the edges.

3. The method of edge-gluing wood plies which comprises simultaneously moving the adjacent edges of a pair of plies on converging paths from a spaced-apart point to a bite and an advancing line of contact, continuously feeding a thread from a source of supply to the bite between the edges, continuously applying adhesive to said thread ahead of the bite, thereby depositing the thread and the adhesive between the edges as they move along said line of contact, and setting the adhesive on the edges to adhesively unite the plies.

4. The method of edge-gluing wood plies which comprises simultaneously moving the adjacent edges of a pair of plies on converging paths from a spaced-apart point to a bite and a subsequent line of contact, inserting the end of a thread into the bite between the edges, drawing the thread from a source of supply, continuously depositing the same between the edges as the plies move along said path, continuously guiding the thread ahead of the bite through a supply of adhesive, whereby the thread deposits adhesive upon the edges to be glued, and setting the adhesive to unite the edges.

5. The method of edge-gluing wood plies which comprises simultaneously moving the adjacent edges of a pair of plies on converging paths from a spaced-apart point to a bite and a subsequent line of contact, inserting the end of a thread into the bite between the edges, drawing the thread from a source of supply, continuously depositing the same between the edges as the plies move along said path, continuously applying adhesive material to the thread ahead of the bite, whereby the thread deposits the adhesive between the edges, and setting the adhesive in that position to unite the plies.

6. In an apparatus for edge-gluing wood plies having means for simultaneously moving a pair of plies along predetermined paths such that their edges to be glued follow converging lines from a fixed, spaced-apart point to a line of contact extending from a bite positioned at a substantially fixed point, means for applying adhesive to said edges, said means comprising means for holding a supply of thread, an adhesive supply, and means for guiding the thread through the adhesive supply to the bite between the edges to be glued.

7. In an apparatus for edge-gluing wood plies having means for moving a pair of plies along predetermined paths with their edges converging from a spaced-apart point to a bite and a line of contact, said means serving to apply lateral pressure to the edges; means for continuously applying adhesive to the edges, and means for accelerating the setting of the adhesive, said adhesive applying means comprising means for guiding an adhesively treated thread and for de-

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positing the same in the bite between the edges.

8. In an apparatus for edge-gluing wood plies having a table over which the plies are adapted to be moved, converging conveyor means adapted to engage the surfaces of adjacent plies and to convey them along lines from a point where the edges are spaced-apart to a bite and along a line of edge contact and to apply lateral converging pressure to the edges, and spacer means positioned between the lines of movement of the plies to prevent premature contact of the edges; means for applying adhesive to said edges, said means comprising means for continuously delivering to the bite between the converging edges of the plies an adhesively treated thread, whereby the thread is drawn forwardly with the movement of the plies and deposits adhesive between said edges.

9. In an apparatus for edge-gluing wood plies having a table over which the plies are adapted to be moved, a pair of converging conveyors on the surface of the table adapted to engage the under surfaces of adjacent plies and to convey them along lines from a point where the edges are spaced-apart to a bite and along a line of edge contact and to simultaneously apply lateral converging pressure to the edges, means above the table for urging the plies downwardly into contact with said conveyors, and spacer means positioned between the converging edges of the plies to prevent premature contact thereof; means for applying adhesive to said edges, said means comprising means for delivering an adhesively treated thread upwardly through the table to the bite between the converging edges of the plies, whereby the thread is drawn forwardly with the movement of the plies and deposits adhesive between the edges thereof.

10. In an apparatus for edge-gluing wood plies having a table over which the plies are adapted to be moved, a pair of converging conveyors on the surface of the table adapted to engage the under surfaces of adjacent plies and to convey them along lines from a point where the edges are spaced-apart to a bite and along a line of edge contact and to simultaneously apply lateral converging pressure to the edges, means above the table for urging the plies downwardly into contact with said conveyors, and spacer means positioned between the converging edges of the plies to prevent premature contact thereof; means for applying adhesive to said edges, said means comprising a receptacle for liquid adhesive below the table, means for guiding a thread from a source of supply through the receptacle and for guiding the same upwardly through the table into the bite between the converging edges of the plies, whereby the thread and adhesive thereon are drawn forwardly with the movement of the plies and the adhesive is deposited between said edges, and means for setting the adhesive while the edges are subjected to said lateral converging pressure.

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