

[54] **VENEER ARTICLE AND PROCESS OF MANUFACTURING PLYWOOD**

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Related U.S. Application Data

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[58] Field of Search 150/93, 304, 335; 144/314 R, 316, 313

[56] **References Cited**

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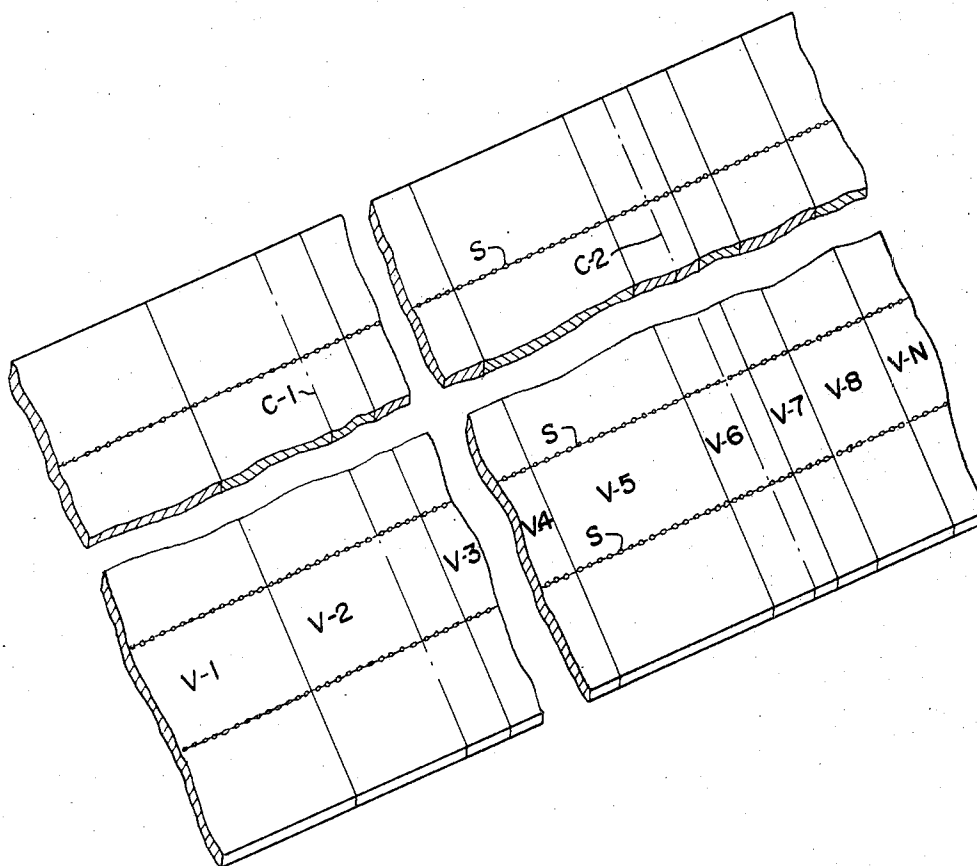
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[57] **ABSTRACT**

A process of manufacturing a plywood panel which includes the steps of producing a plurality of green veneer sheets of random size or widths less than the length or width of the plywood panel to be manufactured with the grain of the wood running lengthwise of the sheets and having a typical moisture content from about 30% to about 300% of the fiber weight, stitching a plurality of the green sheets together in side-by-side relation across the grain of the wood with thread having shrinkage characteristics about the same as that of the green veneer, typically 5% to 10% to produce an assemblage of sheets slightly larger than the plywood panel to be manufactured, drying the assemblages of sheets in conventional veneer driers, and subsequently assembling the dried assemblies of sheets with other veneer sheets or assemblages of sheets into a plywood panel.

