April 22, 1952 R. N. WARE, JR., ET AL 2,593,708

METHOD FOR PRODUCING PAPER COVERED WOOD VENEER

Filed Nov. 13, 1948 2 SHEETS—SHEET 1

Fig. 1

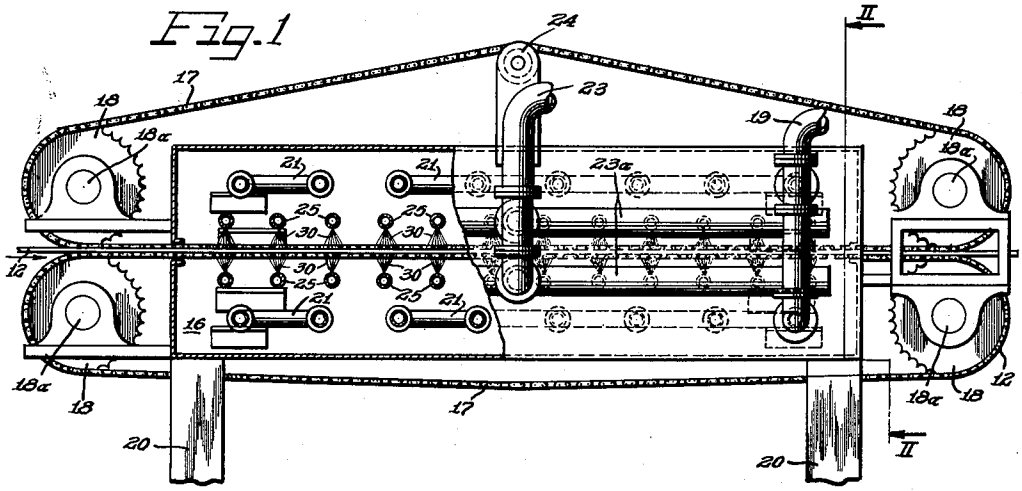
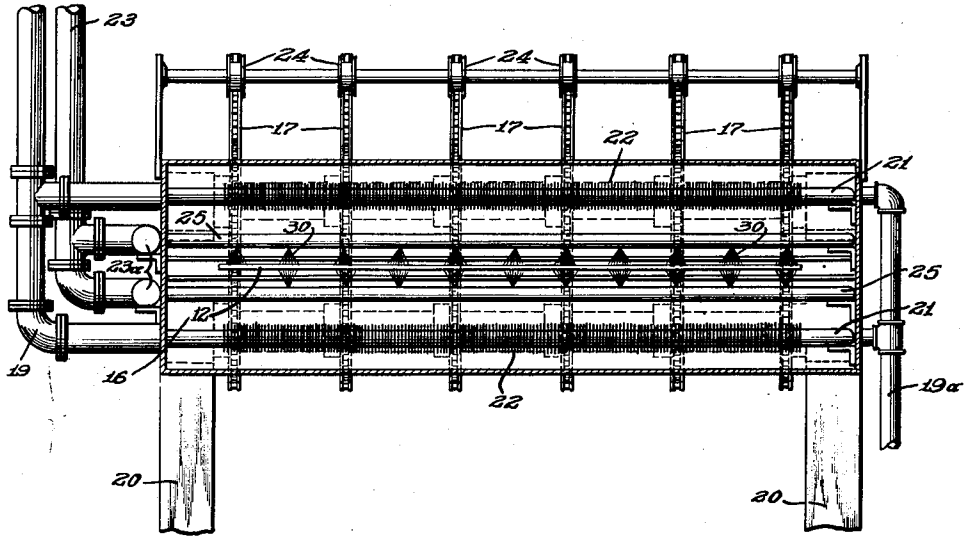


