

April 8, 1958

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2,830,004

METHOD OF PRODUCING CURED WOOD VENEER ARTICLE

Filed July 16, 1954

3 Sheets-Sheet 1

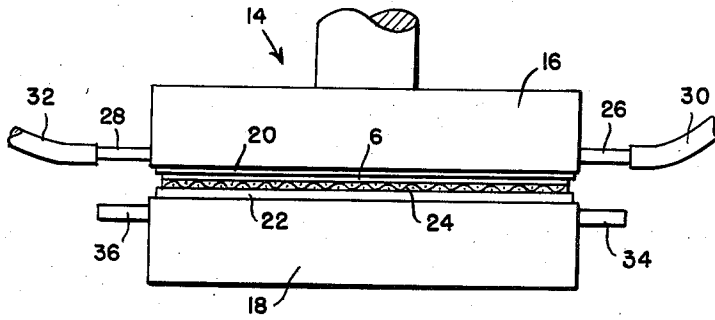


FIG. 2.

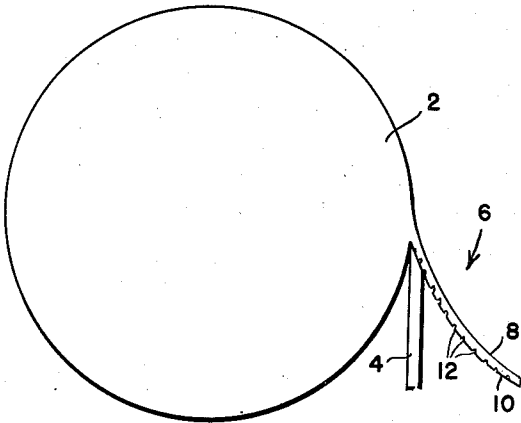


FIG. 1.

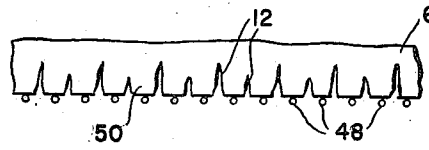


FIG. 5.

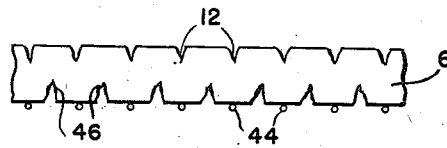


FIG. 4.

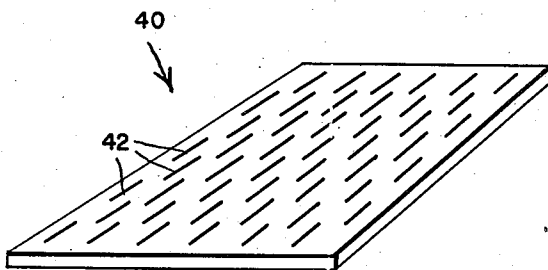


FIG. 3.

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METHOD OF PRODUCING CURED WOOD VENEER ARTICLE

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3 Sheets-Sheet 2

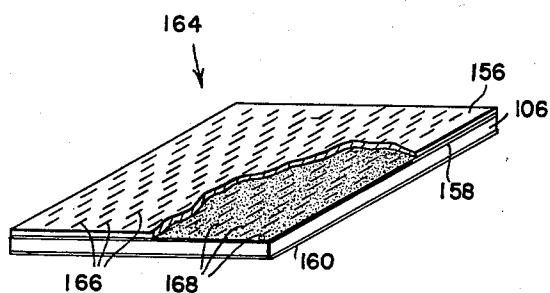


FIG. 6.

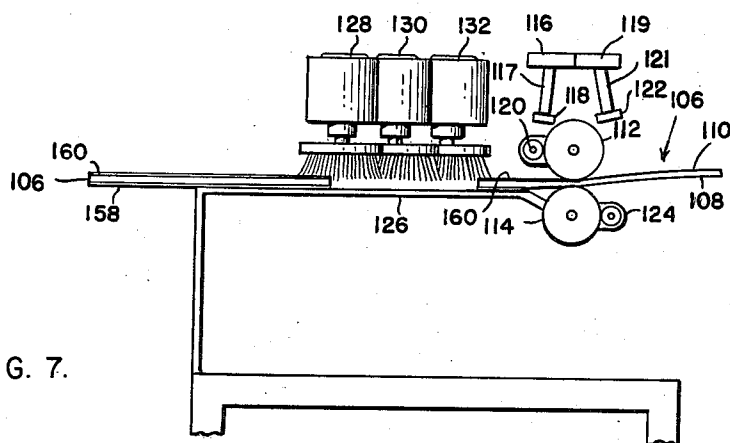


FIG. 7.

