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SYNTHETIC VENEER AND PROCESS OF MAKING SAME

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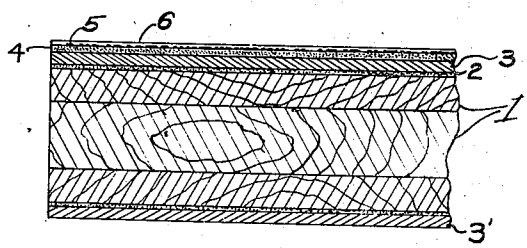


Fig. 1.

INVENTOR.
Thomas S. Reese.

BY
Louis J. McBane
ATTORNEY.

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SYNTHETIC VENEER AND PROCESS OF MAKING SAME

Thomas S. Reese, Cleveland, Ohio

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5 Claims. (Cl. 41—26)

This invention relates to the art of decorating and to synthetic veneers.

The decoration of structural materials, as found in furniture and in buildings, for example, has been effected variously, such as by painting, by plastering and applying wall paper, by natural wood veneers, by decalcomania transfers, by stenciling and in other ways all of which are comparatively expensive because they involve a slow, arts and crafts, technique for production, because they are roundabout, involving steps and materials which are essential to the technique of production but play no part in the final product, and because of the cost of the materials used. Various decorative methods and products have grown up for various uses, each having a technique and involving special materials entirely independent of and different from one another. Decorative mediums at present in use vary greatly in qualities and cost. Natural wood veneers are highly decorative and durable but inherently expensive. Wall paper is inferior in decorative quality, short-lived, but inexpensive. Painted and stenciled finishes are intermediate both in quality and cost.

It is an object of this invention to provide a novel decorative process and a novel decorative product which are useful as the decorative medium for decorating a large variety of structural materials; for furniture, for wall structures, for insulating materials, and which are amenable to efficient modern mass production technique. It is an object of this invention to provide decorative products of highest quality, equal to fine natural wood veneers in decorative quality, which are unlimited in variety of decorative effects, which are equal to or superior to natural wood veneers in durability, and which are comparatively inexpensive, reaching new low levels of cost in highly and permanently decorative structural materials, approaching the cost of wall paper more nearly than that of natural wood veneers.

Veneered wood stock for decorative purposes consists of a core stock of inexpensive wood, which may be laminated, and a veneer of expensive natural wood. The veneer of fine wood is thin, it is warped in various directions throughout its whole extent, affording an uneven billowy surface, it is sold in irregular shapes, it cracks, chips and breaks easily, often there are breaks, cracks and knot holes in it. These characteristics in the veneer make it difficult to handle in production; expert workmanship is required; the veneer must be steamed in order to apply it to the core stock; and the losses in scrap and breakage are high. In making a suite of furniture, or in decorating any large area, it is desirable to have a characteristic grain figure throughout and, if the veneer cannot all be supplied by one flitch, much difficulty and expense are incurred in trying to match the grain figure by veneer from another flitch. To make matched grain panels, great care in the selection of the materials and highly expert workmanship is required to match the grain and to apply the veneer to the core stock in matched condition. The scrap involved in making veneered wood is high and a large part of the cost originates in the cost of the fine wood veneer and in the difficulties which attend the application of the veneer to the core stock; difficulties which are rooted in the nature of the natural wood veneer. Efforts have been made to reproduce expensive woods using printing processes to create a design or figure which simulates wood. Efforts to print directly on wood have not met with success for the material is too bulky to handle efficiently and the surface is too uneven to receive good and uniform prints. It has been found possible to prime and surface the plywood core stock and to transfer a decalcomania print onto the surfacer to produce fine wood imitations. However, the nature of the transferring process and the operating conditions for wood fabricating are such as to render it impractical to mount the transfers at the wood working factory. It is impractical to transport the wood to the source of transfers, for mounting the transfers, because of transportation costs.

It is an object of this invention to provide a novel process for making synthetic veneers which overcome the difficutlies mentioned and which is low in cost and affords a decorative effect of high quality. It is an object of this invention to provide a novel process for making and the synthetic veneer of high quality, great durability, and unlimited decorative variety. It is an object of this invention to provide a novel process for making, and the novel product, veneered plywood which is inexpensive and which affords various decorative effects of high quality and great durability.