4 Claims, 2 Drawing Figures



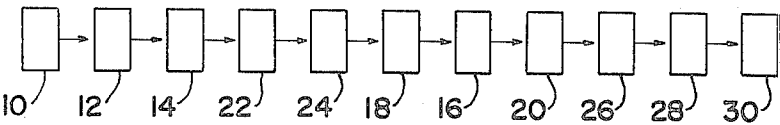


FIG. 1

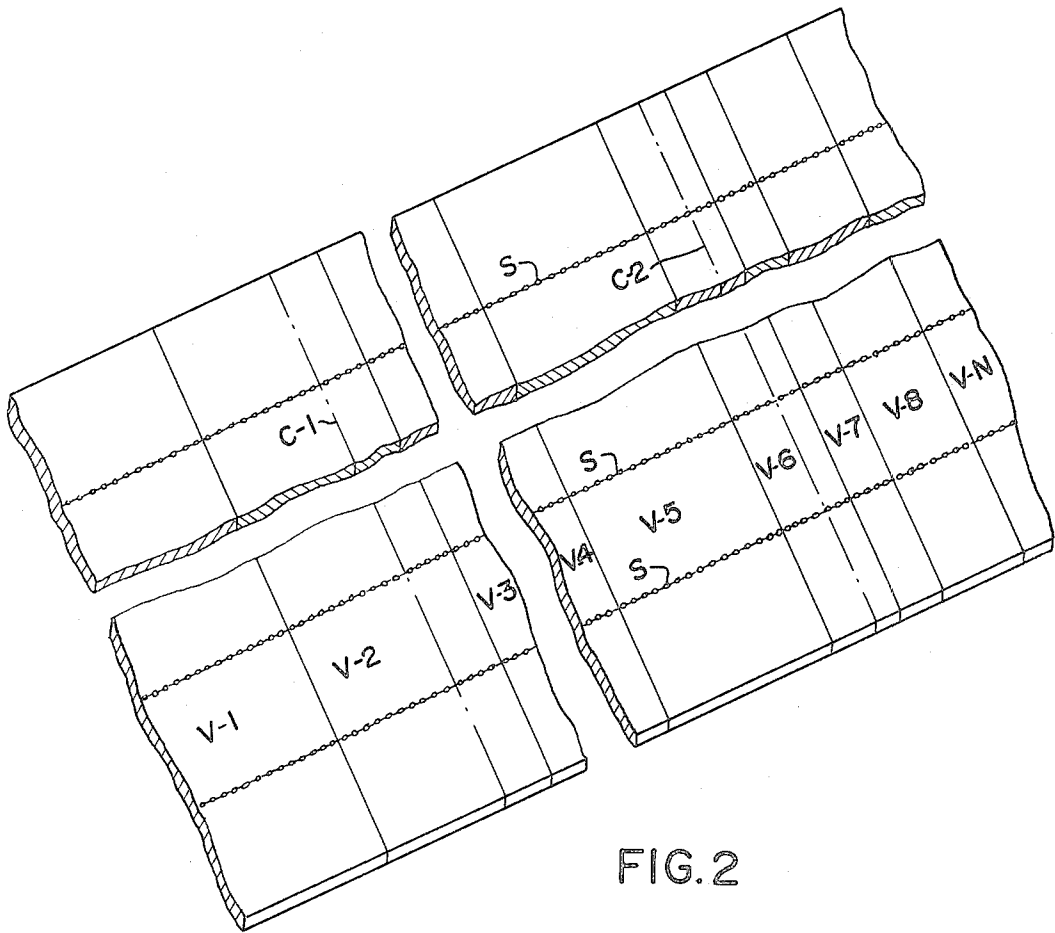


FIG. 2

VENEER ARTICLE AND PROCESS OF MANUFACTURING PLYWOOD

RELATED CASES

This application is a continuation-in-part of my co-pending application Ser. No. 118,850, filed Feb. 25, 1971 now abandoned, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to the manufacture of plywood panels from wood veneer at least some of the veneer layers of which comprise a plurality of veneer sheets of less width than the width or of the length of the panel arranged in side-by-side relation.

2. Description of the Prior Art

Wood veneer for use in the manufacture of plywood originates in the form of relatively long strips of a width slightly greater than the length of the plywood panels to be produced. These strips of veneer while still "green", that is, with a high moisture content, typically from 30% to 300% of the fiber weight, that is, from about 25% to 75% of the total weight, are cut transversely of their lengths into smaller sheets called "veneers" having a width slightly greater than that of the plywood panel, that is, full size sheets or veneers, and/or of less width, fractional size sheets or veneers and "fishtails" that is, fractional size sheets at least parts of which are of less than full length, etc., depending upon imperfections in the strip, etc. Typically more than 50% of the veneer production is in the form of fractional size veneers. These are more commonly used as center, core and cross-band material in the finished plywood panel, that is intermediate the back and face layers, but can be used at least for backs depending upon their quality and the grade of plywood being produced.