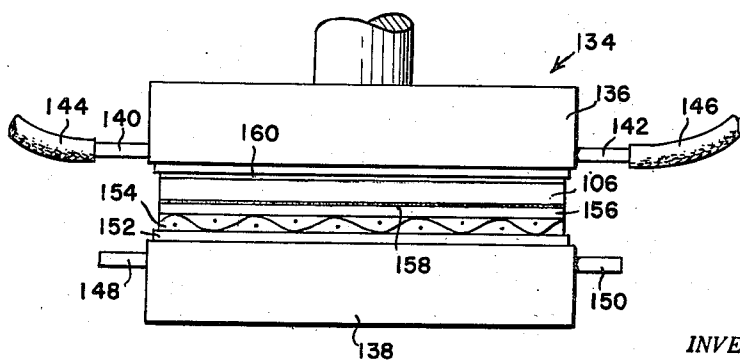


FIG. 8.

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METHOD OF PRODUCING CURED WOOD VENEER ARTICLE

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3 Sheets-Sheet 3

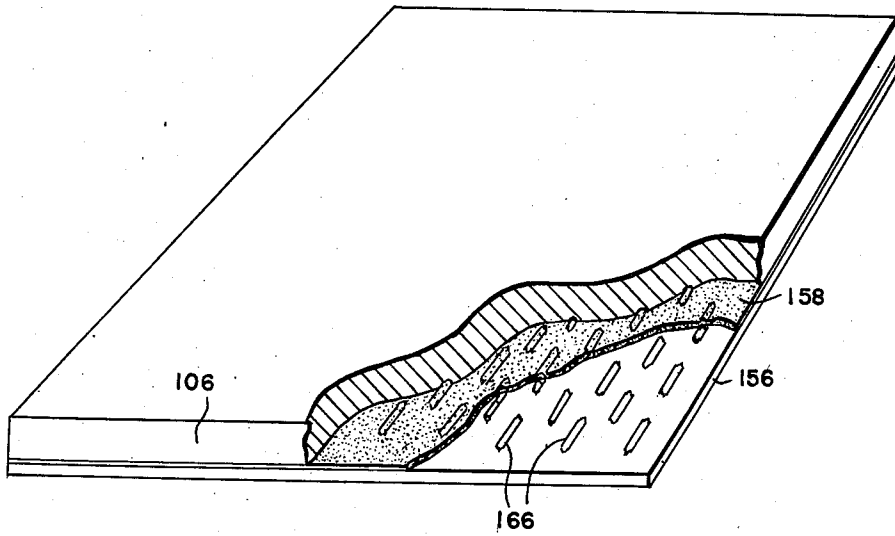


FIG. 9.

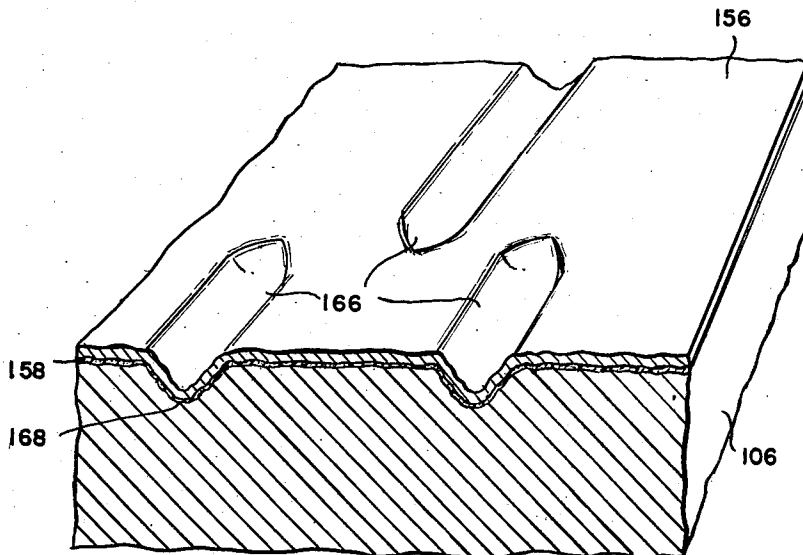


FIG. 10.

