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APPARATUS FOR APPLYING ADHESIVE TO WOOD VENEER

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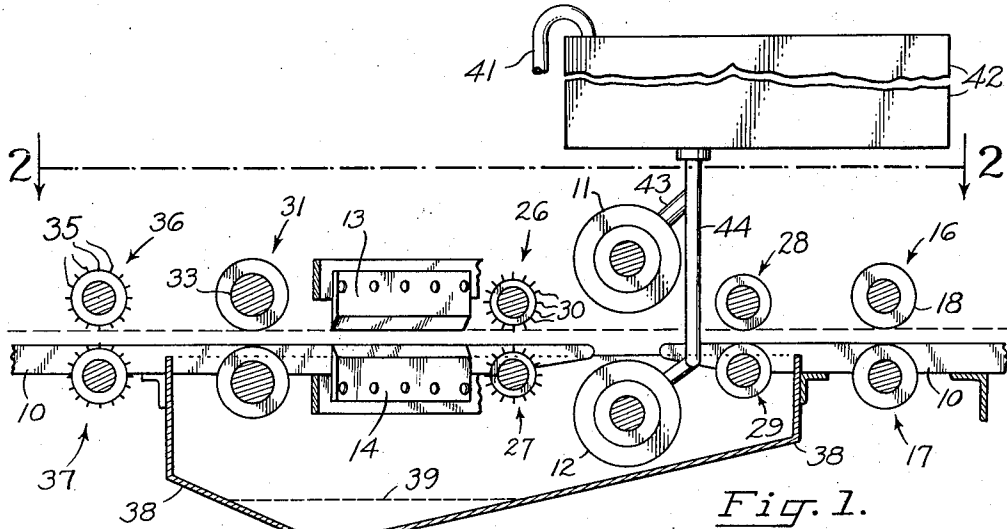


Fig. 1.

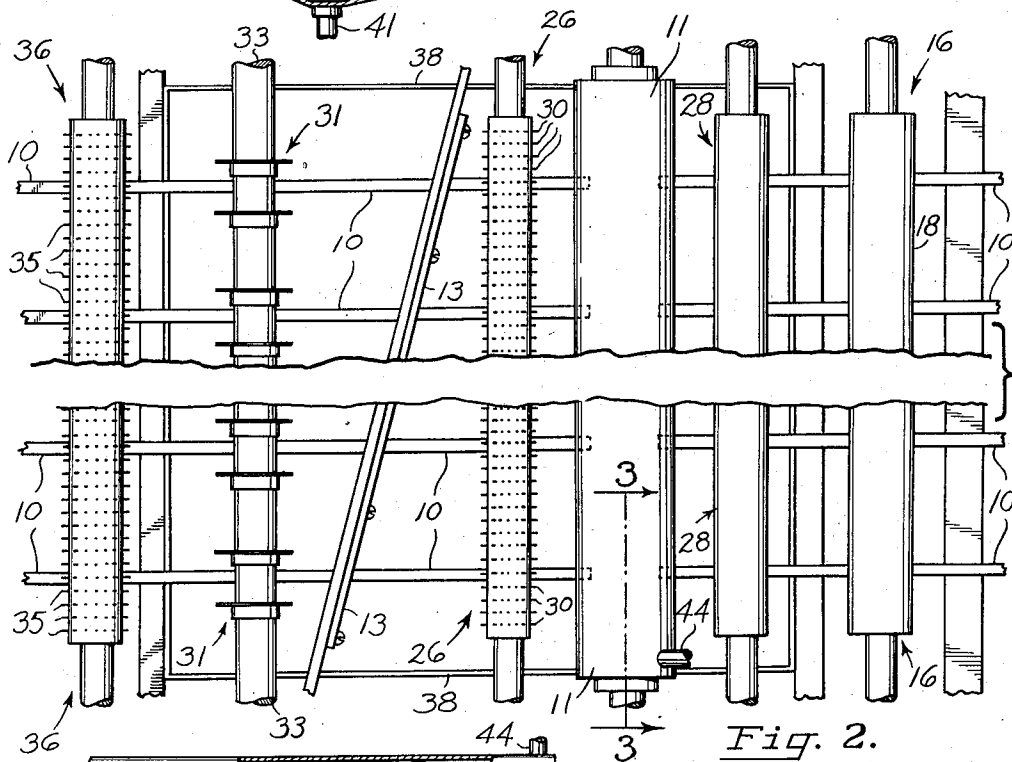


Fig. 2.