The green veneers are subsequently dried in a veneer drier which typically has a plurality of decks and is of a width slightly greater than that of three full width veneers to reduce their moisture content to from about 2% to 12% by weight depending upon the type of glue used in the manufacture of the plywood panels. The loading of veneers into driers, especially the fractional size veneers, and fishtails requires considerable manual handling of the veneers.

Subsequent to being dried the veneers are assembled and further processed into plywood panels, typically with fractional size veneers between face and back veneer sheets which latter sheets are usually of full sheet size.

Since plywood panels have at least three layers of veneers and the layers intermediate the backs and faces are seldom, if ever, full size veneers, it is apparent that the drying and assembling of veneers into a plywood panel necessitates repeated handling of many narrow and/or short veneers including arranging them in close side-by-side relation, highly desirable for efficient drier operation and a prerequisite in the "laying up" of the panel, that is, assembling veneers into panel form. The repeated handling results in considerable breakage and other damage to the veneer.

The use of adhesive tapes and the like for uniting fractional size veneers into full size sheets has been proposed but the veneers or at least the parts thereof to which the adhesive is applied is first dried. Stitching

dried fractional size veneers has also been proposed. Because veneer shrinks upon drying, the drying of merely portions of the veneers has many disadvantages as does sewing or stitching dry veneers which are quite brittle and susceptible to splitting. The inclusion of adhesive tapes and the like in plywood panels is undesirable.

SUMMARY OF THE INVENTION

10 The invention provides a novel and improved process for the manufacture of plywood panels from wood veneer which comprises assembling in side-by-side relation a plurality of green veneer sheets having the grain of the wood running lengthwise and being of less in size than the size of the finished plywood panel and subsequently stitching the side-by-side green veneer sheets transversely of their length and of the grain of the wood with thread which will shrink during drying of the veneer about the same as the veneer will shrink across the grain of the wood during drying to form a larger sheet of connected green veneer sheets for better handling and further processing, such as, drying, etc.

More specifically the invention provides a novel and improved process for the manufacture of plywood panels from wood veneer which comprises stitching together transversely of the grain of the wood with fiber cord or thread-like material which will shrink about the same as that of the green veneer during subsequent drying of the veneer, typically 5% to 10%, a plurality of green veneer sheets of random size less than that of a panel having the grain of the wood running lengthwise and assembled in side-by-side relation, for ease of handling and subsequent processing, such as, clipping, drying, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of equipment suitable for carrying out the process of the invention; and,

FIG. 2 is a fragmentary perspective view of veneer.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention is an article and a process of manufacturing plywood and the preferred principal operations and their sequence of performance is illustrated in the block diagram of FIG. 1 of the drawings.

Veneer for the production of plywood panels is peeled by a veneer lathe 10 from a green log the length of which is slightly longer than the length of the plywood panels to be manufactured. Plywood panels are typically 8 feet long and the logs are normally approximately 7 inches longer than the length of the finished panel. The veneer peeled from the log by the veneer lathe is caught on belted storage decks or runout tables 12 and subsequently cut with or lengthwise of the grain of the wood into sheets or veneers having a maximum width slightly greater than the width of the finished plywood panel at a veneer clipper 14. Typically more than 50% of the veneer is cut into veneers of less than maximum or full sheet size. These veneers are herein referred to as fractional size veneers.

The green veneer sheets which typically have a thickness of about 1/24th inch to 1/4th inch and a moisture content of about 30% to 300% of fiber weight are subsequently dried to a moisture content of about 4% to 6% in a veneer drier 16 into which they are fed by hand either with or without the aid of a mechanical veneer

feeder 18. During drying veneer shrinks in the direction across its wood grain between 5% to 10% depending moisture originally in it. The usual shrinkage is about 6% to 7%. The dried sheets are unloaded from the drier either by hand or by a veneer drier unloader 20 at the exit end of the veneer drier 16.

The veneer drier 16 and the apparatus associated therewith, for example, the drier feeder 18 and drier unloader 20, usually are of a width which is slightly greater than a multiple of the width of the veneer panels being produced. Typically, the width of this equipment is approximately 15 feet to accommodate three full width sheets of green veneer. In the clipping operation, as indicated above, many green veneer sheets are produced which are of fractional size, that is, have a width and/or length less than that of a full size sheet. The loading of such relatively thin veneer sheets, and more particularly those of fractional size into the drier, etc., involves considerable manual labor, particularly in view of the fact that as the various sheets pass through current commercial driers they should be closely arranged in side-by-side and end-to-end relation for efficient operation of the drier.