Insulating board, such as Celotex and the like, is an inexpensive material which is highly porous and not very stiff or strong. Its use has been limited to insulation chiefly because no satisfactory way to decorate it has been found heretofore. It is so porous that it absorbs large quantities of paint. Its surface is too rough

and porous for applying wall paper; except that it be plastered. It is not practical to apply transfer decorations for the surface must be coated with a surfacer and the board absorbs too much of the surfacer, making it costly and difficult to attain a satisfactory surface on which to apply a transfer decoration. Yet, insulating board provided with a suitable low cost, high quality, decoration has a large field of uses.

It is an object of this invention to provide a novel decorative medium for decorating insulating board inexpensively and affording a high quality durable finish. It is an object of this invention to provide a building material having good insulating qualities, long life, adequate strength, affording a beautiful decoration, which is inexpensive, and which may be handled and sold in commerce as a completed material ready to be fastened in place as a finished part of a structure. It is also an object of this invention to decorate hard board, such as Masonite, and other wall boards, such as that known by the trade name Sheet Rock, of hard mineral substance consolidated into sheet form; that known by the trade name Beaver Board, of fibres pressed and consolidated into sheet form; asbestos board, and asphaltum board, inexpensively, beautifully and durably.

Other objects and advantages of the present invention will appear in the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a detail view, enlarged and in cross-section, of a ply wood core stock decorated according to the practise of this invention.

According to this invention printing or lithographing are practised for creating the decorative effect. Printing and lithographing are the most efficient methods for creating beautiful designs in large quantities at low cost, with fidelity of reproduction and high quality of decorative effect.

In order to conform to the well established practises for making wood veneers and to provide the fabricator with a material that may be used and handled by the technique and equipment for handling natural wood veneer, according to this invention, a medium is provided to bear the design and to be mounted on the core stock as a natural wood veneer would be mounted.

For decorating insulating board, such as Celotex, the surface of the board is not adapted to receive a printed or lithographed design and, according to this invention, a medium is provided to bear the design and to be mounted on the insulating board.

The medium may vary according to its application or use, if desired, but in the interest of standardized production, and the attendant advantages, it is desirable that, and according to this invention, the medium may be the same for both of the mentioned applications. And, the same medium may be utilized advantageously in decorating other structural materials, such as wall board, exemplified by Masonite, Sheet Rock, Beaver Board, (trade names) asbestos board, asphaltum board, and the like.

To meet the manufacturing requirements found in the natural wood veneer industry, the medium desirably is of a weight, stiffness, body, strength, and working qualities comparable with those of natural wood veneer. The surface of insulating board is so highly porous and rough that a heavy medium having sufficient inherent strength, stiffness and body not to be modified by the nature of the surface of the board is desirable. A medium adapted for use with wood core stock and with insulating board also is useful for application to hard board and other base materials.

In order that the decorative finish may be durable and permanent, in a measure equal to or greater than natural wood veneer, for example, the medium is made heavy, dense, strong and of comparatively hard wear resistant materials which are substantially unaffected by weak reagents commonly found in home use and by weathering.

To permit easy and efficient handling in the printing and lithographing press the medium is desirably pliable and strong while affording a surface free from rough spots and bulges and otherwise smooth and uniform. The medium should be uniform in thickness.

According to this invention, fibre board, a material well-known in the trade, and consisting of rag, paper, and/or wood fibre which has been chemically treated and/or hardened and compressed into sheet form, has been found to have the foregoing qualities in adequate measure and is an ideal medium for practising this invention. In making fibre board, zinc chloride is a commonly used chemical for hardening the fibres; to attain further hardness the fibres may be subjected to an acid bath also. Such fibre board is very strong, dense and durable, being equal or superior to natural wood veneers in those respects. It has a hard, bone-like or horn-like, surface. It is pliable in sheets of a weight and thickness approximately that of wood veneer. The fibre board is made with the fibres heterogeneously arranged and has no grain, other than that imparted by calendering, so that it is strong and flexible in all directions, and is free from any tendency to chip, crack or break. The strength, the lack of grain, and the pliability of fibre board make possible calendering of the board so that it has a smooth uniform, non-porous surface well adapted to receive a decoration. The fibre board may be handled in wood working processes and with wood working equipment and tools in the same manner as natural wood veneer, except that it is handled with greater facility and less danger of breaking. The fibre board may be laminated with core stock in the same manner as natural wood veneer. The fibre board is an excellent covering medium for insulating board, and similar porous and rough materials, the fibre board having sufficient body, strength, stiffness and thickness that it is not modified by contact with the porous rough surface of the board even though it is pressed into close contact therewith, in uniting it to the board. The fibre board is of a thickness and density similar to that of a light cardboard or a heavy paper but it is modified by processing so that it is hard, tough, strong and resistant to moisture, weathering and weak reagents so that it is equally as durable as the corestock to which it is applied whether it be wood, wall board, or insulating board; and it adds strength thereto. Insulating board, which is inherently weak and lacking in strength and rigidity, is made quite strong and stiff by laminating it with fibre board so that its qualities as a structural material are considerably improved by the fibre board while its insulating qualities remain unimpaired.