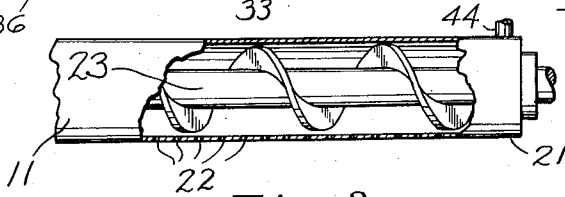


Fig. 3.

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APPARATUS FOR APPLYING ADHESIVE TO WOOD VENEER

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3 Claims. (Cl. 118—102)

This invention relates to method and apparatus for distributing a film or coat of adhesive upon the faces of wood veneer sheets.

In the manufacture of composite products from wood veneer sheets or strips, such as plywood, a problem which has confronted manufacturers has been the proper distribution of adhesive over the faces of the veneer. As would be expected in the manufacture of such products, an even distribution of adhesive over the faces of the veneer is of utmost importance if the product prepared from the veneer is to perform satisfactorily. For instance, poorly distributed adhesive may result in an improper bond being formed between a piece of veneer and the surface to which it is applied, creating in the final product decreased structural strength, blowouts, a lumpy and uneven appearance, and/or a tendency to warp and buckle with age.

Most of the difficulties which arise in the spreading of an adhesive upon a sheet of veneer are due primarily to the surface characteristics of the veneer, and variations in the thickness of the veneer. For example, since wood is a grained, fibrous type of material, any sheet cut therefrom will invariably contain surface irregularities attributable to the wood structure itself. These irregularities have complicated the problem of spreading adhesive upon the surface of the sheet.

As the supply of timber has decreased, logs marketed for veneer production have become increasingly poorer in quality, resulting in the cutting of veneer sheets of uneven thickness. Also, the log supply is such that whereas veneer core stock was formerly trimmed down to a diameter of not less than about 14 inches, currently stock is trimmed to a diameter of approximately 5 inches or less. The thickness and uniformity of any veneer sheet cut from such narrow stock is subject to considerable variation.

Better press techniques using increased pressures and other improvements have permitted the utilization of veneer stock of the type described in the manufacture of plywood having satisfactory thickness. However, considerable difficulty has arisen in properly bonding the veneer sheets, since the variations and imperfections of the veneer resulted in spotty and poorly distributed adhesive.

Conventionally, equipment employed for spreading adhesive upon the face of a veneer sheet has been an adhesive applicator roll which directly contacts the face of the veneer. The adhesive is applied to the roll in any one of a number of ways. The problem of satisfactorily applying glue to veneer has been a continuing one and previous attempts to solve this problem have been along the lines of improvements in the surfaces of the adhesive applicator rolls which contact the veneer. Such rolls are expensive and continually in need of maintenance. For instance, the positioning of an adhesive applicator roll with respect to a veneer sheet is critical as an uneven adhesive film results if the roll is spaced too far away from the veneer sheet, and too thin a film results if the roll is

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spaced too close to the veneer sheet. While in the past the normal wear incident to the use of such an applicator roll has made any such technique a difficult one to control, the introduction of poorer quality, uneven veneer sheets have added considerably to the problem.

I have discovered that a well-distributed, completely satisfactory adhesive film may be applied by advancing a veneer sheet into the path of an ejection system wherein liquid adhesive is ejected in a deluge over the surface of the sheet, and subsequently by appropriate means removing excess adhesive deposited upon the surface so that a regulated film or coat of desired thickness remains evenly distributed on the surface of the veneer sheet. By deluging the veneer, the entire face is covered with adhesive irrespective of the thickness of the veneer sheet. Further, it has been noted that because of the splattering of the adhesive as it is ejected on a veneer face, the adhesive tends to be moved about on the veneer so as to work into the fibers and grain structure of the veneer so that substantially the entire surface area is impregnated with adhesive. Excess adhesive removed from the surface of the sheet may then be treated so as to remove any impurities introduced into the adhesive, and then recirculated for further use. The system is extremely easy to adjust and maintain, and the requirement for any applicator roll is eliminated.

Generally, it is an object of this invention to provide a novel method and apparatus for applying adhesive to wood veneer wherein adhesive is deposited about the entire surface of the veneer irrespective of variations in the veneer sheet.

More specifically, it is an object of this invention to provide an apparatus for applying adhesive to a veneer sheet wherein an excess of adhesive is first distributed over the surface of the veneer sheet, and the surface then treated to yield a uniformly distributed, regulated coat of adhesive.

Another object of this invention is to provide an adhesive applicator which is extremely easy to maintain and to adjust so as to produce coats of adhesive of desired thickness.