Fig. 2



Inventors
Richard N. Ware, Jr.
Reginald Cannon

By Dewey & Charles & Wilbur Attys

April 22, 1952 R. N. WARE, JR., ET AL 2,593,708

METHOD FOR PRODUCING PAPER COVERED WOOD VENEER

Filed Nov. 13, 1948 2 SHEETS—SHEET 2

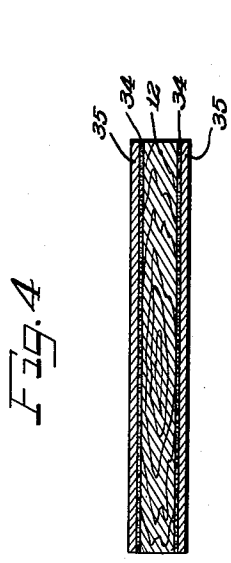


Fig. 4

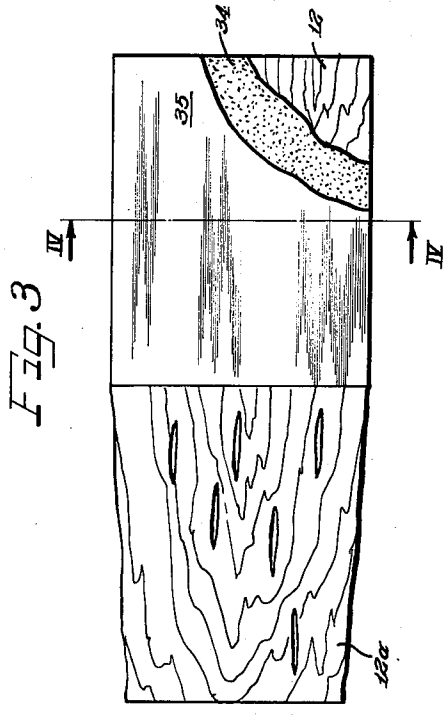


Fig. 3

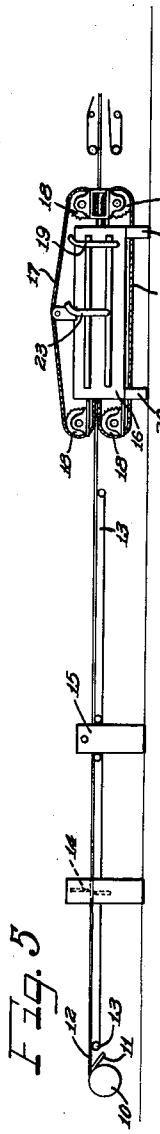


Fig. 5

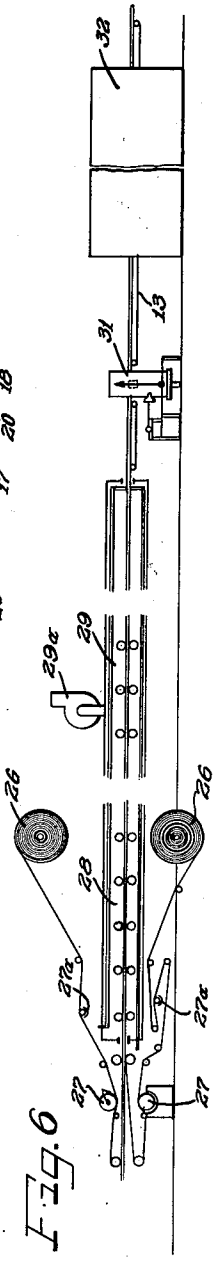


Fig. 6

Inventors
Richard N. Ware, Jr.
Reginald Cannon

By The Firm of Charles R. Wills Attys

Patented Apr. 22, 1952

2,593,708

UNITED STATES PATENT OFFICE

2,593,708

METHOD FOR PRODUCING PAPER-COVERED WOOD VENEER

Richard N. Ware, Jr., and Reginald Cannon, Tallulah, La., assignors to Chicago Mill and Lumber Company, Chicago, Ill., a corporation of Delaware

Application November 13, 1948, Serial No. 59,932

1 Claim. (Cl. 154—124)

1

This invention relates to the production of paper covered wood veneer from green, undried, steamed wood and moistened, stretched paper, and specifically deals with an apparatus and method of making veneer products involving the heating and simultaneous spraying of steam on a flat sheet of veneer, and the covering of the flat sheet with adhesive-coated stretched paper which is fixedly united to the heated, moist wood to hold it in an expanded condition as it is dried, whereby the wood is prevented from cracking during the drying process.

In our copending application, Serial No. 761,138 filed July 16, 1947, now U. S. Patent 2,521,554, dated September 5, 1950, and entitled "Method of Making Paper Covered Veneer," of which this application is a continuation-in-part, freshly peeled veneer is wound into rolls which are heated with wet steam to raise their temperature without drying the wood. The hot steamed rolls of veneer are unreeled as needed and advanced between the adhesive coated faces of wet stretched paper webs.

According to the present invention, freshly peeled veneer is conveyed, while flat, through a partially enclosed chamber in which heating coils and steam spray coils are located. Both sides of the sheet of veneer are then heated and sprayed with steam and the sheet, while still in a hot condition, is advanced between the adhesive coated faces of wet, stretched paper webs. The adhesive on the stretched paper webs is of a type adapted to sufficiently bond the paper to the wood so that the relative slippage therebetween cannot occur even before the wood and paper are dried. The bond thus created is sufficiently strong so that the paper will hold the wood against shrinkage during a subsequent drying operation. At the same time a relatively small degree of shrinkage occurring during the drying operation will not cause a puckering or wrinkling of the paper because it is applied in a stretched condition and has substantially the same coefficient of shrinkage as the wood to which it is bonded.