Fibre board is a comparatively inexpensive material, as a substitute for natural wood veneer, and the resulting product of a wood core stock, wall board as core stock, or insulating board as

core stock, laminated with the fibre board, is correspondingly inexpensive. The fibre board is very easily handled in the laminating process, there is little or no waste, so that the cost of manufacture is low.

The fibre board is strong, smooth, pliable, and of a thickness well adapted for passing through printing or lithographing press. The surface of the fibre board does not afford good adhesion for a print nor a good background. As a background it is too flat, dull and lusterless, and it is not practical to provide the board in natural colors suitable for background color, since it is too difficult to maintain standard colors and not practical to provide the necessary variety of background colors. According to this invention, to afford depth and brilliance of background, to insure good adhesion for the print, and also to provide moisture proof protection, together with the requisite variety of background colors without changes in color standards, the surface of the fibre board is prepared to receive the print by applying a surfacer thereto. As determined by the nature of the fibre board, a primer may be applied first and a surfacer on it. Or, a primer-surfacer, a mixture of primer and surfacer compositions, may be used. Or, where the nature of the fibre board permits, a surfacer alone may be applied. The surfacer should contain pigment to afford a background color for the print; thus to serve as a ground coat. The term "surfacer" shall be used hereinafter to designate any of the foregoing alternatives. The surfacer serves to form a secure bond with the fibre board, to afford a good printing surface, and to afford a background color. The surfacer may be sanded or calendared to eliminate rough spots prior to printing on it. While the surfacer may be of conventional composition, it desirably contains a considerable proportion of pyroxylin or other cellulose ester, to impart strength to it. A suitable surfacer, containing pyroxylin, for application to fibre board, in practising this invention, is as follows:

	Pounds
R. S. 5° nitrocellulose	7.50
Blown castor oil	4.00
Tricresyl phosphate	2.50
Glycerol phthalate resin	2.00
Oxide yellow	15.00
Asbestol	8.00
Butyl acetate	10.00
Ethyl acetate	15.00
Butanol	5.00
Toluol	40.00

The surfacer should be flexible, to be unaffected by flexing of the board. The surfacer may be applied to the fibre board in any suitable manner, as by spreading, spraying, or by printing as described in my copending application Serial No. 704,323, filed December 28, 1933. The surfacer may be treated in any suitable manner, as its nature requires, to dry it or otherwise to cause its composition to reach a suitable permanent form as a hardened film, and then it may be sanded or calendared, if desired.

The decoration is formed on the surfacer by relief or intaglio printing or by lithographing, and standard equipment or methods may be employed for that purpose. Alternatively, the practise disclosed and claimed in my aforesaid pending application, which involves intaglio printing to form both the surfacer film and the figure or design, and which may be utilized for laying down a finish coat, may be employed for practising this invention.