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1

2,830,004

METHOD OF PRODUCING CURED WOOD VENEER ARTICLE

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Application July 16, 1954, Serial No. 443,890

4 Claims. (Cl. 154—132)

This invention relates to cured wood veneer and a method of producing cured wood veneer and has particularly utility with respect to veneer sheets useful, for example, for flooring or paneling. The invention further relates to cured wood veneer having a backing and to method of producing cured wood veneer with a backing. The invention further relates to such cured veneer with a finished face and to the method of producing such cured veneer with a finished face.

Numerous methods of producing veneer are well known in the art. Among the common methods are slicing, sawing and rotary cutting the veneer. The sliced and sawn veneer never fully produces either the plain or quarter sawn effect in the veneer. Each piece of the veneer produced by these two processes is in reality a mixture of the plain and quarter sawn effect. The rotary cut veneer is produced by rotating the freshly cut or green log against a suitable blade to cut a thin sheet therefrom. This method of cutting produces a 100% plain sawn effect.

All of the veneers obtained by the three processes are then normally cured or dried in a drier or drying kiln. This drying procedure has numerous disadvantages. The driers cover large areas of floor space and are expensive to install and operate. The veneers have a marked tendency to curl and wave and to develop numerous checks. While these disadvantages are not of moment in the production of plywood, they do prohibit the veneers from being used in other applications. The severity of these problems mounts rapidly as the thickness of the veneer is increased. Further, because there is no way to control the shrinkage, a loss of surface area of from about 9% to 12% usually results. In addition kiln drying is very time consuming. For example, it usually takes about one and a half hours to dry $\frac{1}{16}$ " veneer in a kiln. These and other problems are solved by this invention.

Further, the products of this invention are advantageous in that they are surprisingly flexible.

In accordance with this invention a sheet of rotary cut veneer of any desirable green wood, such as, for example, oak, maple, beech, birch, sycamore, or Douglas fir, and having a thickness of from about $\frac{1}{16}$ " to about $\frac{3}{16}$ ", is placed in a suitable press with the tight side of the veneer overlying a screen resting on one of the platens of the press. Heat and pressure are applied by the press to indent the veneer by the screen and until the moisture content of the veneer is reduced to substantially zero. The veneer sheet is then removed and placed on a flat surface until it returns to room temperature. I have found that because sliced or sawn veneers do not give a true representation of the plain sawn effect, their use results in undesirable variations in thickness.

More specifically, the veneer is subjected to an absolute pressure (gauge pressure +1 atmosphere) within the range of from about 40 p. s. i. to a maximum absolute pressure which varies with the oven dry density of the

2

veneer. Said maximum absolute pressure will be substantially as computed on the following formula:

FORMULA 1

$$P=556D^2$$

where P =absolute pressure and D =the oven dry density of the veneer. Thus, for example, where the veneer has an oven dry density of 0.481, the absolute pressure range will be from about 40 p. s. i. to about 129 p. s. i.

The veneer is subjected to a temperature in degrees absolute in the range of from about 750° A. to a maximum temperature which varies with the oven dry density of the veneer. Said maximum temperature in degrees absolute will be substantially as computed on the following formula:

FORMULA 2

$$T=1086D^{0.4}$$

where T =temperature in degrees absolute and D =the oven dry density of the veneer. However, the maximum temperature will never be greater than 856° A. Thus, for example, where the oven dry density of the veneer is 0.481, the absolute temperature range will be from about 705° A. to about 810° A.

The veneer is subjected to pressure within this range together with the above specified heating until the moisture content in the veneer is reduced to substantially zero. From about 3 to 10 minutes is generally satisfactory to accomplish this. Test pieces of the veneer are dried in an oven to determine that the moisture content is reduced to substantially zero, the thickness of the veneer and the species being processed determining the time in the press.

The screen will preferably be a metal screen made of copper, aluminum, or any other metal conventionally used for forming screens. We have found a mesh of 14 to be preferable. A mesh range of 7 to 20 is satisfactory.