These and other objects and advantages are obtained by the present invention, various novel features of which will become more fully apparent as the following description is read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side view, partly in section, of an adhesive applicator embodying this invention;

Fig. 2 is a top view, partly broken away, of the applicator illustrated in Fig. 1; and

Fig. 3 is a view, partly in section, along the line 3—3 in Fig. 2, showing a form of an adhesive applicator used in the invention.

Referring to Fig. 1, the apparatus illustrated which embodies this invention comprises in general a plurality of support rails 10 suitably mounted in a conventional type of frame structure, rails 10 providing a support means for a veneer sheet 9 (indicated by dotted lines) as it is advanced through the apparatus from right to left, as viewed in Fig. 1. As the veneer advances through the apparatus, it passes through a treating zone or station comprising adhesive applicators 11 and 12, positioned above and below the path of veneer sheet 9 through the apparatus, and operable to deposit an excess of adhesive upon the top and bottom surfaces of the veneer sheet. Rails 10 are interrupted in the treating station so that adhesive will be applied to the entire face areas of the veneer sheet. Suitable film control means, such as wiper members 13 and 14, are provided for regulating the coat of adhesive deposited upon the veneer sheet by applicators 11 and 12.

More specifically, spaced above lower rails 10, and

gripping the veneer sheet as it enters the apparatus, are a pair of infeed rolls 16 and 17. Rolls 16 and 17 are rotatably mounted in the frame structure in a conventional manner, and are chain driven by an appropriate power source (not shown) so that veneer sheet 9 is fed into the apparatus at a speed determined by the peripheral speed of infeed rolls 16 and 17. Referring to Fig. 2, each of the infeed rolls may be solid rolls having a cylindrical gripping surface 18 which engages the surface of the veneer sheet so as to feed the sheet into the apparatus and treating zone.

Adhesive applicators 11 and 12 are similar to each other in construction, and both will be explained with reference to upper applicator 11. Referring in particular to Fig. 3, each applicator includes a cylindrical cover 21 fastened to the frame structure, which has a plurality of bores or discharge orifices 22 distributed through the side of the member adjacent the path of travel of the veneer sheet through the apparatus. Rotatably mounted within the cylindrical member and driven by appropriate power means is an auger device 23. The spiral turns of auger device 23 serve to force adhesive through bores 22, so that the adhesive is ejected by the pressure created by the auger device and delivered as a deluge upon the upper and lower faces of the veneer sheet passing adjacent to bores 22.

It should be understood that, instead of applicators 11, 12, other suitable means for applying liquid adhesive, such as spray guns or other deluging devices, could be employed.

Referring, again to Fig. 1, in front and to the rear of applicators 11 and 12 and engaging the veneer sheet as it passes through the apparatus, are two pairs of steadying rolls 26, 27, and 28, 29. Rolls 28 and 29 may generally be constructed in the manner of infeed rolls 16 and 17, although preferably they are of somewhat smaller diameter so as to permit them to be placed as close as possible to applicators 11 or 12. As illustrated, rolls 26 and 27 are spiked rolls having a plurality of spikes 30 extending from the periphery of the body of the rolls. Rolls 26 and 27 are spaced from the veneer sheet so that the spikes 30 engage the veneer sheet so as to move the sheet through the apparatus without disturbing appreciably the glue deposited on the veneer sheet by applicators. Power means (not shown) may be provided to rotate these rolls so that their peripheral speed is the same as the peripheral speed of infeed rolls 16 and 17.

Wiper members 13 and 14, which resemble members known as squeegees, are provided to wipe off excess adhesive deposited upon the top and bottom faces of the veneer by applicators 11 and 12. Members 13 and 14 are secured to the frame structure of the apparatus to the rear of the steadying rolls, and extend across the width of the veneer sheet with their inner edges, which constitute elongated resilient contacting portions, engaging the upper and lower faces of the veneer sheet. The members may be placed at an oblique angle with respect to the direction of travel of the veneer sheet, so as to facilitate run-off of excess glue collected by the members. The wiper members are preferably made of a resilient material such as rubber or the like, thereby permitting portions of the members to yield slightly and thus follow more closely the contour of the veneer sheet moving alongside the members.

Mounted in the frame structure to the rear of wiper members 13 and 14 and in rolling contact with the veneer sheet passing therebetween, are a pair of rotatable groove rolls 31. Each groove roll comprises a shaft 33 and a plurality of disc elements affixed in a suitable manner to shaft 33. The disc elements of the groove rolls engage the faces of the veneer sheet to form a series of alternating ridges and hollows in the adhesive coating. Grooving of the adhesive coating produces a more satisfactory coating. For instance, the formation of air pockets be-

tween the veneer strip and the base to which it is applied is minimized.

