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R. J. BYERS ET AL  
METHOD OF MAKING PAPER COVERED VENEER

2,442,115

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Fig. 3

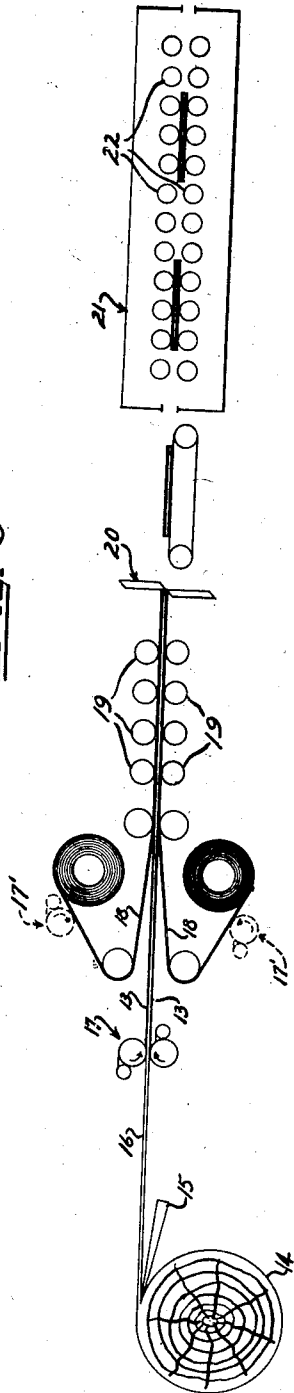


Fig. 2

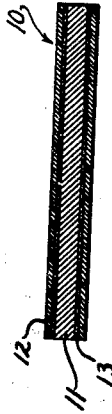
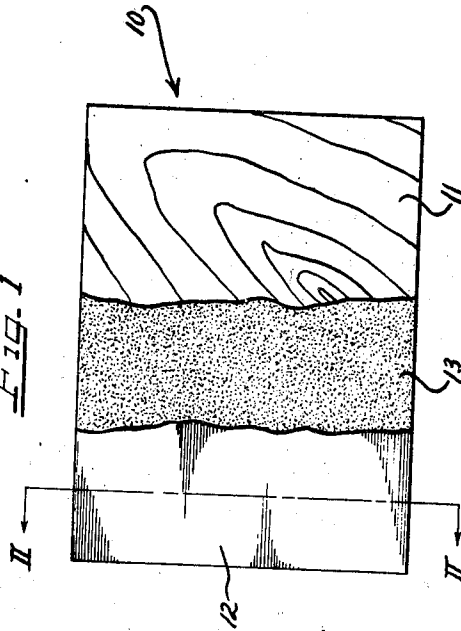


Fig. 1



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## UNITED STATES PATENT OFFICE

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## METHOD OF MAKING PAPER-COVERED VENEER

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2 Claims. (Cl. 154—132)

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In the construction of wood veneers and more particularly in veneers of the combination type, that is, products combining plies of wood, paper, cloth, or other materials, it has been found that the wood veneer sheets are usually constructed from dry wood, and when cemented or glued to covering layers of paper or other material form a veneer product in which the wood veneer is apt to split and check during the construction of the product and after the product is in use thereby making the product inferior and of questionable practical use.

In order to produce a veneer product, which will be practical and meet the requirements of the trade, the present invention has been devised to produce a combination veneer product embodying the use of green wood veneer glued or cemented between flexible plies of a different kind of material by a method involving cold and hot pressure treatments to produce an improved homogeneous product which is strong, tough and flexible and highly practical for use in the construction of containers, boxes, crates and the like.

It is an object of this invention to provide a green wood veneer and paper board product and a method of producing the same which will be inexpensive, simple and effective.

It is also an object of this invention to provide a composite veneer wherein one or more plies of green wood veneer are intimately fastened to layers of different kinds of flexible material to produce a laminated product which is strong, light, durable and flexible and which in its construction will be subject to very little shrinkage when compared to the shrinkage usually encountered in the construction of dry wood veneer products.

It is furthermore an object of this invention to provide an improved method of producing a veneer product involving the use of green wood veneer to reduce shrinkage and provide a resultant laminated product wherein the wood veneer portion is not subject to splitting and checking either during the process of production or when put to practical use.