While printing or lithographing inks well known to the art may be used in practising this invention, it is desirable to use an ink containing pyroxylin or other cellulose derivative, especially when printing on a surfacer containing pyroxylin or other cellulose derivative since the solvents in the ink act on the pyroxylin in the surfacer to cause the ink and the surfacer to merge, in part at least, and thereby to form a strong secure union. A suitable printing ink for intaglio printing, containing pyroxylin, is as follows:

	Parts by weight
R. S. ¼° nitrocellulose	2.00
Blown castor oil	2.00
Dibutylphthalate	2.00
Ester gum	3.00
Ethyl lactate	10.00
Xylol	14.00
Toluidine toner	3.25
Talc	1.50

The print may be a wood imitation, especially when building a veneered wood product. Any printable design is available in practising this invention, such as marble effects, geometric designs, pictoral and floral scenes, and modernistic effects, for example. By affording an unlimited variety of decorative effects, the uses to which the product may be put are greatly enlarged, and public tastes in decorative effects may be more readily and effectively satisfied. By affording an unlimited variety of decorative effects for insulating board that inexpensive material may be put to a large number of new uses thus greatly enlarging its market. Thus new structural materials having new, various and beautiful decorative effects and reaching new low levels of cost are made available by the practise of this invention.

The fibre board bearing bearing the surfacer and print may be mounted in that form or a finish coat may be applied over the print as a part of the veneer manufacturing process. The finish coat may be clear lacquer, varnish or synthetic resin composition and affords a surface which may be highly polished or rubbed either before or after laminating with the core stock. The finish coat protects the print in subsequent processing.

While the print may be formed on the surfacer by transferring, using the printed decalcomania transfer, if desired; the print in situ afforded by the practise of this invention, that is, a print on the material which is to be put into use in that form, has advantages. No intervening materials or operations occur in creating the print and in its application to the surface where it finds use, and the inevitable human errors which detract from the beauty and usefulness of the decoration are minimized. Thus the best possible decorative effects afforded by printing or lithographing processes are made available by the practise of this invention.

Where wood imitation effects are to be created, the naturalness of the effect may be enhanced, and in many instances it is desirable, by providing a pore effect simulating the pores of natural wood. The pore effect may be created by operating on the fibre board with suitable tools, to indent or to cut into the substance of the fibre board. The character of the effect will vary somewhat with the nature of the tool used. Embossing

plates may be used for obtaining some pore effects while punching plates, having cutting projections or serrations may be employed. The fibre board may be passed between rollers provided with an embossing or cutting surface for forming the indentations and/or serrations in the fibre board to simulate wood pores. This operation may be effected before application of the surfacer, in which case the indentations and serrations may be deep and may penetrate the board. Alternatively, the operation may be performed after application of the surfacer, care being taken not to penetrate the surfacer. Or, the operation may be performed after printing the design. In any case, the figure afforded by the serrations and/or indentations should be arranged in register with the figure of the printed design. This is essential to insure that the shade and shadow effects naturally associated with the pores of natural wood shall be reproduced in the finished decoration. Such a decoration, made according to the practise of this invention often cannot be distinguished, by the eye, from natural wood.

Various other relief effects may be made in the same or a similar manner. The fibre board may be embossed or pressed to form cloth weave effects and geometrical or other figures in relief, the print affording the shades, tones, and colors of the decoration being arranged in register therewith. Although it is not essential, it is desirable first to print the figure and then to emboss or press the relief effect into the fibre board.

The fibre board, or the like, bearing the surfacer and print, with or without the finish coat, forms an inexpensive synthetic veneer which may be stored, shipped, sold in commerce, and put to a wide variety of uses. It is well adapted for laminating with wood core stock to make a veneered wood product which is equal to or superior both in durability and decorative effect to fine wood veneers and is much less costly. The synthetic veneer of this invention may be mounted on core stock in the same manner as natural wood veneer. The absence of grain and freedom from breaking, chipping, or cracking makes the synthetic veneer more easily mounted with less cost. The quantity of the synthetic veneer of any particular figure is unlimited so that no difficulties are encountered in finishing large areas in a uniform figure of wood grain. The synthetic veneer may be cut and matched to form matched grain panels in the same manner as the natural wood veneer, but with much greater facility. Or, matched grain effects may be printed in making the synthetic veneer. Also, modern decorative effects of any kind are made readily available by the synthetic veneer.

The synthetic veneer may be mounted on the core stock in sheet form, using an adhesive to bond the two together, and by application of heat and pressure to soften the adhesive and press it into good contact with the surfaces being united throughout their whole extent, as in the case of natural wood veneer, and the product may be worked by the usual wood working equipment and technique for making various articles.