To the rear of groove rolls 31 and 32 are a pair of outfeed rolls 36 and 37. These outfeed rolls resemble steadying rolls 26 and 27, although they may be of a large diameter, and have a plurality of spikes 35 projecting outwardly from the body of the rolls to engage the upper and lower surfaces of the veneer sheet passing between the rolls. Outfeed rolls 36 and 37 are driven by a suitable power means so that their peripheral speed is the same as infeed rolls 16 and 17, and steadying rolls 26, 27, 28 and 29.

Fixed to the frame structure of the apparatus beneath applicators 11 and 12, wiper members 13 and 14, and groove rolls 31, is a catch basin or receiving pan 38. Receiving pan 38 provides a collection means for recovering excess liquid adhesive which falls or splashes from the veneer sheet as it passes through the apparatus. Adhesive recovered in a catch basin or receiving pan 38 is screened through a screen 39 of appropriate mesh, so as to remove sawdust and other foreign particles deposited in the adhesive. From thence it flows to a conduit 41 whereupon a suitable pump (not shown) recirculates the adhesive to an adhesive reservoir 42. Conduits 43 and 44 are provided between the adhesive reservoir and applicators 11 and 12, and adhesive is delivered through these conduits to applicators 11 and 12.

In operation, sheets of veneer introduced into the forward end of the apparatus are fed by infeed rolls 16 and 17 on a path determined by support rails 10 into the treating zone and applicators 11 and 12. Thereupon a deluge of liquid adhesive is deposited on opposite faces of the veneer sheets by applicators 11 and 12, the conditions present causing the adhesive to saturate the entire surfaces of the veneer sheets. Excess adhesive is then removed by wiper members 13 and 14 so that a regulated coat or film of adhesive remains distributed on the veneer sheets. Adhesive falling from the veneer sheets is then strained of impurities, and recirculated for later use. By deluging the veneer sheets with an excess of adhesive, distribution of adhesive over the entire surface of the sheets is assured, regardless of the thickness or minor imperfections of the veneer sheets.

The invention has been described with respect to applying adhesive to two sides of a veneer sheet, however, the adhesive could be applied to only one side of the veneer.

While I have described only a single embodiment of this invention, it is desired not to be limited thereto and it is intended to cover all modifications thereof which should be apparent to one skilled in the art and come within the scope of the appended claims.

I claim:

1. An apparatus for applying a film of liquid adhesive to wood veneer comprising means for supporting said veneer in a path as it is advanced through said apparatus, a pair of adhesive applicators adjacent said path and on opposite sides of said path for depositing adhesive on opposite faces of said veneer, each of said applicators having a plurality of discharge orifices whereby said adhesive is ejected as a deluge against both faces of said veneer, supply means delivering adhesive to said applicators, film control means for removing excess adhesive deposited by said applicators whereby a regulated film is formed on both faces of said veneer, said film control means comprising a pair of stationary wipers mounted on either side of the path for the veneer, each of the wipers having an elongated and resilient contacting portion for resiliently pressing against a face of the veneer thus to determine film thickness, grooving means adjacent said path forwardly of each wiper for imparting grooves to a film of adhesive, and collection means for recovering excess adhesive ejected by said applicators and removed by said film control means.

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2. An apparatus for applying a film of adhesive to a wood veneer sheet comprising a pair of rails for supporting the veneer sheet, infeed rolls for engaging opposite sides of the sheet and advancing it through the apparatus into a treating station, a liquid adhesive applicator in said station on either side of the path of travel of the sheet and out of engagement therewith, an auger in each of said applicators and discharge orifices in the applicators through which an excess of liquid adhesive may be forced by the auger against the sides of the sheet, a reservoir for liquid adhesive, connections from each of the applicators to the reservoir, oppositely disposed pairs of steadying rolls for engaging the sheet on either side of the treating station, a wiper member on either side of the veneer sheet for removing excess adhesive therefrom, a grooved roll on either side of the veneer and in engagement therewith for imparting grooves to the adhesive on the sides of the veneer, a catch basin positioned beneath the applicators, wipers and grooved rolls for receiving excess adhesive, connections from the catch basin to the reservoir, and outfeed rolls for engaging opposite sides of the veneer sheet to remove it from the apparatus.

3. Apparatus according to claim 2 and in which the outfeed rolls have a plurality of spikes projecting from

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the body of the rolls for engaging the sides of the veneer sheet.

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