It is furthermore an object of this invention to provide an improved composite veneer board, involving the use of green wood veneer, and adaptable as an improved substitute for composite dry wood veneer board, laminated corrugated pasteboard material, and dry wood and paper composite veneer now extensively used in the construction of containers, lightweight boxes, crates and for other purposes.

It is an important object of this invention to

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provide an improved method of making a composite board to reduce shrinkage and obviate splitting and checking, said method involving the cutting of green veneer from green logs and with the use of a slow setting water-resistant glue securing the green wood veneer between layers of unsized paper by a cold pressure process followed by a hot pressure treatment to provide a substantially thin, flexible and strong wood veneer product, which may be bent and curled and is capable of withstanding splitting, checking and tearing of the product during construction as well as when the product is put into practical use.

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

On the drawings:

Figure 1 is a top plan view of the product of this invention with successive layers partially removed to show underlying layers.

Figure 2 is a cross-sectional view of the product taken along the line II—II of Figure 1.

Figure 3 is a somewhat diagrammatic side elevational view illustrating the method of making the product of Figures 1 and 2 in accordance with this invention.

The improved composite board or veneering 10, in one of its forms shown in Figures 1 and 2, comprises an intermediate sheet of green wood veneer having cemented or glued to each of the opposite faces thereof, an outer layer or sheet 12 of a selected kind of paper or other suitable material which is secured in place by means of a layer 13 of slow setting water-resistant glue which during the process of making the composite board is absorbed by the wood veneer and paper layers to produce a thin flexible and tough laminated sheet product appropriately adapted for use in constructing containers, boxes, crates, cartons and the like.

While a composite board or veneer product consisting of three superimposed layers of material glued together by a suitable cement or glue has been defined, it is to be understood that composite laminated products consisting of more than three layers may be constructed by the use of green wood veneer in combination with layers of other material secured together by a suitable cement or glue by consecutive cold and hot compression treatments.

It has been found that in the construction of a composite or laminated veneer board formed

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out of a sheet of dry wood veneer, glued or cemented between outer sheets or layers of paper, that there is a loss by shrinkage of approximately ten percent thereby causing a considerable loss in the area of the finished product. It has also been found that in the production of composite board with the use of dry wood veneer that considerable splitting and checking occurs in the wood veneer, both during the manufacture of the composite board as well as when the same is put into practical use.

The improved method of this invention is such that the shrinkage is reduced from ten percent to about two or three percent, and that splitting and checking of the wood veneer is almost completely eliminated due to the use of green wood veneer adhesively secured, while still green, between layers of paper or the like by a cold compression treatment followed by a heat compression treatment.

The improved method of this invention consists of revolving a green wood log 14 in contact with a suitable broad knife blade or cutter 15 by which means a thin green wood veneer 16 is cut away from the log in the form of a continuous sheet. The thin green wood sheet is then fed into a standard type of adhesive applying mechanism 17 which coats both surfaces of the green veneer sheet with a coating 13, 13 of a slow setting water-resistant glue of a type which will not set until the veneer sheet is dried to about thirty percent by weight. This permits the glue to slowly saturate the green veneer sheet as the moisture is slowly dried out, thereby acting to prevent shrinkage of the veneer sheet.

After the green veneer sheet has been coated with the selected kind of slow setting adhesive, which will not become brittle when set, the adhesived green veneer sheet is fed between continuous advancing sheets 18, 18 of tough flexible absorbent paper, such as a slightly sized "kraft" paper or a selected kind of unsized paper having flexible and absorbent qualities and possessing tensile strength in all directions.

The two sheets of paper having the adhesived green wood veneer sheet disposed therebetween is next subjected to a cold pressure treatment by advancing the superimposed paper and green wood sheets between rotating pressure rolls 19. The product is thus cold pressed permitting the moisture which is pressed out of the green wood veneer sheets to be replaced by the adhesive. Attention is called to the fact that by using a green veneer adhesived sheet and cold pressing the same between layers of paper, a sheet of greater area is adapted to be produced than that which is produced by constructing a laminated board out of dry wood veneer which usually has a shrinkage of approximately ten percent while a product such as covered by this invention using a green wood veneer sheet, will have substantially no shrinkage during the cold pressure stage of the process and will ultimately have only about two or three percent shrinkage, when it is finally dried.