When large sheets of the processed veneer are to be manufactured into smaller units, as, for example, a floor tile, it is highly desirable to have these large sheets processed with a backing so that they can be handled in a plant and the units developed therefrom installed without undue loss from cracking and splitting. For example, it may be desirable to produce a herring-bone effect by cutting strips at a 45° angle across the grain of the veneer. If the product is not backed, the corners of these strips would either fall off or be easily broken off.

The customary method of handling green veneer is to clip out all of the defects prior to the drying operation because knots and other defects accentuate the curling and warping of the veneer. To reduce this clipping waste to a minimum, high grade "pealer" logs are used. I have found that defects such as knots can be retained and satisfactorily handled using the method of this invention, thereby producing not only a more inexpensive product from regular logs, but a new product in which the aesthetic value of the knots is retained.

It has also surprisingly been found that a fabric backing can be applied to the veneer sheet simultaneously with the curing process in accordance with this invention. Conventionally, the veneer is first cured and subsequently plied with a backing where the latter is desired, or, alternatively, the fabric is applied to the veneer which is then slowly cured over an extended period of time.

Where the fabric ply is desired in accordance with this invention, a laminate is formed from a sheet of green rotary cut veneer and a sheet of fabric with an adhesive layer in between. The adhesive layer, preferably in an amount of 20 to 60 pounds per thousand square

feet, is applied to the tight side of the veneer and the fabric sheet applied to the adhesive layer. The thus formed laminate is then pressed against a screen with the fabric ply against the screen. This operation holds the fabric in proper position and the screen impression is transferred to the veneer and so held in the face dimension so that the veneer cannot exert its usual shrinking characteristics. The laminate is simultaneously subjected to heating. The moisture content of the wood is reduced substantially to zero and the heating is then continued for a brief time thereafter to set the adhesive. The adhesive does not cure or set before all of the moisture is substantially removed, thus preventing the veneer from disintegrating within itself due to the internal expansion of trapped steam.

The temperatures, pressures, and times given above for use with veneer per se have been found to be equally applicable to the case where the fabric is added. Similarly, after the simultaneous heating and pressing operation, the laminate is placed on a flat surface until it returns to room temperature. As the stack builds up, large sheets can easily be laid in a bowed condition and then the use of weights to keep the veneer flat during the cooling operation is advantageous, as I have found that the veneer, during the cooling process, has a tendency to take the configuration of the surface on which it rests.

The fabric ply may be, for example, a woven fabric such as, for example, cotton, burlap, silk, metal, rayon fiber glass or nylon cloth or a fibrous, mat-type of fabric such as, for example, paper. Kraft paper having a weight of 20 to 100 pounds per 3000 square feet has been found satisfactory by way of example. The fabric should not be so sized as to impede the exit of the steam.

The adhesive is soybean protein dispersed in an aqueous media having a pH in the range of from 2.0 to 6.0. The soybean protein will be from about 15 to 80% by weight of the water. Dispersing agents such as, for example, potassium or sodium sulfite, may be included in the amount of from 1% to 12% by weight of the protein. If a moisture-resistant bond is desired, hexamethylenetetramine or glyoxal is included in the amount of 1% to 18% by weight of the protein. The acid to provide the desired pH range may be any conventional organic or inorganic acids such as, for example, acetic, hydrochloric, formic, propionic, or any other volatile acid.

The use of an adhesive having a pH of from 2.0 to 6.0 is unique and provides a highly desirable result in that the adhesive neither chars nor sets prior to the escape of all of the moisture from the veneer and will set promptly without charring after the moisture ceases to escape from the wood.

During the pressing operation the screen forms indentations in the fabric ply and to a somewhat lesser extent forms corresponding indentations in the veneer. This results in an exceptional bond between the fabric ply and the veneer and also produces a roughened surface which is highly desirable when the end use product is a floor covering adapted to be set in a mastic adhesive applied directly to a concrete surface.