According to the provisions of the present invention the green veneer sheets of fractional size, that is, sheets of less size than the full size sheets, normally used as center, core and cross-band material in the panels being manufactured, are connected in side-by-side relation into a single sheet, preferably having a size not less than approximately the same as that of the full size sheets being used. This assemblage of fractional size veneers is preferably produced by stitching or sewing transversely of the grain of the wood the fractional size veneers, the grain of the wood of which runs lengthwise of the sheets, together in side-by-side relation by a fiber cord or thread material T having shrinkage characteristic about the same as that of the green veneer, typically about 6% to 7%. Either natural or synthetic fiber thread may be employed. Different suitable heat shrinkable synthetic threads are available. Many of these have a polyethylene base. A Dacron thread has been used successfully at a stitcher 22 interposed between the clipper 14 and the drier 16, in advance of the drier feeder 18, if one is employed. Preferably fractional size veneers are stitched together in a continuous manner and clipped into full size sheets either before or after drying as by a second clipper 24 ahead of the drier feeder 18 or behind the unloader 20.

As previously mentioned, the veneers are relatively thin, being typically of a thickness of about 1/24th inch to 1/4th inch, can be readily sewed or stitched by available sewing or stitching machines modified for this purpose. Typical stitches are approximately one-half inch long, although stitches of other lengths may be employed. A plurality of rows of stitches are preferred and are normally produced simultaneously. The thread preferably is such that it shrinks during subsequent drying of the veneer an amount about the same as the shrinkage of the veneer across the grain of the wood so that if the veneer sheets are sewn tightly together they remain in close side-by-side relation after drying. If the thread is such that during the drying of the veneer it shrinks slightly more than the veneer across the grain of the wood it is not necessary to sew the pieces of veneer together as tightly as would otherwise be the case because in this event the greater shrinkage of the thread tightens up the otherwise somewhat loose stitch-

ing and draws the veneer sheets together. In some instances this is preferred as it avoids the necessity of tightly stitching the veneer sheets together and thus facilitates the stitching or sewing operation. In order to securely hold the green veneer sheets together during subsequent handling they are usually sewed together by rows of stitches adjacent to the ends of the veneer sheets and intermediate the ends thereof.

Unclipped stitched veneers of full length but of random width are shown in FIG. 2 of the drawings. The veneers are designated V1 - Vn, the stitching S, and the approximate cut line, shown by dots and dashes, for a full size panel by C1 - C2. Assuming that the strip is slightly wider than 8 feet and that the cut lines are slightly more than 4 feet apart, the cut sheets, in plywood parlance are referred to 4 feet by 8 feet and are suitable for use as core material in 4 foot by 8 foot plywood panels. If the strip was only slightly more than 4 feet wide and was cut into lengths slightly longer than 8 feet the cut sheets in plywood parlance are referred to as 8 foot by 4 foot and are suitable for cross-band material in the same panels.

Subsequent to passing through the drier, and after being clipped or cut to full size sheets if this had not been done before drying, the dried full size sheets of assembled or unitized fractional size veneers have adhesive applied thereto at an adhesive applying apparatus 26 and are subsequently assembled with face and back sheets, preferably of full size, into a panel at a lay-up station 28. From the lay-up apparatus the panels are moved to a veneer press where they are pressed and the adhesive set. Thereafter the panels are trimmed to size. Some may be passed through a panel patching machine 30 where defects which might appear in the outside sheets are patched or otherwise repaired.

While preferred steps of the present process and preferred apparatus for carrying out the process have been referred to in considerable detail, it will be understood that some of the operations referred to may be omitted or otherwise carried out and that additional operations may be performed within the scope of the present invention as long as the process employed comprises assembling or unitizing a plurality of fractional size green veneers for subsequent handling and/or processing.

The phrase "green veneer" is used herein including in the claims as it is understood in the wood veneer art, that is, wood veneer having a moisture content in excess of about 20% of the fiber weight.

From the foregoing disclosure it will be apparent that a new article has been provided as well as a new process of manufacturing plywood panels.