After the cold pressure treatment of the laminated product, constructed of green wood veneer, a composite sheet is produced which is fed into a suitable cutter 20 and is cut into laminated sheets or boards of desired size. The cold pressed laminated sheets or boards are next subjected to a hot pressure and drying treatment by feeding the sheets or boards into a drying kiln 21 in which the sheets are passed between pressing rolls 22 so that while the moisture is removed, the ad-

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hesive is permitted to be intimately pressed into and be absorbed by both the wood veneer sheet and the paper layers thereby closely coordinating the paper layers with the wood veneer sheets and at the same time preventing any marked shrinkage of the resultant product due to the glue filling and setting in the pores of the paper as well as in the wood veneer sheets. After the hot pressure treatment of the laminated sheets or boards, they are discharged from the kiln as tough flexible thin laminated boards 10 with smooth opposite surfaces and are suitably adapted for the making of boxes, cartons, containers and other articles.

It will thus be noted that the improved method hereinbefore described, includes as an essential feature the initial step of using green wood veneer instead of dry wood veneer or veneer sheets which have been cut from dry logs after they have been subjected to boiling or steam treatments to soften the same. The improved method of this invention furthermore includes a cold pressure treatment followed by a hot pressure treatment whereby shrinkage of the resultant product is minimized so that a greater quantity of the finished product is capable of being produced from a given quantity of green wood logs over the quantity adapted to be produced from the same quantity of logs if first dried before veneer sheets are cut therefrom.

It is to be understood that the improved method of producing laminated boards from green wood veneer is a continuous process starting with the initial cutting of green veneer sheets from green logs, applying a slow-setting water-resistant glue to opposite faces of the green veneer before the adhesived green veneer is cold pressed between absorbent paper and before the adhesive is permitted to set, then subjecting the product to heat and pressure during which step the adhesive is permitted to set after it has been absorbed by the paper and the wood veneer to form a resultant product which is without any apparent layers of adhesive showing between the plies of wood and paper material forming the product.

While a three-ply veneer board product has been described as being capable of production by the improved green wood veneer method, it is to be understood that laminated boards including more than three layers of materials may also be constructed from green wood veneer sheets adhesively secured between layers of different kinds of material by following the steps in the method described.

If desired, as shown in dotted lines in Figure 3, the improved veneer product may be produced by applying the slow setting adhesive with standard coating mechanism to the inner surfaces of the layers of paper or other material used to cover the green wood veneer sheet, instead of applying the adhesive to the surfaces of the green wood veneer sheet as hereinbefore described.

It will also be understood that various details of the method may be varied without departing from the principal steps of the method, and that the green veneer sheets may be used in combination with different kind and grades of paper or other suitable material to produce a tough, flexible and comparatively thin composite board or product.

Having described the improved laminated product and the method of producing the same, we claim as our invention:

1. The method of making a composite board

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without substantial shrinkage loss from the expanded green wood condition of wood veneer which comprises forming a sheet of green wood veneer containing more than 30% moisture, coating both broad faces of the green veneer with a slow-setting water-resistant glue, covering the adhesived faces of the veneer with tough, flexible absorbent paper, advancing the paper and veneer between rotating pressure rolls to subject the assembly to cold pressure treatment including pressing of moisture from the wood into the paper and pressing the adhesive into both the wood and paper to form an adhesive bond between the paper and wood before the moisture content of the wood is reduced sufficiently to cause the wood to shrink, and hot-pressing the cold-pressed assembly to dry the wood and adhesive for firmly setting the adhesive, whereby the paper will hold the wood in an expanded green wood condition even after the moisture is removed therefrom.

2. The method of making a composite board without substantial shrinkage loss from the expanded green wood condition of wood veneer, which comprises forming a sheet of green wood veneer from a green log containing more than 30% moisture, covering the faces of the veneer with a tough, flexible absorbent paper with an

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intervening layer of a slow-setting water-resistant glue therebetween, advancing the paper covered veneer between rotating pressure rolls to subject the same to cold pressure treatment including pressing of moisture from the wood into the paper and pressing the adhesive into both the wood and paper to form an adhesive bond between the paper and wood before the moisture content of the wood is reduced sufficiently to cause the wood to shrink substantially, and hot-pressing the cold-pressed assembly to dry the wood and adhesive for firmly setting the adhesive, whereby the paper will hold the wood in substantially an expanded green wood condition even after the moisture is removed therefrom.

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