If desired, the loose or face surface of the veneer can be provided with a finish by applying a coat of the above described adhesive to this side of the veneer before the pressing and heating operation. I have found that an even more attractive and durable finish can be achieved by adding to this adhesive from 5% to 25% by weight of a solution of alkyd resin such as, for example, a phthalic anhydride alkyd resin. The reaction product of phthalic anhydride with glycerol or pentaerythritol or a mixture of these two alcohols modified with drying oil fatty acids, such as china wood oil fatty acids, linseed oil fatty acids, soybean oil fatty acids, perilla oil fatty acids, or oitica oil fatty acids, is satisfactory. The

drying oil fatty acids will be about 25% to 65% by weight of the modified resin and the phthalic anhydride from about 12% to 30% by weight of the modified resin. In lieu of the resin-fatty acid mixture a styrenated alkyd resin in an amount of from 5 to 25% by weight of the adhesive may be added. A styrenated resin with a dehydrated castor oil base is very satisfactory. The thus added ingredients form an emulsion with the adhesive. If desired, this emulsion can also be used to bond the fabric to the veneer sheet.

Where used the finishing composition will preferably be, for example, in an amount of from 60 to 120 pounds per thousand square feet.

Where it is desired to attractively color the veneer, pigments may be included in the adhesive. Exemplary of such pigments are raw sienna, zinc oxide, titanium dioxide, Italian sienna, burnt umber, lamp black, or toning lakes. The pigments will be used in varying amounts depending upon the color to be obtained, but, in general, can be used in an amount of from .05% to 1.00% of the finishing composition. If the veneer is of such character that it needs filling, it is desirable also to include fillers such as, for example, silice, asbestine, or gypsum. The filler when used will be present in from .5% to 10.0% of the finishing composition.

By way of more specific example, the adhesive or finishing composition in accordance with this invention can be made up on the following examples:

Example 1

	Pounds
Soybean protein-----	23
Water -----	40

Stir for 15 minutes. Add 1 pound of sodium sulfite dissolved in 8 pounds of water. Stir 15 minutes. Add 2 pounds of acetic acid dissolved in 8 pounds of water. Stir one-half hour.

Example 2

	Pounds
Soybean protein-----	23
Water -----	40

Stir for 15 minutes. Add 1 pound of sodium sulfite dissolved in 8 pounds of water. Stir 15 minutes. Add 2 pounds of acetic acid dissolved in 8 pounds of water. Stir one-half hour. Add 4 pounds of hexamethylenetetramine. This composition is particularly advantageous as a finish or adhesive as it is water-resistant.

Example 3

	Pounds
Soybean protein-----	23
Water -----	40

Stir for 15 minutes. Add 1 pound of sodium sulfite dissolved in 8 pounds of water. Stir 15 minutes. Add 2 pounds of acetic acid dissolved in 8 pounds of water. Stir one-half hour. Add 18 pounds of 28% solution styrenated alkyd resin dissolved in a half and half mixture of benzene and aliphatic petroleum solvent (Kauri butanol No. 37).

Example 4

	Pounds
Soybean protein-----	23
Water -----	40

Stir for 15 minutes. Add 1 pound of sodium sulfite dissolved in 8 pounds of water. Stir 15 minutes. Add 2 pounds of acetic acid dissolved in 8 pounds of water. Stir one-half hour. Add 12 pounds of a 60% solution of a phthalic anhydride-glycerol resin modified with 3 pounds by weight of the resin of china wool oil fatty acids, dissolved in petroleum solvent (Kauri butanol No. 74).

Soybean protein-----	Pounds
Water -----	23
	40

Stir for 15 minutes. Add 1 pound of sodium sulfite dissolved in 8 pounds of water. Stir 15 minutes. Add 2 pounds of acetic acid dissolved in 8 pounds of water. Stir one-half hour. Add a 10% solution of 5 pounds of phthalic anhydride-pentaerythritol resin modified by 5 pounds by weight of the resin of linseed oil, dissolved in petroleum solvent (Kauri butanol No. 74).

As is apparent from the description of the method, the finished product may, if desired, have a finish of soybean protein. It is customary to finish the exposed face of wood products. Finishing a relatively thin section of wood by conventional means is difficult and expensive. While adhesives are not customarily used as finishes, I have found that the soybean protein adhesive can be used to produce an exceedingly hard, durable and wear-resistant finish. This finish can be applied in a single operation along with curing the veneer, per se at substantial savings in cost over conventional methods. The finished surface is resistant to the ordinary household stains.