It has been found that in cutting wood products which have a coat of lacquer surfacer on the surface that the lacquer acts to dull knives rapidly. This involves considerable expense in time lost for keeping the knives in condition. The process of this invention may be adapted to eliminate this difficulty by first dieing out the synthetic veneer, bearing the decoration and having a coat of clear lacquer, to the shape desired. The core stock may be cut to shape in the usual manner and the died-out piece of veneer united to the cut core stock in the usual manner. A saving in material may be effected by this practice since the print and the lacquer coating may be limited substantially to the shape to be cut out by the dieing operation. Or, the synthetic veneer may be died-out to predetermined shapes and the core stock may be worked into fabricated shapes and the veneer applied to the exposed surfaces thereof. Inasmuch as the synthetic veneer is smooth, even, pliable, lacking in grain, it may be mounted more readily than natural wood veneers which require the use of high pressures and steam during mounting to overcome the bulges and warps of the wood and to flatten the wood out into complete contact with the core stock. By virtue of the advantages of the synthetic veneer it may be mounted successfully on fabricated products. This entails a saving in the quantity of such articles to be kept in stock for a standard article may be made in core stock form and any synthetic veneer may be selected for mounting thereon, according to demand. Also, the synthetic veneer may be died-out to form and applied as an inlay in inexpensive materials.

Likewise, the synthetic veneer of this invention may be mounted on core stock of insulating board in the same manner as on a wood core stock. The resulting product is a good building material having good insulating qualities, adequate strength and rigidity, a beautifully decorated and very durable surface, and yet it reaches new low levels in cost for decorative structural materials. The synthetic veneer adds much strength to the insulating board and protects it from moisture and mechanical abuse, making the product long lived. The synthetic veneer may be laminated with wall board in the same manner and with the same result.

In laminating veneer with such base materials it is desirable, and essential in the case of soft materials such as insulating board, to apply the veneer to both sides of the core stock to make a symmetrical structure and to avoid uneven stresses which would warp the product. According to this invention, the fibre board, unfinished, may be mounted on one side thus saving the cost of the decorating process. Or, the veneer on the unseen side may be coated with suitable lacquer or enamel to provide moisture proof protection and, if desired, to afford a conventional color. Where the synthetic veneer is used to decorate fabricated materials, it may be suitable to apply it to one surface only, the structure of the article affording adequate rigidity to resist warping tendencies.

As shown in the drawing, the core stock 1, consisting of a plurality of laminations, although it may be of one piece, if desired, is united, by adhesive 2, to the synthetic veneer 3. The synthetic veneer 3 bears the surfacer 4 and print 5 overlaid by the clear lacquer film 6. As shown in the drawing, the synthetic veneer, in decorated form, is laminated to one side of the core stock only. A lamination 3' of the fibre board is united with the opposite side of the core stock to form a symmetrical structure so that the stresses due to the laminations will be balanced and will not warp the board. Where the use of the product requires, the decorated form of the synthetic veneer may be applied to both sides of the core stock.

While the invention has been described in detail by way of illustration it is not intended so to limit the invention inasmuch as variations in the details thereof may be made by one skilled in the art without departing from the spirit and scope of the invention as defined in the following claims.

What I claim as my invention is as follows:

1. An article of manufacture comprising a sheet of base material, a synthetic veneer adhesively united to the base material, the synthetic veneer consisting of fibre board having a surfacer thereon and a print on the surfacer.

2. An article of manufacture comprising a sheet of base material, a synthetic veneer adhesively united to the base material, the synthetic veneer consisting of fibre board having a surfacer thereon, a print on the surfacer, a coat of clear finish over the print.

3. An article of manufacture comprising a sheet of base material, a synthetic veneer adhesively united to the base material, the synthetic veneer consisting of fibre board having a surfacer thereon, a print in situ on the surfacer, a coat of clear finish over the print.

4. The method of making structural materials which comprises preparing synthetic veneer by coating fibre board with a surfacer, printing a design on the surfacer, coating over the design in a clear finish, dieing out a piece of predetermined shape of the veneer, uniting the piece to a base material by an adhesive.

5. The method of making structural materials which comprises preparing synthetic veneer by coating fibre board with a surfacer, printing a design on the surfacer, coating over the design in clear finish, dieing out a piece of the veneer in predetermined shape, cutting base material to corresponding shape, uniting the piece of veneer to the cut base material by an adhesive.

THOMAS S. REESE.