An important feature of the present invention resides in the heating and steam spraying of freshly peeled veneer sheets while they are flat.

Another feature of the invention resides in the provision of a continuously operating apparatus which will produce paper bonded veneer from a green log without at any time going through the step of winding the cut veneer into roll form.

An object of the invention is to provide apparatus for forming paper covered wood veneer

2

and including a device for heating and steam spraying the veneer while it is flat.

Another object of the invention is to provide a continuous strip method of making paper covered veneer.

Other and further important objects of this invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings which, by way of a preferred example, illustrate one embodiment of the invention.

On the drawings:

Figure 1 is a side elevation, partially in cross section, of the heating and steaming apparatus showing the conveyors and the heating and steam spray chamber;

Figure 2 is a transverse cross sectional view taken along the line II—II of Figure 1 and showing the steam inlet pipes and the series of chains for conveying the flat veneer through the apparatus;

Figure 3 is a plan view of a wood veneer sheet, one half of which is covered with paper according to this invention but having a portion broken away to show underlying layers and the other half of which is uncovered and shrunk to its full dry wood size;

Figure 4 is a cross sectional view taken along the line IV—IV of Figure 3;

Figure 5 is a schematic view showing the first portion of the apparatus for forming paper covered wood veneer including the veneer forming and heating units; and

Figure 6 is a similar schematic view of the remainder of the apparatus showing the adhesive and paper applicator and the heating, cutting and drying units.

As shown on the drawings:

The veneer steaming and heating unit of Figures 1 and 2 is used in the assembly line of apparatus shown in Figures 5 and 6 to produce the desired veneer product.

As shown in Figure 5, the reference numeral 10 designates a wet or green log being lathe peeled by a cutter blade 11 to produce a veneer strip 12. A belt type conveyor 13 advances the strip flatwise to a trimmer 14 which cuts out unsatisfactory veneer sections and provides straight ends on the veneer pieces to make possible a full mating together of the pieces.

The conveyor 13 then advances the trimmed veneer strips to a sewing machine 15 which joins the ends of the strips together to form a continuous ribbon. Another conveyor 13 then advances the ribbon to the steam chamber 16, best shown in Figures 1 and 2.

The steam chamber 16 consists of a chamber which is enclosed except for the apertures through which the wood ribbon enters and leaves. The chamber 16 is supported at the height of the conveyor belt 13 by the legs 20. Top and bottom pairs of looped chains 17 having spaced opposed active runs directed through the chamber 16 receive the wood ribbon therebetween to convey it in a flat condition through the chamber. These pairs of chains are disposed at spaced intervals across the width of the chamber so that the veneer is amply supported. Each chain is trained around end sprockets 18 mounted on shafts 18a which are journaled in bearings carried beyond the inlet and outlet ends of the chamber 16. One top and one bottom shaft 18a is driven to advance the active runs of the chains through the chamber 16. An idler sprocket 24 for each top conveyor chain maintains the upper return runs of these chains above the chamber 16.

As the veneer ribbon 12 passes through the chamber 16 it is heated by radiation from top and bottom serpentine coils of heater pipes 21, which are maintained at a temperature of about 200 to 250 degrees F. The pipes 21 extend transversely across the chamber above and below the active runs of the chains 17. Fins 22 are preferably provided on the heater pipes 21 to provide more surface for the radiation of heat to the wood veneer 12 between the active runs of the chains. In the embodiment shown the top and bottom coils of pipes 21 are heated by means of steam introduced to one end of the coils through conduit 19 on the front side of the chamber 16 while spent steam is removed from the other end of the coils by conduit 19a on the rear side of the chamber. The steam inlet is preferably at the discharge end of the chamber so the hottest portion of the coils will act on the heated veneer.

In order to keep the wood moist as it is heated during its passage through the steam chamber 16, a series of steam jet pipes 25 is provided for both the top and bottom faces of the strip of wood 12. These steam jet pipes 25 extend transversely across the chamber 16 in closely spaced parallel relation at a level between the pipes 21 and the wood 12. The pipes 25 are supplied with steam through headers 23a, from inlet pipe 23. It will be noted that the jet pipes 25 discharge a myriad of sprays 30 sufficient in number to keep the surface of the strip of wood moist even as the temperature of the wood rises.