When the surface is to be finished, it is preferred to use a caul release compound to prevent the finished surface from adhering to the caul. I have found that any of the common waxes such as, for example, paraffin wax, microcrystalline wax, beeswax, or candellila wax dissolved in a petroleum type solvent, such as petroleum naphtha, are satisfactory. When used, the caul release compound desirably should contain from 5% to 20% wax and from .25% to 1% silicone fluid (Dow Corning #200).

The laminated product made in accordance with the above described method is a cured sheet of rotary cut veneer having a plurality of indentations in its tight side and a fabric sheet glued to the tight side and having indentations registering with the indentations in the veneer sheet.

The indentations in the veneer sheet are the same as the mesh of the screen used and have a depth in the veneer sheet of from about .002 to .010.

The indentations preferably take the form of rows of short, straight lines staggered so that the straight lines of alternate rows are opposite each other.

The invention will be further clarified by reference to the following description in conjunction with the drawings, in which:

Figure 1 is a schematic view of the method of forming rotary cut veneer from a log.

Figure 2 is a front elevation, partially broken away, of a press for carrying out curing of veneer in accordance with this invention.

Figure 3 is a bottom perspective view of a sheet of veneer cured in accordance with this invention.

Figure 4 is a schematic view showing in exaggerated size the checks in a sheet of veneer after being cured by the process of this invention.

Figure 5 is a schematic view showing in exaggerated size the checks in a sheet of veneer after being processed with the loose side of the veneer against a screen.

Figure 6 is a bottom perspective view of a veneer-fabric laminate formed in accordance with this invention.

Figure 7 is a side elevation of apparatus for applying adhesive and a finishing composition to a veneer sheet.

Figure 8 is a front elevation, partially broken away, of a press in which a veneer-fabric laminate is being formed.

Figure 9 is an alternative embodiment in accordance with this invention where the finishing composition is omitted.

Figure 10 is an enlarged view of a portion of Figure 6.

Referring to Figure 1, a freshly cut green log 2 is rotated clockwise against a knife 4 to cut off a veneer sheet

6. The tight side of the veneer sheet 6 is indicated at 8 and the loose side at 10. Since, obviously, the loose side 10 is shorter than the tight side 8 when the sheet 6 is straightened out, checks 12 develop in loose side 10. In view of these checks 12, it has heretofore been the practice to utilize the tight side 8 of rotary cut veneer for the finished surface.

Referring now to Figure 2, a press 14 (shown only in part) has an upper movable platen 16 and a lower fixed platen 18. Assembled between the platens is an upper caul plate 20 and a lower caul plate 22. The conventional aluminum caul plates are satisfactory. Lying on caul plate 22 is a screen 24. Between caul plate 20 and screen 24 is a green rotary cut veneer sheet 6 with its tight side facing screen 24.

Platen 16 is heated by steam pipes 26 and 28, which in turn are connected with flexible steam lines 30 and 32, respectively. Platen 18 is heated by steam pipes 34 and 36.

The lay-up in press 14 having been made as described above, heat and pressure are then applied until the veneer is reduced to a moisture content of substantially zero. The press is then opened and the elements of the assembly between the platens removed. Sheet 6 is placed on a flat surface where it is retained until it has returned to room temperature. The tight side of the cured veneer sheet 40 is indented with impressions 42 of the screen mesh as shown in Figure 3.

Since the impressions were made in the tight side, it will be obvious that the loose side of sheet 40 will be used as the finished or wearing surface of sheet 40, contrary to the practice of using the tight side as the finished or wearing surface of rotary cut veneer.

As seen in Figure 1, the loose side of the rotary cut green veneer has, of necessity, checks 12. Referring to Figure 4, if the tight side 8 of sheet 6 is pressed against a screen, checks 46 will be developed in the tight side due to the rapid drying of the veneer. As illustrated in Figure 4, this creates a well balanced stable sheet of veneer and doubtless explains why such an exceptionally flat and flexible sheet can be obtained even while using very large sections of the veneer in a large press.

By way of contrast, if, in the process, the conventional teaching that the tight side must be the finished or wearing side of the veneer were followed, a far less satisfactory product would be achieved. Figure 5 illustrates the result achieved if the loose side of veneer sheet 6 is placed against a screen 48. In addition to increasing the size of checks 12, additional checks 50 are caused by the bursting of steam through areas between the pressure points of the screen indicated at 48. It is at once apparent that this results in an unbalanced sheet of veneer.