Having thus described my invention, what I claim is:

1. In the manufacture of rectangular plywood panels having length, width and thickness dimensions the steps of producing a plurality of green veneer sheets slightly longer than one of the dimensions other than the thickness dimension of a plywood panel to be produced and of random width less than the other dimension of the panel and with the grain of the wood running lengthwise of the green veneer sheets, arranging a plurality of the green veneer sheets in side-by-side relation, machine sewing the side-by-side green veneer sheets transversely of the grain of the wood and of the length of the green veneer sheets intermediate their ends with thread to produce a plurality of continuous rows of thread stitches connecting the side-by-side green veneer sheets to produce an assemblage of side-by-side green

veneer sheets larger in length and width than the length and width of the panel to be produced, drying the assemblage of stitched together side-by-side green veneer sheets to reduce the moisture content of the veneer and produce an assemblage of connected side-by-side dried veneer sheets, applying adhesive material to the assemblage of connected side-by-side dried veneer sheets, and subsequently assembling the assemblage of connected side-by-side dried veneer sheets having adhesive thereon with other dried veneer sheets into a plywood panel.

2. In the manufacture of rectangular plywood panels having length, width and thickness dimensions the steps of producing a plurality of green veneer sheets slightly longer than one of the dimensions other than the thickness dimension of a plywood panel to be produced and of random width less than the other dimension of the panel and with the grain of the wood running lengthwise of the green veneer sheets, arranging a plurality of the green veneer sheets in side-by-side relation, machine sewing the side-by-side green veneer sheets transversely of the grain of the wood and of the length of the green veneer sheets adjacent to their end and intermediate their ends with thread having shrink characteristics about the same as that of the veneer to produce a plurality of continuous rows of thread stitches connecting the side-by-side green veneer sheets to produce an assemblage of side-by-side green veneer sheets larger in length and width than the length and width of the panel to be produced, drying the assemblage of stitched together side-by-side green veneer sheets to reduce the moisture content of the veneer and produce an assemblage of connected side-by-side dried veneer sheets, applying adhesive material to the assemblage of connected side-by-side dried veneer sheets, and subsequently assembling the assemblage of connected side-by-side dried veneer sheets having adhesive thereon with other dried veneer sheets into a plywood panel.

3. In the manufacture of rectangular plywood panels having length, width and thickness dimensions the steps of producing a plurality of green veneer sheets slightly longer than one of the dimensions other than the thickness dimension of a plywood panel to be produced and of random width less than the other dimension of the panel and with the grain of the wood running lengthwise of the green veneer sheets, arranging a plurality of the green veneer sheets in side-by-side relation, machine sewing the side-by-side green veneer sheets having a moisture content in all areas of not less than about 30% by weight transversely of the grain of the wood

and of the length of the green veneer sheets adjacent to their end and intermediate their ends with thread which will shrink about the same amount as the veneer during subsequent drying of the veneer to produce a plurality of continuous rows of thread stitches connecting the side-by-side green veneer sheets to produce an assemblage of side-by-side green veneer sheets larger in length and width than the length and width of the panel to be produced, drying the assemblage of stitched together side-by-side green veneer sheets to reduce the moisture content of the veneer to from about 2% to 12% by weight and produce an assemblage of connected side-by-side dried veneer sheets, applying adhesive material to the assemblage of connected side-by-side dried veneer sheets, and subsequently assembling the assemblage of connected side-by-side dried veneer sheets having adhesive thereon with other dried veneer sheets into a plywood panel.

4. In the manufacture of rectangular plywood panels having length, width and thickness dimensions the steps of producing a plurality of green veneer sheets slightly longer than one of the dimensions other than the thickness dimension of a plywood panel to be produced and of random width less than the other dimension of the panel and with the grain of the wood running lengthwise of the green veneer sheets, arranging a plurality of the green veneer sheets in side-by-side relation, machine sewing the side-by-side green veneer sheets having a moisture content in all areas of not less than about 30% by weight transversely of the grain of the wood and of the length of the green veneer sheets adjacent to their end and intermediate their ends with thread which will shrink about the same amount as the veneer during subsequent drying of the veneer to produce a plurality of continuous rows of thread stitches connecting the side-by-side green veneer sheets to produce an assemblage of side-by-side green veneer sheets larger in length and width than the length and width of the panel to be produced, drying the assemblage of stitched together side-by-side green veneer sheets to reduce the moisture content of the veneer to from about 2% to 7% by weight and produce an assemblage of connected side-by-side dried veneer sheets, applying a phenolic resin adhesive material to the assemblage of connected side-by-side dried veneer sheets, and subsequently assembling the assemblage of connected side-by-side dried veneer sheets having similar adhesive thereon with other dried veneer sheets into a plywood panel.

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