The sprays cooperate to maintain the moisture of the veneer, based on dry weight, at between 50–200%, while the steam coils heat the wood to about 165 to 225° F. in a very short treating time. The treating time within the chamber 16 is normally 3 to 15 seconds. The force of the steam sprays 30 blowing vertically on the face of the veneer forces chips and fuzz from the veneer.

Upon emerging from the steam chamber 16 the strip of wood 12 is immediately passed between strips of adhesive-coated wet tough kraft paper, as best shown in Figure 6. Rolls of paper 26 are unrolled and the paper is threaded around a series of idler rolls and over moistening rolls 27a enroute to adhesive applicator rolls 27 which apply wet adhesive to those faces of the paper to be bonded to the wood. During this portion of travel of the unwound paper it is stretched to remain taut. The wet paper is firmly attached to both sides of the wood veneer during passage through a series of pressure rolls 28. Some of these rolls are in a heating section 29 having moist air exhausted therefrom by a blower 29a. The section 29 is preferably heated to temperatures around 120 to 180° F. The paper is firmly joined to the wood by non-slipping adhesive bonds before the wood reaches the shrinking point, which is usually below 30% moisture content. The bonds are quickly established, even with relatively slow-setting glues, because the high temperature of the wood causes a setting reaction to start as soon as the adhesive paper is pressed against the heated wood. Soya bean glue is a satisfactory bonding agent since it will set to form a non-slipping bond before either the paper or the wood dries to its shrinking point.

Upon emerging from the pressure rolls the veneer strip is cut into suitable lengths by means of a cutter 31. The material is then conveyed to a drier 32 having an inlet temperature around 250° F. and an outlet temperature around 375° F. This drier produces a dried product having a moisture content between about 6 to 12%.

Figures 3 and 4 illustrate the structure of the finished material as compared with normally dried wood veneer. The wood strip 12 is secured on both sides to the paper 35 by means of the adhesive 34. The paper covers 35 are smooth and unpuckered and hold the dried wood to prevent shrinking which would otherwise take place. The paper prevents the fiber bundles in the wood from pulling the softer pith apart to create open holes or checks, such as are shown at 12a on the left side of Figure 3, which shows the greater shrinkage taking place in an uncovered piece of wood.

The steam chamber process of the present application avoids heretofore used reeling steps and speeds up heretofore known laminating processes. It also makes possible the use of heated veneer woods which cannot be satisfactorily peeled from heated logs. For example, cottonwood will fuzz up if peeled when heated, while the heating of the already peeled veneer by steam sprays actually smooths down the veneer surface and blows off any fuzz or loose chips.

It will of course be understood that various details of the process and apparatus may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

We claim as our invention:

The method of forming paper covered veneer sheets from green undried wood, which comprises, forming a flat ribbon of green undried wood veneer, passing the flat green undried wood veneer ribbon between heaters to heat the wood, spraying hot steam on both broad faces of the ribbon as it passes between said heaters, holding the ribbon against warping as it is heated and sprayed, continuing said heating and spraying to produce a flat ribbon of veneer having a temperature between 160 and 250° F. and a moisture content about 30%, unreeling a first roll of paper above said ribbon, unreeling a second roll of paper beneath said ribbon, wetting one face of each of said webs of paper, adhesive-coating the other face of each of said webs of paper, stretching the wet paper, depositing the adhesived faces of the stretched wet paper on the heated wet veneer ribbon, pulling the paper covered assembly through a heating chamber, successively pressing the assembly in said chamber, heating the assembly in said chamber to temperatures beneath the boiling point of water to partially set the adhesive to form a firm bond between the wood and paper capable of holding the wood and paper against relative slippage, and thereafter drying

the assembly at a higher temperature to a moisture content of between 6 to 12% while said paper and the adhesive bond hold the wood against shrinkage.

RICHARD N. WARE, JR.
REGINALD CANNON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
811,446	Schwartz	Jan. 30, 1906
1,369,743	Hood et al.	Feb. 22, 1921
1,637,945	Kershaw	Aug. 2, 1927
1,642,928	Kocha	Sept. 20, 1927
1,689,812	Wood	Oct. 30, 1928
1,725,708	Fowler	Aug. 20, 1929
1,805,179	Loetscher	May 12, 1931
1,851,709	Laucks et al.	Mar. 29, 1932
2,095,389	Kondolf	Oct. 12, 1937
2,305,525	Gustin	Dec. 15, 1942
2,387,631	Weir	Oct. 23, 1945
2,415,028	Bosomworth et al.	Jan. 28, 1947
2,425,660	Ware et al.	Aug. 12, 1947
2,442,115	Byers et al.	May 25, 1948
2,444,918	Cone	July 13, 1948
2,521,554	Ware et al.	Sept. 5, 1950