Surprisingly, also, the product of this invention will expand and contract under ordinary relative humidity changes only about one-fifteenth as much as kiln dried veneer. Even under drastic changes of relative humidity of, for example, 80%, the product of this invention will expand and contract only about one-sixth as much as kiln dried veneer.

Commencing with Figure 6 there is illustrated the method incorporating a fabric ply to form a veneer-fabric laminate and the product of the method. Adverting to Figure 7, green rotary cut veneer sheet 106 is fed between rollers 112 and 114, which both rotate in a direction to advance sheet 106. A pan 116 has a spout 117 provided with a plug 118. Removal of plug 118 provides for the delivery of a supply of adhesive into the area between roller 112 and adjacent roller 120 which abuts against roller 112 and acts to supply an even coat of finishing composition to roller 112.

Adhesive pan 119 has a spout 121, which is provided with a plug 122. Removal of plug 122 results in the delivery of a supply of adhesive into the area between roller 114 and a roller 124, which abuts against roller 114 and supplies an even coat of adhesive to roller 114.

With the finishing composition applied to the loose side of the finish sheet and the adhesive applied to the tight side of the finish sheet 106, it is advanced on to the longitudinal grill 126 where the loose side is brushed by motor brushes 128, 130 and 132. The motor brushes act to spread and thoroughly rub the finishing composition into the loose side of the veneer sheet.

Figure 8 shows the veneer sheet in a press 134 after the above discussed operations. The press 134 has an upper movable platen 136 and a lower fixed platen 138. Platen 136 is heated by circulating steam through lines 140 and 143, which are connected respectively to flexible lines 144 and 146. Platen 138 is heated by circulating steam through lines 148 and 150.

Referring now to the lay-up shown in the press 134 in Figure 8, a bottom caul plate 152 rests on platen 138 and a screen 154 in turn rests on caul plate 152. A fabric ply 156 abuts screen 154 and is joined to the tight side of veneer sheet 106 by adhesive 158. A finishing composition 160 overlies the loose side of sheet 106 and penetrates into the veneer.

The lay-up having been formed as described, heat and pressure are applied within the pressure and temperature ranges given above. This operation is continued until substantially all the moisture stops passing through the sheet 106. After the moisture stops passing through the adhesive 158 and ply 156, the adhesive 158 sets and the heating and pressing is then discontinued.

Having the adhesive on the acid side rather than alkaline results in being able to satisfactorily cure the veneer prior to the setting of the adhesive and this avoids having the adhesive block the flow of moisture from the veneer. During the heating and pressing each crossing of the screen has formed a pressure point resulting in indenting the fabric into the veneer and preventing any substantial shrinkage by the fabric or the veneer. Thus, differential shrinkage between the fabric and the veneer is also eliminated.

The thus processed veneer sheet 106 is then removed and placed on a flat surface until it returns to room temperature.

The finished, cured, fabric ply veneer sheet 164 is shown in Figure 6. As shown in Figure 6, screen 154 forms indentations 166 in fabric ply 156 and similar corresponding indentations 168 in veneer sheet 106.

From the above description of the drawings, it will be obvious that where it is not desired to place a finishing composition on the loose side of the veneer sheet, it is simply necessary to remove finishing composition pan 116 from the apparatus shown in Figure 7 and in this event motor brushes 128, 130 and 132 may also be removed. The finished product will then be as shown in Figure 9, that is, identical with the product of Figure 6 without finishing composition 160.

It is not desired to be limited except as set forth in the following claims, the above description being by way of illustration only.

What is claimed is:

1. The method of curing rotary cut green wood veneer having a thickness of from about $\frac{1}{16}$ " to about $\frac{3}{16}$ " and having checks substantially all on the loose side of the veneer, which comprises pressing the tight side of the veneer, against a screen of a mesh of from 7 to 20 at an absolute pressure within the range of from about 40 p. s. i. to a maximum absolute pressure substantially as given by the following formula: $P=556D^2$ where P =absolute pressure and D =the oven dry density of the veneer, to indent the surface of the tight side of the veneer with the screen and simultaneously subjecting said veneer to an absolute temperature of within the range of from about 705° A. to a maximum absolute temperature substantially as given by the following formula: $T=1086D^{0.4}$ where T =temperature in degrees absolute and D =the oven dry density of the veneer, said temperature never exceeding 856° A., to reduce the

moisture content of the veneer to substantially zero and returning the veneer to room temperature, said method producing checks on the tight side of the veneer to substantially balance the checks on the loose side of the veneer.

2. The method of producing a rotary cut cured veneer article having a backing which comprises securing a sheet of fabric to the tight side of a sheet of rotary cut green wood veneer having a thickness of from about $\frac{1}{16}$ " to about $\frac{3}{16}$ " and having checks substantially all on the loose side of the veneer with an adhesive comprising soybean protein dispersed in an aqueous media having a pH in the range of 2.0 to 6.0, pressing the fabric ply of the thus formed laminate against a screen of a mesh of from 7 to 20 at an absolute pressure within the range of from about 40 p. s. i. to a maximum absolute pressure substantially as given by the following formula: $P=556D^2$ where P =absolute pressure and D =the oven dry density of the veneer, to indent the surface of the tight side of the veneer with the screen and simultaneously subjecting the laminate to a temperature of within the range of from about 705° A. to a maximum absolute temperature substantially as given by the following formula: $T=1086D^{0.4}$ where T =temperature in degrees absolute and D =the oven dry density of the veneer, said temperature never exceeding 856° A., to reduce the moisture content of the veneer to substantially zero and set the adhesive and returning the thus treated laminate to room temperature, said method producing checks on the tight side of the veneer to substantially balance the checks on the loose side of the veneer.

3. The method of producing a rotary cut cured veneer article having a finished surface which comprises coating the loose side of a sheet of rotary cut green wood veneer having a thickness of from about $\frac{1}{16}$ " to about $\frac{3}{16}$ " and having checks substantially all on the loose side of the veneer with a composition comprising soybean protein dispersed in an aqueous media having a pH in the range of 2.0 to 6.0 and containing an alkyd resin in an amount of from about 5% to 25% by weight of the soybean protein and aqueous media, pressing the tight side of the veneer against a screen of a mesh of from 7 to 20 at an absolute pressure within the range of from about 40 p. s. i. to a maximum absolute pressure substantially as given by the following formula: $P=556D^2$ where P =absolute pressure and D =the oven dry density of the veneer, to indent the surface of the tight side of the veneer with the screen and simultaneously subjecting said veneer to a temperature in the range of about 705° A. to a maximum absolute temperature substantially as given by the following formula: $T=1086D^{0.4}$ where T =temperature in degrees absolute and D =the oven dry density of the veneer, said temperature never exceeding 856° A. to reduce the moisture content of the veneer to substantially zero and returning the thus finished veneer to room temperature, said method producing checks on the tight side of the veneer to substantially balance the checks on the loose side of the veneer.

4. The method of producing a rotary cut cured veneer article having a backing on one surface and a finishing composition on the other surface which comprises securing a sheet of fabric to the tight side of a sheet of rotary cut green wood veneer having a thickness of from about $\frac{1}{16}$ " to about $\frac{3}{16}$ " and having checks substantially all on the loose side of the veneer with an adhesive comprising soybean protein dispersed in an aqueous media having a pH in the range of 2.0 to 6.0, coating the loose side of said veneer sheet with said adhesive, pressing the fabric ply of the thus formed laminate against a screen of a mesh of from 7 to 20 at an absolute pressure within the range of from about 40 p. s. i. to a maximum absolute pressure substantially as given by the following formula: $P=556D^2$ where P =absolute pressure and D =the oven

dry density of the veneer, to indent the surface of the tight side of the veneer with the screen and simultaneously subjecting the laminate to a temperature of within the range of about 705° A. to a maximum absolute temperature substantially as given by the following formula: $T=1086^{0.4}$ where T =temperature in degrees absolute and D =the oven dry density of the veneer, said temperature never exceeding 856° A., to reduce the moisture content of the veneer to substantially zero and set the adhesive and returning the thus treated laminate to room temperature, said method producing checks on the tight side of the veneer to substantially balance the checks on the loose side of the veneer.

5

10

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